Female motorsport fan engagement on social media-based brand communities

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Abstract

This study explored the engagement of female motorsport fans within F1 team brand communities on Twitter (now 'X'). Specifically, we sought to investigate why and how female fans were engaging with social media-based brand communities managed by F1 motorsports teams, and to gain better insights into the factors that encourage or deter female fan engagement within such communities. Our research methods combined online surveys and content analysis of Twitter posts. The investigation revealed that female fans seemed hesitant to engage actively within motorsports team brand accounts due to a fear of receiving negative reactions to their comments. The findings also identified differences between the participation activities of female and male fans, as well as interest in different content categories. This study recommends that motorsports team brand community managers or social media managers give greater consideration to the well-being of female fans interacting on their social media platforms and communities. They also need to be aware of gender-based differences in engagement as well as the specific issues faced by female publics.

Keywords

social media marketing, Formula 1, motorsports, Twitter, online brand community

INTRODUCTION

Many sport fans today seek continuous engagement and connection with their favourite teams beyond the consumption of live events. They do so in the form of regular engagement with brand-related content (eg informative team news, entertaining team-related posts) on social media. For this reason, it is now common for many sport team brands to use such platforms to enhance their connection with fans. 1 Some brands have even developed social media-based brand communities where both brand representatives and brand fans use the social media platform to 'share their ideas, feelings, and consumption experiences of a common brand in any format (from text to multimedia) and in an efficient manner'.2 Such social media-based brand communities can consist of large heterogeneous crowds where there is no hierarchy or formal structure, with varying forms of fan engagement.³

Fan engagement on social media-based brand communities has been examined in various sports settings, but there has been scant attention to the context of motorsport. Motorsport brands like Formula 1 (F1) have their own specificities, including a core product offering where only a limited number of fans can experience their fandom in the physical event setting. Many F1 fans rely on other types of media to live their fanship⁴ and, consequently, many have been using social media as a means to engage with their favourite motorsport team brands. From a digital marketing perspective, social media would appear to be an effective way to engage with fans in the motorsport context. For instance, Wood and Burkhalter⁵ provide

a detailed analysis of how the F1 racing brand has successfully implemented various social media engagement strategies since 2017 to engage with a new wave of younger fans all year round and not just during the racing season.

To our knowledge, however, no research to date has focused specifically on the experiences of female fan engagement within motorsport social media-based brand communities. To address this gap in the literature, this study aimed at gaining better insights into the experiences of female fans engaging with motorsport team brands on social media, with a specific focus on F1 team brands on Twitter (now known as 'X'). We particularly investigated aspects such as type and level of participation, interaction sentiment and content preferences. We also attempted to gain more insights into the factors within social media-based brand communities that had the potential to either boost or hinder female fan participation. The findings of this study could help practitioners involved in social media engagement to be better aware of the specific issues faced by female sports fans, especially in a sport that has traditionally been dominated by a male audience.

LITERATURE REVIEW The female sport fan

In the context of marketing, a sport fan can be defined as: 'an enthusiastic devotee of some particular sports consumptive object'. However, there are varying levels of devotion and interest among sports fans, and different types of consumption objects to which sports fans can be drawn.

Such objects could include the sport itself, a specific team, a specific player, or any other person having a strong association with the sport.7 According to Hirt and Clarkson,⁸ sports fans can also be segmented in terms of the core needs (such as entertainment, eustress, escape, aesthetics, self-esteem, companionship and group affiliation) that they want to satisfy when engaging with a particular sport; needs that may also vary at different stages of engagement, as well as in terms of gender. For instance, Toffoletti9 found that 'identifying as a sport fan is central to many women's senses of self and plays an important part in shaping their relationship to others'. Additionally, Sveinson and Hoeber¹⁰ found that female football fans valued the importance of enjoyment from both the love of team and the sport. Other studies have pinpointed that aesthetics may be a driving factor in attracting some women to particular sports. 11 A level of gender bias has also been identified: several studies have shown how male sports fans consider their female counterparts to be inauthentic fans. 12 Indeed, despite the significant increase in female participation in contemporary sport fandom — a domain that historically been male-dominated — Crawford and Gosling¹³ have argued that female sport fans continue to be marginalised within fan communities (as well as in academic research).

Social media-based brand communities

A brand community can be defined as a 'specialized, non-geographically bound community, based on a structured set of social relations among admirers of a brand'.¹⁴ It provides a place where consumers interact with the brand and with other consumers. Based on this definition, social media-based brand communities

can be considered as a type of brand community that is situated on a social media platform. However, it is important to recognise that 'not all online communities are brand communities and not all online brand communities are social media based'. 15 In fact, as observed by Rosenthal and Brito, 16 brand pages on social media can sometimes be developed into a loose form of a brand community with the function of providing information exchange, allowing for identity communication and cultivating shared norms. In such situations, brands could initiate conversations through different types of recurrent and timely brand posts¹⁷ on which members can comment and interact with the comments of other members on the posts, hence helping in developing connections between members. 18

Social media-based brand communities also have certain specific characteristics that make them different not only from the conventional idea of a brand community but also from other types of virtual or online brand communities not based on social media (eg forums). For instance, in their study of Jeep and Harley Davidson official fan pages on Facebook, Habibi et al. 19 found that social media-based brand communities tended to have less richness in communication, that their social structures were less hierarchical, that they could have huge membership numbers (sometimes in millions), and that members tended to use multiple formats for content creation and storytelling (ie photo/video rather than just text). Even though there may be a lack of social interaction among the followers of a social media brand page on a particular social media platform (eg X), some of them may still develop a sense of community.²⁰ This could be in relation to motivational drivers behind joining a social media brand page. Five key drivers

for community participation were identified: (a) the opportunity to develop relationships with other admirers of the brand; (b) the opportunity to engage in fun and entertaining activities with others including interactive games; (c) to be able to acquire or share information about the brand; (d) to explore ways to earn rewards or incentives from the brand; and (e) to make the most of the ease of access and convenience of social media platforms.²¹

Social media-based brand communities in a sport context

In a sport marketing context, it can be argued that the nature of the sport product (unpredictability, perishability, heavy fan involvement with simultaneous production and consumption) requires brand managers to present a consistent appearance to consumers.²² Some researchers²³ have even postulated that social media-based brand communities created on platforms like X, Facebook, Instagram and YouTube can positively influence fans' identification and relationships with their team, and expand brand value through improved game attendance, the purchase of team products and increased media consumption. This can lead to fans maintaining loyalty and a high positive attitude towards the team, and as a result, greater resistance to bad performances.²⁴

It has also been argued that professional sports clubs could use social media to increase brand value and strengthen the fans' ties with the team, ²⁵ get information about fan preferences and habits, promote sponsors²⁶ and increase the frequency and intensity of interactions with fans.²⁷ The long-term success of a social media-based brand community relies on a solid base of actively involved members, ²⁸ as the attitudes towards a brand are shown to be dependent on the social

interactions between group members.²⁹ As noted by some researchers,³⁰ the majority of members in such contexts tend to be passive readers and therefore, the key challenge for every brand community is to keep its members engaged and encourage participation.

In a study³¹ focusing on European football fans and their engagement with their club's Facebook pages, researchers found that different fans had different levels of interaction, from low-level passive contribution and labour (eg liking or commenting) to more high-levels modes of contribution, such as investing time and labour into creating posts motivated by brand love. In a Canadian football context, Gibbs et al. 32 found that teams mostly posted news and updates during live events to engage fans but it appeared that the main reason for fan engagement with the social media platform was the fans' desire to be informed about news relevant to the team (factual news and live updates). It seemed that promotions (such as discounts), interaction with other fans and opinion sharing were inferior motivations. This could explain why some sports team brands tend to favour posts that Parganas et al.³³ describes as the 'core product of the club, namely the match itself'.

Female sports fans' engagement in social media-based brand communities

Female fans seem to be under-represented in online sports discussions, and their legit-imacy as sports fans has been and continues to be questioned.^{34,35} Most studies that have investigated sports fan interactions on social media-based brand communities have seemed to focus on social media users as a single group instead of considering different demographic characteristics such as gender. However, one study

by Clavio et al.³⁶ examined the differences between male and female fans in their utilisation of the platform now known as X. Surveying fans of NFL, NBA and NHL teams, the authors found that female fans were more likely than male fans to engage with their team's X feed (eg replying to posts), and rated the informational, commercial and social functions of their team's X account as more appealing. These findings stood in contrast to previous studies that indicated that male fans dominated the social media spaces. In a different geographical context, however, researchers identified that Indonesian football female fans commonly used the platform X to keep up to date with information such as team news and match reports, but also to engage with other fans and discuss topics around their team. However, due to the male domination of these online fandoms. female fans often felt excluded from these communities and hence felt restricted in their ability to fully enjoy the benefits of such online sport brand communities. As a result, female fans turned to separate communities, created by and for female fans.³⁷

Synthesis and research questions

The advent of social media has fundamentally changed sports fandom, facilitating the emergence of social media-based brand communities. There is no agreed definition of what constitutes a 'community' online, but research in this area seems to acknowledge that some social media platforms could manifest certain aspects of an online brand community. Given the diverse nuances in how the terms online or virtual brand communities have been defined and conceptualised in the literature, the present study uses the term social media-based brand community to refer to a group formed through a social media platform characterised mainly by

information exchange around one focal brand where brand representatives (eg employees, athletes, coaches, etc) and admirers use the platform to 'share their ideas, feelings and consumption experiences of a common brand in any format (from text to multimedia) and in an efficient manner'. ³⁸ In the context of F1 racing, an example of a social media-based brand community as per this definition would be the official account of an F1 team on the X platform.

Based on the review of the extant literature on the topic, it would appear that scarce attention has been given to female sport fans' engagement within on social media-based brand communities. Some academics that have looked into this issue from a feminist perspective³⁹ have even argued that female sport fans have been marginalised, not only within their sports team fandom communities, but also in the academic research related to sport fandom. Previous research also identifies a lingering perception among male sports fans that female fans are inauthentic fans. 40 Studies that have looked specifically into the experiences of female fans within social media-based brand communities have identified feelings of exclusion, with some female sports fans even turning to separate communities created by female fans. 41 Moreover, studies on female fans in the social media context have been carried out predominantly through surveys and interviews, leading to inconsistent results, which can also be ascribed to the differences between sports sectors. Moreover, while sports teams' social media channels have been analysed in terms of the number of likes, comments and shares the content stimulates. this has been done only in a general context without distinction between gender. Lastly, it appears that many sports-related social media engagement studies have

predominantly been conducted within a European football context, although certain observations made within this context can be generalised and applied to other sports contexts.

The present study holds that different sports categories with substantial global fan bases could contribute to advancing our understanding on the topic. For instance, motorsport brands such as F1 have received scant attention in social media brand engagement studies, despite their growing popularity. In light of these gaps identified in the extant literature, the following research questions are proposed:

RQ1: How do female sport fans engage with motorsport social media-based brand communities with regards to type and level of participation, interaction sentiment and content preferences?

RQ2: What elements within motorsport social media-based brand communities have the potential either to boost or hinder female sport fan participation?

METHODOLOGY

As the first step of the research process, the content of social media posts by F1 teams on Twitter (now X) was analysed to derive common content categories. Next, we employed two methods to gather the data for quantitative analysis. First, we developed an online survey of motorsport fans that used the identified categories, and conducted the survey over three weeks from 23rd June, 2021 to 16th July, 2021 via the JISC Online Survey platform. For the second source of data, we analysed the interactions (ie replies, retweets and likes) of followers of motorsports teams' accounts on the platform. Data collection required the use of multiple libraries and application programming interfaces (APIs). Content analysis was used to sort the social media posts into appropriate categories. In addition, a machine-learning based gender inference library was used to infer the gender of fans, where it was not specified, and another library was used to infer the sentiment of the post; an area of our research interest. Figure 1 illustrates the research workflow.

Social media choice and sample selection

Sports teams are active on different social media channels, of which Facebook, Instagram and X are the most common. Although organisations tend to use multiple social media channels, the precise role of each channel differs. For instance, Instagram seems to focus on visual content rather than customer-to-business interaction, while X seems to be the preferred medium for bidirectional conversation. direct interaction with consumers and the creation of meaningful engagement. 42 Twitter (now X) was selected as the social medium for this study for the following reasons: (a) prior observations indicated that F1 teams seemed to be using the platform to post interactive tweets and to encourage conversations with fans; and (b) it provides a rich API that offers access to the content needed in this work, while Instagram (where there could be more female fans) has reduced its API functionality. The sample of F1 teams was selected based on Hookit's Social Engagement Rankings for May 2021, which identified Mercedes-AMG F1, McLaren F1 and Ferrari F1 as the top three teams across all auto racing series in terms of interaction on Twitter. 43 Those teams were also ranked in the top ten entities that generate the greatest brand value in the F1 space.44

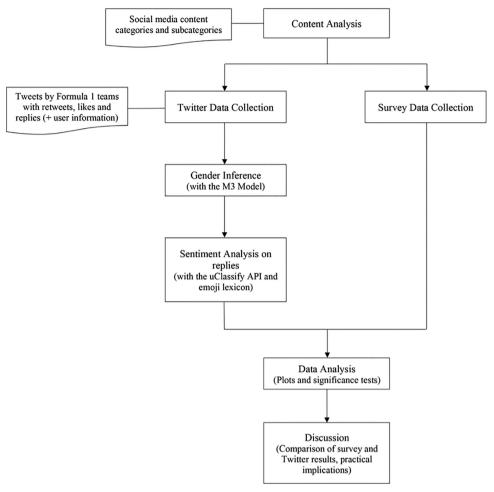


Figure I Methodology flowchart

Content analysis

This study used the directed content analysis approach⁴⁵ with initial categories developed from the literature review. Existing literature on the categorisation of general organisational social media brand posts and in the sports-specific context were reviewed to develop initial categories for the content assignment. The categories were compared and adapted in the motorsport context to derive suitable categories. An initial coding schedule was developed and tested on a sub-sample of 100 tweets from 24th May, 2021 to 14th June, 2021 to validate the categories and

discover inconsistencies in the initial coding schedule. While the resulting categories did not change and proved suitable, additional subcategories were added while developing the coding schedule, resulting in the following categorisation:

A. Emotional, creative and entertaining

- 1. Race weekend highlights
- 2. Multimedia content relating the team and the sport
- 3. Multimedia content focused on drivers
- 4. Humorous content
- 5. Wallpapers

- 6. Emotionally worded and serious content
- 7. Current event celebrations (non-race weekend related)
- B. Informational and Educational
 - 8. Behind the scenes content
 - 9. Race weekend reports
 - 10. Educational facts and answers
 - 11. News and Announcements
- C. Brand-related
 - 12. Historical facts
 - 13. Team stats
 - 14. Team values and commitments

D. Promotional

- 15. Merchandise and discounts
- 16. Partners and sponsors
- 17. Promotions of other team channels
- 18. Competitions and prize draws

E. Interactive

- 19. Personal questions and calls for interaction
- 20. Quizzes and polls
- 21. Questions for the team and drivers

F. Community related

- 22. Fan content
- 23. Fan acknowledgement

G. Live updates

- 24. Live tweets during race weekend events
- 25. Results
- H. Non-team related
 - 26. External causes and charities
 - 27. Other racing related events

Survey

A link to the online survey was posted on various social media pages (X, Reddit and Tumblr), inviting motorsport fans to complete the questionnaire. To gain insights into motorsport fans' motivation for engagement with social media channels in the questionnaire, their content preferences and engagement activity were designed in adherence to the guidelines by Williamson.⁴⁷ Closed opinion questions were measured on a five-point Likert scale, avoiding leading questions, double-barrelled questions and statements with negatives. Two open questions were used to obtain qualitative insights on the participants' opinions where categories for closed questions could not be defined or could limit the responses.

The survey included questions on demographic data (gender, age) and general interest in motorsports ('What motorsports do you actively follow?'). Then, participants were asked for their reasons for following the social media accounts of motorsports teams and their content preferences. Response categories for motivations were developed by examining similar surveys from previous studies. The motivation ('I follow my team's social media account to ...') was measured on a fivepoint Likert scale, with answers coded as 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree,5 = strongly agree. Similarly, the interestin different content categories was based on the results of the preceding content analysis and measured on a five-point Likert scale ranging from 1 = not interested at all to 5 = very interested.

Subsequent questions used to measure activity types based on the COBRA (consumers' online brand related activities) framework. Closed factual questions were asked for different consumption, contribution and creation types based on similar questionnaires from previous literature. Additionally, a closed opinion question was included to measure the level of comfort with different activity types (eg'I feel comfortable liking/favouriting posts created by official team accounts'), building on the findings of Fenton *et al.* ⁴⁸ A further distinction was made for the commenting activity type, where different

sentiment was included (eg commenting to express love and encouragement, commenting to express criticism, commenting to proclaim knowledge) based on the findings of Stavros et al. 49 about fan motivations for commenting on NBA teams' Facebook pages. An open question was included to give participants the ability to elaborate on their answers if wanted ('If disagreed, why don't you feel comfortable?'). Another open question of exploratory nature ('What do you think motorsport teams could do to create a more welcoming online environment that encourages participation?') added for additional qualitative insight on fan preferences, which was used to make recommendations for motorsport teams.

X data analysis

To measure engagement, quantitative data analysis was carried out on the collected tweets. For every tweet, the users who liked ('favourited'), retweeted or replied to the post were collected and classified into female, male, diverse and organisational users based on profile information. The total amount of reactions from female and male users on the previously defined tweet categories were analysed and compared. Due to the platform not displaying user gender information in user profiles, this approach is naturally limited to the classification accuracy of the selected gender inference model. The sentiments of 62,895 replies on the collected tweets were analysed using a sentiment classification API to calculate the sentiment score of the replies, ranging between -1 (negative sentiment) and +1 (positive sentiment), with scores around 0 indicating neutral sentiment. The sentiment score distributions and the word amount and emoji amount distributions

were then compared between female and male fans' replies.

Data collection

A combination of multiple libraries and APIs (Tweepy, Twint and Twitter API v2) was used to collect X data, as a single library could not offer all required functionality. To avoid collecting a large amount of data at once, the code to collect the data was executed every two days from 25th June, 2021 to 15th July, 2021. On every collection day, the X data from two to four days before was collected (eg code executed on the 25th of June downloads tweets from 21st and 22nd June). The time buffer was implemented due to the nature of social media, where reactions to posts can be added days after the post. While the average lifespan of a tweet seemed to be between 15 and 20 minutes,⁵⁰ the two-day buffer was chosen because replies and retweets might still be added by users who do not use the platform daily.⁵¹ Tweets were collected using the Twint library to configure a search for all tweets posted by the respective teams in the two-day timeframe, excluding retweets. Because original tweets include replies posted to other tweets, the replies were filtered out by checking for the existence of a reply to value, which indicates whether the tweet is a reply. Every tweet was then manually looked up and assigned to a category and subcategory based on the content analysis results. To determine users' interaction with motorsport racing brand teams' X accounts, replies, likes and retweets of teams' tweets were collected as well. Replies were collected using combination of Twint and Tweepy, likes were collected using Twitter API v2 (maximum of 100 likes per tweet), and retweets were collected using Tweepy.

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Gender inference

To distinguish between female and male fans' behaviour, the gender information of reactions to teams' tweets needed to be established. As no API or library provides this information about X users, we employed a two-step pipeline to infer this information. In the first step, the description and location fields of the users are extracted and manually checked for the existence of gender pronouns. These pronouns determined users' gender. In the second step of the pipeline, for users without gender pronouns, we used the M3 (multimodal, multi-attribute, multilingual) deep learning-based system developed by Wang et al.⁵² for gender inference. M3 uses four input sources: the profile picture, the username, the profile description and the user's full name to infer users' demographic attributes. The system consists of an image model to process profile images and a text model for the three textual input sources. M3's prediction values included the probability of the user profile belonging to a gender or being an organisation. If the probability of the user being a non-organisation was higher, a gender was assigned by comparing the probability of male and female. Otherwise, the user was declared an organisation. To test the performance of M3 on our data, 215 user profiles from the liking users dataset were randomly selected, and the gender heuristically determined. After removing deleted profiles and those profiles where the gender could not be determined, 202 profiles were left. The user profiles were run through the pipeline resulting in 89.6 per cent accuracy of gender identification.

Sentiment analysis

To understand the sentiment of replies to teams' tweets, every reply was run through a pipeline consisting of two steps

to calculate the sentiment. Replies with links in the text were removed because they mostly contained reaction images, from which sentiment cannot be easily inferred. In the first step, all emojis within the text were extracted and looked up in an emoji sentiment dictionary using an emoji lexicon developed by Kralj Novak et al.,53 who used 1.6 million tweets and 83 coders to annotate the emoji usage as positive, negative or neutral. The lexicon contains 970 emojis with their total number of occurrences, and the number of times it was annotated as positive, negative or neutral. The total emoii sentiment score of the text was the mean score of all emojis in the text. To analyse the sentiment of the text, the machine-learning web service uClassify was used. The sentiment classifier, developed by the official uClassify team, is trained on 2.8 million documents from three datasets: (a) an X dataset consisting of tweets; (b) Amazon product reviews; and (c) Rotten Tomatoes movie reviews, making it suitable for long and short texts. Moreover, the uClassify sentiment analyser is available in multiple languages (English, Spanish, French and Swedish) and is able to determine sentiment of common emoticons such as ':)' and ':/'. To detect the language of the text in order to input to the uClassify service, the pycld3 library was used. In addition to the four languages supported by uClassify sentiment analysis, Italian and Portuguese were added to the Spanish list to be analysed with the Spanish-based classifier. The total sentiment of a reply was calculated by calculating the mean value of text and emoji sentiment scores.

RESULTS

In total, 829 team tweets, 125,403 retweets, 71,024 replies and 76,825 likes with the corresponding user genders

were collected. A total of 792 tweets could be sorted into the predefined categories. Figure 2 shows the distribution of categories. Category A contains the highest number of tweets. This is due to the number of subcategories within this category, and the relevance of the topics. The primary aspect of this category is team/driver-related content. As the tweets were collected during the race season, a significant portion of them were related to live updates during race weekends. Community and brand-related posts are the smallest categories. Of the 792 tweets, 775 were left for analysis after removing rows that did not contain participation rates for all engagement types (due to missing like, retweet or reply counts that could not be collected).

In total, 477 responses were collected from the survey. Most respondents were female (60.8 per cent), followed by male (29.6 per cent), non-binary (8.2 per cent) and other (1.5 per cent). The most common age groups were 16–24 (60.6 per cent) and 25–34 (28.7 per cent). Ten per cent were over 35 years old. The top three followed motorsport categories were Formula 1 (95.6 per cent), MotoGP (29.4 per cent) and Formula E (25.6 per cent). Formula 1 stands out from all categories,

with almost every respondent following this sport. This facilitated the comparison with the X data gathered from F1 teams. Of 60.3 per cent male and 88.6 per cent female respondents who follow the official accounts of motorsport teams, most follow Instagram and X, as shown in Figure 3.

Type and level of participation on X

The engagement analysis on 775 tweets revealed differences in female fans' engagement types on social media channels. A statistically significant difference exists between at least two of the three participation rates of different engagement types with $\chi^2(2) = 83.063$, p < 0.001. A pairwise comparison was employed, because a significant χ^2 value indicates that a difference exists but does not inform which and how many groups differ. For the post hoc comparison, the familywise Type I error rate must be controlled so that it does not become excessive.⁵⁴ This is done by adjusting the significance values by the Bonferroni correction for multiple tests. The post hoc analysis revealed that the participation rate of retweets (Mdn = 0.2778) is significantly lower than the participation rate of replies (Mdn = 0.3448)

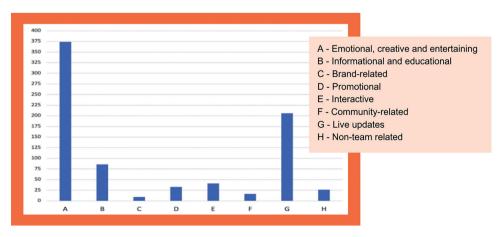


Figure 2 Categories of tweets

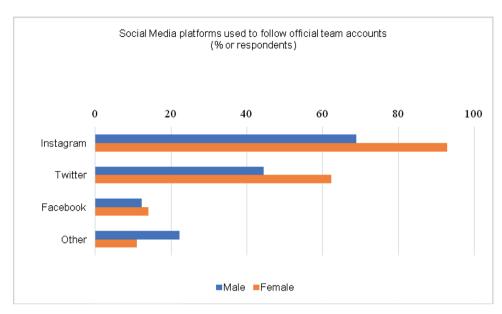


Figure 3 Social media platforms used to follow official motorsport brands

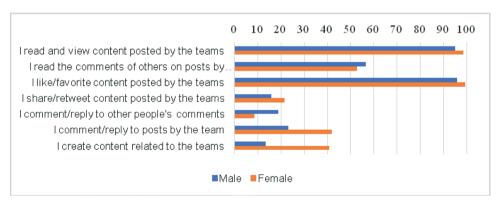


Figure 4 Engagement in social media activities (per cent of respondents)

(p < 0.001) and of likes (Mdn = 0.3103) (p < 0.001), but there is no significant difference between likes and replies. The survey results support these findings, where more than twice as many female respondents indicated they reply to tweets rather than retweeting them, and five times more female respondents indicated that they like tweets frequently. Further survey analysis suggests that while female fans feel comfortable liking tweets, the comfort is much lower for sharing and replying to tweets.

The aversion to sharing and replying to tweets can be explained by the discomfort of some fans in showing their interest in sports and their belonging to a 'fandom' to their private followers. For example, two female survey respondents answered:

Not many of my friends are interested in motorsports — would seem out of character to them if they saw me commenting.

Only like sharing with like-minded people which not all my followers are.

However, the source of discomfort most commonly indicated by female respondents was the perceived hostile social media environment, which prevents female fans from participating in discussions and replying to tweets. The general unfriendly environment, which was also a reason for some male fans to refrain from participating in fear of receiving backlash and criticism, was frequently accompanied by gender issues. The following comments were typical:

As a female fan, even though I have followed the sport for over a decade and I am quite knowledgeable, it might result in sexist remarks. I have seen this happen many times before, so even if I would want to comment publicly, I would decide against it.

I often see male fans accusing women of being 'fake fans' and questioning their knowledge of the sport, so it just isn't worth it in my opinion.

Interaction sentiment

The distribution of sentiment scores in the replies were similar, as assessed by visual inspection of the distribution shapes (see Figure 5). A Mann-Whitney

Independent-Samples Mann-Whitney U Test replying_user_gender

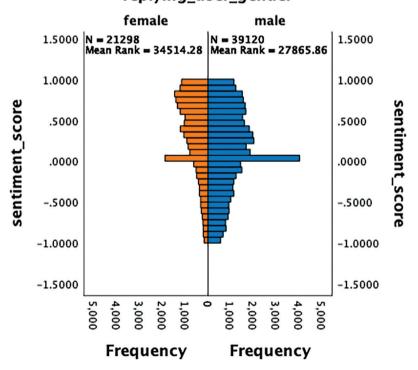


Figure 5 Mann-Whitney U test distributions, where a sentiment score of I corresponds to the most positive, 0 to neutral, and -1 to the most negative sentiment

U test was run to compare the sentiment scores of the two groups.

Test results revealed that the median sentiment score of female replies (Mdn = 0.3730) was statistically significantly higher than of male replies (Mdn =0.1318), U = 324905637, z = -44.768, p < 0.001. With the calculated effect size of r = -0.182 it can be said that there is an effect for gender and the sentiment of replies, albeit small. Furthermore, the emoji count in female replies was significantly higher (mean rank = 35334.64, Mdn = 1) than in male replies (mean rank = 27419.23, Mdn = 0), U = 307433627, z = -58.611, p < 0.001. With an effect size of r = -0.238, a small to medium effect exists. The survey indicates that on a five-point Likert scale, the mean for feeling comfortable in commenting to express encouragement and love

(M=2.98), was higher than commenting to express criticism or discuss topics (M=2.32) for female respondents. The survey results (Table 1) give possible explanations for these findings. The ratings were accommodated with explanations, such as not wanting to share criticism outside of the comfort zone, especially criticising professionals, and not wanting to contribute to the hostile environment; for example:

Social media can be a very negative environment, so I don't see the point in me voicing any negativity towards them as well.

While positive comments create a less hostile environment, female fans' hesitation to post critical replies could be a missed opportunity for teams to listen to

Table I: Interaction comfort.

	Strongly					Strongly		
	Disagree					Agree		
	1	2	3	4	5	Mean (SD)		
I feel comfortable lik								
Male	1	1	3	27	37	4.42 (0.76)		
Female	1	1	3	72	176	4.66 (0.57)		
I feel comfortable sharing/retweeting posts created by official team accounts								
Male	4	9	22	15	19	3.52 (1.20)		
Female	9	31	48	94	71	3.74 (1.10)		
I feel comfortable commenting on official team posts to express encouragement and love for the team						the team		
Male	9	12	19	15	14	3.19 (1.31)		
Female	26	73	65	59	30	2.98 (1.19)		
I feel comfortable co	mmenting on of	ficial team po	sts to ex	press critic	ism or discuss and ana	yse topics		
Male	10	17	15	16	11	3.01 (1.31)		
Female	61	98	57	26	11	2.32 (1.08)		
I feel comfortable commenting on official team posts to proclaim knowledge and expertise								
Male	14	20	16	11	8	2.70 (1.29)		
Female	61	82	63	20	8	2.19 (1.07)		

their fans' opinions and potentially find ways to improve their relationships with fans.

Content preferences

Figure 6 shows a series of boxplots for the like/retweet/reply count on the eight tweet categories. Table 2 summarises the statistical differences between the various categories. The median like count of category D ('Promotional') is the highest, while category C ('Brand-related') has the lowest median. Because the collection of likes was limited to 100 liking users per post, only a few outliers exist.

The results of the Kruskal-Wallis H test for the female like count showed a statistically significant difference between the mean ranks of the categories $\chi^2(7) = 54.511$, p < 0.001.

The boxplots for the retweet counts show many outliers for categories A ('Emotional, creative, entertaining') and G ('Live updates'). Category F ('Communityrelated') and A have the highest median, at 39, followed by category C at 30 ('Brand-related'). Mean ranks of retweet counts were significantly different for the categories, as shown by the results of the Kruskal-Wallis H test, $\chi^2(7) = 114.305$, p < 0.001. The boxplots of the reply counts unsurprisingly show a distinct category E ('Interactive') with the highest median, the largest interquartile range and the highest reply values. Similar to retweets, categories A ('Emotional, creative, entertaining') and F ('Community-related') are ranked in the top three, while categories D ('Promotional'), G ('Live updates') and H ('Non-team related') have the lowest reply counts. There is a statistically significant difference between the mean ranks of female reply counts, $\chi^2(7) = 147.314$, p < 0.001. Table 3 shows the results of post

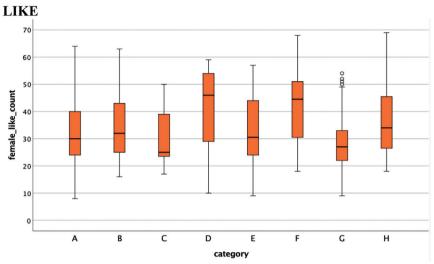
hoc comparison with adjusted significance values by the Bonferroni correction with p = 0.001 between different categories for likes/retweets/replies. Among other findings, this indicates that the like count for category G ('Live updates') is statistically significantly lower than for most other categories; the retweet count for category A ('Emotional, creative and entertaining') is significantly higher than for most other categories; and reply counts for categories A ('Emotional, creative and entertaining') and E ('Interactive') are significantly higher than most other categories. Concluding, we can say that categories A, F, E and D attract the bulk of interactions from female fans.

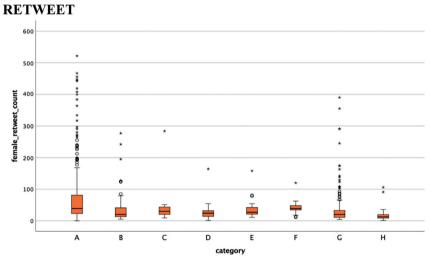
Discomfort within social media-based brand team communities

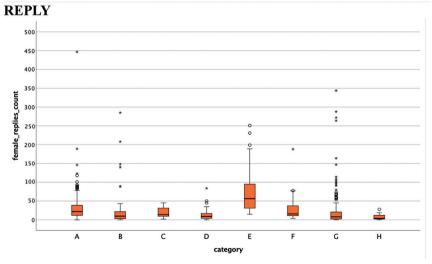
The results indicate that female fans are hesitant to engage actively on team accounts because of their fear of receiving negative reactions to their comments, as shown in Table 4. Because satisfaction from receiving positive feedback on comments leads to more active contribution, the fear of commenting prevents fans from contributing to the community.

Promoting fan-tailored experiences

Multiple survey respondents indicated their desire for a more interactive and fan-tailored experience on the social media channels, which shows the inclination towards brand communities. While interaction posts are common for the observed Formula 1 teams, and popular among fans, they are limited to similar questions ('Where are you watching from?') and polls. Explicitly asking the fans what content they would like to see and featuring







Fiure 6 Boxplots of like/retweet/reply count

Table 2: Statistical differences between different categories for likes/retweets/replies counts.

Α	В	С	D	Ε	F	G	Н	
	tr		ltr	r		ltr	tr	A (Emotional, creative and entertaining)
				r		1		B (Informational and educational)
								C (Brand-related)
				r		I		D (Promotional)
						r	r	E (Interactive)
						1	t	F (Community-related)
								G (Live updates)
								H (Non-team related)

Key: I, likes; t, retweets; r, replies

Table 3: Female like count mean ranks (with highest marked bold).

Category	n	Mean rank likes	Mean rank retweets	Mean rank replies
A (Emotional, creative and entertaining)	367	392.92	470.68	451.19
B (Informational and educational)	85	436.45	319.58	312.72
C (Brand-related)	7	352.00	400.86	386.93
D (Promotional)	33	544.86	307.14	288.50
E (Interactive)	38	406.39	383.70	639.57
F (Community-related)	16	529.13	458.13	439.06
G (Live updates)	205	311.10	299.16	293.00
H (Non-team related)	24	468.60	193.33	204.58

Table 4: Reasons for discomfort.

	Male	Female	Total
Hostile environment			
Fear of receiving criticism, backlash or hate from other fans	5	15	20
Fear of others disliking/disagreeing with the ideas			
Hostile, sexist responses from male fans due to being a female fan		12	12
Environment not welcoming enough to ask questions and discuss topics		11	- 11
Total	5	38	43
Don't feel knowledgeable enough to proclaim knowledge and analyse topics	4	18	22
Feel like opinions don't make difference / comments don't get seen	1	4	5
Usage of other platforms to discuss and analyse team / sport-related topics	2	7	9
Don't feel comfortable showing my interests in sports on my personal accounts (eg not retweeting because own followers are not interested, not commenting for fear of judgment from followers)	I	11	12
Don't like to comment and share views in general	6	12	18
Don't like to share criticism outside of the comfort zone		4	4
Don't like being negative and criticising, avoiding confrontation so as not to contribute to negativity		6	6
Don't like to criticise professionals who know better		5	5

more diverse people on Q&A sessions would help create more personalised experiences for different types of fans. Furthermore, survey respondents also reported not commenting on posts due to the lack of acknowledgment. Therefore, by responding to fan comments, teams could create more participation while also strengthening the relationship with their fans, similar to a brand community. To emphasise the community character, virtual fan events could be established, as one survey participant suggested:

Have "#FanFridays" or something where fans can participate in fun challenges and competitions. Eg challenging fans to dress up as their favourite driver, or create art, or have a crazy haircut to support the team.

DISCUSSION

This study investigated female engagement in social media based brand communities with a specific focus on F1 team brands on the social media platform now known as X. The focus on F1 motorsport was particularly interesting given the perception of it as male-dominated. Our exploratory investigation revealed that female fans seemed to be hesitant to engage actively on F1 team accounts because of their fear of receiving negative reactions to their comments. While female fans experienced a sense of satisfaction when receiving positive feedback on comments made (which could lead to more active contribution), their fear of negative reactions seemed to prevent them from contributing more to the social-media brand-based community. These findings seem to concur with previous studies observing that some social media participants engage in forms of self-censoring and speech regulation due

to the fear of harassment.⁵⁵ Furthermore, it appears that some female motorsports fans experience similar forms of unquestioned misogyny observed in prior studies around female experiences on social media platforms.⁵⁶

With the results indicating that the motorsport brand communities on X seemed to be more hostile than welcoming and supporting for female fans, this suggests that a whole category of members may be marginalised and unable to benefit fully from the sense of community. Multiple survey respondents indicated that they would like a more community-like environment to prevail in such online spaces. Moreover, female fans who are new to the sport and the team could lack the confidence to seek assistance from others and therefore not fully reap the benefits of brand communities. Therefore, motorsport teams' community managers should focus on actively moderating their comment sections (eg filtering out hateful comments and banning abusers) and actively advocate for a more inclusive mindset in their communities to create a safe environment. In the long term, this approach could reinforce female fans' sense of virtual community⁵⁷ within such environments.

The results offer unique insights into the experiences of female motorsport fans and show differences between the participation activities of female and male fans, as well as the interest in different content categories. To effectively drive female engagement on their channels and create a community around their brand, motorsport teams should focus on entertaining and emotional content, especially related to the drivers, race highlights, funny tweets (eg memes) and fan community-related content. While male fans already show higher

participation rates and community-like behaviours through interaction with other fans, female fans are more likely to feel excluded from the community. This phenomenon appears to suggest that in the context of the virtual community construct,⁵⁸ the 'membership' component is lower for female motorsports fans than for their male counterparts.

We also found that fans engage in a significant volume of creative activities away from the social media channels where teams have a presence (eg on Tumblr and Reddit). This means that teams are not part of the value creation process. By encouraging fans to contribute and create on social media channels, teams would not only be better placed to increase active participation and engagement, but could potentially also reach a wider audience through the use of fan-created content. Analysis of X data showed that the female participation rate is low, especially for retweets. At the same time, however, there is a strong demand for community-related content. By encouraging the posting of such content, teams could increase engagement, especially the retweet rate. While male fans already show interaction with other fans and community-like behaviours, teams should try to integrate female fans into the community. This idea is also supported by the data analysis in this study, which showed that promotional tweets had the highest mean rank for likes by female fans but the lowest for male fans.

On a broader level, motorsports brands must also consider the well-being of the female fans interacting on their social media platforms and communities. Community managers need to be aware of the gender-based differences in engagement as well as the specific issues faced by female publics. As this study has identified, the perceived hostility of the environment is one of the main reasons for the lower level of female engagement on motorsports social-media-based brand team communities. Community brand managers could consider identifying and helping to strengthen the voices of gender-based intragroups within their brand communities.⁵⁹

CONCLUSION

This work investigated the engagement of female fans on motorsport social media-based brand communities with a specific focus on F1 team brands on X. To our knowledge, this is the first study to explore female fan engagement within this context using a mixed methods approach that delves into the type and level of participation, interaction sentiment and social media content preferences. This study is also distinctive from previous works in the sports context (eg football) in that it examines female and male fans' engagement separately by using existing classifiers to infer the gender of social media profiles. This work is, however, subject to limitations that need to be recognised. Notably, we must acknowledge the fact that gender identity is a complex construct and cannot always be inferred accurately from pronouns, names or profile pictures. We are also aware of the potential risk of misclassification and that the study excludes non-binary and other gender identities from the consideration set. Moreover, the gender inference process could not be performed on all followers due to the large size of the follower list, which exceeds the available computing

power. Secondly, the tweets were collected during the racing season, resulting in the collation of many tweets from the Live Update category. In addition, due to time constraints, the tweets were collected across a 20-day window, in which two races occurred. Therefore, while we postulate that the results may be extrapolated for the whole year, we recommend that additional research, with a similar methodology, be carried out using a larger number of tweets, to include tweets from the off-season. We are also aware that the heavy imbalance of samples in some categories could influence some of the statistical tests. With regards to the survey administered online, we are aware that there could be some form of respondent bias that should not be ignored. For instance, most female respondents indicated that they create content on Tumblr rather than on other channels, which could be due to many Tumblr users self-selecting into the survey.

Despite these limitations, however, we believe that this study contributes to a better understanding of the experiences of a category of sport fan that has not been adequately researched in the past, especially within the context of social media based online communities. Some of the findings presented could be particularly useful to sports marketers, social media managers or community managers that wish to work on enhancing the experiences of their female audience and make their social media-based brand communities a more inclusive space.

APPENDIX

Fan engagement on motorsports social media survey

Part I: Demographic and Screening Questions

- 1. How old are you?
 - < 16
 - 16 24
 - 25 34
 - 35 − 44
 - 45 54
 - 55 64
 - > 65
- 2. What gender do you identify as?
 - Male
 - Female
 - Non-binary
 - Other
- 3. What motorsports do you actively follow? (multiple answers possible)
 - Formula 1
 - Formula E
 - MotoGP
 - NASCAR
 - WorldSBK
 - IndyCar
 - Other:

Part II: Motivations

- 1. Do you follow the official accounts of motorsport teams?
 - Yes
 - No
- 1a. What social media channels do you use to follow motorsport team accounts? (multiple answers possible)
 - Twitter
 - Instagram
 - Facebook
 - Other:
- 1b. How much do you agree with the following statement? "I follow my team's social media account to ..."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Receive up-to-date information and news about the team, drivers and events					
Consume entertainment content (photos and videos)					
See what other followers think about the team					
Follow live updates of races as they happen					
Give my opinions and input					
Interact with other followers and participate in discussions					
Receive affirmation (eg likes) for my comments					
Access discounts and promotions					
Enter prize draws and contests					
Show my love and support for the team					
Feel closer to the team					

1c. How interested are you in the following content posted by official team accounts?

	Not interested at all	Not very interested	Neutral	Somewhat interested	*
Entertaining and emotional (photos and videos, memes, wallpapers, emotionally worded posts, celebrations)					
Informational and educational (news, race debriefs and previews, technical and circuit facts, post-race thoughts)					
Brand related (team values and commitments, team stats and historical facts)					
Promotional (merchandise sales, sponsors and partners, competitions and prize draws)					
Interactive (personal experience and opinion questions, quizzes and polls, questions for the team)					
Fan community related (reposts of fan content, eg art or comments, fan acknowledgement)					
Live updates during races (live blogging, results)					
Non-team related (external causes, charities, other racing categories)					

1d. (If no selected) Why don't you follow official motorsport team accounts on social media?

PART III: ACTIVITY

- 1. Please select all statements that apply to you
 - I read and view content posted by the teams
- I read the comments of others on posts by the teams
- 2. Please select all statements that apply to you
 - I like/favourite content posted by the teams

- I comment/reply to posts by the teams
- I comment/reply to other peoples' comments on posts by the teams
- I share/retweet content posted by the teams
- 2a. How much do you agree with the following statements?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel comfortable liking posts created by official team accounts					
I feel comfortable sharing/retweeting posts created by official team accounts					
I feel comfortable commenting on official team posts to express encouragement and love for the team					
I feel comfortable commenting on official team posts to express criticism or discuss and analyse topics					
I feel comfortable commenting on official team posts to proclaim knowledge and expertise					

- i. If disagreed, why don't you feel comfortable?
- ii. What do you think motorsport teams could do to create a more welcoming online environment that encourages participation?
- 3. Do you create content related to the teams (eg photos, videos, art, edits, opinionated posts and analysis?)
 - Yes
 - No
- 3a) In what online spaces do you post your created content?
 - Twitter
 - Instagram
 - Facebook
 - Tumblr
 - Reddit
 - Other

References

- Williams, J., Chinn, S. J. and Suleiman, J. (2014) 'The Value of Twitter for Sports Fans', *Journal of Direct, Data and Digital Marketing Practice*, Vol. 16, No. 1, pp. 36–50.
- (2) Habibi, M. R., Laroche, M. and Richard, M. O. (2014) 'Brand Communities Based in Social Media: How Unique Are They? Evidence From Two Exemplary Brand

- Communities', *International Journal of Information Management*, Vol. 34, No. 2, pp. 123–132.
- (3) *Ibid*.
- (4) Chung, K. and Hwang, G. (2015) 'Antecedents and Consequences of Formula One Spectators Fanship: The Case of Inaugural Grand Prix', Journal of Physical Education and Sport Management, Vol. 6, No 6, pp. 38–46.
- (5) Wood, N.T. and Burkhalter, J. N. (2023) 'A Formula for Success: How Formula One Racing Embraced Digital and Social Media to Engage Fans', *Journal of Digital & Social Media Marketing*, Vol. 11, No. 1, pp. 43–59.
- (6) Hunt, K. A., Bristol, T. and Bashaw, R. E. (1999) 'A Conceptual Approach to Classifying Sports Fans', *Journal of Services Marketing*, Vol. 13, No. 6, pp. 439–452.
- (7) *Ibid*.
- (8) Hirt, E. R. and Clarkson, J. J. (2011) 'The Psychology of Fandom: Understanding the Etiology, Motives, and Implications of Fanship', in: Kahle L. R. and Close A. G. (eds) 'Consumer Behavior Knowledge for Effective Sports and Event Marketing', Taylor and Francis, New York, pp. 59–85.
- (9) Toffoletti, K. (2017) 'Women Sport Fans: Identification, Participation, Representation', Routledge, New York.
- (10) Sveinson, K. and Hoeber, L. (2015) 'Overlooking the Obvious: An Exploration of What It Means to Be a Sport Fan From a Female Perspective', *Leisure Studies*, Vol. 34, No. 4, pp. 405–419.
- (11) Hirt, E. R. and Clarkson, J. J. (2011) 'The Psychology of Fandom: Understanding the Etiology, Motives, and Implications of Fanship', in: Kahle L. R. and Close A. G. (eds) 'Consumer Behavior Knowledge for Effective Sports and

- Event Marketing', Taylor and Francis, New York, pp. 59–85.
- (12) Sveinson and Hoeber, ref. 10 above.
- (13) Crawford, G. and Gosling, V. K. (2004) 'The Myth of the "Puck Bunny": Female Fans and Men's Ice Hockey', *Sociology*, Vol. 38, No. 3, pp. 477–493.
- (14) Muniz, A. M. and O' Guinn, T. C. (2001) 'Brand Community', Journal of Consumer Research, Vol. 27, No. 4, pp. 412–432.
- (15) Sorensen, A. and Drennan, J. (2017) 'Understanding Value-Creating Practices in Social Media-Based Brand Communities', Service Industries Journal, Vol. 37, No. 15/16, pp. 986–1007.
- (16) Rosenthal, B. and Brito, E. P. Z. (2017) 'How Virtual Brand Community Traces May Increase Fan Engagement in Brand Pages', Business Horizons, Vol. 60, No. 3, pp. 375–384.
- (17) Tafesse, W. and Wien, A. (2017) 'A Framework for Categorizing Social Media Posts', Cogent Business & Management, Vol. 4, No. 1, pp. 1–22.
- (18) Miliopoulou, G. Z. (2021) 'Brand Communities, Fans, or Publics? How Social Media Interests and Brand Management Practices Define the Rules of Engagement', European Journal of Marketing, Vol. 55, No. 12, pp. 3129–3169.
- (19) Habibi et al. ref. 2 above.
- (20) Sook Kwon, E., Kim, E., Sung, Y. and Yun Yoo, C. (2014) 'Brand Followers: Consumer Motivation and Attitude Towards Brand Communications on Twitter', *International Journal of Advertising*, Vol. 33, No. 4, pp. 657–680.
- (21) Sung, Y., Kim, Y., Kwon, O. and Moon, J. (2010) 'An Explorative Study of Korean Consumer Participation in Virtual Brand Communities in Social Network Sites', *Journal of Global Marketing*, Vol. 23, No. 5, pp. 430–445.
- (22) Thompson, A. J. (2016) 'Building Brands and Fan Relationships Through Social Media: The Case of the Grand Slam Tennis Events', PhD thesis, Massey University.
- (23) Alonso-Dos-Santos, M., Rejón Guardia, F., Pérez Campos, C., Calabuig-Moreno, F. and Ko, Y. J. (2018) 'Engagement in Sports Virtual Brand Communities', *Journal of Business Research*, Vol. 89, pp. 273–279.
- (24) Ibid.
- (25) Williams et al., ref. 1 above.
- (26) Anagnostopoulos, C., Parganas, P., Chadwick, S. and Fenton, A. (2018) 'Branding in Pictures: Using Instagram as a Brand Management Tool in Professional Team Sport Organisations', European Sport Management Quarterly, Vol. 18, No. 4, pp. 413–438.
- (27) Machado, J. C., Martins, C. C., Ferreira, F. C., Silva, S. C. and Duarte, P. A. (2020) 'Motives to Engage With Sports Brands on Facebook and Instagram — The Case of a Portuguese

- Football Club', *International Journal of Sports Marketing and Sponsorship*, Vol. 21, No. 2, pp. 325–349.
- (28) Meek, S., Ogilvie, M., Lambert, C. and Ryan, M. M. (2019) 'Contextualising Social Capital in Online Brand Communities', *Journal of Brand Management*, Vol. 26, No. 4, pp. 426–444.
- (29) Füller, J., Matzler, K. and Hoppe, M. (2008) 'Brand Community Members as a Source of Innovation', *Journal of Product Innovation Management*, Vol. 25, No. 6, pp. 608–619.
- (30) Kamboj, S. and Rahman, Z. (2017) 'Understanding Customer Participation in Online Brand Communities: Literature Review and Future Research Agenda', Qualitative Market Research: An International Journal, Vol. 20, No. 3, pp. 306–334.
- (31) Vale, L. and Fernandes, T. (2018) 'Social Media and Sports: Driving Fan Engagement With Football Clubs on Facebook', *Journal of Strategic Marketing*, Vol. 26, No. 1, pp. 37–55.
- (32) Gibbs C., O'Reilly, N. and Brunette, M. (2014) 'Professional Team Sport and Twitter: Gratifications Sought and Obtained by Followers', *International Journal of Sport* Communication, Vol. 7, No. 2, pp. 188–213.
- (33) Parganas, P., Anagnostopoulos, C. and Chadwick, S. (2015) "You'll Never Tweet Alone": Managing Sports Brands Through Social Media', Journal of Brand Management, Vol. 22, No. 7, pp. 551–568.
- (34) Antunovic, D. and Whiteside, E. (2018)
 'Feminist Sports Media Studies: State of the Field', in: Harp, D., Loke, J. and Bachmann, I. (eds) 'Feminist Approaches to Media Theory and Research', Palgrave Macmillan, Cham, pp. 111–130.
- (35) Fenton, A., Gillooly, L. and Vasilica, C. M. (2021) 'Female Fans and Social Media: Micro-Communities and the Formation of Social Capital', European Sport Management Quarterly, Vol. 23, No. 2, pp. 370–390.
- (36) Clavio, G., Walsh, P. and Coyle P. (2013) 'The Effects of Gender on Perceptions of Team Twitter Feeds', Global Sport Business Journal, Vol. 1, No. 1, pp. 1–14.
- (37) Azizi, N. and Tambunan, S. M. G. (2017) 'Constructing an Imagined Community of Fandom and Articulating Gender Identity: A Case Study on Indonesian Female Football Fans' Participation in Social Media', in: Budianta, M., Budiman, M., Kusno, A. and Moriyama, M. (eds) 'Cultural Dynamics in a Globalized World', Routledge, London, pp. 311–316.
- (38) Habibi et al. ref. 2 above.
- (39) Sveinson and Hoeber, ref. 10 above.
- (40) Crawford and Gosling, ref. 13 above.
- (41) Azizi and Tambunan, ref. 37 above.

- (42) Jackson, D. (2015) 'Twitter vs Instagram: Which Is Best for Your Brand', available at https:// sproutsocial.com/insights/twitter-vs-instagram/ (accessed 25th May, 2021).
- (43) Hookit (2021) 'Top Athletes, Teams & Leagues Monthly Social Rankings', available at https://www.hookit.com/ranks/ (accessed 24th May, 2021).
- (44) BlackBook (2020) 'Hookit's Social Report | 2020, Part One — How Did the Series, Teams and Brands Perform?', available at https:// www.sportspromedia.com/opinion/hookitsocial-report-2020-part-one-f1-nascar-ferrarimclaren-mercedes (accessed 24th May, 2021).
- (45) Hansen, A., Cottle, S., Negrine, R. and Newbold, C. (1998) 'Mass Communication Research Methods', New York University Press, New York.
- (46) Ibid.
- (47) Williamson, K. (2018) 'Questionnaires, Individual Interviews and Focus Groups', in Williamson, K. and Johanson, G. (eds), 'Research Methods', Tilde University Press, Prahran, VIC, pp. 349–372.
- (48) Fenton et al., ref. 35 above.
- (49) Stavros, C., Meng, M. D., Westberg, K. and Farrelly, F. (2014) 'Understanding Fan Motivation for Interacting on Social Media', Sport Management Review, Vol. 17, No. 4, pp. 455–469.
- (50) Wilson, C. (2019) 'Updated: Lifespan of a Social Media Post', available at https:// mtomconsulting.com/updated-lifespan-of-asocial-media-post/ (accessed 31st July, 2021).
- (51) Butler, M. (2017) 'The Life of a Tweet: A Look at the First 24 Hours', available at https://blog

- .hubspot.com/marketing/life-of-a-tweet-ht (accessed 30th July, 2021).
- (52) Wang, Z., Hale, S., Adelani, D. I., Grabowicz, P., Hartman, T., Flöck, F. and Jurgens, D. (2019) 'Demographic Inference and Representative Population Estimates From Multilingual Social Media Data', in Proceedings of the 2019 World Wide Web Conference, San Francisco, CA, 13th–17th May.
- (53) Kralj Novak, P., Smailović, J., Sluban, B. and Mozetič, I. (2015) 'Sentiment of Emojis', Plos One, Vol. 10, No. 12, DOI: 10.1371/journal .pone.0144296.
- (54) Sheskin, D. J. (2020) 'Handbook of Parametric and Nonparametric Statistical Procedures', 5th edn, Newyork, CRC Press.
- (55) Marwick, A. E. (2021) 'Morally Motivated Networked Harassment as Normative Reinforcement', Social Media+ Society, Vol. 7, No. 2, pp. 1–13.
- (56) Barlow, C. and Awan, I. (2016) "You Need to Be Sorted out With a Knife": The Attempted Online Silencing of Women and People of Muslim Faith Within Academia', Social Media + Society, Vol. 2, No. 4, pp. 1–11.
- (57) Blanchard, A. L. (2008) 'Testing a Model of Sense of Virtual Community', Computers in Human Behavior, Vol. 24, No. 5, pp. 2107–2123.
- (58) Blanchard, A. L. and Markus, M. L. (2004) 'The Experienced Sense of a Virtual Community: Characteristics and Processes', ACM Sigmis Database, Vol. 35, No. 1, pp. 64–79.
- (59) Fournier, S. and Lee, L. (2009) 'Getting Brand Communities Right', Harvard Business Review, Vol. 87, No. 4, pp. 105–111.