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LA INFLUENCIA EN REDES SOCIALES

DURANTE LOS EVENTOS DEPORTIVOS:

"Los casos de Twitter en los Mundiales de Ciclismo en Pista de Londres (Reino Unido) 2016, y Apeldoorn (Países Bajos) 2018"

Programa de Doctorado en Administración y Dirección de Empresas

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RESUMEN

Las redes sociales han provocado un gran cambio en la manera en la que los eventos deportivos son consumidos en la actualidad, ya que consiguen generar una conversación y ser aglutinadores de un seguimiento que en muchos casos era impensable a través de los medios de comunicación tradicionales. Tanto para los grandes eventos y los deportes de masas, pero muy especialmente para los deportes minoritarios, también llamados de nicho, todas las acciones en medios digitales cobran gran importancia.

En este contexto de medios sociales en el deporte, la red social Twitter genera grandes debates y se posiciona como líder de la conversación en torno a los diferentes temas de actualidad deportivos o para el seguimiento de temas deportivos más específicos. El dinamismo de Twitter se basa en la participación individual, propiciando que diferentes usuarios conduzcan la conversación social gracias a su capacidad de influir. Por ello identificar tanto las dimensiones y variables, como los usuarios con mayor capacidad de generar influencia en esta red social se considera de gran importancia. En nuestra tesis, utilizando de manera combinada dos metodologías como el SNA (análisis de redes sociales) y el AHP (proceso de análisis jerárquico), se propone una medida de la influencia en Twitter basada en variables obtenidas de la propia plataforma de Twitter (número de tweets, número de retweets y número de seguidores) y otras calculadas a partir del SNA (outdegree, indegree y PageRank). Para componer este índice se utilizó el AHP, y se analizaron dos ediciones de un evento deportivo de un deporte de nicho: el ciclismo en Pista.

Analizando la conversación generada en torno al mundial de Londres 2016 bajo el hashtag oficial #TWC2016, y el mundial de Países Bajos de 2018 con el hashtag de la ciudad organizadora #Apeldoorn2018 , se constató que la dimensión autoridad formada por las variables número de retweets y pagerank era la que mayor ponderación obtuvo, un 62%, frente a la popularidad con un 29% y la actividad con un 8,4%. Además se consiguió identificar a los usuarios más influyentes de cada uno de los eventos, concluyendo que las cuentas con mayor influencia en Twitter eran las relacionadas con los deportistas

participantes y organización del evento. En los eventos se pudo comprobar la importancia de la participación de los organizadores en la conversación generada, ya que en el evento de Londres, donde el perfil organizador fue uno de los más influyentes fueron más de 55.000 los tweets registrados, frente a los 19.000 de Apeldoorn, donde el organizador ocupó posiciones muy inferiores en este ranking de la influencia.

Nuestra investigación adquiere gran importancia en esta área de los deportes de nicho, ya que puede resultar de gran interés para el estudio de la dependencia y origen cultural y geográfico de los deportes de nicho, y cómo posibles organizaciones pueden identificar las cuentas más influyentes que pueden redundar positivamente en la generación de menciones y beneficios para posibles patrocinadores. De hecho en nuestra tesis se refleja la creación de diferentes *clusters* geográficos en torno a los deportistas de un mismo país, y la importancia de determinados perfiles para ampliar el tamaño de estos grupos.

ABSTRACT

Social networks have caused a great change in the way sporting events are currently consumed. They generate a conversation that in many cases was unthinkable through traditional media. Both for major events and mass sports, but especially for minority sports, also called niche sports, every action in digital media are very important.

In this context of social media in sports, the social network Twitter generates great debates and positions itself as the leader of the conversation around the different current sports topics or for the monitoring of more specific sports topics. Twitter's dynamism is based on individual participation, allowing different users to lead the social conversation thanks to their ability to influence. Therefore, identifying both the dimensions and variables, as well as the users with the greatest ability to generate influence in this social network, is considered of great importance. In our thesis, using in a combined way two methodologies such as the SNA and the AHP, a measure of the influence on Twitter is proposed based on variables obtained from the Twitter platform (number of tweets, number of retweets and number of followers) and others calculated from the Social Network Analysis (outdegree, indegree and PageRank). To compose this index, the Analytical Hierarchy Process was used, and two editions of a sporting event of a niche sport were analyzed: Track cycling.

Analyzing the conversation generated around the 2016 London World Championship under the official hashtag #TWC2016, and the 2018 Netherlands World Championship with the organizing city's hashtag #Apeldoorn2018 , it was found that the authority dimension formed by the variables number of retweets and pagerank was the one that obtained the highest weight, 62%, compared to popularity with 29% and activity with 8.4%.

In addition, it was possible to identify the most influential users of each event, concluding that the accounts with the greatest influence on Twitter were those related to the participating athletes and the organization of the event. In these

events, verifying the importance of the participation of the organizers in the generated conversation, was possible, just in the London event, where the organizer profile was one of the most influential, more than 55,000 tweets were registered, compared to 19,000 of Apeldoorn, where the organizer ranked much lower in this ranking of influence.

Our research acquires great importance in this area of niche sports, since it can be of great interest for the study of the dependency and cultural and geographical origin of niche sports, and how potential organizations can identify the most influential accounts that can positively result in the generation of mentions and benefits for potential sponsors. In fact, our thesis reflects the creation of different geographical clusters around athletes from the same country, and the importance of some profiles to expand the size of these groups.

RESUM

Les xarxes socials han provocat un gran canvi en la manera com els esdeveniments esportius són consumits actualment, ja que aconsegueixen generar una conversa i ser aglutinadors d'un seguiment que en molts casos era impensable a través dels mitjans tradicionals. Tant per als grans esdeveniments i els esports de masses, però molt especialment per als esports minoritaris, també anomenats de nínxol, totes les accions en mitjans digitals cobren gran importància.

En aquest context de mitjans socials a l'esport, la xarxa social Twitter genera grans debats i es posiciona com a líder de la conversa al voltant dels diferents temes d'actualitat esportius o per al seguiment de temes esportius més específics. El dinamisme de Twitter es basa en la participació individual, i propicia que diferents usuaris condueixin la conversa social gràcies a la seva capacitat d'influir. Per això identificar tant les dimensions i les variables com els usuaris amb més capacitat de generar influència en aquesta xarxa social es considera de gran importància. A la nostra tesi, utilitzant de manera combinada dues metodologies com el SNA i l'AHP es proposa una mesura de la influència a Twitter basada en variables obtingudes de la pròpia plataforma de Twitter (nombre de tweets, nombre de retweets i nombre de seguidors) i altres calculades a partir de l'Anàlisi de Xarxes Socials (outdegree, indegree i PageRank). Per compondre aquest índex es va fer servir el AHP i es van analitzar dues edicions d'un esdeveniment esportiu d'un esport de nínxol: el ciclisme de Pista.

Analitzant la conversa generada al voltant del mundial de Londres 2016 sota el hashtag oficial #TWC2016, i el mundial de Països Baixos de 2018 amb el hashtag de la ciutat organitzadora #Apeldoorn2018 , es va constatar que la dimensió autoritat formada per les variables nombre de retweets i pagerank era la que més ponderació va obtener, amb un 62%, davant de la popularitat amb 29% i l'activitat amb el 8,4%.

A més es va aconseguir identificar els usuaris més influents de cadascun dels esdeveniments, concloent que els comptes amb més influència a Twitter eren aquells relacionats amb els esportistes participants i l'organització de l'esdeveniment. En aquests esdeveniments es va poder comprovar la importància de la participació dels organitzadors en la conversa generada, només a l'esdeveniment de Londres, on el perfil de l'organitzador va ser un dels més influents, es van registrar més de 55.000 tuits, davant dels 19.000 de Apeldoorn , on l'organitzador va ocupar un lloc molt més baix en aquest rànquing de l' influència

La nostra recerca adquireix gran importància en aquesta àrea dels esports de nínxol, ja que pot resultar de gran interès per a l'estudi de la dependència i l'origen cultural i geogràfic dels esports de nínxol, i com possibles organitzacions poden identificar els comptes més influents que poden redundar positivament en la generació de mencions i beneficis per a possibles patrocinadors. De fet, la nostra tesi reflecteix la creació de diferents clústers geogràfics al voltant d'esportistes d'un mateix país, i la importància d'alguns perfils per ampliar aquests grups.

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1 Introducción

Desde sus inicios a finales de los años 90, las plataformas de redes sociales han provocado la atracción de millones de usuarios que las han integrado entre sus prácticas diarias con un alto consumo (Boyd & Ellison, 2007; Chang & Hsiao, 2014). Podemos considerar que las redes sociales tienen su origen en los sociogramas, que se pueden definir como estructuras sociales compuestas por un conjunto de actores y lazos definidos entre ellos (Barnes, 1969). Las plataformas de redes sociales, de manera más concreta, se definen como un servicio que permite a los usuarios de Internet: (i) construir un perfil público o semipúblico dentro de un sistema delimitado, (ii) articular una lista de otros usuarios con los que compartir conexión, y (iii) ver su lista de conexiones y de las de otros dentro de ese sistema (Boyd & Ellison, 2007).

Las redes sociales como plataformas de conexión entre usuarios han permitido potenciar las relaciones entre las personas. Hay un precedente sobre la medida de la distancia entre cualquier persona del mundo previo a la era de Internet. El escritor húngaro Karinthy (1929) en su cuento titulado *"Chains"* fue el primero que planteó la idea de que entre dos personas cualesquiera se podría encontrar una cadena de cinco intermediarios como máximo, que se conocieran entre sí. Esta idea se conoció como los seis grados de separación. Más tarde el psicólogo estadounidense Milgram (1967) verificó la plausibilidad de esta idea y acuñó el término de "small world" o mundo pequeño, al asumir esos pocos grados de separación entre cualesquiera personas. Más recientemente Watts (2003) ilustró los efectos de estos grados de separación en diversas áreas sociales es para la difusión de innovaciones, los efectos de la bolsa o las epidemias (Watts, 2003; Ke, 2010; Zhang & Tu, 2009). En relación a la comunicación entre las personas, la tecnología de Internet en general, y las

plataformas de redes sociales en particular, iba a potenciar mucho más la cercanía entre los usuarios.

Precisamente con el nombre SixDegrees, en el año 1997 surgió la que se considera como la primera plataforma de red social (Boyd & Ellison, 2007; Howard, 2008), aunque fue unos años más tarde con la consolidación de MySpace surgida en 2003 y Facebook nacida en el año 2004, cuando las redes sociales tal cual las conocemos actualmente empezaron a cobrar gran importancia (Janusz, 2009; Kujath, 2011). Dos años más tarde, en 2006, fue Twitter la red social que surgía, con elementos diferenciadores e innovadores con respecto a las existentes en ese momento. Su limitación a 140 caracteres al escribir mensajes, la posibilidad de interactuar con cualquier usuario de la red o la introducción de las etiquetas, también conocidas como hashtags, ejes a través de los cuales articular una conversación entre diferentes usuarios (Cunha et al., 2011; Parselis, 2014; Simpson, 2018), fueron elementos claramente disruptivos.

Las redes sociales, integradas en lo que conocemos como web 2.0[1] (Flores et al., 2009; Prato & Villoria, 2010), se incorporaron en gran diversidad de organizaciones, instituciones y áreas de conocimiento, convirtiéndose en espacio de encuentro y de debate y llegando a todo tipo de ámbitos y personas (Túñez & Sixto, 2011). Desde su aparición se han convertido en una herramienta de gran impacto a la hora de interactuar con los ciudadanos, crear comunidades y establecer un modelo de comunicación bidireccional (Rodríguez & Ureña, 2011).

Según el último informe realizado por la plataforma de gestión de redes sociales Hootsuite a fecha de Enero 2022, 4.620 millones de personas utilizan redes sociales, es decir más del 58% de la población mundial, y el tiempo promedio de uso de las plataformas de redes roza las 2,30 horas diarias (Kemp, 2022).

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[1] El término web 2.0 es lo que se conoce como la evolución de la primera world wide web, donde los sitios web que surgen lo hacen fomentando la interacción y la colaboración de los usuarios para la creación de contenido. La web pasa de ser simple fuente de información a un entorno de trabajo colaborativo.

Las redes sociales también se han consolidado en el mundo del deporte con la interacción a través de ellas de todos los actores implicados, desde las competiciones y eventos deportivos (Abeza et al., 2014), las diferentes instituciones como organizaciones o asociaciones (Cano, 2019), además de los clubes deportivos (Cano, 2017) o deportistas (Green, 2016) y por supuesto aficionados y seguidores (Sotelo González, 2012).

En este proceso de interacción entre los diferentes actores, las redes sociales han provocado una evolución y transformación de la comunicación deportiva, de manera que hoy en día se realiza un seguimiento de las competiciones y de los partidos con los diferentes actores implicados a través de estas plataformas (Gutiérrez, 2019). En este caudal de emisión de información, y al contrario de lo que sucedía hasta la llegada de la web 2.0, los aficionados y seguidores cobran gran protagonismo al poder convertirse en emisores de información. El valor de este proceso comunicativo puede evaluarse por parámetros propios de las redes sociales, tales como el número de veces que un mensaje es marcado como favorito o reutilizado por otros usuarios, o el número de impresiones y el alcance conseguido por la publicación.

De igual manera sucede con los clubes deportivos. Su presencia en las redes sociales es percibida ya desde hace años como parte de su estrategia global de marketing, o en diferentes aspectos como: en la comunicación con sus usuarios, en la gestión de su estrategia de marca, en una mejora en la eficiencia de los recursos (Abeza et al., 2013), o como indica Pedersen (2012) equilibrando las ventajas, los beneficios y las oportunidades de las redes sociales frente a los medios tradicionales de comunicación.

Con nuestro estudio, vamos a tratar de analizar cómo los eventos deportivos se siguen a través de las redes sociales, viendo quienes son los actores más importantes en esta conversación generada en torno a los mismos. Para ello, hemos dividido nuestra tesis en los siguientes capítulos. En este primero de introducción, realizaremos una aproximación a como las redes sociales se han introducido en los eventos deportivos. A continuación, hablaremos del

aspecto vital de nuestro estudio: la influencia en redes sociales. Una vez desarrollados estos dos puntos, nos centraremos en la presentación del deporte objeto de estudio, el ciclismo en pista. Tras la exposición sobre el ciclismo en pista, será el momento de presentar los objetivos planteados en nuestra investigación para acabar este primer capítulo introductorio, con la descripción de las metodologías utilizadas. Los siguientes tres capítulos (II, III y IV) abarcan los artículos publicados en las diferentes revistas durante el periodo de realización de nuestra tesis. Los capítulos finales incluyen la discusión de resultados, las conclusiones y unas posibles futuras líneas de investigación.

1.1 La comunicación y las redes sociales en los eventos deportivos.

Las redes sociales se han ido integrando cada vez más en nuestras diferentes actividades rutinarias, especialmente en las de ocio (Gallardo-Camacho et al., 2016; Rodríguez Vázquez et al., 2017). Dentro de estas actividades de ocio donde se encuentra el consumo de televisión, Rodríguez Vázquez et al. (2017) analizan como las cadenas ante los consumos de contenidos televisivos cada vez más personalizados desarrollan estrategias para conectar con los usuarios mediante todos sus medios, incluyendo las redes sociales. De esta forma se intenta incentivar a los espectadores al seguimiento de los programas a través de los diferentes perfiles sociales y mediante el uso de determinados *hashtags*.

En el terreno de los eventos deportivos, Gallardo-Camacho et al. (2016) se centran en la relación entre los espectadores que ven los programas deportivos en televisión con los usuarios de Twitter. Obtienen conclusiones muy interesantes sobre el porcentaje de perfiles que siguen programas de contenido deportivo, y como los programas de más éxito en la red social no son los más vistos en la televisión convencional. Nos situamos por tanto en un nuevo espectro donde las redes sociales enriquecen el visionado de los eventos deportivos a través de la televisión. Además centrándonos en la importancia de la comunicación y también en el ámbito deportivo, autores como Pedersen (2012) destacan la importancia de ésta como elemento

esencial de la industria del fútbol, ya sea desde una perspectiva individual, o ya sea grupal en el caso de las entidades deportivas. La comunicación en el deporte se convierte en el eje vehicular por el que los miembros de una comunidad participan en la escenificación, consumo y organización de eventos (Wenner, 1989). En esta línea, Parente (1977) ya hablaba, a finales de los 70 del siglo pasado, del espectáculo deportivo como el ritual más participativo de la sociedad contemporánea gracias a la interdependencia generada entre los medios y el deporte. Otros autores, como Llopis (2007), hablan del espectáculo deportivo, en su caso el fútbol, como el gran ritual festivo, y Real (2013) reafirma la importancia del papel de la comunicación en el ámbito del deporte para lograr semejante impacto social.

Parece obvio, por tanto, que en este "ritual participativo", las redes sociales y la capacidad de interacción de los diferentes actores implicados en el pre, durante y post de un evento deportivo jueguen actualmente un papel vital. En este entramado de comunicación y de interacciones, es muy importante analizar las características de los diferentes perfiles sociales involucrados en el mismo (Kassing et al., 2004). La participación en esta comunidad del deporte origina que muchos perfiles se entrelacen de múltiples maneras y con distintos grados de influencia, tanto individuales como colectivas (Kassing et al., 2004).

Existen también un número muy importante de referencias que detallan las ventajas y oportunidades de tener presencia y utilizar una adecuada estrategia de redes sociales, para los eventos deportivos y sus diferentes actores (Abuin-Penas & Fontenla-Pedreira, 2020; Fernández Peña et al., 2011; García Mirón, 2011; Lopez Rodriguez, 2017; Peña, 2021). En estos estudios, se tienen muy claros diferentes beneficios y ventajas como (i) los asociados a la visibilidad del evento y sus deportistas, (ii) la capacidad de viralización de diferentes momentos y (iii) la inmediatez de la "retransmisión" y seguimiento del evento en redes sociales. Además, los seguidores de un evento pueden aportar un gran valor añadido por motivos tan obvios como el del usuario que asiste a un evento deportivo en directo y capta momentos que no son visibles en la retransmisión, o incluso momentos inadvertidos para otros espectadores.

1.1.1 Twitter y los eventos en el deporte

Twitter, la red social objeto de nuestra investigación, surgió en marzo del año 2006, Se originó en el seno de la empresa "*Odeo*" gracias a sus cuatro fundadores Jack Dorsey, Noah Glass, Biz Stone y Evan Williams, siendo utilizada dentro de esta compañía como un servicio de microblogging para sus empleados, con su conocida limitación de 140 caracteres (que años más tarde evolucionaría a 280). En el año 2007, la red consiguió múltiples reconocimientos internacionales y a finales de ese mismo año se convirtió en empresa independiente de sus fundadores. Aunque sin duda fue el año 2009 el del gran crecimiento de la corporación, ya que pasó de 5 a 71 millones de usuarios.

Como elemento diferenciador importante frente a las redes existentes en ese momento, y aunque no fue una creación propia, Twitter fue la red social precursora del uso de los hashtags, etiquetas a través del cual articular un tema o conversación. El término hashtag es una palabra compuesta por *hash* (símbolo de la almohadilla) y la palabra *tag*, cuyo significado en inglés es etiqueta. Estos hashtags, que ya habían sido utilizados en otros chats anteriores, fueron una sugerencia de algunos de los usuarios de la red en sus orígenes, especialmente el ingeniero Chris Messina, y obtuvieron gran popularidad en octubre del 2007 debido a los incendios que asolaron San Diego ese año (Salazar & Salazar, 2017).

El primer mensaje lanzado a través de esta red social fue el de uno de sus fundadores Jack Dorsey el 15 de Julio de 2006, que decía "Just setting my twtrr". Desde sus inicios quiso posicionarse, como así reza su misión: "Dando a todos el poder de generar y compartir ideas e información al instante y sin obstáculos". Como aspecto frente a otras redes se destaca también la limitación original de 140 caracteres incluyendo espacios y la posibilidad de interactuar con cualquier usuario a través de la mención del mismo.

A fecha marzo de 2022, Twitter posee más de 330 millones de usuarios activos en el mundo (datos de la propia red), y según diferentes investigaciones recientes las ventajas más importantes de la misma frente a otras redes abarcan aspectos como la capacidad de divulgación de la información, la posibilidad del seguimiento de las palabras o las reflexiones sobre tendencias en redes (Suau-Gomila, 2020; Vázquez-Cano & Sevillano, 2019).

Desde sus inicios, Twitter se fue convirtiendo en una de las redes sociales con mayor impacto. Así lo constatan investigaciones de años próximos a su inicio, como la de Rodríguez & Ureña (2011), que hablaban de una red con grandes funcionalidades y la de mayor relevancia entre determinados sectores, como por ejemplo la clase periodística y política. Un año más tarde, Romero & Marín (2012) referenciaban el gran impacto en la sociedad y las numerosas posibilidades de las redes sociales en general y de Twitter en particular en los programas deportivos de radio. Durante años posteriores, otras investigaciones continuaban en la línea del gran impacto de Twitter en ámbitos como la política (Alonso-Muñoz & Casero-Ripollés, 2018; Barberá & Rivero, 2014; Campos-Domínguez, 2017; García et al., 2015; López-García, 2016) o el deporte (Dias, 2018; Ramos et al., 2019).

Asimismo, desde que surgió, Twitter se convirtió en un cauce para obtener presencia en medios más tradicionales y ser un generador de noticias. Debido a su gran repercusión, los medios prestan mucha atención a lo que se dice en Twitter, produciéndose un efecto altavoz o rebote. Este efecto altavoz puede producirse de dos maneras, bien "retuiteando" información relevante ya lanzada por otros usuarios, o bien generando noticias propias con base en la información emanada desde otras cuentas. Al ser Twitter una plataforma con una gran presencia de informadores, se podía también fomentar el diálogo entre periodistas y otros grupos de relevancia como políticos, directores de comunicación o jefes de prensa de instituciones, algo fundamental en su trabajo diario (Rodríguez & Ureña, 2011).

Twitter, además de favorecer el contacto y el diálogo entre usuarios, ha mostrado un componente informativo que le confiere un gran valor en términos estratégicos. Para muchos usuarios, Twitter se ha convertido en un medio a través del cual estar informados de la actualidad, tanto a través de las publicaciones de periodistas (Porto López, 2020) como de cualquier usuario que se convierte en narrador de hechos de los que está siendo testigo a través de Twitter (Cavalcanti & De Oliveira, 2019).

Esta función de Twitter como herramienta comunicativa ya estaba muy presente en sus orígenes. De hecho, uno de sus fundadores, Dorsey, que poco tiempo después fue su primer CEO, ya decía que más que una red social, Twitter era una herramienta de comunicación (Gutiérrez-Rubí, 2012).

Volviendo al ámbito deportivo y a la actualidad, investigaciones específicas recientes analizan la importancia de Twitter en la violencia en el fútbol (Figueras, 2021), el auge del deporte femenino (Cárdenas, 2021) o la manera de actuar en los eventos deportivos de un político en particular en esta red social (Watson, 2021). Si hablamos de actividad en Twitter durante los eventos deportivos, datos recogidos por Linares (2021) para Kantar refieren en más de 1.800.000 los tweets lanzados en los últimos Juegos Olímpicos (JJOO) de Tokio 2021, e investigaciones como las de Boehmer (2015) destacan que el uso de Twitter no disminuye el consumo de retransmisiones deportivas sino que ambas variables se correlacionan positivamente. En esta línea, la plataforma Neuro Insight.com, especializada en la realización de estudios de mercado, publicó una investigación que revelaba cómo Twitter había cambiado la experiencia de visualización en directo para los aficionados a los deportes y cómo afectaba a la publicidad de las marcas, al mismo tiempo que los usuarios de Twitter eran más receptivos al contenido que usuarios de otras plataforma sociales (Pollack, 2018). Este estudio constató que los eventos deportivos seguidos a través de Twitter al mismo tiempo que en televisión, conseguían mayores niveles de interacción y recuerdo que cuando solo son seguidos a través de televisión.

En esta simbiosis de Twitter y los eventos deportivos, dos de los objetivos de esta red social para los próximos años (Saez, 2021) son los siguientes, según indica su CEO para España Javier Pagán:

(i) convertirse en estadio de las próximas competiciones deportivas, es decir, ser la red social de referencia de los aficionados deportivos;

(ii) apostar por modelos de atribución en el terreno de las acciones de respuesta directa, es decir, ser capaz de analizar cómo Twitter influye en la conversión de manera positiva, y en qué grado.

Estos dos objetivos de Twitter se pueden considerar de gran importancia para los llamados deportes de nicho. Con este nombre se designa aquellos deportes que tienen una cobertura mediática muy inferior a la que tradicionalmente se conocen como sus contrarios, los deportes de masas. Nuestra tesis gira en torno a uno de estos deportes, donde empiezan a aparecer investigaciones sobre los mismos y sus oportunidades en redes sociales (G. Greenhalgh et al., 2021; Sanahuja-Peris et al., 2021).

Como conclusión y tras las investigaciones e informes vistos, es importante destacar el papel predominante que las redes sociales, y especialmente Twitter, están cobrando en el mundo del deporte en general y en los eventos deportivos en particular. Por tanto, conocer mejor a los diferentes perfiles de usuarios de redes sociales resultará muy importante para entender las dinámicas de comunicación en red y las influencias que se dan entre los usuarios. Este será un aspecto al que nuestra tesis intentará aportar parámetros para un mejor entendimiento.

1.2 La influencia en redes sociales.

El análisis de la influencia en redes sociales se ha convertido en los últimos años en un tema de gran interés (Peng et al., 2017). Este tipo de información aporta una serie de ventajas muy importantes: (i) sociológicamente sirve para entender los comportamientos sociales de las personas, (ii) es útil para proporcionar una base en la toma de decisiones públicas y entender la

orientación de la opinión pública, y (iii) en términos de país, es válido para entender el progreso o la estabilidad económica (Peng et al., 2018).

Como comentan Peng et al. (2018) existen ya artículos (Sang & Xu, 2013; Tang et al., 2009), libros (Rabade et al., 2014), encuestas (Batrinca & Treleaven, 2015) y tutoriales (Sun & Tang, 2011) (Sun & Tang, 2011)que relacionan y hablan de este análisis de la influencia en redes sociales en diversos ámbitos. Sin embargo, con el incremento de las diferentes redes tanto en número como en volumen, surgen numerosos desafíos al querer analizar la influencia para un usuario determinado (Peng et al., 2017).

Para entender el concepto de influencia en redes sociales vemos la definición que sobre la misma hacen Peng et al. (2018) quienes indican que la influencia es una relación que se establece entre dos entidades para una acción específica. En particular, una entidad influye en la otra para realizar una acción. Por lo general, la primera entidad se llama el influenciador y la segunda entidad se llama el influenciado. La influencia puede entenderse en diferentes términos de certidumbre, y en esta línea otros autores como Cercel & Trausan-Matu (2014) definen la influencia como sigue: Dados dos individuos u, v en una red social, u ejerce la potencia sobre v, es decir, u tiene el efecto de cambiar la opinión de v de forma directa o de manera indirecta.

Por tanto, en esta acepción de la influencia distinguimos dos perfiles, el influenciado, individuo que modifica su comportamiento en base a lo prescrito o recomendado por el otro perfil, el influenciador, o también llamado influencer.

Actualmente el término influencer implica la evolución del líder de opinión aplicado al medio online (Gómez Nieto, 2018). En los últimos años con la consolidación y el auge de las redes sociales, el término influencer ha experimentado un interés creciente a muchos niveles y por tanto se ha convertido en objeto de análisis y discusión. De hecho según el último Estudio Anual de Redes Sociales (IAB Spain, 2022) un 53% de usuarios declara seguir a influencers en redes sociales.

Otro ejemplo de la importancia e interés creciente del término influencer es la Figura 1.1, que muestra la evolución de las búsquedas en internet sobre esta palabra, a través de Google Trends, una herramienta de google que permite analizar el interés que genera un término de búsqueda a lo largo de un horizonte temporal.

Figura 1.1 Captura de pantalla de la herramienta Google Trends a las 17:50 h del 11 de Febrero 2022

Con este crecimiento del interés generado, la medición de la influencia y la consideración de un usuario como influyente se ha convertido en un tema de creciente importancia. El papel del influencer en diferentes ámbitos ya ha sido objeto de estudio en los últimos años (Castelló Martínez & Del Pino Romero, 2015; Morales, 2017; Sanz-Marcos et al., 2019), incluso con investigaciones donde se analizan malas praxis y actitudes poco claras (Gomez, 2018; Mastacan, 2011). Sin embargo, vemos que identificar a un usuario como influyente resulta complicado, ya que estos estudios hablan de su papel en las campañas, pero no se centran en la identificación de estos usuarios influyentes.

En los últimos años han aparecido también diferentes herramientas que decían evaluar la influencia en base a una serie de parámetros. Algunas de estas herramientas, como *Klout,* fueron incluso objeto de análisis e investigaciones (Edwards et al., 2013; Rao et al., 2015). No obstante, esta herramienta desapareció finalmente el año 2018. No faltaron análisis que hablaban de la capacidad de manipulación que se podía realizar sobre este índice (Savvopoulos et al., 2018).

Otra de las herramientas utilizadas para el análisis de la influencia en redes sociales ha sido el llamado Análisis de Redes Sociales, o también conocido por su acrónimo en inglés SNA (Social Network Analysis). Esta metodología se centra en modelos matemáticos y en la teoría de grafos (Scott, 2017). En los grafos hay dos elementos principales: los nodos que son los usuarios de las redes, y las aristas, que son las conexiones que se establecen entre los diferentes usuarios. Partiendo de estos modelos, los análisis se centraban en identificar los nodos con mayores conexiones y, por tanto, con mayores probabilidades de influir en el comportamiento del resto de nodos.

Tras las diferentes posibilidades para analizar la influencia, el dilema se abría sobre la definición de qué es ser una persona influyente, un influencer. Bakshy et al. (2011), consideran como influencer a los individuos que impactan de gran manera en la difusión de la información, por lo que a diferentes niveles de difusión y de maneras de compartir contenido, hablaríamos, por tanto, de diferentes tipos de influencia (Lara-Navarra et al., 2018). Estos mismos autores consideran que dado que cada red social presenta variables y normas de compartir contenidos diferentes, a la hora de medir la influencia las variables a considerar en cada una de ellas deberían ser diferentes, generándose una ambigüedad.

Considerando el caso concreto de Twitter, estudios como los de Cha et al. (2010), apuntan, para medir la influencia, variables específicas de esta red, como el número de seguidores, (aquellos perfiles que están suscritos a las publicaciones de una cuenta) los retweets (acción específica de Twitter que consiste en repostear el contenido lanzado por una cuenta. Es indicativo de

que se está de acuerdo con el mensaje lanzado) o las menciones (cada vez que un usuario es nombrado en la red). Otros como los de Alonso et al. (2017) consideran los favoritos o likes (acción que consiste en marcar un tweet como interesante o coincidente con las opiniones del que lo publica) como elementos clave. Con toda la información anterior, autores ya mencionados como Lara-Navarra, et al. (2018) plantearon incluso un proyecto para detectar tendencias y referentes en el área de la influencia. Bajo el nombre de Propuesta *Social Engagement* este proyecto quería convertirse en una reflexión sobre la creación de algoritmos para la medición de la influencia. Esta propuesta junto con lo visto anteriormente nos sitúa en un contexto de discusión donde no terminan de vislumbrarse de manera clara las variables a considerar para la medición de la influencia.

Vinculándolo con nuestra investigación en el área del deporte, surgen estudios sobre la manera en la que se menciona a las marcas y sus expectativas en el patrocinio (Yang et al., 2019), los efectos en el patrocinio de la actividad de los seguidores (Neal, 2017) o incluso analizando el impacto de los influencers y patrocinadores en la aceptación de los productos por parte de los consumidores (Wang & Lee, 2021).

Por todo ello, nuestro análisis tiene por objetivo poner algo de luz en este contexto, aunque sea en una red social determinada como es Twitter, y en un evento deportivo de nicho, como son los mundiales de ciclismo de pista.

1.3 El Ciclismo en Pista y los Campeonatos del Mundo.

1.3.1 Introducción

El ciclismo en pista es una de las siete modalidades de ciclismo que existen. Las otras son (i) el de montaña, (ii) ciclocrós, (iii) trial, (iv) ciclismo en sala, (v) bmx, y el más conocido, (vi) el de ruta o también llamado de carretera. Las características más diferenciadoras del ciclismo en pista son principalmente las de disputarse en un velódromo, y obviamente con bicicletas con unas propiedades distintas. Las bicicletas de pista son de piñón fijo, es decir con

pedales siempre en movimiento y con una única marcha. Además, no tienen frenos, de modo que para frenar hay que reducir paulatinamente la intensidad del pedaleo. En la imagen 1.3 podemos ver la bicicleta de pista de la marca Look, modelo T20, con la que el equipo olímpico francés disputó los pasados JJOO de Tokio 2021.

Figura 1.2 Bicicleta de pista modelo T20 de la marca Look. Imagen de Ciclismoafondo.es obtenida el 1 de mayo de 2022.

Los velódromos suelen tener una longitud entre los 166 y los 330 metros, siendo los más habituales los de 250 metros. Los de esta longitud son, además, los considerados para las competiciones oficiales actuales.

La primera prueba de ciclismo en pista fueron los Seis días de Londres celebrados en 1878. Esta prueba fue la antesala de los "modernos" London Six Days que empezaron a disputarse desde 1896, y donde los participantes rodaban durante seis días cubriendo distancias superiores a los 3.000 kilómetros, con breves paradas para descansos y masajes mínimos (Bacon, 2014).

El ciclismo en pista ha estado presente en todas las ediciones de los Juegos Olímpicos modernos celebrados desde 1896 en Atenas. Aunque ya tres años antes, en 1893, la Asociación Ciclista Internacional, predecesora de la UCI

(Unión Ciclista Internacional)[2] celebró los primeros campeonatos del mundo de Ciclismo en Pista en Chicago. Si exceptuamos el periodo de entreguerras de la primera y segunda guerra mundial, los Mundiales de Ciclismo en pista se han venido celebrando siempre.

Los Campeonatos Mundiales de Ciclismo en Pista, (también conocidos coloquialmente como los Mundiales de Pista) son la competición más importante a nivel mundial de este deporte. El ciclismo en pista, aún a pesar de su antigüedad, su tradición y espectacularidad, no consigue en muchos países los datos de repercusión mediática y audiencia que sí obtiene en los países con mayor tradición como Gran Bretaña, Paises Bajos, Francia o Bélgica en Europa y Colombia en Latinoamérica.

En el Ciclismo en Pista, se disputan diferentes pruebas que varían en función del recorrido, las reglas y el nº de participantes en cada una de las mismas. Así en base a estas características todas las pruebas se agrupan en dos principales, las pruebas de velocidad, donde la explosividad de los corredores y las velocidades que se alcanzan son las propiedades principales, y las pruebas de fondo, donde la distancia y las habilidades de los participantes son muy diferentes a las de las pruebas de velocidad.

Dentro de las pruebas de velocidad, distinguimos la velocidad individual y por equipos, el kilómetro contrarreloj y el keirin (donde se circula tras una moto a velocidad constante durante las primeras vueltas). Dentro de las pruebas de fondo, encontramos la persecución individual y por equipos, el scratch (carrera donde el ganador es el primer corredor que llega a meta tras superar una distancia determinada), la eliminación (prueba en la que cada dos

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[2] La entidad máxima que regula todas las competiciones de ciclismo en pista, al igual que las de las otras disciplinas oficiales como la carretera o el mountain bike, es la UCI, Unión Ciclista Internacional (Union Cycliste Internationale en francés, lengua oficial). La UCI nació en 1900 con la integración originaria de las federaciones nacionales de Bélgica, EEUU, Francia, Italia y Suiza, y en la actualidad cuenta con la asociación de más de 185 federaciones. La sede se ubica en la localidad suiza de Aigle.

vueltas se va eliminando el corredor que atraviesa la meta en última posición) , la puntuación (prueba combinada que incluye puntos para los tres corredores que pasan la línea de meta en primeras posiciones cada diez vueltas y que otorga además un número de puntos por cada vuelta ganada al total del pelotón; el ganador es el corredor con más puntos acumulados) o la madison (carrera de relevos con una dinámica similar a la de puntuación individual) que se disputa por parejas. Según los campeonatos, la inclusión de todas estas pruebas varía, siendo cambiante en competiciones como los JJOO, o con alguna variación en los mundiales, las copas del mundo, los campeonatos continentales o los nacionales de cada país.

Las pruebas femeninas se incluyeron en el calendario de los JJOO desde la edición de Seúl en el año 1988, aunque en los Mundiales ya lo hacían desde París en 1958.

A nivel de medallero y centrándonos en los Campeonatos del Mundo, el país mas laureado es Alemania (si se considera la unión de las antiguas RDA y la RFA), apareciendo a continuación Francia, Países Bajos, Gran Bretaña y Australia. En los mundiales de pista, las pruebas que se disputan (a fecha 2021) son once tanto para mujeres como para hombres, aunque en los campeonatos analizados en nuestra investigación eran diez, ya que la carrera de eliminación ha sido incluida desde la edición de 2021 en Roubaix (Francia). En la Tabla 1.1 se muestra el medallero oficial de las 25 primeras posiciones, tras la disputa de esa última edición de Roubaix en octubre de 2021.

Tabla 1.1 Los 25 paises con más medallas conseguidas en el total de los Campeonatos del Mundo de Ciclismo en Pista disputados hasta la edición 2021 incluida.

Clasificación	País	Oro	Plata	Bronce	Total
1	Alemania	145	135	150	430
2	Francia	142	119	131	392
3	Reino Unido	108	85	68	261
4	Paises Bajos	109	98	89	296
5	Australia	86	93	75	254

6	Italia	85	91	104	280
7	Rusia	82	74	68	224
8	EEUU	50	44	48	142
9	Bélgica	49	54	52	155
10	Suiza	33	34	36	103
11	Dinamarca	31	40	35	106
12	España	19	21	14	54
13	República Checa	17	14	25	56
14	Bielorrusia	14	2	7	23
15	Nueva Zelanda	13	22	19	54
16	Japón	13	12	14	39
17	Polonia	9	7	9	25
18	Colombia	7	5	0	12
19	Canadá	6	19	16	41
20	Hong Kong	5	2	4	11
21	China	4	14	9	27
22	Austria	4	8	11	23
23	Ucrania	4	7	3	14
24	Cuba	4	4	5	13
25	Lituania	2	8	10	20

Fuente: Elaboración propia.

Si nos centramos en deportistas individuales (Tabla 1.2), el británico Chris Hoy es el ciclista con más preseas conseguidas en campeonatos mundiales, aunque el francés Arnauld Tournant acumula más medallas de oro.

Tabla 1.2 Ranking de medallistas masculinos en Campeonatos del Mundo de Ciclismo en Pista, incluye 2021

Posición	Nombre	Pais	Oro	Plata	Bronce	Total
1	Arnaud Tournant	Francia	14	3	2	19
2	Chris Hoy	Reino Unido	11	6	8	25
3	Florian Rousseau	Francia	10	2	4	16
4	Urs Freuler	Suiza	10	0	5	15
5	Kōichi Nakano	Japón	10	0	0	10
6	Cameron Meyer	Australia	9	4	2	15
7	Grégory Baugé	Francia	9	4	1	14
8	Harrie Lavreysen	Paises Bajos	9	2	0	11
9	Daniel Morelon	Francia	8	3	5	16
10	Jeffrey Hoogland	Paises Bajos	6	6	0	12

Fuente: Elaboración propia.

Al hablar de las féminas (Tabla 1.3), es la australiana Anna Meares la que obtuvo más metales en los mundiales que disputó, aunque la alemana Kristine Vogel también consiguió el mismo número de metales de oro, once.

Tabla 1.3 Ranking de medallistas femeninas en Campeonatos del Mundo de Ciclismo en Pista, incluida la edición de 2021

Posición	Nombre	Pais	Oro	Plata	Bronce	Total
1	Anna Meares	Australia	11	10	6	27
2	Kristina Vogel	Alemania	11	1	4	14
3	Félicia Ballanger	Francia	10	1	0	11
4	Victoria Pendleton	Reino Unido	9	5	2	16
5	Kirsten Wild	Paises Bajos	9	4	5	18
6	Sarah Hammer	EEUU	8	5	2	15
7	Natallia Tsylinskaya	Bielorrusia	8	1	1	10
8	Laura Kenny	Reino Unido	7	7	1	15
9	Chloé Dygert	EEUU	7	0	0	7
10	Olga Slyusareva	Rusia	6	6	6	18

Fuente: Elaboración propia.

1.3.2 Los Mundiales de Londres 2016

El velódromo de Lee Valley Velopark acogió del 2 al 6 de marzo los Campeonatos del Mundo de ciclismo en pista del año 2016 (Imagen 1.4). Se trata de un velódromo que se construyó unos años antes para la celebración de los JJOO de Londres del año 2012, y que por primera vez acogía unos mundiales de pista.

Figura 1.3 Velódromo Lee Valley Velopark

Fuente: Elaboración propia

Los Campeonatos fueron un triunfo para el país anfitrión, el Reino Unido, que conquistó nueve medallas, de las cuales cinco fueron de oro. La local Laura Trott consiguió dos oros (scratch y ómnium) y un bronce (persecución por equipos) siendo la deportista con mayor numero de preseas ganadas en la competición junto al alemán Joaquim Eilers que consiguió las mismas medallas que la británica, pero en pruebas diferentes. (kilómetro contrarreloj, keirin y velocidad por equipos).

Los Mundiales se cerraron con un espectacular triunfo de la pareja Wiggins-Cavendish en la prueba de madison (prueba con la que se finalizan habitualmente todas las grandes competiciones). Esta carrera suponía además la despedida de los campeonatos de Bradley Wiggins, el ciclista más laureado de la historia de los JJOO con ocho medallas (siete en pista y una en

carretera), amén de doce medallas en Mundiales, siendo este oro su última presea en unos Campeonatos del Mundo.

En los Mundiales de Londres 2016, participaron 390 deportistas de 45 países diferentes, siendo la Federación Rusa, con 29 ciclistas, el país que mayor participación tuvo. Alemania con 8 medallas y Australia con 5, fueron los dos países que tras el organizador más veces subieron al podio.

1.3.3 Los Mundiales de Apeldoorn 2018

El miércoles 28 de febrero de 2018 empezaba, con la celebración de las primeras clasificatorias de la prueba de persecución por equipos, la edición número 115 de los Campeonatos del mundo de ciclismo en pista. Un total de 370 atletas provenientes de cuarentas países iban a disputar veinte pruebas, diez femeninas y diez masculinas, hasta el domingo cuatro de marzo.

La competición se celebró en el velódromo Omnisport de la ciudad neerlandesa de Apeldoorn (Imagen 1.5), que ya en el 2011 había acogido también la prueba, aunque con una superficie diferente, ya que a causa de la humedad la pista de madera fue cambiada totalmente en el año 2015. En el mismo velódromo, se celebraron también los Campeonatos de Europa del año 2011 y 2013.

Figura 1.4 Acceso al velódromo Omnisport

Fuente: Elaboración propia

El país que mayor número de medallas obtuvo fue el organizador, Países Bajos, con un total de quince metales, de los cuales cinco fueron de oro. Cuatro de estas preseas fueron obtenidas por la deportista local Kirsten Wild que fue sin duda la gran triunfadora de los campeonatos, al conseguir tres oros de manera individual (scratch, puntuación y ómnium) y una plata en la prueba de madison junto a su compañera Amy Pieters. La otra gran triunfadora de estos mundiales fue la velocista alemana Kristine Vogel, que, con dos títulos mundiales, iba a igualar a la australiana Anna Meares como la mujer con más títulos mundiales obtenidos, cifra que desgraciadamente no podría superar al sufrir un accidente meses más tarde entrenando, que la obligaría a dejar la competición tras quedar parapléjica.

Otros ciclistas destacados de la competición fueron el también local Jeffrey Hogland que al igual que la estadounidense Chloe Dygert conquistaron dos títulos mundiales.

1.4 Objetivos de la investigación

Sintetizando lo expuesto anteriormente, cabe destacar las siguientes ideas:

- En primer lugar, la gran importancia adquirida por las plataformas de redes sociales en nuestra sociedad actual en general y en el mundo del deporte en particular.
- En segundo lugar, el posicionamiento adquirido por Twitter como plataforma y red social ideal para seguir tanto eventos como la actualidad en global, y los eventos deportivos en particular.
- En tercer lugar, la brecha existente para establecer, por un lado, los parámetros que forman parte de la influencia en una red social y por otro, la manera en que estos afectan. Estos dos aspectos son de suma importancia para la identificación de los usuarios más influyentes, lo que se conoce como "influencers".
- Por último, la identificación de estos usuarios puede resultar de interés para los patrocinadores. Es muy importante para conocer la manera de

difundir los diferentes mensajes y su impacto en los posibles miembros de las comunidades que se generen.

Todo ello cobra vital importancia en el objetivo general de nuestra tesis. Considerando además que nuestra investigación se desarrolla en un deporte de nicho, (que ya mencionábamos anteriormente), conseguir la identificación de los perfiles con mayor capacidad de ejercer la influencia en los eventos de estos deportes, es de gran importancia. En los deportes de nicho, la existencia de patrocinadores y el retorno económico para los mismos, cobra una mayor trascendencia que en los deportes de masas. Por ello, todos los puntos anteriores se concatenan de manera perfecta para la detección de los influencers en las redes sociales y sus posibilidades en los eventos deportivos de nicho.

En este escenario, el objetivo general de la tesis doctoral es identificar los perfiles con mayor capacidad de ejercer la influencia en un evento deportivo de nicho. Este objetivo general se desglosa en los siguientes objetivos específicos de investigación:

O.I.1: Identificar las variables que puedan ser utilizadas para la medición de la influencia en Twitter.

O.I.2: Elaborar un índice, a partir de esas variables, que nos permita la evaluación de la influencia.

O.I.3: Determinar quiénes son los usuarios más influyentes en un evento deportivo de nicho y cuál es su perfil.

O.I.4: Analizar de qué manera contribuyen al evento los grupos de usuarios anteriores, desde el enfoque del deporte de nicho, y qué consecuencias se pueden extrapolar para posibles acciones de marketing y promocionales en este tipo de eventos.

1.5 Metodologías utilizadas

Para la consecución de los objetivos propuestos, y en base a la eficiencia de utilizar metodologías que pudieran complementarse de manera que su combinación aportara resultados de valor y de innovación a nuestra investigación, se utilizaron dos metodologías diferentes: el SNA y el Proceso de Análisis Jerárquico, AHP, por las siglas en inglés (Analytics Hierarchy Process). Mediante el SNA podíamos responder al primero de los objetivos planteados y con la combinación de ambas, abordar el resto de ellos. La unión de ambas metodologías supone una aplicación novedosa en las investigaciones sobre influencia en redes sociales.

1.5.1. El análisis de redes sociales (SNA)

Las redes sociales como estructuras dinámicas y complejas, en las que existe un intenso intercambio de información, han sido estudiadas en diversos ámbitos (Aguirre, 2011; Marteleto, 2001; Souza & Quandt, 2008). Para el estudio de redes sociales, una de las metodologías utilizadas de manera habitual ha sido el SNA (Scott, 2017).

El SNA surge como aproximación metodológica para el estudio de las relaciones e interacciones entre los diferentes actores de una red (McGloin & Kirk, 2012; Wasserman & Faust, 1994) . En este análisis, cualquier relación social entre actores puede ser objeto de estudio e investigación (El-Sayed et al., 2012; Lusher et al., 2010; Mandarano, 2009). El análisis de redes sociales nos ayuda a entender las conexiones entre actores sociales y cómo están cohesionados todos los perfiles de una red, quienes son los líderes de las mismas y la posición que ocupan en esta red. También nos permite detectar subgrupos, o lo que se denomina *clusters* de usuarios, que son aquellos que se agrupan por otros intereses o consideraciones adicionales a los que unen al total de la red.

Como conceptos básicos en el análisis de redes sociales, la teoría de grafos (Tutle, 2001) tiene un papel muy importante ya que supone la representación

gráfica de todo este entramado de conexiones y relaciones entre los diferentes actores de una red (Chakraborty et al., 2018; Otte & Rousseau, 2002). Además, la teoría de grafos proporciona una serie de conceptos para describir las propiedades de la interacción entre agentes sociales. Además, define una serie de variables que permite cuantificar y comparar estas propiedades para plantear hipótesis y comprender mejor el funcionamiento del sistema. En un grafo, tenemos dos tipos de datos: un conjunto de nodos, que son los diferentes actores, perfiles o usuarios de la red, y un conjunto de aristas o líneas entre pares de nodos. Estas aristas representan las relaciones entre los diferentes nodos, es decir, la conexión que existe entre dos agentes dentro del sistema.

En los estudios basados en el SNA, los principales parámetros de estudio son los grados de formalidad, densidad y centralidad de la red (Andrade et al., 2019; De Nooy et al., 2005). La formalidad la entendemos como la existencia de reglas o normas para la interacción, la densidad como el número de enlaces que existen entre los diferentes usuarios, y la centralidad, a la importancia de los diferentes nodos o vértices que componen la estructura de la red. Cuanto mayor número de relaciones poseen los usuarios de la red, se consideran más centrales jugando un gran rol en la conexión con el total de la red al tener una alta conectividad. Si los usuarios de la red tienen similares grados de conectividad estaremos entonces ante redes descentralizadas. Los usuarios que actúan como nodos de conexión entre diferentes subgrupos de la red (*clusters*), se consideran como puntos de influencia sobre la estructura en su conjunto, por sus posibilidades en la transferencia de información. Otro factor clave de la centralidad, que además valoriza y cohesiona toda nuestra investigación, es la identificación de los nodos más importantes de una red desde el punto de vista de la difusión de una información, lo que Borgatti (2013) llamó el problema del actor clave.

En nuestros artículos se ha utilizado como metodología el análisis de redes sociales (SNA). Esto es debido a que nuestro objeto de estudio son las comunidades y redes que surgen en dos eventos deportivos en una red social específica, Twitter, y en torno a un elemento de conexión, el hashtag de cada

uno de los eventos. Para el primero de los artículos se utilizó el SNA de manera única y para el segundo y tercero, combinada con otra metodología, el proceso de análisis jerárquico (AHP).

1.5.2. El proceso de análisis jerárquico (AHP)

El AHP fue desarrollado por Saaty (1980), y se trata de una metodología adecuada en nuestras investigaciones por la complejidad del fenómeno de la influencia en Twitter. Esta técnica ya se utilizó en la industria deportiva empleándola para analizar diversas posibilidades sobre patrocinio deportivo (Lee & Ross, 2012), o la externalización de los servicios de marketing en un club deportivo (Lee & Walsh, 2011). También fue utilizada para la realización de un ranking de los diferentes clubes de fútbol de la liga israelí (Sinuany-Stern, 1988), donde se seguían diversos criterios que van en la misma línea de nuestro trabajo, o para el análisis de la Federación Iraní de deporte (Sajjadi & Damaneh, 2014).

La metodología del AHP está basada en evaluar diferentes criterios que permitan la jerarquización de un proceso para optimizar la toma de decisiones (Cheng & Li, 2001; Saaty, 2008). Este proceso se estructura en varios niveles:

- En el más alto, se sitúa el objetivo principal.
- En los niveles intermedios se sitúan los criterios y subcriterios a comparar y evaluar.
- Finalmente, en el nivel más bajo, se describen las alternativas que serán comparadas.

Con la metodología AHP, se resuelven problemas donde hay que priorizar entre diferentes opciones y decidir la más adecuada. Este proceso está considerado como una gran herramienta en la toma de decisiones. Por su flexibilidad se utiliza en problemas donde hay que evaluar parámetros cualitativos y cuantitativos.

El AHP ha sido utilizado en campos muy diferentes como la logística (Toncovich et al., 2007), el desempeño de proveedores (Osorio Gómez et al., 2008), o la innovación en universitarios (Marin-Garcia et al., 2014). Una vez identificado el problema a resolver y las diferentes alternativas u opciones, el AHP se inicia con la realización de un cuestionario individual a un grupo de expertos en el que se evalúan la importancia de los diferentes criterios para su resolución. Cada experto que realiza el cuestionario compara los diferentes criterios por pares, primero entre los distintos criterios, y después entre cada uno de los subcriterios. Se utiliza una escala del 1 al 9, donde 1 supone la misma importancia de las dos variables comparadas, y 9 supone una importancia extrema de una frente a la otra.

Una vez que cada experto ha evaluado los criterios a través de la escala señalada, se crea una matriz individual que incluirá todas las comparaciones o juicios "par a par". En esta matriz, todos los elementos son positivos y verifican las propiedades de reciprocidad y consistencia (Saaty, 2008). Para la validación de ambas propiedades, se utiliza la ratio de consistencia. Uno de los principales puntos del AHP es que la experiencia y el conocimiento de las personas que participan en este proceso son tan importantes como los datos utilizados.

Con la utilización del proceso de análisis jerárquico (AHP) en combinación con el análisis de redes sociales (SNA) en nuestra tesis e investigaciones, pretendemos contribuir a eliminar la brecha existente en la identificación de los usuarios con influencia en una red social, haciéndolo de una manera que resulta novedosa. En los tres artículos utilizamos el SNA, para caracterizar la interacción de los diferentes usuarios en Twitter. En los artículos dos y tres, se aplica además el AHP y se cuantifican así los atributos de un determinado fenómeno, la influencia. Esto se realiza a partir de una serie de juicios valorativos proporcionados por los expertos que han participado en la investigación.

1.6 Artículos publicados

Para abordar los objetivos de esta tesis, se consideró el ciclismo en pista como el marco de estudio. El objeto de estudio fue la conversación generada en Twitter por los dos eventos anteriores: el Mundial de Londres 2016 y el de Apeldoorn 2018. El corpus del análisis estuvo formado por los tweets que contenían el hashtag oficial de cada uno de los dos mundiales, en el caso de Londres el utilizado fue #TWC2016 y en el de Apeldoorn #Apeldoorn2018.

El autor de esta tesis asistió de manera presencial a ambos eventos y pudo así constatar de primera mano, cómo los organizadores de cada uno de los eventos dinamizaban los mismos, e "invitaban" (si lo hacían) al uso de las redes sociales o del hashtag principal.

Tras asistir a cada uno de los dos eventos, el autor descargó los tweets con los hashtags correspondientes. Una vez recopilada y analizada la información, el plan de trabajo de la tesis consistió en la elaboración de un artículo sobre cada uno de los eventos y de un tercero que estudiara y comparara ambos campeonatos.

El primer artículo estudió el Mundial de Londres 2016. Fue publicado por la revista suiza *Social Sciences* en Mayo de 2019 y su principal metodología fue el SNA. Para el segundo evento se añadió la metodología del AHP, para lo que se contó con la participación de una serie de expertos. Estas dos metodologías se aplicaron a la conversación generada en Twitter en torno al Mundial de Apeldoorn 2018. Al mismo tiempo que se trabajaba en este segundo artículo, se empezaron a extraer una serie de conclusiones y de comparaciones entre ambos eventos, que iban sirviendo de base a lo que debería ser el tercer artículo, el comparativo de ambas ediciones. Por tanto, ambos artículos, segundo y tercero, se fueron trabajando de manera más o menos continuada.

Sin embargo, lo que tenía que ser el tercer artículo fue aceptado rápidamente por la revista receptora del mismo, mientras que el que tenía que ser el segundo artículo requirió de unas revisiones posteriores para su publicación. Por esta circunstancia, lo que debía ser el segundo de los artículos

cronológicamente, fue publicado en fecha posterior al tercero. Así, el artículo que estudia el Mundial de Apeldoom 2018 fue publicado por la revista *Revista Mediterránea de Comunicación* en fecha de Enero de 2022, y el artículo comparativo de ambos eventos vio la luz en la revista *Social Sciences* en Septiembre de 2020.

2 Identificando influencers en Twitter en el Mundial de Londres 2016

Este capítulo 2 es una versión adaptada del artículo publicado en la revista Social Sciences, según los siguientes datos.

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2.1 Abstract

Social media platforms have had a significant impact on the public image of sports in recent years. Through the relational dynamics of the communication on these networks, many users have emerged whose opinions can exert a great deal of influence on public conversation online. This research aims to identify the influential Twitter users during the 2016 UCI Track Cycling World Championships using different variables which, in turn, represent different dimensions of influence (popularity, activity and authority). Mathematical variables of the social network analysis and variables provided by Twitter and

Google are compared. First, we calculated the Spearman's rank correlation coefficient among all users (n = 20,175) in pairwise comparisons. Next, we performed a qualitative analysis of the top 25 influential users ranked by each variable. As a result, no single variable assessed is sufficient to identify the different kinds of influential Twitter users. The reason that some variables vary so greatly is that the components of influence are very different. Influence is a contextualised phenomenon. Having a certain type of account is not enough to make a user an influencer if they do not engage (actively or passively) in the conversation. Choosing the influencers will depend on the objectives pursued.

Keywords: popularity; activity; authority; social network; rank correlation

2.2 Introduction

Social media communication platforms have definitively consolidated their place in various aspects of our society and behaviour (Kaplan & Haenlein, 2010; Towner & Munoz, 2016; Wilson & Dunn, 2011). Without a doubt, the sports industry has been affected such as few others by the consolidation of social media (Dart, 2014; Hutchins & Rowe, 2010). The use of social media accounts, for example, has transformed the relationship between athletes and their fans and followers, making it more intimate and immediate in terms of response time (Cleland, 2014; Hambrick et al., 2010; Kassing & Sanderson, 2010). Moreover, the relationship between sporting events, spectators, fans and sponsors has also changed. For example, Delia & Armstrong (2015) studied the 2013 Roland Garros tennis tournament, measuring the sponsors' impact on social media, and Yu & Wang (2015) analysed fans' sentiment expression by looking at their tweets during several 2014 World Cup matches.

Filo et al. (2015) and Santomier (2008) examined these changes in their analysis of how the "new media" have changed the production and consumption of sports, and the significant implications of this change in such key areas as sponsorship. Meenaghan et al. (2013) analysed how quantifying the efficacy and impact of social media campaigns on platforms such as Twitter represents

a significant opportunity for the increasing number of companies, sporting events and social media platforms by measuring return on investment. It is also a new outlet for advocacy. Hull & Schmittel (2015) explored how advocates for concussion awareness in football used Twitter to help spread their message during the 2013 Super Bowl. Consequently, determining and analysing the companies/organisations or individuals who, through their social media profiles, are most likely to transmit information and exert influence on other users, has become extremely important in social media management.

Despite the efforts made by organizations and brands, the identification of influencers is still the main challenge for both companies and marketers (Khan et al., 2017; Lahuerta-Otero & Cordero-Gutierrez, 2016), also even for sporting events. Thus, this research aims to identify the influential Twitter users during the 2016 UCI (Union Cycliste Internationale) Track Cycling World Championships, using different variables which, in turn, represent different dimensions of influence. We have divided this objective into the following sub-objectives: (i) compare the rankings of influential users in terms of the variables within one dimension; (ii) compare influential user rankings in terms of variables from multiple dimensions; and (iii) identify the most influential users in each dimension.

2.3 Literature Review and Theoretical Framework

2.3.1 Twitter and Sport Research

Different studies have been carried out on the Twitter social media platform. Athletes have been the subject of different studies due to their relevance and importance. In many cases, they are considered as celebrities. Sports celebrities are unique from other types of celebrity in that their value is directly related to their own field performance (Turner, 2016). Kassing & Sanderson (2010) analysed the tweets launched by the cyclists during the Giro d'Italia. Pegoraro (2010) studied professional athletes using Twitter and found that most athletes used the online social network to communicate with fellow athletes

and followers. In other words, they used Twitter more as a means of interaction than as a promotional vehicle. Hambrick et al. (2010) and Hambrick & Mahoney (2011) obtained similar results to Pegoraro (2010). Other users whose activity on Twitter has also been studied are journalists(Hambrick & Sanderson, 2013), sponsors (Abeza et al., 2014; Delia & Armstrong, 2015) and sport organisations (M. L. Naraine et al., 2016; Wäsche, 2015).

Different studies have attempted to identify the influential users on Twitter in different sports and environments with different objectives. Clavio et al. (2016) analysed the interaction network of a Big Ten American football team's Twitter community. Hambrick (2012) examined how two bicycle-race organisers and influential Twitter users spread information through the online social network to promote their events. Hambrick & Pegoraro (2014) examined social media communities formed during the 2014 Olympic Games. Naraine et al. (2016) compared international and domestic multisport events. Naraine & Parent (2016) analysed national sport organisations and Wäsche (2015) focused on regional sport tourism. More recently, Yan et al. (2019) investigated the Twitter networks of the 2017 UEFA Champions League Final. Although Social Network Analysis (SNA) is commonly used by most of these studies as a methodological approach, the theoretical framework differs. Clavio et al. (2016) used the systems theory, Hambrick & Pegoraro (2014) employed the word-of-mouth (WOM) conceptual framework, and Naraine et al. (2016) based their approach on the stakeholder theory. We propose the two-step flow hypothesis as theoretical framework in order to operationalise influence based on different dimensions.

2.3.2 Two-Step Flow Hypothesis

Many researchers have studied how information is transmitted between the media and individuals. In their two-step flow theory, Katz & Lazarsfeld (1955) explained the role played by a particular group of people in forming the opinion of the general public. They made a bridge between the media and

their contact network, so that they could be considered as prescribers regarding the information published by the media. As such, their contact networks give them more credence than to the media itself, so that they were considered opinion leaders.

In their time, Katz and Lazarsfeld broke from traditional theories of communication, which spoke of the media's direct influence on the public at large. The two-step theory's principal hypothesis, on the other hand, modelled the media influence process in two stages: first, communication starts with the media and flows towards opinion leaders. Second, opinion leaders transfer that information to the public at large. The key element of this theory is identifying the correct opinion leaders, as they can vary from topic to topic (Katz, 1957).

The arrival of the Internet has altered this communication process itself. In this new scenario, Veglis & Maniou (2018) presented the mediated data model of communication flow, where they incorporated new roles of intermediation. It is the case of data journalists and information seekers, who are distinguished because they know how to organize information and work with large amounts of data (big data). In political communication, Chadwick (2011) featured the new scenario as a hybrid media system consisting of an interrelation of two different logics: the classical media logic and the network logic. This last one is characterized by the interaction of a large amount of actors through the digital media.

As today's social media platforms are based on user-to-user relationships, this theoretical model might help us to understand the information flow on them(Norris & Curtice, 2008). If we identify the influencers of certain groups on these sites, it would be possible to track the desired disseminated messages (Brosius & Weimann, 1996; Freberg et al., 2011). According to Morone & Makse (2015), users identified as influential are most capable of disseminating information on Twitter. Nevertheless, measuring a user's influence in any social media platform is a conceptual problem. There is still no consensus as to the definition of an influential user, and different studies define the term in

numerous ways (Bouguessa & Romdhane, 2015; Gayo-Avello, 2013). It can also be difficult to identify which elements determine influence, the parameters used by the tools to do so, or even the structure of social connections. Indeed, identifying influence can vary greatly depending on the metrics used to measure it (McNeill & Briggs, 2014; Yamamoto et al., 2017).

Riquelme & González-Cantergiani (2015) classified the studies of influence on Twitter according to three categories: popularity, activity, and a third group named with the general term influence measures. Dubois & Gaffney (2014) selected a measure focused on the internal importance of a user. Following these authors, we shall examine these three dimensions of the interaction among Twitter users: popularity, activity and authority. A user can be considered popular when many other users follow them. Take, for example, celebrities, who need not be active to be popular. An active user engages in the social network consistently and frequently during a given period, regardless of the attention paid to them by other members of the network. Engagement refers to every measurable activity. On Twitter, it is impossible to know if a user has read a tweet. However, tweets, re-tweets, and mentions, among other things, are measurable (Sousa et al., 2010). Finally, a user has authority when they have connections with other highly connected users. This research relies on these three dimensions—popularity, activity and authority—to analyse influence.

2.3.3 Social Network Analysis

Identifying influencers has had strong support from SNA, which emerged in the 1940s from Lewin's Gestalt Theory (Lewin, 1939). Lewin formalised and formulated his theory with graph analysis, and in the 1970s, the theory's mathematical base was further developed and applied by many researchers (Freeman, 1978; Freeman et al., 1991; Lozares, 1996). Despite subtle differences of opinion among researchers, the central tenet of social network theory is the assumption that what people feel, think, and do comes from the situational

relation patterns among actors. SNA helps evaluate the interdependent actions among users overall, despite the fact that not all users are directly linked to one another. This is in stark contrast with the idea that the attributes of individual actors cause behavioural patterns. Thus, the relevance of SNA lies in the evaluation of these social relationships based on the interactions among all the agents involved (Scott, 2017).

Although SNA is a common methodological approach in many fields, it has only recently come into the focus of sport researchers. Quatman & Chelladurai (2008) and Wäsche et al. (2017) provide a general assessment of the utility of the social network theory and analysis and show a wide range of different applications in sport management research. Quatman & Chelladurai (2008) go one step further and empirically explore the social interaction patterns among scholars in the field of sport management, using a social network perspective. Researchers have used this SNA methodological approach to identify popular users within social networks (Clavio et al., 2013; Hambrick & Pegoraro, 2014; Hambrick & Sanderson, 2013; Naraine et al., 2016). SNA can help event organisers understand how social media communities are structured and expand their knowledge of how to manage the conversations held by these communities around their events.

A key concept in social network theory is centrality (Borgatti et al., 2013). This term is associated with an actor's ability to influence the network's internal dynamics due to that actor's location (Borgatti & Everett, 2006). Among the various measures of centrality are degree centrality and eigenvector centrality. Each node has a degree of centrality, characterising its relative position within the network by looking at the edges connecting to that particular node. This can be differentiated between indegree (when the interaction is started by the node) and outdegree (when the interaction is addressed to the node) (Newman, 2010). Eigenvector centrality (also called eigencentrality) assigns relative scores to all nodes based on the assumption that connections to high-scoring nodes increase a node's score more than an equal number of connections to low-scoring nodes (Florez Fernandez, 2008). Eigencentrality

differs from degree centrality metrics in that the former takes into account the weight of the connected nodes (Bonacich, 1972).

These centrality measures can operationalise the selected user influence dimensions when they are applied to the interaction network formed during the Twitter conversation: indegree can measure popularity, outdegree can measure activity, and eigenvector centrality can measure authority. We want to contrast them with two direct variables taken from the user account: number of followers as a proxy for popularity, and number of tweets as a proxy for activity. In the case of authority, we want to compare eigenvector centrality with the measure provided by PageRank algorithm. This variable has previously been used as a general evaluation for influence (Riquelme & González-Cantergiani, 2015). PageRank is the algorithm used by Google to evaluate the importance of website pages, and it assesses the probability that a user randomly clicking on links will arrive at a particular page (Page & Brin, 1998). Web pages have a higher chance of being reached if they are linked to many times, and if those links come from highly linked pages. All these variables allow us to establish a ranking of Twitter users. To this end, we shall address the following research question (RQ):

RQ1: What are the differences between the user rankings provided by these influence variables taken from SNA (indegree, outdegree, and eigenvector centrality), from Twitter data (number of followers and number of tweets) and from Google (PageRank)?

These variables provide a user classification based only on their overall interaction during the Twitter conversation, regardless of their role in the event. However, we can expect that the event organiser will be more involved (Hambrick, 2016), and that journalists will be more relevant in the conversation (M. L. Naraine & Parent, 2016). Dubois & Gaffney (2014) featured the most relevant users extracted by certain variables of influence, in terms of their role in an electoral campaign. Likewise, in a sporting event there are several roles that might exert their influence by way of their profile. In order to better assess the

influential actors, the analysis should take a close look at the top ranked users according to the six previous variables. This will be useful for evaluating whether the three dimensions reveal opinion leaders with no institutional links, as was revealed in the initial studies of personal influence (Katz & Lazarsfeld, 1955).

RQ2: Which user profile, in terms of their role in the event, is more present at the head of the rankings provided by the selected influence variables?

2.4 Data and Methodology

2.4.1 The Sporting Event

From 2 March to 6 March 2016, the UCI Track Cycling World Championships were held in London's Olympic velodrome at Lee Valley VeloPark. The event's signage, event programmes and promotional images included various messages inviting spectators—whether live or on television—to interact with the event. These messages included the official hashtag #TWC2016, the event's official Twitter account @trackworlds, and the phrase "Tweet from your seat." This sport event was therefore appropriate to explore our RQ as the organisers encouraged the public to participate in the Twitter conversation.

2.4.2 Data

For our research, we downloaded the tweets with the hashtag #TWC2016 sent from 15 February to 14 March 2016. We used Audiense, specific software for capturing Twitter data. Although we cannot assure that we have all the tweets specified with that condition, at least we have a big sample that we consider enough for our research. The hashtag (#TWC2016) was the same as the one used by The Women's Conference 2016. This Conference was held in December 2016. Though the dates did not coincide, we checked that there was no tweet of this event in our database. We included the pre-, during and post periods as cited by Abeza et al. (2014) and Yan et al. (2018). We analysed

55,572 tweets (English and non-English) sent initially by 20,303 users, which later fell to 20,175 users after we detected 128 errors or duplicates, among other issues. Once the database was refined, we identified the interactions among the users in the conversation through mentions and re-tweets. To visualise this network, we created a graph using the Gephi software and the Fruchterman–Reingold algorithm (Bastian et al., 2009). We used this algorithm because it emphasizes complementarities in the graphical representation of the network and makes the different clusters emerge. In this graph, the edges are weighted. Table 2.1 shows the basic information about the graph. The number of nodes (23,339) is greater than the number of users analysed (n = 20,175) because the first one includes those users who were mentioned but did not write any tweet with the hashtag #TWC2016.

Table 2.1 Information about the data.

Item	Number
Tweets	55.572
Users	20.175
Retweets	35.667
Mentions	28.176
Nodes	23.339
Edges	66.444

2.4.3 Analysis

We ranked users according to each variable. Then, we performed two different analyses. First, we performed a quantitative analysis. We calculated the Spearman's rank correlation coefficient among all users (n = 20,175) in pairwise comparisons (Del Campo-ÁVila et al., 2013), seeking to determine whether different variables yield similar rankings of users. A positive value indicates a positive correlation, whereas a negative value indicates an inverse correlation (Santesmases Mestre, 2009) (Santesmases Mestre, 2009). We used Spearman's coefficient because it is a nonparametric measure of rank correlation since the

behaviour and social phenomena associated with web-based social spaces usually follow a power law distribution.

Next, we performed a qualitative analysis of the top 25 influential users ranked by each variable. This sample is enough to provide variety of results, and its size can be managed to bring meaningful insights (Dubois & Gaffney, 2014). We carried out a content analysis of each account's profile (Clavio et al., 2013; Wilson & Dunn, 2011). To classify the users, we created the following coding system:

1 = Cyclist participating in the event; 2 = Media (press, radio, TV, etc.); 3 = Fans/Supporters; 4 = Media related to cycling (magazines, websites, etc.); 5 = Journalists, bloggers, ex-cyclists; 6 = Related institutions (federations, cycling teams, organisations); 7 = Others. Once we had selected all users, one of the authors made an initial classification, and another revised it. When there was a discrepancy, the third author was consulted.

2.5 Results and Discussion

2.5.1 Interaction Network

Figure 2.1 shows the interaction graph during the Twitter conversation. Each of the nodes represents a user, and its size corresponds to the indegree variable: a larger size and a bigger font indicate a greater value of this centrality measure. The largest nodes are those that receive the largest number of mentions and retweets. The edges are weighted according to the number of interactions. The colours represent the cluster identified by Gephi.
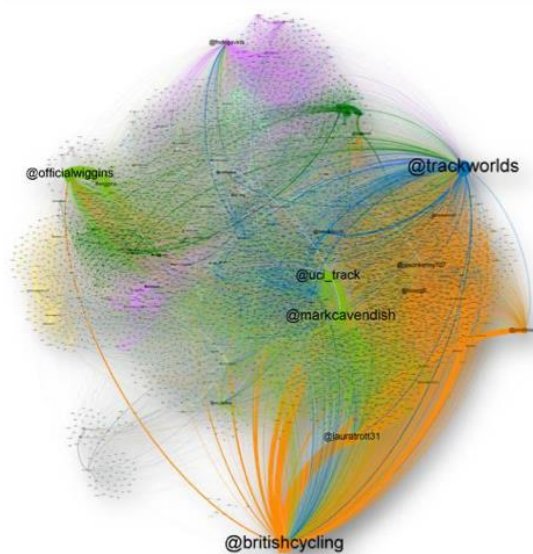
Figure 2.1 Interaction graph during the Twitter conversation with the hashtag #TWC2016

The clusters reflect the grouping of the users who are talking about the event linked by close interactions. One reason for this clustering has been the language. For example, followers of Colombian cyclists are included in the same cluster and speak in the same language (Spanish). Peripheral positions influence neighbouring clusters while central positions reflect a reach to a greater number of users. Therefore, there may be a node with a high indegree but linked to a few clusters. For example, @trackworlds and @bristishcycling receive edges of few colours compared to @markcavendish or @uci_track, since these are in a central position in the graph. This is exactly the outcome provided by the use of the Fruchterman–Reingold algorithm. We can conclude that we have synthesized the conversation graphically to identify the relative position of the users in the global interaction.

2.5.2 Correlation between Ranks

Results are shown in Table 2.2. First, every rank correlation coefficient was significant. Although we take *indegree* and *number of followers* to represent the same dimension (popularity), the two measurements are negatively correlated at −0.490. This could be because the most mentioned users do not

necessarily have the highest number of followers, and vice versa. Similarly, *outdegree* and *number of tweets* are not highly correlated (0.614), despite both metrics representing activity. A possible interpretation is that those who tweet the most do not necessarily mention the greatest number of people. Regarding the *authority* dimension, Table 2.2 shows that there is a high positive correlation between *PageRank* and *eigencentrality*, yielding two very similar rankings. As opposed to the previous dimension, these two variables are quite similar in conceptual terms and are, therefore, highly aligned. This means that we can characterise the dimension of authority with either of the two variables, as the ranking yielded by one would be quite similar to that of the other.

Table 2.2 Spearman's ranks between variables

First metric	Paired metric	Spearman's rank	Probability
Indegree	Number of followers	-0.490	0.000**
Indegree	Outdegree	-0.022	0.001**
Indegree	Number of tweets	0.695	0.000**
Indegree	PageRank	0.818	0.000**
Indegree	Eigencentrality	1.000	0.000**
Outdegree	Number of followers	0.145	0.000**
Outdegree	Number of tweets	0.614	0.000**
Outdegree	PageRank	0.549	0.000**
Outdegree	Eigencentrality	-0.017	0.017*
Nº de followers	Number of tweets	0.180	0.000**
Nº de followers	PageRank	0.059	0.000**
Nº de followers	Eigencentrality	-0.487	0.000**
Nº de tweets	PageRank	0.925	0.000**
Nº de tweets	Eigencentrality	0.697	0.000**
PageRank	Eigencentrality	0.820	0.000**

Note: ** Significant at 1% ($p < 0.01$); * Significant at 5% ($p < 0.05$).

Of the remaining correlations, we should point out the high positive correlation between *indegree* and *PageRank* (0.818), and *indegree* and *eigencentrality*

(1.000), which could mean that being mentioned often (*indegree*) has a positive effect on being a reference and becoming an authority (*PageRank* and *eigencentrality*) on Twitter. The correlation between *PageRank* and *number of tweets* is also very high (0.925). In other words, the authority ranking (*PageRank*) correlates positively with the productivity ranking (*number of tweets*). Perhaps the key detail is not that users who tweet more often have a higher *PageRank*, but rather that users with a high *PageRank* tweet more often. *Number of tweets* also correlates positively with *indegree* and *eigencentrality*, but to a lesser degree (0.695 and 0.697, respectively). These figures may reaffirm the importance not only of tweeting often but also of interacting with other users.

Nevertheless, *number of followers* has a very low rank correlation with the other variables: *outdegree* (0.145), *number of tweets* (0.180), *PageRank* (0.059) and *eigencentrality* (−0.487). This implies that the users with the largest number of followers are neither those who mention the most users, nor those who tweet the most, nor are the references merely due to their authority in the realm of sports (*PageRank* and *eigencentrality*). Finally, *outdegree* negatively correlates with *indegree* (−0.022), which means that the users most mentioned are not those who most mention other users and vice versa. *Outdegree*'s correlation with the two authority variables is more problematic. *Outdegree* has a very small, negative correlation coefficient (−0.017) with *eigencentrality*, and a significant positive correlation coefficient (0.549) with *PageRank*. This difference suggests that the *PageRank* calculation gives much more weight to the user's propensity to mention others, whereas in the other metric, this measurement is not very important. One potential explanation is that the *eigencentrality* calculation assumes an asymmetrical network (not distinguishing between the direction of the edges), whereas the edge's direction is relevant in the *PageRank* calculation.

These results would reinforce the findings of Barnes & Harary (1983), Knoke & Kuklinski, (1982), Wäsche (2015), as well as Naraine & Parent (2016), who discussed the importance of the connectivity and density of relationships in

social networks. After analysing the correlation between the dimensions' variables, we performed a content analysis to compare user rankings among the variables of a single dimension.

2.5.3 Influential Users by Popularity

The popularity of a Twitter user is determined by the variables *indegree* and *number of followers*. In the quantitative analysis, these values are negatively correlated. This fact is confirmed in our qualitative analysis (Table 2.3), as only three of the 25 profiles with the greatest *number of followers* rank in the top 25 profiles with the greatest *indegree*. Of the three users in the top 25 for both variables, @trackworlds ranks first with 5749 followers, far behind @bbcnews, which tops the overall list with 6,232,200.

Table 2.3 Top 25 users by popularity

Rank	Indegree				Number of followers		
	User	Value	Number of followers	Class	User	Value	Class
1	trackworlds	1924	5749	6	bbcnews	6232200	2
2	britishcycling	1842	117368	6	bbcsport	5352955	2
3	markcavendish	1453	1280000	1	juanmansantos	4348023	7
4	uci_track	1315	6817	6	independent	1811168	2
5	officialwiggins	1243	51557	1	aztecadeportes	1692541	2
6	lauratrott31	940	306000	1	gazzetta_it	1531605	2
7	jasonkenny107	613	101000	1	bundesliga_de	1397813	7
8	fndogaviria	565	13932	1	markcavendish	1280000	1
9	teamgb	531	676042	6	khairykj	1204386	7
10	leevalleyvp	468	5891	6	bild	1182922	2
11	jondibben1	466	4353	1	juanpabloraba	1132804	5

12	bbcsport	345	5352995	2	gettysport	978940	7
13	cyclingaus	305	27529	6	casaleantonio	771673	5
14	uci_cycling	290	168002	6	aierta	739479	7
15	mundociclistico	255	17821	4	adidasuk	735479	7
16	azizulawang	253	44894	1	chrishoy	677632	5
17	eurosportuktv	247	44965	2	teamgb	676042	6
18	bicigoga	242	112567	5	nos	618643	2
19	owaindoull	221	5652	1	silvioluiz	615984	5
20	etixx_quickstep	214	175953	6	clarebalding	609473	5
21	becksjames	213	23570	1	teamsky	580043	6
22	sebastianmorav	207	1497	1	bbc5live	577698	2
23	cvndsh	183	21851	7	teamcanada	545464	7
24	skycycling	177	52449	6	infopresidencia	530276	7
25	eliaviviani	157	32423	1	telegraaf	453957	2

In our analysis of the 25 users with the highest *indegree*, the Championship cyclists (Class 1) hold a plurality of the spots. In total, there are 11 cyclists, seven of which are on the British team. There is also a Colombian, an Italian, a Spaniard and a Malay. Of these athletes, only one is a woman (Laura Trott). Nine accounts belong to organisations related to the sporting event (Class 6): cycling federations, velodromes, etc. This would seem logical, as it represents a way for the organisations to interact during the event. Indeed, the top two accounts in the *indegree* ranking are @trackworlds, the event's Twitter account, and @britishcycling, the British Cycling Federation's official account. A Class 7 account also stands out in this ranking. It belongs to the trademark of Mark Cavendish, @cvndsh, one of the cyclists with the greatest media reach during the championships. Lastly, the accounts of the two channels that broadcasted the event appear (@bbcsport and @eurosportuktv) (Class 2), as well as the accounts of two journalists who specialise in cycling (Classes 4 and 5).

In the *number of followers* variable, the general media accounts (Class 2) are predominant, as these accounts have many followers who want to stay abreast of the day's news. The top two spots are held by @bbcnews and @bbcsport, with 6,232,200 and 5,352,955 followers, respectively. There are other British general media accounts (@independent and @bbc5live), as the event took place in UK, but there are others from Mexico (@aztecadeportes), Italy (@gazzetta_it), Germany (@bild) and the Netherlands (@nos and @telegraaf). Likewise, Class 7 also dominates this ranking. We can see the accounts of public figures with extensive media reach, such as the President of Colombia (@juanmansantos) and the Malaysian Minister of Sport (@khairykj). The German Football League (@bundelisga_de) and the Getty Images account for sport (@gettysport) can also be found, among others. The accounts of journalists and bloggers (Class 5), and those of event-related institutions (Class 6), are also visible in this ranking. The only cyclist to appear in the top 25 is @markcavendish, with 1,280,000 followers.

Both rankings offer potentially useful information to those companies considering sponsoring an event (Demir & Söderman, 2015). Upon choosing an athlete or institution to sponsor, they should consider not only the *number of followers*, but also to what extent the institution or athlete is mentioned (*indegree*), a signal of the interest they spark in other users on the network. For instance, the cyclist with the greatest number of followers is the first one in the indegree ranking (@markcavendish), being the exception. The rest of the cyclists who appear in the indegree ranking do not even reach 400,000 followers, in comparison to the 1,280,000 followers attracted by @markcavendish. The cyclist with the lowest number of followers is @sebastianmorav (1497) and occupies a higher position than @eliaviviani in the indegree ranking, with even 30,926 followers more than @sebastianmorav. In a sporting event, it may be that the results obtained by the athlete can greatly influence the number of mentions received. This could be the case of @sebastianmorav who won two medals (one gold and one bronze). These results show a certain democracy in this social media platform, as users great

and small have the opportunity to influence the community (Cha et al., 2010; Hambrick & Pegoraro, 2014).

2.5.4 Influential Users by Activity

The variables that make up the activity dimension are *outdegree* and *number of tweets*. After comparing user rankings for each variable (Table 2.4.), we see that only 14 accounts appear in both. In the *outdegree* ranking, 10 of the 25 profiles belong to fans or people unknown to the public at large (Class 3), thereby a priori lacking any significance. Next are the event-related organisations, (Class 6), which appear in this ranking due to their prominent role in promoting the event. Then, there are the cycling-related media outlets (Class 4). Indeed, the top two accounts in this ranking belong to this category (@groupiecam and @fixedgearfever). Lastly, a journalist specialised in cycling (Class 5) and lesser-known general media outlets (Class 2), such as @actussportvideo and @germansportnews, round out the list. Anecdotally speaking, we should mention @velodromomed, a Class 7 account created to call for the construction of a velodrome in the Colombian city of Medellin. This ranking stands out for its large variety of accounts. Every class appears except Class 1 (athletes). One could say that the variable *outdegree* makes lesser-known accounts more visible.

Table 2.4 Top 25 users by activity

Rank	Outdegree				Number of tweets			
	User	Value	Number of followers	Class	User	Value	Number of followers	Class
1	groupiecam	168	55	4	Robayocolombia	682	2635	3
2	fixedgearfever	167	1286	4	Pelotonwatch	559	21999	4
3	velodromomed	162	255	7	Fixedgearfever	420	1286	4
4	robayocolombia	144	2635	3	Groupiecam	367	55	4

5	trackworlds	120	5749	6	Britishcycling	355	117368	6
6	leevalleyvp	107	5891	6	Gazettedessport	317	4487	2
7	realdeanporter	100	1969	3	Trackworlds	304	5749	6
8	_pigeons_	89	6926	5	_pigeons_	261	6926	5
9	britishcycling	86	117368	6	Velodromomed	257	255	7
10	cyclismactu	81	15525	4	Cyclingaus	256	27529	6
11	ramonap1988	79	350	3	Twowheeledtank	247	3964	5
12	iflck	68	740	3	uci_track	236	6817	6
13	seigneurlouis	67	205	3	Leevalleyvp	227	5891	6
14	swaragency	67	376	3	cyclogy_	168	90	7
15	actusportvideo	66	6098	2	Clubsforkids	152	233	7
16	tony_bobfan	62	280	3	Kevinpersyn	147	209	5
17	cyclingaus	60	27529	6	Realdeanporter	126	1969	3
18	kolkwitzer	60	294	5	davidverral	124	97	3
19	davidverrall	59	97	3	ciclo21	120	10833	4
20	oidoracritica	59	1569	3	Joanseguidor	118	4151	5
21	uci_track	59	6817	6	cyclismactu	116	15525	4
22	aubondossard	53	542	5	Velouk	115	20241	6
23	germansportnews	53	49	2	Aussielarry	109	11984	5
24	carolynb66	51	376	3	Teamgb	107	676042	6
25	cyclogy_	51	90	7	Kerrrrrryyy	102	870	3

In the *number of tweets* variable ranking, the most active account is @robayocolombia, a cycling enthusiast from Colombia. The following three most active accounts belong to Class 4 cycling-related media outlets: @pelotonwatch, @fixedgearfever, and @groupiecam. Related institutions (Class 6) are the predominant account type in this ranking, with @britishcycling and @trackworlds leading the pack. Then, cycling-related media outlets (Class 4) and journalists and bloggers (Class 5) each have two accounts in the top 25, the former represented by @ciclo21 and @cyclismactu and the latter by

@_pigeons_ and @twowheeledtank. Fans also appear in this ranking (@robayocolombia, @realdeanporter, @davidverral, and @kerrrrrrryyy), but to a lesser extent than in others. The only general media account to appear in the top 25 is @gazettedessport.

The fact that the cyclists fail to appear in these rankings, as opposed to those determined by popularity, makes sense given that they are focused on the championships and do not engage in Twitter. These results contrast with those obtained by Kassing & Sanderson (2010) where cyclists interacted with their fans during the Giro d'Italia. Athletes provided commentary and opinions, fostered interactivity, and cultivated insider perspectives for fans on Twitter. Something similar happens in electoral campaigns, during which candidates remain quite active (Agre, 2002; Dahlgren, 2005; Small, 2011). However, in some top-level competitions, the national committees or federations impose social media limits on their athletes. At times, even the event organisers impose such limits or prevent athletes from mentioning brands that compete with those of the event's official sponsors.

Consequently, as in the case of the study, Twitter activity falls to the media outlets reporting on the event, as well as the participating federations and organisations. The elevated positions occupied by @trackworlds and @leevalleyvp in the *outdegree* ranking coincide with the findings of Hambrick (2016), in that the national race organiser used a combination of messages, while focusing more on interactions with others. Fans perform the important task of mentioning other users, above all the cyclists, serving as the championships' commentators. The identification of these active users can provide organisations with an opportunity to co-create added value to the fan experience (Koenig-Lewis et al., 2018; Kolyperas et al., 2019). Given the importance of lesser-known accounts in this dimension, it could be an example of how sporting events can be used to build community networks thanks to social capital also in the digital environment (Hofer & Aubert, 2013; Misener & Mason, 2006). Nonetheless, *outdegree* identifies influential potentials since it would be necessary to analyse the effect of their activity on others. Finally,

comparing the *number of followers* and *number of tweets* rankings, @teamgb is the only account which appears in both. In addition, also comparing the number of followers of the accounts of the activity dimension, we can see that a higher number of followers is not translated into a higher number of tweets or outdegree. This is consistent with the results of Abeza et al. (2014) and Gibbs et al.(2014). They found that a higher number of followers does not automatically imply that an organisation is more active on Twitter.

2.5.5 Influential Users by Authority

In the authority dimension, we analysed the variables *eigencentrality* and *PageRank*. Table 2.5 shows 19 accounts appearing in both variables' rankings, the greatest number of any dimension. One possible explanation is the high correlation between these two variables compared with those of the other dimensions. An analysis of the *eigencentrality* variable reveals that 16 cyclists (Class 1), as well as seven event-related institutions (Class 6), appear in this ranking. The top four positions are held by @britishcycling, the cyclists @markcavendish and @officialwiggins (the official Twitter page of Sir Bradley Wiggins's cycling team), and @uci_track (the official account for all UCI *Track Cycling* events). England, Australia, Italy, Spain, Colombia, Germany and Malaysia all have cyclists representing them in this ranking. The athletes are the nexus between the distinct groups and their cluster, thereby making it possible to transmit information to the latter (Rogers, 1995). The accounts of the Track Cycling World Championships' organisers and participants also serve as a nexus between the groups they influence. The British media outlets (Class 2) that broadcasted the event (@bbcsport @eurosportuktv) round out the top 25 users by authority. For a sporting event, the *eigencentrality* variable could provide a great deal of information regarding the different clusters within a social network.

Table 2.5 Top 25 users by authority

	Eigencentrality				PageRank			
Rank	User	Value	Number of followers	Class	User	Value	Number of followers	Class
1	britishcycling	0.902	117368	6	trackworlds	0.032	5749	6
2	markcavendish	0.733	1280000	1	britishcycling	0.025	117368	6
3	uci_track	0.704	6817	6	uci_track	0.019	6817	6
4	officialwiggins	0.636	51557	1	markcavendish	0.019	1280000	1
5	lauratrott31	0.555	306000	1	officialwiggins	0.015	51557	1
6	jasonkenny107	0.394	101000	1	lauratrott31	0.013	306000	1
7	leevalleyvp	0.370	5891	6	fndogaviria	0.010	13932	1
8	fndogaviria	0.355	13932	1	jondibben1	0.008	4353	1
9	jondibben1	0.348	4353	1	edwinavila189	0.008	8262	1
10	cyclingaus	0.288	27529	6	jasonkenny107	0.008	101000	1
11	teamgb	0.279	676042	6	leevalleyvp	0.008	5891	6
12	bbcsport	0.233	5352995	2	cyclingaus	0.008	27529	6
13	uci_cycling	0.216	168002	6	teamgb	0.005	676042	6
14	tennanto	0.197	8324	1	bbcsport	0.005	5352955	2
15	becksjames	0.187	23570	1	uci_cycling	0.004	168002	6
16	eurosportuktv	0.185	44965	2	owaindoull	0.003	5652	1
17	annameares	0.154	31349	1	eurosportuktv	0.003	44965	2
18	kristinavogel	0.150	4428	1	sebastianmorav	0.003	1497	1
19	ed_clancy	0.147	46600	1	azizulawang	0.003	44894	1
20	eliaviviani	0.142	32423	1	eliaviviani	0.003	32423	1
21	stevenburke88	0.135	12600	1	tennanto	0.003	8324	1
22	azizulawang	0.135	44894	1	becksjames	0.003	23570	1
23	cyclingnzl	0.131	4447	6	bicigoga	0.003	112567	5
24	sebastianmorav	0.130	1497	1	skycycling	0.002	52449	6
25	matthewglaetzer	0.128	1090	1	mundociclistico	0.002	17821	4

In the *PageRank* variable ranking, the predominant accounts in the Track Cycling World Championships also belong to the cyclists (13 accounts, Class 1) and the event organisers (eight accounts, Class 6). Nonetheless, the top three spots are held by @trackworlds, @britishcycling, and @uci_track, followed by the cyclists @markcavendish and @officialwiggins. The @bbcsport and @eurosportuktv accounts (Class 2) also have a high *PageRank*, as do the cycling-related journalism accounts @bicigoga and @mundociclistico, Classes 5 and 4, respectively. The user with the top *PageRank* is @trackworlds. This result is relevant given that @trackworlds has more back links (1924) than any other user. As Naraine et al. (2016) point out, sport organisations emerge as highly connected and as powerful stakeholders.

In terms of authority within the mentions network, Table 2.5 shows the best-connected users. In calculating *PageRank,* whether the user is mentioned or not affects the value (directed network), whereas *eigencentrality* ignores this difference (undirected network). Despite this difference, many users appear in both tables, and their ranking therein is quite similar. Table 2.5 shows the greater weight of the athletes and institutions in the Twitter conversation. These results are similar to those obtained by Yan et al. (2018) in the 2017 UEFA (Union of European Football Associations) Champions League Final. Perhaps this alignment highlights the key role played by teams (in this case, the national institution) in cycling, which might otherwise seem to be an individual sport. This emergent feature of the Twitter conversation suggests that users admire the national team as much as the cyclists themselves. Therefore, both (national teams and cyclists) have to pay attention to their Twitter accounts in order to develop stronger relationships and to elicit greater engagement with users and fans on social media. Particularly, cyclists should ensure they tweet content aligned with their desired personal brand (Kunkel et al., 2019).

Finally, we should highlight the role played by different media. The two channels that broadcasted the event (@bbcsport and @eurosportuktv) appear in *indegree, eigencentrality* and *PageRank* rankings. However, they do not feature in the activity dimension. In the *outdegree* variable, the media

@actusportvideo (French) and @germansportnews (German) appear. In the *number of tweets* variable, only the Italian account @gazettedessport becomes visible. In *number of followers*, @bbcsport occupies the second place. Consequently, broadcasting the sporting event is not translated into being the most active media account on Twitter. This active role is played mainly by Internet-only sports media and bloggers specialised in cycling, in other words, non-traditional media accounts. These results contrast with those achieved by Clavio et al. (2013) who found a high percentage of interactivity, both inbound and outbound, in traditional and non-traditional media accounts. This may be because we are analysing different sports. Clavio et al. (2013) analysed the social network of a Big Ten American football team's Twitter community, a sport that arouses great interest in the media, while we analysed the UCI Track Cycling World Championships, a niche sport that does not generate much interest in the media.

2.6 Implications

In this research, we sought to identify the influential Twitter users during the 2016 Track Cycling World Championships (#TWC2016) in terms of the dimensions of popularity, activity, and authority. Each dimension is evaluated by distinct variables. In doing so, this study provides several contributions to scholarship. First, using a rank correlation coefficient to compare variables, we examine the degree to which different variables agree, and consecutively, what different dimensions of influence might exist. Second, using a qualitative analysis of the top 25 influential users for every variable, we obtain the different key actors in the #TWC2016 community on Twitter. In this way, we relate mathematical variables of the SNA and variables offered by Twitter and Google with the dimensions of influence in a global conversation on Twitter during a sporting event. Across the variables *indegree* (popularity dimension), *eigencentrality*, and *PageRank* (authority dimension), the most influential user accounts are largely the same, with the top ranked accounts belonging to cyclists and event-related institutions. National teams are also identified as influential in

these dimensions. A possible explanation is the high rank correlation among the three variables. This result could be understood as logical given that these users are the sporting event's major players. They are the true protagonists of the event. Second, the variables *outdegree* and *number of tweets* (activity dimension) are positively correlated, but to a lesser extent than *indegree, eigencentrality* and *PageRank*. In the *outdegree* variable, the top-ranked accounts belong to fans and event-related institutions, whereas in *number of tweets*, a predominant number of accounts belong to event-related institutions, specialised media outlets, and journalists. *Number of followers* variable correlates quite low with the other variables. In this ranking, the most important actors are general media and other popular users accounts not related to the sporting event. Actually, this variable has the highest number of users of Class 2 (media) and Class 7 (others).

At this point, we can say that different variables, sensitive to different dimensions of influence, do indeed identify users differently. We could argue that *indegree* could perhaps be considered as a variable to measure authority with *eigencentrality* and *PageRank* in the conversation around a sporting event. However, being mentioned is also a sign of popularity during the realisation of the event. *Number of followers* points out different actors not related directly to the event. So, it could be considered as a variable to measure the dimension of popularity but in general terms, not exclusively associated with the sporting event. Typically, the most important variables used in sport management for assessing influence are number of followers (Hambrick, 2016; Hambrick & Pegoraro, 2014; Hambrick & Sanderson, 2013), number of tweets (Hambrick & Pegoraro, 2014) and different measures of centrality (M. L. Naraine & Parent, 2016; Wäsche, 2015; Yan et al., 2018). We can observe that different variables identify different kinds of Twitter players. The reason that some variables vary so greatly is that the components of influence are very different. This is consistent with Carter (2016) (Carter, 2016), since he explains how influence assessed by network extensive measures is much more complex than influence understood by marketing firms and social media influencers. Influence is a contextualised phenomenon. From the

perspective of the Two-Step Flow Hypothesis, if we think only of those who actively engage, we are already limiting ourselves to likely event-related institutions, specialised media outlets and journalists. We rule out the cyclists, the current major players, as they do not tweet during the races. However, they are considered authorities and are mentioned frequently in the Twitter conversation. Therefore, belonging to a certain user account class, such as journalist, athlete, media outlet, or related institution, does not guarantee that account the influencer status during the sporting event if it fails to participate (actively or passively) in the conversation.

This study also provides some managerial implications, as this research is useful to market researchers interested in identifying who influence most in the Twitter conversation. First, the accounts of the most mentioned and most authoritative cyclists and national teams could be particularly relevant for those companies interested in event sponsorship, brand identification and transmitting their corporate values. Both (national teams and cyclists) should pay attention to their Twitter accounts as part of their strategic communication due to their impact in the conversation. Second, promoting the event is not the cyclists' responsibility, given that they are participating in the races. Rather, this responsibility should fall upon the event-related institutions, the specialised media outlets, and the fans. The information provided by the fans can help organisations better understand the fan experience and to target the most influential fans for relationship building and to stimulate interaction. Third, if we want to spread a particular message, the influencers can be chosen better depending on the type of audience to be reached. For example, if a more general audience is chosen, the variable *number of followers* provides a series of accounts not directly related to cycling that allows reaching a wider audience. On the contrary, the rest of the variables we have explored in this study provide accounts more related to the world of sports and cycling, thus addressing a more specific audience. Finally, the media that broadcast the sporting event play an important role in the Twitter conversation, although they may not have been the most active.

2.7 Limitations and Future Research

Although this research has provided insight into determining influential users within a sporting discussion network on Twitter, it has some limitations that should be considered for future research. First, the data used in this study comes exclusively from a cycling event (2016 UCI Track Cycling World Championships), which limits the generalisation of the results to other cycling events and to other kinds of sports. Track cycling is considered a niche sport in comparison with other categories of bicycle racing or other sports. This research is the analysis of a case study and results are specific to this single network. Maybe, results could be extended or compared to other niche sports. Second, this research does not take into account the dynamic nature of social media. Things change from one moment to the next. The sporting discussion network is different at the beginning of races and during the end. Abeza et al. (2014) and Yan et al. (2018), obtained different results depending on the period of time analysed. Related to this point, the current analysis is focused on the entire picture of the whole interaction.

As future lines of research, it would be interesting to extend a similar approach comparing different sporting events to determine if they have the same influence pattern. The comparison could be performed both inside and outside the cycling world. Some research questions to answer in the future could be if the network operates similarly for other cycling events (for example, the mentioned Giro d'Italia) or, comparatively, there are differences in networks across events. Even different social media platforms could be compared. In this case, we analyse Twitter but Facebook or Instagram are also relevant (Anagnostopoulos et al., 2018). The temporary dimension should also be included to compare the network in different periods of time (i.e., pre-, during, and post-). Thus, it could be analysed how the network evolves over the duration of the event (Chew et al., 2017). An important point is whether the sports to be compared are considered niche sports or not. Maybe differences are found based on the very nature of the type of sport (Perić, 2018).

Although specific to our network, these results are useful for future studies of influence on Twitter and potentially other social media platforms. There are many opinion leaders, likely far more than we examined in our top 25 qualitative analysis. Nevertheless, it is not only important to know who these opinion leaders are, but also to assess the indicators by which we can carry out this identification. In an exploratory way, we have examined multiple variables to measure the different dimensions of influence. Other variables and dimensions could be included and discussed. For instance, those variables related to the density of the network (homophily and heterophily) (McPherson et al., 2003). The process of identifying the influential users (how and who) presents an interesting avenue for future research. Another possible line of research would be to create a model based on the established dimensions and variables, assigning a weight to each one to find the most influential account during an event. This would be possible with multi-criteria decision methods, such as, Analytic Hierarchy Process (AHP) or Analytic Network Process (ANP) (T. Saaty, 1980). Such a model could effectively replace the tools based on unclear parameters used by companies to identify the most influential user.

2.8 Conclusions

This study used multiple variables to measure the different dimensions of influence in order to identify the most influential members of the #TWC2016 community on Twitter. In terms of popularity, results are different depending on the variable considered. *Indegree* highlights cyclists and institutions related to the sporting event as the most influential users. Instead, *number of followers* points out general media and other popular user accounts not related to the sporting event. When activity is considered, the related institutions are still prominent, but media outlets and journalists specialised in cycling and fans are integrated into the lists of most influential. Finally, considering the authority dimension, cyclists and institutions related to the sporting event stand out again. No single variable assessed is sufficient to identify the different kinds of influentials found within a sporting discussion network on Twitter during an

event. The choice of some influencers or others will depend on the objectives pursued.

3 Los líderes de la conversación en Twitter en el Mundial de 2018

Este capítulo 3 es una versión adaptada del artículo publicado en la revista Revista Mediterránea de Comunicación, según los siguientes datos.

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3.1 Abstract

Fans of niche sports generally find minimal content in mainstream media due to their limited audience. Instead, social media offers them the opportunity to follow these specific sports. The dynamics behind digital media are based on individual participation, hence some prominent users lead the social

conversation thanks to their capacity to influence. However, the complexity of the concept of influence and the existence of multiple parameters for its measurement make it difficult to identify these key users. Our research proposes a measure of the influence on Twitter based on variables derived from the platform (number of tweets, number of retweets, and number of followers) and from the Social Network Analysis (outdegree, indegree, and PageRank). The Analytic Hierarchy Process was used to assign a weight to each variable. This measure of influence was applied to the conversation generated on Twitter around a niche sporting event: the 2018 UCI Track Cycling World Championships. From a 19 701-tweet corpus, we identified the 25 most influential users. The results indicate that the organisers and the participating cyclists played a relevant role in the Twitter conversation. In addition, the geographic distribution of these influential users reflects the cultural dependence of niche sports.

Keywords

AHP; cycling; niche sports; influential users; sporting events; Twitter.

3.2 Introduction

Sport teams need communication to raise their public awareness. Mainstream media capitalise a good deal of this interest, as they reach a large audience. The development of digital channels has propitiated increasing access to sports information. User interaction is a key difference between the mass media, which provide clear top-down-oriented communication, and the digital media, which allow more horizontal communication. As users engage in the digital conversation, they help to spread information and create new content as a manifestation of a strong sense of belonging (Chan-Olmsted & Xiao, 2019; Thompson et al., 2017; Vale & Fernandes, 2018). This engagement can also be considered by sports teams as an asset to increase their financial value (Scelles et al., 2017), promote brand sponsorship (Santomier, 2008) and attract spectators (Nisar, Prabhakar & Patil, 2018). In a similar vein, social networks

enhance the experience of attending sport events, providing event organisers and sports teams with new sources of information to help better understand their relationship with spectators, sports fans and sponsoring brands (Abeza et al., 2014; Delia & Armstrong, 2015; M. L. Naraine et al., 2016; X. Wang, 2015).

Twitter has singular characteristics among the digital media. This social network provides quick interaction among users, and strongly contributes to the spread of information through viral mechanisms. In the context of sports communication, Twitter helps to get a picture of the main topics discussed by users (González et al., 2021; Guzmán et al., 2021; Huang et al., 2017). The open conversation in Twitter allows us to explore how athlete branding unfolds over a period of time (Su et al., 2020), and the different way teams can build strong relationships with fans (Naraine, 2019; Wang, 2020). The way professional athletes, sport clubs, and amateurs take part in this online conversation has also been relevant (Hutchins, 2011; Kassing & Sanderson, 2010). In particular, Twitter has modified the way TV spectators watch sport events, as this platform provides an immediate interaction with many other users who are following the same event simultaneously (Smith et al., 2019; Yan et al., 2019).

In addition to these possibilities for broadening the experience of sport communication, Twitter opens up promising opportunities for minority sports. Mainstream media usually pay attention to sports that have a large spectator base, as their business model is based on the viewing figures. However, Internet in general, and Twitter in particular, make low-demand products and services accessible to those users interested in them. This phenomenon, known as long tail (Anderson, 2006), is perfectly suited to niche sports in Twitter.

According to Miloch & Lambrecht (2006), professional niche sports appeal to a small segment of sport consumers. Among the examples they provide we find lacrosse, bowling, fishing, curling, horse racing and archery. All of them were related to the US public, as the consideration of a sport as niche depends on the particular society to which it refers. Nevertheless, precisely because this sort of sport can be considered as a niche product, their athletes and followers are

much more homogeneous than those sports. This feature is of great interest for sponsorship funding (G. P. Greenhalgh & Greenwell, 2013; Greenwell et al., 2013; Miloch & Lambrecht, 2006). In terms of communication, social media is a key channel for the niche sport fan group, especially for information gathering and building communities, thanks to user interaction (Kang et al., 2019). In the dynamics behind these platforms, information flows by interaction. In this regard, there is a particular group of users who boost this information flow in the network when they interact with the message, making content viral (Tafesse & Wood, 2021; Y. Zhang et al., 2017). Exploring how the Twitter conversation evolves requires the identification of this key group of users.

Although there are already several research works on the ways in which large sport teams and mass sporting events (such as the Olympic games or world soccer championships) leverage social networks (Abeza et al., 2014; Clavio et al., 2013; Guzmán et al., 2021; Jensen et al., 2015; X. Wang, 2015; Yu & Wang, 2015), in the case of niche sports the research is much more limited (Mastromartino et al., 2020; Trivedi et al., 2020). Our study helps fill this gap by analysing the Twitter conversation during the 2018 UCI Track Cycling World Championships. This competition is the most important event in track cycling, but the sport can be considered niche, as its media coverage is much less widespread than road cycling, as would be the case of the Tour de France.

This research explores the main profiles of the more influential Twitter users during an international event of a niche sport. To tackle this problem, we developed an influence index based on six variables. Some of them are taken from the direct participation of the user, and the rest from social interaction. We composed this index based on a novel methodology in digital communication research: Analytic Hierarchy Process (AHP)(Lamirán-Palomares et al., 2020). This technique establishes a weight for a series of variables based on the judgements of a group of experts. AHP is particularly appropriate for this problem, as it allows us to quantify the attributes of a complex phenomenon such as influence in Twitter. The process ensures consistency among the opinions collected, so that the output can be considered reliable according to

the group of experts. Once we had drawn up the index, we applied it to the case of the 2018 UCI Track Cycling World Championships, a niche sport among cycling modalities.

The paper is structured as follows. The theoretical framework reviews the literature on influence on Twitter, the Social Network Analysis (SNA) applied to Twitter, and niche sports. After that, we briefly introduce the 2018 UCI Track Cycling World Championships. Then, the research objectives are presented. Next, the research methodology is outlined, where the AHP stands at the core of the process. Subsequently, the results are presented and discussed. The paper ends by pointing out some limitations to our research.

3.3 Theoretical framework

3.3.1 Influence on Twitter

The dynamics of digital communication have different parameters from those of the traditional media, whose main indicator is the audience. On Internet, the logic of network communication bestows great power on users whose intervention propels dissemination of the message. This action can be considered as part of its influence in the network. Influence can be considered broadly as the ability of an individual to make others change their attitude, opinion, or commentary (Dubois & Gaffney, 2014). In this regard, social networks create special conditions for influencing due to the interactions of the users. Nevertheless, identifying a user as influential becomes complicated. Some theories help to explain different aspects of how this influence can be conceived.

Agenda setting theory (McCombs & Shaw, 1972) explains the capacity of mass media to determine the news items that are of informative interest. Depending on the way they present the content, mass media play a role in attributing different levels of importance to them. This way of influencing is focused on the content, and is explained by the prescriptive role exerted by mainstream

media. With the arrival of social media, this role has had to be shared, at least partially, with other agenda-setters (Blasco-Duatis & Coenders, 2020). As Rubio García (2014) states, there is a strong correspondence between the media agenda and the public agenda reflected in Twitter.

Another relevant conceptualisation to characterise the process of media influence was the two-step flow theory (Katz, 1957). This theory underlined the bridging role that certain individuals played between the media and the public, so that these individuals could be considered as prescribers of the information published by the media. These individuals were designated opinion leaders and were initially characterised by having a wide network of contacts, being considered experts on a specific topic, and having a relevant position within a local community. In this case, influence is exerted by way of personal interaction. The advent of Internet revived this two-step communication model, which had been weakened by the direct effect of television. Veglis & Maniou (2018) suggested an evolution from the two-step theory to a model of communication flows where the role of intermediation with the network of contacts becomes crucial when analysing influence.

The possibility of tracking the interactions and the content published in social media has prompted research to identify the key actors in disseminating messages (Denia, 2021). Researchers have used different metrics to identify influential Twitter users with the aim of assessing their position within the structural network. Kwak et al. (2010) ranked users according to the number of followers and also added the PageRank variable, which was originally used in web positioning (Page & Brin, 1998). Bakshy et al. (2011) linked the influence to the follower base and the time active in Twitter, but suggested that users with a smaller base could be more effective for marketing campaigns. González-Bailón et al. (2013) focused on user activity, counting their Twitter messages over a period of time, and identified four types of different users. Lara-Navarra et al. (2018) presented different instruments used to measure influence in social media.

In sport communication, different studies have analysed some Twitter profiles that can operate as influential in the conversation. Athletes have been the subject of some of these studies, in many cases leading them to be seen as "celebrities" (Kassing & Sanderson, 2010; Pegoraro, 2016). Other sport-related users whose activity on Twitter has also been analysed include journalists (Hambrick & Sanderson, 2013), sponsors (Meenaghan et al., 2013) and event organisers (Hambrick, 2016; Wäsche, 2015). Focusing on influence, other studies have already attempted to identify influential users on Twitter in different sports (Blaszka et al., 2016; Hambrick et al., 2010; Naraine et al., 2016). For Bouguessa & Romdhane (2015) and Gayo-Avello (2013), there is no clear consensus on the variables to be used to measure influence in Twitter. Albero-Gabriel (2014) highlighted the convenience of taking as main indicators the number of followers, the number of retweets and the number of mentions.

Cha et al. (2010) pointed out that a large number of followers is related to the popularity of the profile and has its significance in the number of mentions, while the number of retweets is conditioned by the interest of the tweet. Hence, we see that there are multiple ways of ranking influence based on the inclusion or exclusion of different variables.

Influence in Twitter comprises multiple approaches, as it is difficult to capture in just one measure. One methodology that has proved to be very useful for featuring Twitter conversations is Social Network Analysis (SNA). This methodology studies the interaction among social agents (Scott, 2017; Wasserman & Faust, 1994). The social relationships are usually represented in a graph. This figure is composed of nodes, which represent the social agents, and edges, which represent the interactions between two agents. A node will be more important if it plays a relevant role in the interaction (De Nooy et al., 2005). This relevance corresponds to the concept of centrality. Two basic measures of centrality are the indegree of a node (the number of interactions initiated by that node) and the outdegree (the number of interactions directed to that node).

SNA methodology is very well suited to the relationships created through posting in Twitter, as there are some activities, such as following, retweeting, and mentioning, that can be considered interactions in terms of SNA (Clavio et al., 2013; Sanderson & Hambrick, 2016; Wäsche et al., 2017).

Dubois & Gaffney (2014) compared the degree of agreement of six Twitter metrics, so that different facets of influence could be identified. Most of the metrics were standard SNA measures, such as indegree, eigenvector centrality and clustering coefficient. Riquelme & González-Cantergiani (2015) covered the extensive literature on the ways in which Twitter influence has been evaluated. They classified the metrics into three broad categories: activity, popularity, and influence. They considered users influential in Twitter if they participated frequently by posting, if they were recognised by the community, and if their actions in the platform affected the activity of other users. Many of the metrics collected by Riquelme & González-Cantergiani (2015) were related to SNA.

We consider influence in Twitter in a restricted way: the capacity of a user to spread information in a significant manner and the presence of a user in the content of the online conversation. Following the categories proposed by Riquelme & González-Cantergiani (2015), we articulated this capacity in three dimensions: activity, authority, and popularity. A user can be influential: i) if their participation in the Twitter conversation is frequent (activity dimension); ii) if the tweets they post provoke the interaction of other relevant users in the conversation (authority dimension); and iii) if they enjoy the recognition of other users (popularity dimension) (Lamirán-Palomares et al., 2020).

To construct our model, we selected two variables related to each of the three dimensions identified, with the aim of quantifying the phenomenon of influence in Twitter. In total, we had six variables. Although it is not easy to find neat boundaries to classify the variables, the dimensions helped us select the appropriate metrics to assess the user influence. Three of these variables correspond to the direct posting by the Twitter user, whereas the other three

variables come from considering the Twitter interaction in terms of SNA, i.e., retweeting and mentioning.

The six variables are as follows. User activity is reflected in the *number of tweets* posted by a user (González-Bailón et al., 2013). More tweets imply a more participative user. Tweets can be just a message, in plain text, or may contain a reference to another user. This is the case when retweeting a tweet or mentioning a user. The way of measuring this referential activity is by looking at the *outdegree* of the node. A user can be considered endowed with authority if their tweets are retweeted. So, the *number of retweets* of a user would be a way of indicating peer acknowledgement of the worth of their publications (Albero-Gabriel, 2014; Cha et al., 2010). In terms of SNA, the authority of a user is captured by the *PageRank* metric. This measure ranks higher when a user is linked by other users who in turn have high PageRank. Therefore, PageRank provides a measure of the density of the interaction relationships. This means that if a high PageRank user intervenes in a conversation, it is much more likely that the message will spread more quickly than if another low-PageRank user intervenes (Dubois & Gaffney, 2014; Kwak et al., 2010). Finally, popularity can be assessed by looking at the *number of followers* of a user (Albero-Gabriel, 2014; Cha et al., 2010; Kwak et al., 2010). From the interaction perspective, popularity can be evaluated through the *indegree* of a node, i.e., the number of mentions and retweets received by a user (Albero-Gabriel, 2014; Cha et al., 2010; Dubois & Gaffney, 2014).

3.3.2 Niche sports and social media

Niche sports are characterised by their reduced audience (Miloch & Lambrecht, 2006). The specific interest aroused by this kind of sport make it very appropriate for leveraging the long-tail dynamics (Anderson, 2006): social media bring together supporters and enthusiasts that otherwise would be unattended by mainstream mass media. The interest in researching niche sports has been linked to the special possibilities provided to sponsoring brands

(Miloch & Lambrecht, 2006). Greenhalgh & Greenwell (2013) asked more than 30 sponsors about the criteria they used to select which niche sports they would promote. Audience reach, cost-effectiveness, and the fit between company image and target market were positioned as the main criteria, whereas social media opportunities were ranked among the least important criteria for investment.

Recently, some researchers have examined specific ways of social media communication about niche sports. Kang et al. (2019) analysed three marketing activities in the context of CrossFit, a niche sport with scant media coverage in the US. They examined Twitter, Facebook and YouTube posts. According to these researchers, these platforms were used primarily to provide information and to interact with the community, but they detected less content regarding product promotion. Trivedi et al. (2020) conducted a study about the pro-Kabaddi league, a minority sport in India. They comprised three activities as social media communication: user-generated content, firm-generated content and social media ads. The results proved the influential role played by social media communication in boosting fans' online community engagement, and subsequently in game attendance and sponsor's product purchase intention. Mastromartino et al. (2020) analysed the factors influencing socialisation of ice hockey fans in the Sunbelt region of the US. This sport began to appear there 25 years ago. These researchers found evidence that the ways the fan-base socialise were departing from traditional sources, as they were through family and media exposure. The paper suggests that this change may be due to the access to communication technology by the new generation. Nevertheless, there is scant attention paid to the specific way information flows in Twitter regarding niche sports through prominent users. This point may be of great interest for event organisers, brand sponsors and sports teams.

3.4 The 2018 UCI Track Cycling World Championships

Track cycling is a modality of bicycle racing mainly oriented to professional

bikers. Races take place in velodromes, special arenas designed for cycling at high speed. Track bicycles are characterised by having a fixed gear and lacking brakes. They are designed to reduce resistance as much as possible to increase velocity. Unlike road cycling, track cycling competitions are much less viewed by media audiences, so it can be considered a niche sport.

The UCI Track Cycling World Championships are the most important event in this niche sport. They are held annually by the International Cycling Union (UCI in French). Professional and amateurs compete together, representing their countries. These championships encompass several events, such as time trial, individual pursuit, team pursuit or scratch race. There are races for women and races for men. The winning rider is distinguished by the UCI with a rainbow jersey. The 2018 edition took place in Apeldoorn, the Netherlands, from 28 February to 4 March. There were 40 competing nations, and 20 events. The medal table was headed by the Netherlands, the host country, with 12 medals. Germany, Great Britain, Australia, and Italy achieved 6 medals in the championships.

3.5 Research objectives

This aim of this research is to analyse in depth the impact of Twitter in a niche sport. The key issue structuring the whole research process is the concept of influence in social networks. Based on this assumption, three main objectives were set:

O1: To draw up an index to measure Twitter influence for each user participant in the conversation based on the following variables: number of tweets, outdegree, number of retweets, PageRank, number of followers and indegree.

O2: To identify the most influential users in the Twitter conversation about the 2018 UCI Track Cycling World Championships.

O3: To analyse the contribution of the most influential Twitter users to the event from the approach of being a niche sport.

3.6 Methodology

3.6.1 Analytic Hierarchy Process

The AHP was designed by Saaty (1980) and has been applied in the resolution of a wide variety of problems, including sports-related questions (Lee & Walsh, 2011; Sinuany-Stern, 1988). AHP requires a group of experts to evaluate the importance of different criteria to solve a given problem. Its basic principle assumes that the experience and knowledge of the experts involved is as important as the data, so it is used in problems where both quantitative and qualitative aspects need to be assessed. The goal is to prioritise a series of items. The AHP allows structuring of the items in different levels. In the case of having two levels, the process distinguishes between criteria and subcriteria, in such a way that there is a group of subcriteria depending on each criterion.

The experts prioritise the different items by filling in a questionnaire. Each question always compares two items. The respondent scores each pair of items from one to nine, where one means the same importance of both items, and nine means extreme importance of one item over the other one. First, all the criteria are compared in groups of two. Then, the questionnaire asks for the subcriteria pertaining to the first criterion, following the same approach of pairing the items. The following question asks the importance of the subcriteria associated to the second criterion, so that the process continues in this way to cover all the criteria with their respective subcriteria. AHP goes beyond a mere sorting of items, as it integrates several hierarchical levels (criteria and subcriteria) and takes into account the degree of relevance between two items considered by the experts (qualitative estimation). This leads us to the critical contribution of the process.

One matrix is created with the peer-to-peer comparisons made by each expert. All the matrix elements are positive and verify the property of reciprocity (Saaty, 1980). However, the matrix does not necessarily comply with the property of consistency, as the expert's judgements are subjective (Marin-Garcia et al., 2014). To verify this property, the consistency ratio must be calculated. This ratio reflects how consistent the judgements made by one expert are on the whole. The ratio is compared with a reference value that varies according to the size of the matrix (Saaty, 2008). Following Marin-Garcia et al. (2014), our threshold for the consistency ratio was set at 10%. Values lower than 10% mean that the successive judgements made by the expert have been consistent throughout the process, so that their comparisons can be considered reliable. Values higher than 10% reflect that the expert's judgements lack consistency, and, therefore, that this evaluation should be reviewed or discarded. In order to merge the validated judgements into a single judgement representative of the entire group, the geometric mean is used. Saaty (2008) recommends this method, as it maintains the reciprocity property of comparative judgements.

In our case, the dimensions of the influence (activity, authority and popularity) play the role of AHP criteria, while the variables we have identified as critical for measuring influence in Twitter correspond to the AHP subcriteria (number of tweets, outdegree, number of retweets, PageRank, number of followers and indegree). Figure 3.1 presents the integration in the AHP methodology of the hierarchical relationships between influence dimensions and influence variables.

The AHP questionnaire initially provided a brief description of the items we wanted to prioritise, i.e., the criteria and the subcriteria. The question for the criteria was posed as follows: "Which of these two alternatives do you estimate is more important when considering the influence of a user in Twitter? If you estimate one alternative more relevant than the other, please state the degree of importance ranging from one (equally important) to nine (extremely more important)." An example of the scale for evaluating one pair of criteria was:

"Authority 9 7 5 3 1 3 5 7 9 Activity". An example of a question regarding a couple of subcriteria was: "Which of these two variables do you estimate is more important when considering the activity of an influential user in Twitter? If you consider that one alternative is more relevant than the other, please indicate the degree of importance ranging from one (equally important) to nine (extremely more important)." The scale presented to the respondent was as follows: "Number of tweets 9 7 5 3 1 3 5 7 9 Outdegree". The questionnaire ended up by asking about sociodemographic variables.

The experts who answered the questionnaires were fifteen intensive Twitter users. Ten of them worked in marketing, media and communication agencies of different sizes, and 80% of them collaborated in universities providing training in digital marketing. Fourteen of them had college degrees and five of them were PhDs.

Figure 3.1 AHP structure process used to assess Twitter influence
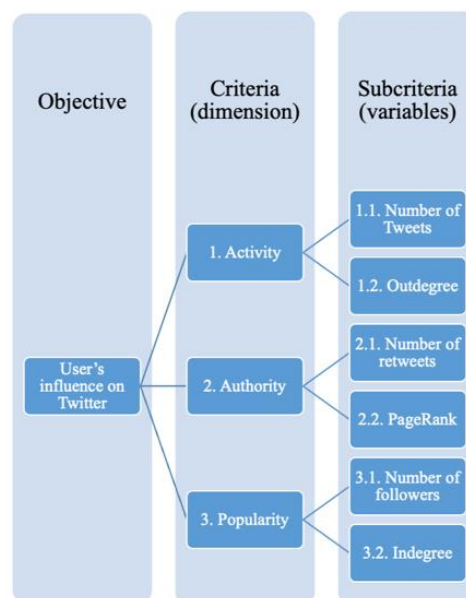
Source: own creation.

3.6.2 Corpus and variables

The dataset was built by collecting the tweets that included the Championship official hashtag #Apeldoorn2018. The extraction period extended from February 28 to March 4. We employed Audiense software. The size of the resulting corpus was 19,701 tweets. They had been posted by 7,281 different users. We obtained the number of tweets, the number of followers and the number of retweets for each user directly from the dataset. To evaluate the indegree, the outdegree and the PageRank for each user, we first drew up the graph of the interaction among the users registered in the dataset, and then we evaluated those variables with Gephi (Bastian et al., 2009), a popular software for SNA.

3.6.3 Research process

The main research objective was to identify the influential users based on the selected variables after revising the academic literature. To construct a unified measure of influence, we carried out the expert consultation according to the AHP methodology. The output of this process provided the weight for each variable.

Next, we estimated the variables involved for all the users present in the dataset. Given the variables and the corresponding weights, we assessed the degree of influence of each user according to this function:

$$Influence\ Index = \quad C_{11} * Number\ of\ Tweets + C_{12} * Outdegree$$
$$+ C_{21} * Number\ of\ Retweets + C_{3} * PageRank$$
$$+ C_{41} * Number\ of\ followers + C_{42} * Indegree$$

, where Cij corresponds to the weight of the j subcriterion of the i criterion. Each variable was normalised over the sum of all the values. In this way, the influence index is a number between 0 and 1, and the sum of all the influence indexes must be 1.

This unified measure allowed us to sort all the users according to their degree of influence. This way, the 25 most influential users were identified. Finally, the top 25 users were categorised into seven groups, according to their profile: 1 = Participating athlete; 2 = Media; 3 = Amateurs; 4 = Cycling-related media; 5 = Journalists, bloggers and content creators; 6 = Cycling-related institutions (federations, event organisation); 7 = Others. Figure 3.2 summarises the research process.

Figure 3.2 Methodological approach
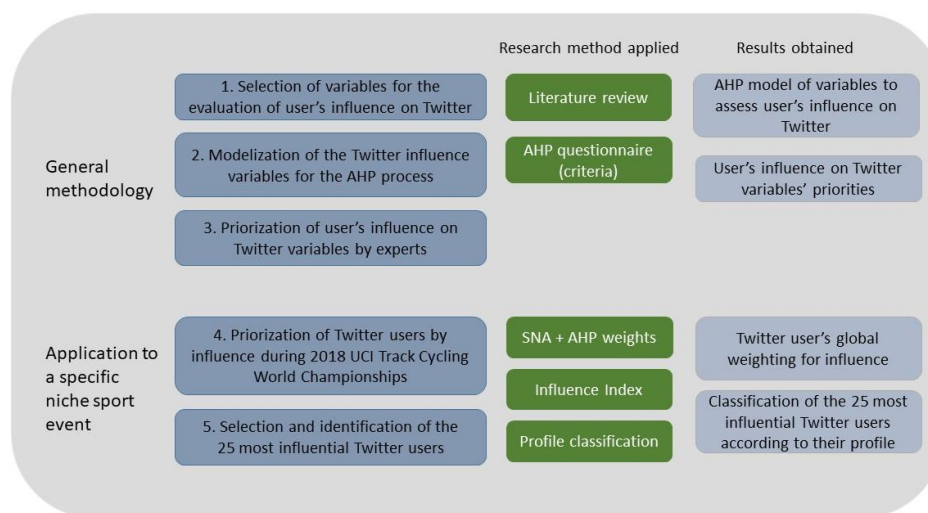
Source: own creation based on Baviera-Puig, García-Melón, Ortolá & López-Cortés (2021).

3.7 Results

3.7.1 Model of Twitter user's influence estimated by experts

The consulted experts completed the questionnaires with the peer-to-peer comparisons. Consistency ratios were calculated for each questionnaire as AHP prescribes. Three out of the fifteen questionnaires had to be discarded, as they obtained a consistency ratio higher than 10%. With the results of the validated

questionnaires, the geometric mean was calculated, as recommended by Saaty (2008), to obtain a single representative judgement of the whole group.

Table 3.1 shows the weights of the subcriteria that assess the influence of a user on Twitter according to the experts consulted. The most important subcriteria or variables when evaluating Twitter user influence were the number of retweets (37.28%), PageRank (24.75%) and indegree (20.17%). The less important were the number of tweets (3.22%), outdegree (5.16%) and number of followers (9.42%). In terms of criteria, the influence dimension of authority obtains the highest weight, as the criterion value represents the sum of the respective weights of the dependent subcriteria.

The first stage of the methodology ended by obtaining these weights. This was the generic stage; thus, the list of subcriteria and their weights can be used in any Twitter user's influence prioritisation process, regardless of the type of issue being evaluated. In the next section, we will apply these results to the 2018 UCI World Track Cycling Championship to find out the most influential users during this event.

Table 3.1 Weights of the criteria and subcriteria that determine a user's influence on Twitter

Criteria	Subcriteria	Weight (%)
C1. Activity	C11. Number of tweets	3.22
	C12. Outdegree	5.16
C2. Authority	C21. Number of retweets	37.28
	C22. PageRank	24.75
C3. Popularity	C31. Number of followers	9.42
	C32. Indegree	20.17
TOTAL		100.00

3.7.2 Centrality measures

Gephi provided the centrality measures for each user registered in the dataset: outdegree, indegree and PageRank. Figure 3.3 shows the graph of Twitter users' interaction during the studied event. The node size represents the outdegree measure. The colours show the different clusters or groups identified by Gephi. Clusters reflect users who are grouped by close interactions. One of the reasons for this proximity is nationality. Thus, for example, the profiles of Colombian cyclists and their followers are included in the same green group and speak the same language (Spanish). The profiles that describe Spanish cyclists are coloured orange, and the British in blue. The peripheral positions influence neighbouring clusters, while the central positions reach a greater number of users. This figure synthesises the conversation to identify the relative position of the users in the global interaction. Now, we proceed to use the AHP results to find out the most influential users in this interaction.

Figure 3.3 Twitter interaction graph of the event with the hashtag #Apeldoorn2018
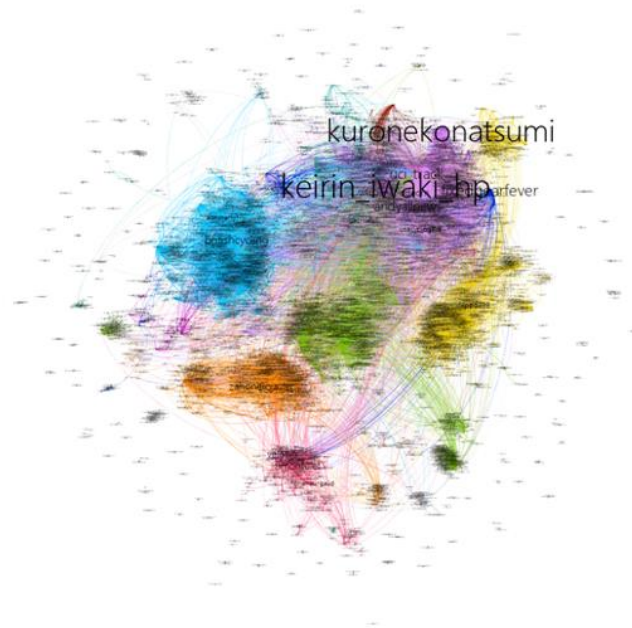
Source: own creation.

Table 3.2 The 25 most influential Twitter users with breakdown by variables and profile categories

	User	Tweets	Followers	RT	Ind	Outd	PR	Inf (%)	PC
1	UCI_Track	294	14,178	3,672	2,087	73	0.05874	23.302	6
2	BritishCycling	161	156,532	1,189	818	47	0.01803	7.936	6
3	fedeciclismocol	22	36,990	503	395	8	0.01180	3.740	6
4	Eurosport_IT	27	73,342	511	339	6	0.01074	3.567	2
5	Federciclismo	47	25,907	350	339	20	0.01015	2.987	6
6	fabianpuerta141	3	17,318	0	674	5	0.01598	2.683	1
7	BBCSport	6	7,250,358	11	40	6	0.00207	2.647	2
8	FFCyclisme	86	18,543	402	145	24	0.00656	2.499	6
9	JuanManSantos	1	5,298,442	60	61	1	0.00400	2.393	7
10	RFECiclismo	97	24,890	348	174	21	0.00605	2.317	6
11	JCF_cycling	79	15,508	449	144	3	0.00359	2.315	6
12	ClaraLuzRoldan	1	26,023	222	222	0	0.00697	1.888	5
13	ItaliaTeam_it	6	51,811	219	166	0	0.00675	1.755	6
14	TeamGB	17	928,775	234	143	13	0.00257	1.728	6
15	mundociclistico	17	37,116	260	204	8	0.00318	1.697	4
16	SebastianMoraV	7	2,187	150	277	7	0.00603	1.681	1
17	carlosvives	1	4,988,539	0	0	1	0.00004	1.60	7
18	chloedygert30	8	4,619	0	305	10	0.00852	1.43	1
19	alberttorresb	36	3,135	64	229	39	0.00595	1.41	1
20	gannafilippo	8	2,938	0	290	9	0.00753	1.308	1
21	maximilianlevy	8	2,968	0	246	9	0.00662	1.136	1
22	Coninews	5	236,970	151	140	2	0.00226	1.121	6
23	Japan_Olympic	1	399,065	104	102	0	0.00321	0.999	6
24	usacycling	13	59,591	53	162	14	0.00409	0.971	6
25	wkbaanapeldoorn	85	947	46	123	34	0.00395	0.966	6

Notes about the table:

RT: Retweets. Ind: Indegree. Outd: Outdegree. PR: PageRank. Inf (%): Normalised Influence (%). PC: Profile Category.

Profile category: 1 = Participating athlete; 2 = Media; 3 = Amateurs; 4 = Cycling-related media; 5 = Journalists, bloggers, and content creators; 6 = Cycling-related institutions (federations, event organisation); 7 = Others.

3.7.3 Most influential users

The influence is assessed for every user according to the six variables measured (number of tweets, outdegree, number of retweets, PageRank, number of followers and indegree) and the weights provided by the AHP process. This index allows sorting of all the 7,281 users. Table 3.2 shows the top 25 influential users according to our influence assessment and includes their profile classification.

Observing the 25 most influential users, we find: six athletes, five men and one woman (category 1); thirteen related somehow to the event, such as organisations and federations (category 6); two mass media (category 2), and four from other categories (4 and 7). It should be noted that the first three positions, UCI_Track, BritishCycling and fedeciclismocol (the Colombian Cycling Federation), as well as the fifth, (FederCiclismo) belong to the same category (6). It is also important to note that the local event organiser account, wkbaanapeldoorn, appears in position 25.

The next most important user group is that of the athletes. Colombian Fabián Puerta, the Spaniards Sebastián Mora and Albert Torres, Italian Filippo Ganna and German Maximilian Levy stand out in this group. The only woman who appears in this ranking is Chloe Dygert, from the USA.

Finally, we have another six users, two from generalist media, Eurosport from Italy and the BBC, which were two media that broadcast the event, and four from two different groups. These were three public figures: Juan Manuel Santos (Colombian President), Carlos Vives (Colombian singer) and Clara Luz Roldan (Colombian politician), as well as a specialised medium (*Mundo Ciclístico* magazine). These four users have in common that their origin is Colombian.

If we analyse the outcomes by country of origin, we see that the country with the highest number of users in this ranking is Colombia, with six positions. Italy comes the next with five users, followed by the United Kingdom and Spain with three, and finally the United States, Japan and France with two users each.

3.8 Discussion

The aim of this research was to study the conversation dynamics in Twitter during a niche sport event. The backbone of the research is the concept of influence. In particular, we are interested in characterising the professional profiles of those users who stand out due to their capacity to spread information through the interaction network and to their status as a reference in the conversation. This is even more relevant when analysing the case of a niche sport, as its public impact is much more reduced because of the scant or null mass media coverage. In this case, we focused on the 2018 UCI World Track Cycling Championships and the conversation generated in Twitter containing the hashtag #Apeldoorn2018.

The first objective (O1) was intended to build a measurement for assessing the influence in Twitter. This phenomenon was considered from three perspectives or dimensions: activity, authority and popularity of the user. For each dimension, we pick two variables that could serve as a metric for that aspect. All six variables provided useful information on the impact of the user's influence in the Twitter conversation. For this reason, AHP methodology was employed, as it allows researchers to draw up an index combining different weighted variables. The AHP output provides the weights based on the nuanced judgements of an expert panel, and the procedure assures that those qualitative opinions are consistent.

According to the experts consulted for this research, the results of the AHP process highlighted the relevance of considering authority dimension (62%) over popularity (29.6%) and activity (8.4%) of a particular user to be considered as influential in Twitter. Looking at the variables involved, the global opinion given by the experts allocated 37.28% of the weighting to the number of retweets 24.75% to the PageRank and 20.17% to the indegree measure. This result suggests, on the one hand, the importance of the content for being considered as influential, as we can assume that high-quality messages will be shared by a greater number of users. On the other hand, we can infer the advantage of being referenced by other users who are well referenced in the

whole interaction network at the same time. The other three variables reached smaller weights: 9.42% for the number of followers, 5.16% for the outdegree metric and 3.22% for the number of tweets. Therefore, in our model we could say that influence is, at an essential level, a phenomenon linked more with quality than quantity. In other words, activity alone does not create influence, but rather the quality of one's influence (understood as part of the authority and popularity dimensions).

The weights obtained in the AHP procedure allowed us to identify the top 25 influential users who tweeted about the 2018 UCI Track Cycling World Championships celebrated in Apeldoorn during the first days of March (O2). The two most prominent user profiles in this classification are the sport organisations and the athletes. However, Hambrick et al. (2010) and Naraine et al. (2016) considered that the event organiser and sport journalists would exert an influential role in the Twitter conversation during sport events. In our case, in the first position we find the main organiser user, the UCI_Track, which is by far the most influential user (23.3% of normalised influence, whereas the next user has 7.9%). It posted the most (294 tweets), and its follower base was medium sized compared with the rest of the table (14,178). The fact of being a niche sport made this contribution more valuable. However, we did not find any journalists in the top 25. Instead, the classification revealed two mainstream media (Eurosport_IT and BBCSport), one specialised magazine (mundociclistico) and three public figures (JuanManSantos, ClaraLuzRoldan, and carlosvives). This lack of journalists could be explained precisely because we are dealing with a niche sport.

It should be noted that the greater or lesser influence of these top 25 users is not always related to the number of medals achieved in the races. The Netherlands led the final medal count with 12 medals and was also the host country, but this did not translate into a higher number of users from this country among the 25 most influential users. In fact, the local event user wkbaanapeldoorn appears in position twenty-five and it is the only one belonging to the Netherlands in Table 3.2. In contrast, Colombia won only one medal, and yet there are 6 users of

Colombian origin in the ranking. These are the two extreme cases. In the intermediate situations, we find Italy, United Kingdom, Spain, the United States, Japan and France. Athletes from these countries won medals, and in addition Twitter users from these countries were ranked among the most influential ones during the event. This unbalanced situation could be explained because in the Netherlands, track cycling is considered a niche sport. But this is not the case with Colombia, where cycling is much more popular. This fact shows how the consideration of a sport as niche or not depends on the national culture in which it takes place (Miloch & Lambrecht, 2006).

These outcomes could confirm the relevant role played by cycling-related institutions, e.g., federations and associations (category 6), in promoting the Twitter conversation about the event. Yan et al. (2019), in their research into the UEFA Champions League Final, obtained a similar result when they identified the prominence of large sports entities in the Twitter network structure. In their case, it was the Champions League that held a privileged position in the ranking. Therefore, we can see how this group is relevant both in large sporting events and in niche sports. In this sense, the strategic management of social media by this type of institution is a fundamental communication resource.

The participating cyclists (category 1) are another group with a strong presence in the list of top influential users, and therefore their role as catalysers of the online conversation could be considered transcendental. This suggests that the ranking position could be a consequence of their sporting outcome and of their activity or mention-receiving in Twitter. In this regard, the role that Twitter could play as a means of amplifying the sport results obtained by the athletes would be very important in terms of future personal promotion. These results are consistent with those obtained by Kang et al. (2019) for niche sports. They also found that, despite their relevance in the digital conversation, both kind of actors (categories 1 and 6) did not take advantage of promotional opportunities compared to interaction and information opportunities. It is worth mentioning that all the athletes positioned in this ranking won a medal during the championship, and it is remarkable that in this classification no athlete from

the organising country (the Netherlands) appears, when there were several who were present in the medal registry and had user accounts in Twitter also.

The scenario for this study was a niche sport (O3). In addition to the cultural differences among the tweeting communities and the invigorating role played by the event organiser, Table 3.2 highlights the key presence of public figures in the conversation. The Colombian individual users tweeted just once, and they were regarded as an influential actor in the conversation by our index. Two of them had a very significant follower base (JuanManSantos with 5.3M and carlosvives with 5M). The participation of celebrities always has a strong impact, which is even more evident in the case of a niche sport. Although digital communication has helped promote niche sport fandom (Mastromartino et al., 2020), the main actors in the Twitter conversation around niche sports are organisations and mainstream media. This salience makes it difficult for niche sport sponsors to invest in social media (G. P. Greenhalgh & Greenwell, 2013).

The classification of user profiles into different categories according to origin, profession or sporting results gives our research significant added value by transferring the scope of events to a global digital environment. This suggests that social media influence spans traditional boundaries and expands the reach of events to a broad digital sphere. This could be particularly relevant for event organisers and athletes of niche sports in their digital communication strategy.

3.9 Limitations and future lines of research

One limitation of our research is that it does not consider the dynamic nature of social media. The temporal dimension could also be included in future research to compare the interaction network in different time periods (before, during and after the event) as Abeza et al. (2014) did. In this regard, it would be useful to analyse the network evolution throughout the duration of the event. Other important limitation is the expert panel and its size. The research results depend

on this consultation. One way to improve this research outcome would be to expand the group of experts. At least this study has proved the utility of applying AHP methodology to the problem of quantifying influence.

As future lines of research, it could be interesting to compare these results with another sporting event (World Cup or European Championships), to determine whether the most influential users follow the same pattern as this research. In this way, the conclusions that refer to the grouping by categories of the different users or the geographical origin of the accounts and their relationship with the sports results obtained could be verified. Another line of research would be to analyse the scope of the Twitter posts of the different influential users over their communities. In this way, the impact could be better estimated, both in terms of media coverage and sponsorships, either of the event itself or of a particular athlete. Finally, further research could test whether these results could also be useful for other social networking sites, such as Facebook or Instagram.

3.10 Conclusions

Influence in Twitter is constructed from a variety of perspectives. Following the AHP methodology, we were able to draw up an index for assessing the relative degree of influence of a user who participates in a Twitter conversation. Aspects more related with quality rather than quantity were rated better by the experts consulted. The variables referring to authority (number of retweets and PageRank) were considered to feature more important Twitter influence than those referring to activity (number of tweets and outdegree).

This influence index was applied to Twitter conversation during the 2018 UCI Track Cycling World Championships. The fact that it is a niche sport enabled us to delve into the digital communication around a lower-demand sport. The global conversation confirmed the cultural dependence of this kind of sports. In

addition, the top 25 influential users were shaped by cycling organisations, athletes, media and public figures.

Although influence is a contextualised and complex phenomenon, the use of AHP provided a useful tool for identifying the most influential users on Twitter. This list helped to approach a niche sport with the aim of determining more accurately who leads the online conversation. In this regard, our research reveals the important role that social media can play when promoting a niche sport without opportunities for consideration in the traditional media. If a proper strategy is developed through the right social media influencers, it can make a significant impact.

4 Los influencers de Twitter en el deporte. Comparativa de los Mundiales de Ciclismo en Pista 2016 y 2018

Este capítulo 4 es una version adaptada del artículo publicado en la revista Social Sciences, con los siguientes datos.

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4.1 Abstract

Social media has consummated a sea change in the way users view and participate in sporting events through the media. In the digital medium, identifying the profiles with the greatest influential capacity is a key issue. Using the analytical hierarchies process (AHP), the aim of our research was to identify the most influential Twitter accounts in a major sporting event: The Track Cycling World Cups. The competitions from the years 2016 and 2018

were analysed, downloading all the tweets that included the official hashtag of each event and drawing up the graph of mentions and retweets. After reviewing the literature, activity, authority and popularity were defined as dimensions to assess influence, and two subcriteria were chosen as measures for each of them. Activity was measured by number of tweets and outdegree, authority by retweets and PageRank, and popularity by number of followers and indegree. By consulting experts following the AHP approach, various weights were assigned to these measures, resulting in authority as the most influential. With this weighting, the accounts with the greatest influence on Twitter turned out to be those related to organisation of the event and those of the athletes taking part.

4.2 Introduction

The online medium has significantly changed the way in which media audiences consume sporting events. Social networks have allowed fans, viewers and different stakeholders to achieve a high level of interconnection and interactivity focused on these sporting events and the news generated. This interconnection has spread regardless of national or cultural borders, turning this digital communication environment into a global exchange of shared experiences, discussion and participation between people of different places and status. Studies such as those by Pardo & Calle, (2016) on the Youth Olympic Games are a reflection of this evolution of social networks in the field of sporting events. This study details how, through the internet, the media and large companies are losing the leading role they previously had in favour of users, and the role that the International Olympic Committee plays as a precursor of social networks in the field of sport. All this with a detail of the evolution presented by the different editions of the Olympic Games and their presence on internet.

Previous works have demonstrated how the digital medium has come to play a crucial role in the consumption of sports through the media. Several studies have shown that fans engage in a variety of behaviours around and during sporting events in the online world, including relationships with athletes (Clavio et al., 2013), the exchange of information (Blaszka et al., 2016) or the interactivity in this exchange of information (Clavio & Walsh, 2014)). Other research has also shown the participation in the digital medium of the different sporting organisations (E. Frederick et al., 2014; Lebel & Danylchuk, 2016), how athletes use this medium for the development of their personal brand (E. L. Frederick et al., 2015), or how organisations engage with fans (Thompson et al., 2017).

Sporting events are prime examples of interconnected environments that provide the public with a shared context in which to enjoy a sports competition and global electronic communication. At the same time, they illustrate the changing face of sports-consuming audiences, the potential scope that these events have within the online environment and, therefore, how they have evolved as a result of this more global and accessible digital communication. All these aspects were presented by Wang (2015), while also attempting to predict the attitudes of users participating in social media during these sporting events.

However, the dynamics and measurement of this digital communication involve different parameters than those of conventional media, where the audience is the main indicator. In the online medium, the logic of network communication requires measures to assess which users have the greatest ability to influence the general conversation. This is not a simple question, mainly due to the complexity of the interactions. For example Meenaghan et al. (2013) analysed how the growth of social media constitutes a great opportunity for sports entities and other companies if they can gauge the effectiveness and impact of campaigns on social networks like Twitter. Just as there is a lack of definition of clear parameters to define the influence on online media, it was not possible to detect any study on influential users in niche sporting events. Although the study by Yan et al. (2019)features users with

influence on a large-scale event, such as the 2017 UEFA Champions League Final, that study did not present the combination of different variables to arrive at a single ranking of influence.

Our article contributes to covering this gap. As the aim is to address such a complex phenomenon as influence on social networks, two techniques were used, the combination of which is also novel. The social network analysis (SNA) technique, which attempts to characterise the interaction of numerous agents, has provided a first basis for activity on Twitter. Subsequently, the analytic hierarchy process (AHP) was applied. This methodology is especially appropriate for this problem, as it allows us to quantify the attributes of a certain phenomenon based on a series of assessments provided by experts. One advantage of AHP is that it ensures the consistency of these judgements, thereby increasing the reliability of the results.

Given the context, this research takes a two-pronged approach. On one hand, identifying the weight of the criteria that measure influence in the Twitter social network and, on the other, discovering which profiles have the greatest weight in said criteria in the context of a major sporting event. For the analysis, two editions of the largest track cycling event in the world were considered: The World Championships. The analysis focused on the event held in London in 2016 and the one in Apeldoorn (Netherlands) in 2018. For the analysis of both, the official hashtags created by their organisers were used; in the case of London 2016, #TWC2016, and in the second event, #Apeldoorn2018. The two editions were chosen to compare and contrast the use of Twitter, and thus analyse possible similarities and differences in the users who participated in the conversation of the two events. The aim is to better understand the influencing process on Twitter.

4.3 Literature Review and Theoretical Framework

4.3.1 Influence and Social Networks

Journalism in general and the work of journalists have undergone a great transformation in recent years. Immediacy and therefore expiry of information, the capacity to produce content by different users and interactive materials are some of the changes derived mainly from the introduction of the internet and with it from the digitisation of the work processes through the implementation of tools and services that did not previously exist. Veglis & Maniou (2018) provided an explanation of the changes taking place, starting from the two-step theory and its evolution towards a model of communication flows with a solid base in Big Data and macro data.

Social media platforms have a great responsibility and play an important part in this transformation of journalism and journalistic work (Campos-Freire et al., 2016). The first social network platforms, such as MySpace or Facebook, which emerged as of 2004, are the ones that led to great changes in the behaviour of people in general (Ayala, 2012; Gil Antón, 2012; Moyano et al., 2007) and of many jobs and organisations in general, and in journalism in particular (Figaro et al., 2015; Herrero Curiel, 2012). This is due to the fact that, although previously journalists were practically the only ones with the capacity for the production and "spread" of news, the arrival of the networks means that anyone has the capacity to create content and achieve its dissemination via these platforms, without the need for the support or endorsement that journalism involves for a communication medium.

In recent years, social networks applied to sport in general—and Twitter in particular—have been the subject of different analyses with their consequent conclusions, such as (Gallardo-Camacho et al., 2016; Pérez Dasilva et al., 2015)Gallardo-Camacho et al. (2016) or Pérez-Dasilva et al. (2015). There are also other studies that cover a wide variety of topics, such as Pegoraro (2016), which examined professional athletes who used Twitter and the object of its use, or Sanderson & Hambrick (2016), who studied the activity on Twitter of different journalists in the field of sport. Likewise, different sports have been the

subject of study, and among them cycling, the sport the object of our research. For example Kassing & Sanderson, (2010) analysed the tweets sent by the cyclists taking part in an edition of the Giro d'Italia. All of these articles hinge around the use of Twitter among different users, and the main research focuses on the study of activity in this social network.

Several sporting organisations have also used Twitter to share information, communicating and interacting with their stakeholders (Hambrick et al., 2010), and the study by (Witkemper et al., 2012) showed how Twitter presents an opportunity for organisations to engage in timely and direct contact with their audiences. In fact, other communication and marketing studies have examined the use of social media as a sports marketing tool. For example, Armstrong et al. (2016) explored The Los Angeles Kings' social media marketing strategies and concluded that social media provided the team with an opportunity to foster the development of relationships and the brand community.

Finally, and in reference to our topic of analysis, influence and users, different studies have already discussed these users on Twitter, both in different sports and in other settings with different objectives. For example Clavio et al. (2016) analysed the interaction of a football team's community on Twitter. Hambrick (2016) examined how bicycle race organisers and Twitter users disseminated information through the network to promote their events. Likewise, Hambrick & Pegoraro (2014) examined the social media communities that formed during the 2014 Olympics, Naraine et al. (2016) compared national and international multi-sport events, and Blaszka et al. (2016) looked into the use of the hashtag on Twitter during the 2011 World Series. These studies identify those users with the highest use of Twitter or analyse the interaction that is generated between the different users of an event or around a certain hashtag, but they fail to identify or define the parameters of influence.

We could define social influence as the ability of a user to intentionally or unintentionally, and based on their opinions, produce changes in the beliefs, attitudes, motivation or behaviour of others (Day, 2020). Specifically, in the

social media environment, this influence can be understood as the ability to control the flow of information (Toole et al., 2012) and influence the interactions taking place among users that form a network (Leavitt et al., 2009). The different users who participate in social networks, including the communication media, adapt their ability to influence others in an environment of change. Although social networks allow access to all users, not all users are the same, and they differ from each other by their ability to influence others, as this will determine the impact and scope of the global conversation (Fuchs, 2014). Influence therefore becomes an extremely important value in this context of massive information flows.

4.3.2 How to Measure Digital Influence

To extract data from social networks and thus be able to determine the different variables or parameters that can be part of the measurement criteria, it is possible to use different methodologies. User-generated content (UGC) is therefore the object of study, on the basis of which several methods are applied to extract information. The studies by Saura, Reyes-Menendez & Bennett (2019) or Saura, Reyes-Menendez & Filipe (2019) provide a vision of the way in which this data gathering is possible and the comparison between different methodologies. The importance of these two studies also lies in the fact that they both use the software applied in our analysis, Gephi. The former analyses the education sector, and the latter examines the digital marketing sector, in a comparison between approaches. They are therefore indicative studies of the importance and possibilities of the large amount of user-generated content (UGC), and, moreover, in a social network such as Twitter (the same as used in our analysis). Other articles carrying out studies on social networks and which also used this same software are described below: Akhtar et al. (2013) with an analysis about Facebook; Thirumalai et al. (2017) in a cost analysis for Facebook web click data; or Bruns (2012), with a study of conversations on Twitter.

There are also studies on the world of sports that use Gephi software, even in some cases setting out from the SNA, and without the study of any specific social network, analysing sports performance, such as the study by Hurst et al. (2016) focused on women's volleyball. In this study, the social network analysis approach is used and with it, this software. If we focus more specifically on sports events and Twitter, we find the analysis by Gouveia (2018), which studied the conversation generated in this social network over a soccer match in Portugal, a match of maximum rivalry between two clubs in Lisbon, Benfica and Sporting. That study analysed two specific hashtags (one for each club) and the user groups that interact around each of them. This study, similar to ours, analysed the profiles with major influence on the event, but with a great difference; this identification was carried out after the conversation analysis and without identifying the variables belonging to a certain group that might explain this supposed influence.

Another study using Gephi and which could be presented with similarities to ours is that of Yan et al. (2019). In it, they study a specific event, the 2017 UEFA Champions League final and the conversation generated on Twitter with the hashtag #UCL. They present the users with a greater influence on the conversation under three parameters of social network analysis, and even carry out their ranking and categorisation. This study presents the analysis at three specific times of the event, before, during and after it, and the evolution of the interest that was generated around the hashtag at these points of the analysis, and thus takes into account the dynamism of social networks, but it does not analyse the reason for the inclusion in those rankings. With the analysis carried out and as a summary, we present a table (Table 4.1) of different studies that use the same software as that used in our article.

Table 4.1 Studies that use Gephi as software for social network analysis. Source: own creation

Authors	Year	Topics Studied	Social Network Analysed
Bruns	2011	Hashtags, replies, communication studies	Twitter
Hurst	2016	Voleyball, sport performance,	--------
Thirumalai, Sree and Gannu	2017	Social Network Analysis, Cost estimation function, web click data	Facebook
Gouveia, Lapa and Di Fatima	2018	Football, users clusters, sporting events	Twitter
Yan, Watanabe et al.	2019	Football, Uefa Champions League, influence, power dynamics	Twitter
Saura, Reyes-Menendez and Bennet	2019	Education, sentiment analysis,	Twitter
Saura, Reyes-Menendez and Filippe	2019	Digital marketing, data-driven methods, bussines knowledge	Twitter

With all the data generated on social platforms, digital influence is a complicated concept to measure due to its multidimensionality and the large number of variables that appear in digital networks. Several formulas are used to measure it. Riquelme & González-Cantergiani (2015) detailed and classified the different measures used in the scientific literature on the influence on Twitter, and the importance of the need to know variables to be able to define the most influential users. As detailed in their study, the variables that can be part of the different criteria are very varied and come from different sources, such as the Twitter tool per se, complex mathematical models or rankings used in web analytics. Therefore, the totality of this review leads us to the adoption of three widely used and specific dimensions for Twitter: activity, popularity and authority (Lamirán-Palomares et al., 2019; Riquelme & González-Cantergiani, 2015):

1. Activity: A user is considered active when their participation in Twitter is constant and frequent, regardless of the attention they receive

from other users. When talking about participation, reference is made to all activity that is measurable in a broad sense. In this sense, some of the variables analysed are the generation of original tweets and retweets, mentions or responses. The most active users may generate a large volume of information to be spread throughout their network of contacts.

2. Authority: A user has authority when they post messages that arouse the interest of other users, that is, they receive many retweets, quotes or likes, which would be some of the variables considered. So, a user has great authority when they have links with other highly connected users in the network that enhance their range. Authority is linked with the interaction among the actors in a network. The key to providing a user with digital authority is thus their ability to actively or passively connect to the digital debate.

3. Popularity: A user is deemed popular when they are acknowledged by many other users of the network. One example could be a celebrity, who need not necessarily be considered as active. A priori, the number of followers is one of the main variables of this indicator. The greater the number of followers, the greater the popularity of a user to and their potential to circulate the information. However, some research works have already noted that users with a high degree of popularity are not necessarily influential on Twitter (Cha et al., 2010).

4.3.3 Research Questions

Within these dimensions, we see how many and different variables can be identified as part of them: generation of tweets, retweets, number of followers, connections with other users, responses to tweets, etc. So, once the dimensions and the possible variables were identified, we would ask ourselves three questions on which to base our research:

RQ1: What would be the most appropriate weight of each of these three dimensions (activity, authority and popularity) that would allow us to quantitatively assess the influence of a sporting event?

To this end, we shall measure the dimensions already identified (activity, authority and popularity) by different variables. Through this question, we try to ascertain the weight of the dimensions and the key variables for a user to be considered influential. Thanks to this information, users can be classified based on general interaction over the course of events, before posing the second research question.

RQ2: Which user profile (based on its assignment to different groups) holds the highest positions according to the dimensions and variables analysed?

A priori, it could be considered that some specific roles would occupy the positions of "greater influence" as stated in the studies by Hambrick et al. (2010) or Naraine et al. (2016), where a relevance in the conversation is indicated by the fact of occupying a certain role (organiser or journalist). In our event, we shall observe the users ranked best based on the above dimensions and assign them to certain categories and roles.

RQ3: Where do the users with a greater influential capacity come from?

Once the users are categorised based on their occupation and role, it is interesting to analyse the geographical origin. Studies such as those by Toole et al. (2012), distinguish the geographical origin of influencers, and therefore consider that in a sporting event the most influential profiles may be conditioned by the country or area of origin, which may be an interesting observation. The country organising the event or those teams with the highest number of medals are parameters to consider in this analysis, and studying whether these or other variables act as conditioning factors for Twitter influence will be of interest and thus the object of research.

Finally, the great contributions of our study, which have not been made at any previous time, are therefore: (i) the analysis of social networks in niche sporting events compared to the analysis of large events; (ii) the identification and

establishing of a criterion that combines different dimensions to measure influence; (iii) the use of a new methodology in our sector, combining a highly contrasted software in the analysis of social networks, with another multicriteria methodological process, as detailed below.

4.4 Methodology

4.4.1 Social Network Analysis (SNA)

Social media can play an integral role in the experience of sporting events to varying degrees and with different effects, either to highlight positive effects such as supporting athletes or to expose negative issues and problems. Researchers can explore these activities on social media through social media analysis (Social Network Analysis, SNA), which suggests that individuals and groups form relationships, and the combination of individuals, groups, and their accompanying relationships form networks used to exchange information and other resources. Social networks can be developed without any connection to sports facilities (Maclean et al., 2011) and teams (Warner et al., 2012). They can also occur in online environments, as the SNA facilitates the creation of these networks (Bruns et al., 2014). SNA can help event organisers understand how different communities emerging on social networks develop and expand their knowledge, and how these communities can play a critical role in the conversations that take place around their events, whether through positive or negative word of mouth (WOM) (Sahelices-Pinto & Rodríguez-Santos, 2014).

Two methodologies were used to carry out our research. Initially, the SNA served to identify a part of the variables related to influence on Twitter. SNA arose from the Gestalt Theory (Lewin, 1939) the, who formulated the theory with a graphic analysis. Later, other researchers such as Freeman (1978) or Lozares (1996) developed and applied the mathematical basis of the theory. SNA studies the patterns of the situational relationship between the different actors to gauge the social behaviour of a population and evaluate the interdependent actions among the different users, even though not all users are directly related (Scott, 2017).

SNA can help achieve a better understanding of how the different users taking part in the conversation use a social network such as Twitter. Wasserman & Faust (1994) defined social networks such as collections of individuals, organisations and events, plus the shared relationships between all of them. Social network analysis examines them by observing their members in their natural environments, defining their roles within the social network and analysing their network of relationships (Wasserman & Faust, 1994).

Researchers use social media analytics to explore different groups and events using sociograms that visually represent members of social media and their relationships. Each member of the network is represented by a single point (node), and a line joining two nodes indicates that the members of the network share a relationship. The collection of nodes and lines becomes a sociogram, and the resulting diagram shows the members of the network, their shared relationships and the collective social network (De Nooy et al., 2005). Sociograms describe the social network, helping to identify the influential network members who spread information to others in the network. The most influential members are generally located near the centre of the network and have a greater number of lines or relationships linking them with other members. Less influential members have fewer relationships and position themselves in remote locations along the periphery of the network (De Nooy et al., 2005).

Although SNA is now a common methodological approach in many areas, more recently it has become the focus of research in the field of sports. In this sense, Wäsche et al. (2017) provided a general assessment of the utility of the theory, showing a range of different applications to investigate sports management. Quatman & Chelladurai (2008) went further, exploring patterns of social interaction between different academics in the field of sports management, using a social network perspective. Blaszka et al. (2016), Hambrick (2016), Hambrick & Pegoraro (2014) and Sanderson & Hambrick (2016), have already used this methodological approach to identify popular users on different social networks. SNA can help event organisers understand how social media communities are structured, thereby expanding the

knowledge necessary to manage and administer the conversations that communities develop around these events, which is clearly exemplified in our research.

4.4.2 Analytic Hierarchy Process (AHP)

After SNA, the second methodology applied was the Analytical Hierarchy Process, also known as AHP, developed by Saaty (1980) and designed for solving complex problems with multiple possibilities. The AHP method is based on the evaluation of different criteria to arrange a process into a hierarchy in order to optimise decision-making. This methodology is used for problem solving where it is necessary to prioritise between different options and decide the most convenient one. These decisions can range from simple personal and qualitative decisions to highly complex quantitative conclusions. The hierarchical analysis process thus becomes a flexible and robust multicriteria decision-making tool, and it is used in problems where both quantitative and qualitative aspects must be taken into account.

The AHP technique organises the critical aspects of a problem into a hierarchical structure and reduces complex decisions to a series of comparisons, thus allowing hierarchisation of the different criteria assessed. AHP has been applied to resolve a wide variety of problems and is based on the principle that the experience and knowledge of the actors are as important as the data used in the process. When tackling a problem, this process calls for subjective assessment by means of a questionnaire from a group of experts regarding the importance of the different criteria for its resolution, specifying the relative importance of each of them. To this end, the different criteria are compared in pairs, first among the different criteria, and subsequently between each of the subcriteria, using a scale from 1 to 9, where 1 assumes the same importance of the two variables compared, and 9 assumes an extreme importance of one against the other. Rankings of 3, 5 and 7 show different degrees of importance of one compared to the other.

After each expert evaluates the criteria through the aforementioned scale (1, 3, 5, 7, 9), an individual matrix is created that contains the pairwise comparisons or judgements. In this matrix, all the elements are positive and verify the properties of reciprocity and consistency. Consistency is checked using a ratio that reflects how consistent the judgements made by experts are in relation to large samples of purely random judgements. This consistency ratio is a value that is calculated and compared with a reference value that varies according to the size of the matrix (Cheng & li, 2001; Saaty, 2008). In our case, the consistency ratio considered as a reference was 10% (Saaty, 2008). If the value of the consistency ratio obtained is equal to or less than 10%, it means that the evaluation within the matrix is acceptable and that there is a good level of consistency in the pairwise comparisons. In contrast, if the consistency ratio is greater than 10%, it is because there is an inconsistency in the pairwise comparisons and, therefore, the evaluation process of that expert should be reviewed or discarded. An acceptable consistency ratio (less than or equal to 10%) helps ensure reliability in the decision-making process. In order to merge the individual judgements from each expert into a single rating representative of the entire group, the geometric mean is used. Saaty (2008) recommends this method, as it maintains the property of reciprocity of pairwise comparisons.

One of the advantages of AHP is the possibility of adding different types of information, which facilitates participation in the process, both of users with a marked technical tendency and others without that profile. Likewise, it allows for the development of very different types of analysis, with purely quantitative situations, or others with qualitative situations. The hierarchical analysis process is ideal in the multicriteria decision-making problem, given its relative simplicity in application, as demonstrated by the various applications recorded in the literature. For all these reasons, AHP constitutes a very adequate methodology to face our problem, given the complex dimensions of which the social phenomenon of influence on Twitter is composed.

4.4.3 Data Variables

From the identification of the three fundamental dimensions of influence, a pair of variables associated with each dimension was determined. According to AHP nomenclature, the dimensions would work as criteria and the variables as subcriteria. In each dimension, one of the variables or subcriteria would correspond to a measure of centrality of the SNA (outdegree, PageRank and indegree) and the other would be provided by the activity on Twitter. In this sense, the activity would be measured by the number of tweets, and by the tweets with mentions to other users (outdegree); authority would be measured by the number of retweets and PageRank, and popularity by the number of followers and mentions received from other users (indegree) (Lamirán-Palomares et al., 2019).

In SNA, each node has a degree of centrality, characterised by its relative position within the network according to the users connected to it. The interactions of each user (node) are differentiated between indegree (interaction initiated by the node) and outdegree (the interaction is directed at the node)(Newman, 2010). In addition, we use PageRank, a measure that assumes that a user is important when mentioned by other important users. PageRank was developed by Google to provide the organic positioning of web pages in search results. PageRank assesses the likelihood that a user who randomly clicks on links will reach a particular page (Page & Brin, 1998). Table 4.2 shows the detail of the variables with their explanation.

Table 4.2 Variables that make up each dimension of influence on Twitter

Dimension	Variables (Origin)	Description
Activity	Number of tweets (Twitter)	Tweets published by a user during the data capture period
Activity	Outdegree (SNA)	Tweets published by a user during the data capture period
Authority	Number of retweets (Twitter)	Tweets published by a user during the period and retweeted by other users
Authority	PageRank (SNA)	Value that measures the importance of the user according to the Google algorithm applied to the interactions received during the capture period (retweets and mentions)
Popularity	Number of followers (Twitter)	Users following an account
Popularity	Indegree (SNA)	Number of mentions of a user received during the capture period

4.4.4 Research Process

Figure 4.1 shows the phases of the current research. After each event was held, the tweets were downloaded. Through the Audiense platform, the tweets that included each hashtag were captured. It is important to note that the hashtags analysed (TWC2016 and Apeldoorn2018) were not used simultaneously for any other topic apart from the event studied. In fact, the hashtag #Apeldoorn2018 refers solely and exclusively to the event that we analysed, and the hashtag #TWC2016 was subsequently used at the end of that year for two events that had nothing to do with ours, and at no coinciding point in time, so it was not possible to include any of these in our corpus. Audiense is a platform that allows access to the Twitter API (Application Programming Interface). We asked for all the tweets where the hashtag of each event was included.
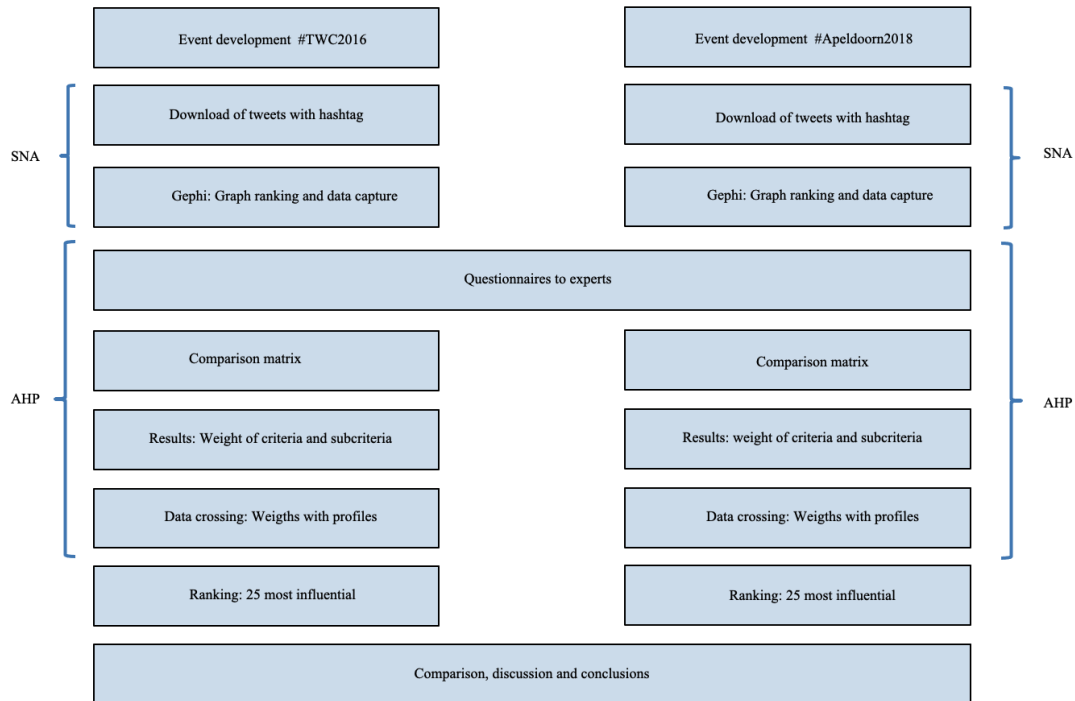
Figure 4.1 Detail of the steps carried out for the research in the two events

Next, the variables associated with influence were evaluated, according to their three dimensions. Using Gephi software (Bastian et al., 2009), graphs of the interaction between users (including mentions and retweets) were constructed and variables from the SNA were calculated. Subsequently, the experts were consulted to establish the weight of the various criteria (activity, authority and popularity) and subcriteria (Lamirán-Palomares et al., 2019), using AHP methodology.

The questionnaires were transferred to fifteen heterogeneous experts from both the professional and academic spheres, who, in addition to working on aspects related to digital communication, had to be active users on Twitter and, therefore, be accustomed to the use of this social network. In order to provide an objective view of the different variables that make up influence, these experts worked or had worked in agencies where they managed different social media accounts, and so could provide a vision beyond the subjectivity of simple social media users. As a common factor among these experts was that they were all located in the same country, and to reinforce and avoid

possible errors due to bias and subjectivity, once the questionnaires had been completed, they were subjected to an analysis of the degree of inconsistency, according to the AHP methodology per se.

Questionnaires were conducted with the experts in order to assign a balanced weight to each variable, so that the degree of influence of the users could be quantified. The questionnaires were completed following the AHP methodology, that is, with pairwise comparisons of the different criteria and subcriteria. Of the fifteen questionnaires completed by the experts, three were eliminated, as they presented a consistency ratio greater than 10%, the reference value according to AHP methodology. With the results of all the experts, the geometric mean was calculated, as recommended by Saaty (2008), to obtain a single judgement representative of the entire group. Then, the final weight of each subcriterion was calculated from the geometric means.

Next, the 25 highest rated user accounts from each of the six subcriteria assessed in the research were identified and ordered. Given that some of these accounts appeared in more than one subcriterion, it was normalised by the sum of the value of each of them and the weights obtained were applied, identifying the 25 most influential user accounts. Finally, the users were categorised into seven groups according to their profile. One of the authors made an initial classification and another revised it. When there was a discrepancy, the third author was consulted. The seven groups were as follows:

- 1 = Athlete taking part in the event;

- 2 = Media (press, radio, TV, etc.);

- 3 = Fans in general;

- 4 = Cycling-related media (magazines, websites, etc.);

- 5 = Journalists, bloggers, former cyclists;

- 6 = Related institutions (federations, team, organisers);

- 7 = Others not attached to the previous groups.

Finally, the comparison and analysis of the results obtained in the two events were carried out. For each of the two events, London 2016 and Apeldoorn 2018, the number of tweets and users were different. In London, the users numbered more than 20,000 and in Apeldoorn only 7281. The 25 highest rated user accounts from each of the six subcriteria assessed in the research were identified and ordered. Coincidentally, 89 total accounts were identified in each event as the sum of the 25 most influential accounts for each subcriterion. Table 4.3 details the general data of each of the two editions analysed.

Table 4.3 General data of the two world championships analysed

Event	UCI Track 2016 World Championship	UCI Track 2018 World Championship
Event location	London (UK)	Apeldoorn (Netherlands)
Event date	2–6 March 2016	28 February–4 March 2018
Official hashtag	#TWC2016	#Apeldoorn2018
No. tweets analysed	55,572	19,701
Users taking part	20,175	7281

4.5 Results

4.5.1 Criteria and Subcriteria of Influence

Table 4.4 shows the ranking of the subcriteria that determine the influence of a user on Twitter according to the survey carried out. The numbers in parentheses represent the weight distribution of the different criteria and subcriteria considered in the analysis. In the last column, the final weight corresponding to each subcriterion and whose total sum is 100% appears. In view of the results,

we deduced that authority, which includes as subcriteria the number of retweets with 37.28% weighting, plus PageRank, 24.75%, is the criterion whereby a user is considered more influential on Twitter (62.03%), according to the experts consulted. Next, we have popularity (29.59%), which consists of indegree (20.17%) plus the number of followers (9.42%). Finally, at a great distance from the previous two, we have activity (8.38%), with the subcriteria of outdegree (5.16%) and the number of tweets (3.22%). The subcriteria belonging to authority (number of retweets and PageRank) have a higher weight than the other four, and all of them are ranked in the same order as the criteria.

Table 4.4 Weighting of the subcriteria that determine the influence of a user on Twitter

Ranking	Criterion	Subcriterion	Waiting
1	Authority (0.620)	Number of retweets (0.601)	37.28%
2	Authority (0.620)	PageRank (0.399)	24.75%
3	Popularity (0.296)	Indegree (0.682)	20.17%
4	Popularity (0.296)	Number of followers (0.318)	9.42%
5	Activity (0.084)	Outdegree (0.616)	5.16%
6	Activity (0.084)	Number of tweets (0.384)	3.22%

According to the hierarchy obtained from criteria and subcriteria, we shall determine which are the most influential Twitter user accounts during the two editions of the event.

4.5.2 Determination of the Most Influential Users

Figure 4.2 and Figure 4.3 show the graphs of the interaction of users through Twitter during the events studied, considering the interaction as the mentions received among all of them (indegree). Figure 4.2 reflects the London event,

hashtag #TWC2016, and Figure 4.3 the event in Apeldoorn (Netherlands), where the hashtag was #Apeldoorn2018. Each of the nodes is equivalent to a user and its size represents the importance in terms of mentions received. The different colours show the different clusters or groups identified by the Gephi software used.
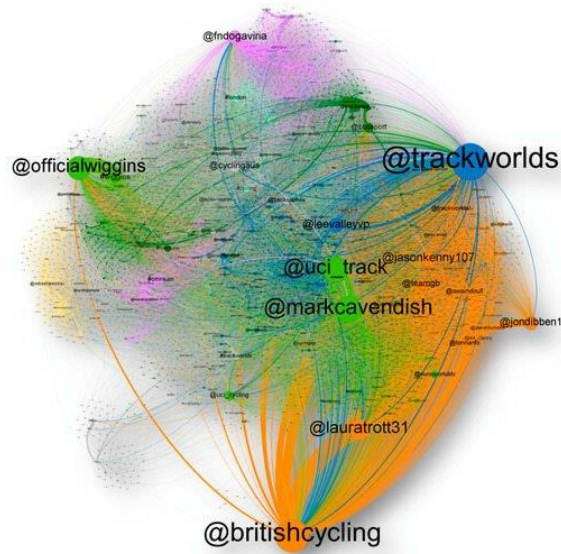

Figure 4.2 Interaction graph of the event with hashtag #TWC2016
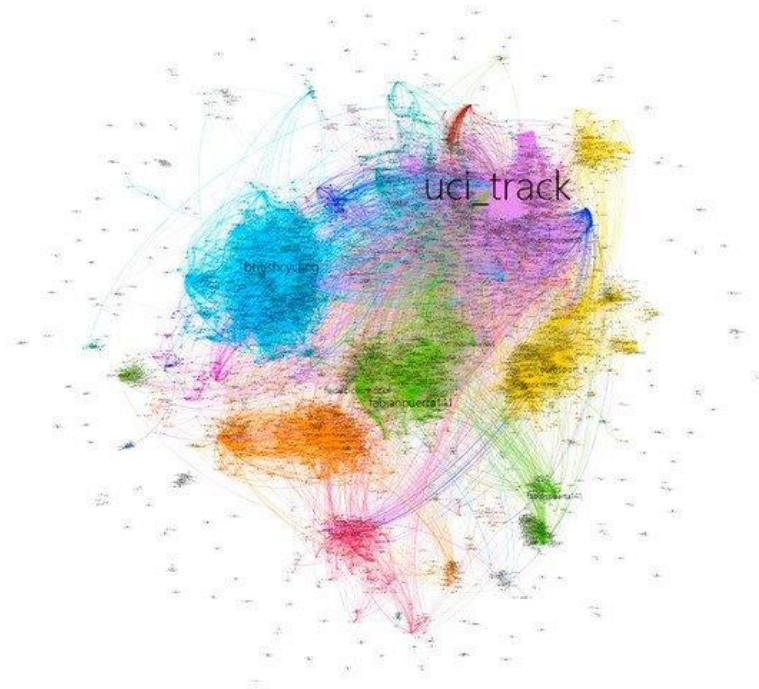
Figure 4.3 Interaction graph of the event with hashtag #Apeldoorn2018

The clusters show users that are grouped by close interactions. The largest nodes are in the case of London 2016 Trackworlds, which was the organising account of the event, and in Apeldoorn2018 the International Cycling Union, UCI_Track. At first glance it can already be seen how in 2016 there was a greater number of influential accounts compared to 2018, where a single account of great relevance appears, the aforementioned UCI_Track. With these graphs, we have synthesised the conversation graphically to identify the relative position of the users in the global interaction.

Table 4.5 shows a comparison, summary and summation of the two events. In the sum of the total of the two events, we find among the most influential accounts: fourteen athletes, (category one); twenty-one related in one way or another to the event such as organisation, federations … (category six); five media outlets (category two) and the rest of the accounts in other categories (three, four, five and seven). It should be noted that the first three, in each of the two events, belong to the same category (six), in particular, that of accounts related to the event organisation. These outcomes give us an idea of the relevant role played by the organisers in promoting the media diffusion of the event. It is also important to note that the (Twitter) accounts of the event, in one case Trackworlds and in the other wkbaanapeldoorn, appear in very different positions. In London, the official account of the event appears as a great influencer in the third position, whereas in Apeldoorn it comes last.

Table 4.5 Grouping of users by category and event. Source: own creation

Accounts	Year 2016	Year 2018	Total
1. Athletes	8	6	14
2. Communication media	3	2	5
3. Fans	1	0	1
4. Specialist media	2	1	3

Accounts	Year 2016	Year 2018	Total
5. Journalists, bloggers ...	1	1	2
6. Event institutions	8	13	21
7. Others	2	2	4
Most influential account	British Cycling	UCI track	
Most influential athlete	Official Wiggins	Fabián Puerta	
Most influential media outlet	BBC Sport	Eurosport IT	
Organising account (position)	Trackworlds (3)	Wkbaanapeldoorn (25)	

Table 4.6 and Table 4.7 show the ordering and classification of the accounts according to the weight obtained in the AHP for each of the events. Analysing the 25 most influential accounts of the 2016 event, we found:

Table 4.6 The 25 most influential accounts with a breakdown by variable and group allocation. World Championship 2016

Ranking	User	Tweets	Followers	Retweets	Indegree	Outdegree	PageRank	Weighting	Category
1	@britishcycling	355	117,368	7812	1842	86	0.02650	0.16265	6
2	@uci_track	236	6817	3741	1315	59	0.01897	0.08960	6
3	@trackworlds	304	5749	1710	1924	120	0.03318	0.08287	6
4	@officialwiggins	26	51,557	919	1243	22	0.01651	0.04458	1
5	@markcavendish	0	1,280,000	0	1453	0	0.01871	0.03861	1
6	@teamgb	107	676,042	1646	531	31	0.00615	0.03852	6
7	@BBCSport	10	5,352,955	1001	345	9	0.00468	0.03638	2
8	@lauratrott31	0	306,000	0	940	0	0.01414	0.02563	1

Ranking	User	Tweets	Followers	Retweets	Indegree	Outdegree	PageRank	Weighting	Category
9	@cyclingaus	256	27,529	639	305	60	0.00784	0.02255	6
10	@leevalleyvp	227	5891	182	468	107	0.00811	0.01891	6
11	@bicigoga	54	112,567	827	242	9	0.00298	0.01827	5
12	@fndogaviria	1	13,932	0	565	1	0.00966	0.01611	1
13	@jasonkenny107	0	101,000	0	613	0	0.00836	0.01565	1
14	@BBCNews	1	6,232,200	0	0	1	0.00002	0.01543	2
15	@jondibben1	0	4353	0	466	0	0.00926	0.01448	1
16	@mundociclistico	55	17,821	484	255	35	0.00259	0.01339	4
17	@PelotonWatch	559	21,999	510	128	20	0.00169	0.01328	4
18	@JuanManSantos	1	4,348,023	133	15	1	0.00032	0.01315	7
19	@skycycling	70	52,449	477	177	2	0.00261	0.01192	6
20	@uci_cycling	57	168,002	212	290	16	0.00455	0.01183	6
21	@azizulawang	27	44,894	333	253	24	0.00334	0.01167	1
22	@GazetteDesSport	317	4487	466	123	26	0.00146	0.01138	2
23	@robayocolombia	682	2635	195	70	144	0.00186	0.01092	3
24	@ThreeSixtyMgmt	10	376	543	109	8	0.00141	0.01061	7
25	@sebastianmorav	20	1497	310	207	15	0.00337	0.01051	1

Table 4.7 The 25 most influential accounts with a breakdown by variable and group allocation. World Championship 2018

Ranking	User	Tweets	Followers	Retweets	Indegree	Outdegree	PageRank	Weighting	Category
1	UCI_Track	294	14,178	3672	2087	73	0.05874	0.23302	6
2	BritishCycling	161	156,532	1189	818	47	0.01803	0.07936	6

Ranking	User	Tweets	Followers	Retweets	Indegree	Outdegree	PageRank	Weighting	Category
3	fedeciclismocol	22	36,990	503	395	8	0.0118	0.0374	6
4	Eurosport_IT	27	73,342	511	339	6	0.01074	0.03567	2
5	Federciclismo	47	25,907	350	339	20	0.01015	0.02987	6
6	fabianpuerta141	3	17,318	0	674	5	0.01598	0.02683	1
7	BBCSport	6	7,250,358	11	40	6	0.00207	0.02647	2
8	FFCyclisme	86	18,543	402	145	24	0.00656	0.02499	6
9	JuanManSantos	1	5,298,442	60	61	1	0.004	0.02393	7
10	RFECiclismo	97	24,890	348	174	21	0.00605	0.02317	6
11	JCF_cycling	79	15,508	449	144	3	0.00359	0.02315	6
12	ClaraLuzRoldan	1	26,023	222	222	0	0.00697	0.01888	5
13	ItaliaTeam_it	6	51,811	219	166	0	0.00675	0.01755	6
14	TeamGB	17	928,775	234	143	13	0.00257	0.01728	6
15	mundociclistico	17	37,116	260	204	8	0.00318	0.01697	4
16	SebastianMoraV	7	2187	150	277	7	0.00603	0.01681	1
17	carlosvives	1	4,988,539	0	0	1	0.00004	0.016	7
18	chloedygert30	8	4619	0	305	10	0.00852	0.0143	1
19	alberttorresb	36	3135	64	229	39	0.00595	0.0141	1
20	gannafilippo	8	2938	0	290	9	0.00753	0.01308	1
21	maximilianlevy	8	2968	0	246	9	0.00662	0.01136	1
22	Coninews	5	236,970	151	140	2	0.00226	0.01121	6
23	Japan_Olympic	1	399,065	104	102	0	0.00321	0.00999	6
24	usacycling	13	59,591	53	162	14	0.00409	0.00971	6
25	wkbaanapeldoorn	85	947	46	123	34	0.00395	0.00966	6

- Eight accounts belonging to athletes, seven men and one woman (category one),
- Eight that were related in one way or another to the event (category six) (organisation, federations ...),
- Three media outlets (category two),
- Six different accounts from other categories.

This distribution is accentuated even further in the top ten positions, as there are six accounts related to organisation of the event, namely @britishcycling, @ucitrack, @trackworlds, @teamGB, @cyclingAUS and @leevalleyvp; three profiles of athletes (@officialwiggins, @markvavendish and @ lauratrott31) and one media account (@BBCSport).

Observing the origin of the athletes who appear in this classification, those of the British team stand out, as five of their profiles appear here, (@officialwiggins, @markcavendish, @lauratrott31, @jasonkenny107 and@jondibben1). We have one Colombian cyclist@fndogaviria, one from Malaysia (@azizulawang) and closing this classification, one Spanish rider (@sebastianmorav). It should be noted that this presence in the ranking comes about in very different ways, as there are several runners who do not present any activity during the course of the event (Cavendish, Trott, Kenny and Dibben), and others who do so intensely (Wiggins, Wang and Mora).

After the athletes, among the 25 most influential profiles, we then find general media, then specialist media, and finally others not attached to any of the above categories. This is the case of the profile of Colombian President Juan Manuel Santos, who appears in this list for his "participation" in the event by congratulating Colombian runner Fernando Gaviria (who also appears in the ranking) for winning his medal.

If we look at the 2018 event, among the 25 accounts we find:

- Thirteen related with the event (category six),

- Six athletes, five men and one woman (category one),

- Two media (category two),

- Four accounts from other categories (four and seven).

It should be noted that the first three accounts, UCI_Track, BritishCycling and Fedeciclismocol (the Colombian Cycling Federation), and also the fifth, (FederCiclismo) belong to the same category, that of accounts related to the event organisation, category six. Thus, and as in the 2016 edition, these results confirm the relevant role of the organisers as promoters of the event.

In the 2018 edition, the next group in importance is that of athletes. In this group, the Colombian Fabián Puerta and Spaniards Albert Torres and Sebastián Mora stand out (also appearing in 2016), along with Italian Filippo Ganna and Germany's Maximilian Levy. The only woman who appears in this ranking is the American Chloe Dygert. Notably, it should be mentioned that all the athletes who appear in this ranking won a medal during the championship, and it is also noteworthy that no athlete from the organising country (Netherlands) appears in this classification, although there were several who had a presence in the medal standings and also had profiles on Twitter.

Lastly, we have another six profiles, two from the mainstream media, Eurosport from Italy and the BBC, which were two media outlets broadcasting the event, and four from two different groups. These were three "public" characters: Juan Manuel Santos, (Colombian President who also appears in the 2016 ranking), Carlos Vives (Colombian singer) and Clara Luz Roldan (Colombian politician), as well as a specialised magazine (*Mundo Ciclístico*). These four profiles have in common that they are Colombian in origin. This circumstance is related to the medal gained by one of the athletes present in the ranking, the Colombian Fabián Puerta. This data item could reflect the popularity of track cycling and, in particular, of the event analysed in Colombia.

Next, Table 4.8 and Table 4.9 reflect the distribution by categories and geographic origin of the different users for the two editions of the event, in

addition to the detail of the medals achieved by each of the countries that had influential users.

Table 4.8 Distribution of influential users by country and category. 2016 Event

Country	Medals	Influential Users	Influential Users Category						
			1	2	3	4	5	6	7
Germany	8	0							
Australia	5	2				1		1	
Colombia	5	5	1		1	1	1		1
Spain	2	1	1						
France	3	0							
Great Britain	9	12	5	2				5	
Italy	1	1		1					
Malaysia	0	2	1						1
The Netherlands	4	0							
USA	2	0							
Others	22	2						2	

The user categories are as follows: 1—Athletes; 2—Media; 3—Fans; 4—Specialist media; 5—Journalists, bloggers; 6—Organisations and/or institutions related to the event or cycling; 7—Other different profiles.

Table 4.9 Distribution of influential users by country and category in the 2018 Event

Country	Medals	Influential Users	Influential Users Category						
			1	2	3	4	5	6	7
Germany	6	1	1						
Australia	6	0							
Colombia	1	6	1			1	1	1	3
Spain	1	3	2					1	
France	2	1						1	
Britain	6	3		1				2	
Italy	6	5	1	1				3	
Japan	1	2						2	
The Netherlands	12	1						1	
USA	4	2	1					1	
Others	15	1						1	

The user categories are as follows: 1—Athletes; 2—Media; 3—Fans; 4—Specialist media; 5—Journalists, bloggers; 6—Organisations and/or institutions related to the event or cycling; 7—Other different profiles.

4.6 Discussion

The aim of our research was to identify influential Twitter users during an event, the Track Cycling World Cup. Two editions of the championship were considered: London 2016 and Apeldoorn 2018. The influence was evaluated according to the criteria of activity, authority and popularity. Thanks to the hierarchical analysis methodology, we were able to assign weights to different variables that measured each dimension of influence. This way, we identified the most influential Twitter accounts for each event and the typology of these accounts/users according to the seven major groups established.

With the results obtained, and in response to RQ1, it was verified that the authority criterion was rated with 62% weighting according to influence, followed by popularity with 29.6% and finally activity with 8.4%, as the order and degree of the criteria to be considered within influence. This highlights the importance of the contents of a tweet, as when the content is relevant it will have a high number of retweets, a subcriterion belonging to authority, which represents 37.28% of the total influence.

Usually, the most important variables used in other sports-related research to assess influence have been the number of followers (Hambrick, 2016; Hambrick & Pegoraro, 2014; Hambrick & Sanderson, 2013), the number of tweets (Hambrick & Pegoraro, 2014) and the different measures of centrality (Naraine et al., 2016; Naraine & Parent, 2016; Wäsche et al., 2017). The outcome of this research may indicate that the number of followers may not be the only suitable criterion to gauge the influence of the user on Twitter, and that others should be considered when choosing influencers at a sporting event.

In fact, the number of retweets received has a weight of more than 37% within the total for influence according to the experts consulted, with the remaining 25% being the PageRank variable. Continuing with the ordering of the subcriteria, the mentions received (20%) would be the next variable to consider, along with the number of followers (9%), the outdegree (5%) and the number of tweets (3%).

Focusing the discussion on RQ2, firstly, the presence of category six user accounts, which are cycling-related institutions, such as national federations or the event organisation, should be highlighted. Between the two editions of the event there were 21 accounts in this category. They are "specialised" accounts that present weights in all the subcriteria, so that the "construction" of influence is carried out from all possible aspects. Secondly, the accounts of the athletes taking part (category one) stand out, of which there were 14.

Therefore, with the quantitative results and the qualitative categorisation defined, the second research question would be answered. The highest ranked accounts are those belonging to cyclists and institutions related to the event, in

addition to the accounts of the different national teams. This result could be understood as logical, given that these users are the main "actors" of the sporting event. This logical assumption that athletes are the most important actors in a sporting event can also be extrapolated to the case of social networks and the possibilities offered both to followers (Stavros et al., 2014) and to clubs and associations (Sanderson, 2014) or the organisers of a sporting event (Sjöblom et al., 2018). In these three studies, the motivations of club fans or attendees of a sporting event for interacting with clubs and at events are already verified. Therefore, if athletes are an important users of networks that generate more interest both in the practice of sport and through their activity in social media or even in other media, the limitation of the use of their social networks, which occurs on some occasions as indicated below, can greatly limit the scope of the conversations that are generated in them.

Moreover, the great importance of event organisers and related accounts (federations, teams, etc.) in providing the event with great media coverage is notable. If these accounts promote that participation, the messages of the rest of the actors involved could be greatly amplified, with all the implications that could be derived. Similarly, it could be seen how promoting the event is not the responsibility of the cyclists, as they are taking part in the races, but if the participation of any of them is achieved, the possibilities of the "involved" being considered as an influencer greatly increase. This point is thus a line of discussion that can be agreed between the organisers of an event and those responsible for the athletes, incentivising the use or participation of athletes in the digital conversation, as in minority sports it this can help greatly to extend the scope and significance of media coverage, or even the construction of an experience with the user, which is much more complicated to achieve in sports or events of the greatest global significance, such as the Soccer or Basketball World Cups, or club competitions in these sports at the highest level.

After this point, we consider it interesting to carry out the analysis of the geographical origin of the accounts that appear in the classification, to try to analyse causes and/or possible connection points and respond to the last of the RQs. One of the parameters that we understand may be relevant is the

origin of the athletes who were awarded a medal in the course of the event (Cerezuela, 2003; Rojas-Torrijos, 2012). Carrying out the geographical analysis of the origin of the medal winners and the influential users as shown in 4.5.6 and 4.5.7, it is important to distinguish between both editions and observe that the greater or lesser influence of these accounts will not always be related to the number of medals achieved in the different trials.

In the 2016 event, Great Britain appeared to lead both rankings. It was the country with the highest number of medals and the one with the most influential users. The fact that it was the organiser country that year may explain the large number of influential users in that edition. This contrasts with the results for 2018, where the Netherlands, despite being the organiser and the country with the most medals, only had one user among the 25 most influential. Equally notable in the same sense were other countries such as Germany and Australia, which despite winning a large number of metals in both editions, had barely one or two users among the most influential accounts. In 2016, Germany won eight medals and had zero influential users and in 2018 Australia got six medals and had no outstanding users. In the opposite sense, Colombia appears, with two medals, one in each edition, and a great following among its profiles in the two years, five in 2016 and six in 2018.

These data on geographic origin could be understood a priori, by trying to link them with the importance that each country attaches to this sport, so in Colombia cycling in all its forms is one of the sports with the greatest media impact, as also occurs in England. On the opposite side we would have Germany and Australia, countries with a great number of successes in this discipline, but with little impact on their digital environment. As we have verified, the participating cyclists (category one) are one of the groups with the greatest presence in the list of influential accounts determined. Their role as promoters of the event can therefore be considered crucial. For this reason, the analysis of the connection between medals achieved and presence in the ranking of influential accounts is interesting. When analysing this parameter, we see that all the athletes who appeared on the list of influencers did achieve a medal, but nevertheless there are many athletes who despite winning a medal

did not appear among the influential accounts. Analysing whether the reason is that they did not take this social network into account, or did not use it, we observe that:

- In the 2016 edition, there were 76 athletes who won a medal.

- From that total, 53 had a Twitter account, so only 23 did not have one.

- Eight athletes appear in the list of the 25 most influential, and of these eight (seven men and one woman) all won a medal.

- In the 2018 edition, 80 athletes achieved at least one medal.

- From that total, 54 had a Twitter account and 26 did not.

- There were six athletes among the 25 most influential accounts, and all of them (five men and a woman) won a medal.

Among the athletes who did have an account, it was analysed whether they used it during the course of the event, understanding "use" as use to send a tweet. Whereas some athletes did make considerable use of it, others sent out only the odd tweet and others never used it at any time. So, again it appears that activity is not the most prominent criterion, and in fact it turns out that, among the most influential athletes, there are some who did not send any tweets. In contrast, this user group did score very high rankings in the other criteria and subcriteria.

In the light of these data, we could extrapolate that, if the athletes who obtained the medal had had outstanding scores in all the subcriteria, their appearance among the most influential accounts could be facilitated. It cannot be concluded that their appearance among the influential accounts is a consequence of the result obtained, but of the sum of all the criteria, just as happens for the rest of the users. Summarising, and responding to RQ3, in the 2016 edition the most influential users came from the organising country, Great Britain, which had 12 accounts in this classification. However, this was not the

case in the 2018 edition, where only the event organiser account appears among the 25 most influential, specifically ranked 25th.

4.7 Conclusions

In conclusion, this current study complements the studies carried out individually for the events of 2016 and 2018, and where initially the identification of the criteria that influence an event on Twitter was the most important research question. Furthermore, this study considers two editions of an event, which confers an important added value to overcoming the limitations derived from the consideration of only one. In addition, our research provides an important fact by adding the geographical consideration of users who appear to be influential in an event and looking for the factors that may define their appearance in this classification. Our analysis and results, notwithstanding the fact that influence on social networks in general and on Twitter in particular is a complex phenomenon to measure, may be useful for future studies of influence on Twitter and potentially on other social media platforms, in addition to serving as a parameter and standards of action for organisers seeking media coverage of an event and its amplification through social networks, especially Twitter.

Finally, another important conclusion to be added would be that even taking into account the complexity of identifying influential users, considering the criterion of authority with the number of retweets as the main variable and the characteristics (categories and origin) of the users influential a priori, would allow us to consider these conclusions not only to learn more about the behaviour of social network users, but also to provide information for the media that use Twitter as a tool to distribute their content and for the brands that seek a presence at an event and/or need to know the possible return on an action carried out on social networks during a sports event. At this time in which traditional media organisations increasingly turn to social networks to recover audiences lost due to the increase in interactivity, provide feedback guidelines and develop a relationship with followers, understanding the complex

phenomenon of influence on social networks becomes a strategic factor for all stakeholders involved in the organisation of a sports event.

4.8 Theoretical and Practical Implications

This study provides other implications regarding the management of sporting events, as this research is useful for all those interested in identifying the most influential accounts in an event. Thus, the accounts of the most mentioned and most authoritative national cyclists and teams could be particularly relevant for those companies interested in sponsoring events. Therefore, national teams and cyclists should pay attention to their Twitter accounts as part of their strategy, due to their impact on the conversation. Similarly, event organisers must be aware that promoting the event cannot be the responsibility of cyclists, as they are competing in races. Rather, this responsibility must fall on themselves, in addition to "taking advantage" of specialist media and those fans with influential accounts according to some of the dimensions analysed. The information they provide can help organisations better understand the customer experience and target the most influential for building relationships and stimulating interaction.

Likewise, and placing this study as a prelude to other subsequent research, once the criteria that measure influence have been identified and the most influential users are identified, the next step could be to analyse the possible impacts regarding return both in media coverage of an event and when evaluating possible sponsorships, either for an event itself or for a particular athlete.

The analysis of the activity on the Twitter social network of athletes taking part in an event could be another of the implications of this study. Sometimes, the activity of these athletes is limited by the indications and "orders" of those responsible for them, either coaches or the event organisers themselves. Thus, for example, during the 2014 World Cup in Brazil, there were several coaches who did not allow or restricted the activity of their athletes on social networks,

so the possibilities for them to take part in the conversation and/or fulfil their sponsorship contracts with some brands may be limited, with the implications that this would entail. Or the International Olympic Committee (IOC) that limits the use that can be made of social networks by athletes during their participation in the Olympics, as dictated by Rule 40 of the IOC Olympic Charter. Or even the practical work by Loayza Valarezo (2015) that analysed possible relationship between the use of social networks and sporting performance. Given all of the above, it would be interesting to know the reasons that caused, for example, the athletes of the Netherlands team to have little activity in the edition of the event analysed in this research.

Gender analysis might be another interesting implication. Studies such as those by Lebel & Danylchuk (2016) or by Burch et al. (2015) already established differences between the ways in which athletes of one sex or another use Twitter, and implications could therefore be established that explain the fact that fewer women appear in the ranking of influencers, one woman only in each of the editions among influential athletes, namely Britain's Laura Trott in 2016 and the American Chloe Dygert in 2018 in Appeldoorn.

4.9 Limitations and Future Research

The most important limitations of this analysis are derived, first of all, from the fact that the study was carried out on a single sport and one of a more or less minority nature. Track cycling is considered a niche sport compared to road cycling, so a comparison with some other trial of a similar scope to those developed in road cycling would be ideal: road cycling world championships, or even one of the great team events, *Vuelta a España, Giro d'Italia* or *Tour de France*. It would be interesting with this comparison to determine whether the results obtained follow the same pattern of influence. The comparison could even be drawn both inside and outside the world of cycling. Thus, future research questions to answer could be whether the network works similarly for other cycling events (for example, the *Giro d'Italia* cited in another research work) or for other sports.

Another limitation is that the results are specific to one social network: Twitter. In our case, the analysis has been carried out on this social network, but it could be compared with other social network platforms such as Facebook or Instagram, which are also relevant (Park et al., 2009). In addition, the growth in the number of users of the latter, more than 1 billion in the world (data as of February 2020) could advise an assessment of a network where the hashtag is also one of the axes of communication, as on Twitter.

The dynamic nature of social media is another limitation. In these networks, changes are constantly taking place. At the start of the trials, the debating networks are some that may be different during the course of the trials and others different at the end. Abeza et al. (2014) and Yu & Wang (2015) reported different results depending on the period of time studied. Abeza et al. (2014) compared the use of Twitter for sponsorship activation by Olympic Programme sponsors during the Sochi 2014 Winter Olympics through the Olympic time period (i.e., before, during and after). In our study, the analysis focuses on the whole image of the entire interaction. The time dimension should also be included to compare the network at different time periods (i.e., before, during and after). Therefore, the analysis could focus on how the network evolves throughout the duration of the event.

5 Discusión de resultados

El objetivo de nuestra tesis era el estudio de la conversación generada en una red social concreta, Twitter, y sobre un evento deportivo de nicho: los Mundiales de ciclismo en pista. Para añadir valor se han analizado dos ediciones de este evento, de manera que nos permitiera una discusión y conclusiones de los resultados que no estuvieran sesgadas por el hecho del análisis de una sola edición. El eje que vertebra todo este análisis es un concepto que ha cobrado en los últimos años un gran interés: la influencia. Por ello nuestra investigación estudia la dinámica de la conversación en Twitter con conceptos que contribuyen a comprender mejor la comunicación digital.

En primer lugar, queríamos estudiar unas dimensiones conceptuales y una serie de variables que pudieran funcionar como indicadores de la influencia. A partir de estas variables se quería elaborar un índice de influencia. Por último, se buscaba identificar a los usuarios con mayor capacidad de difundir la información en los eventos deportivos objeto de estudio.

Estos objetivos cobran especial importancia al ser estudiados y analizados en eventos de un deporte de nicho. La obtención de marcas patrocinadoras resulta más complicada por la escasa visibilidad informativa de estos eventos y el difícil retorno de la inversión publicitaria realizada. Con nuestro análisis, se proporciona a organizadores y a posibles marcas interesadas, parámetros y líneas de actuación que les ayuden a aumentar el alcance de las acciones comunicativas, el número de usuarios impactados y por tanto la visibilidad del evento y de las marcas patrocinadoras.

Veamos si los objetivos específicos quedan resueltos.

O.I.1: Identificar las variables que puedan ser utilizadas para la medición de la influencia en Twitter.

Como primer objetivo en nuestra tesis se buscaba la identificación de unas variables para la evaluación de la influencia en Twitter. A partir del estudio teórico realizado, se identificaron tres dimensiones, autoridad, popularidad y actividad. Una vez seleccionadas estas dimensiones, se identificaron las seis variables que nos permitirían cuantificar las tres dimensiones. De estas variables algunas procedían del propio análisis del SNA (outdegree, indegree y eigencentrality), otras directamente de Twitter (número de tweets y número de seguidores) y otra como el pagerank extraída también del SNA pero al mismo tiempo utilizada por Google para la medición de sus sitios web. Mediante el coeficiente de correlación de rango de Spearman's, se compararon las distintas variables y el grado en que estas variables concordaban.

Una vez realizado estos procesos, se analizó la ordenación de las cuentas más influyentes según cada dimensión y variable. En primer lugar, se constató que cogiendo las variables de centralidad de grado propia (eigencentrality) y PageRank, (ambas pertenecientes a la dimensión de autoridad) la ordenación de las cuentas influyentes era en gran medida la misma, siendo las cuentas más influyentes las de deportistas e instituciones. En segundo lugar, utilizando las variables grado de salida y número de tweets (pertenecientes a la dimensión de actividad), las cuentas mejor clasificadas pertenecían al grupo de aficionados e instituciones relacionadas con el evento, y en tercer lugar si se consideraban las variables número de followers e indegree (de la dimensión popularidad), un número predominante de cuentas pertenecían a instituciones relacionadas con eventos, deportistas, medios especializados y periodistas.

Con estos resultados obtenidos se podía constatar cómo considerando unas u otras variables la identificación de los usuarios influyentes variaba de distinta manera. En algunos casos (dimensiones de autoridad y popularidad) la ordenación era similar, pero sin embargo con la variable, número de tweets de la dimensión actividad, los usuarios identificados variaban mucho respecto de las otras, ya que aparecía un nuevo usuario: los aficionados.

Con los resultados obtenidos en el primer artículo en base al SNA, se respondía al primero de los objetivos planteados y se obtenían conclusiones importantes para la identificación de variables y dimensiones. En dos de las dimensiones, se incluían variables que procedían tanto del SNA como de la propia Twitter. Sin embargo, en una de ellas, la autoridad, ambas variables eran procedentes del propio SNA, la centralidad de grado propia y el pagerank. En ambos casos además la ordenación era muy similar.

O.I.2: Elaborar un índice, a partir de esas variables que nos permita la evaluación de la influencia.

Nuestro siguiente objetivo era la elaboración de un índice que incluyera las variables identificadas. Como hemos comentado se consideraron tres dimensiones en base al análisis de la bibliografía. Estas dimensiones eran: la actividad, la popularidad y la autoridad. Para cada dimensión se iban a asignar dos variables que sirvieran como métrica y como factor adicional y valor importante añadíamos el AHP como metodología para la elaboración de este índice.

En base a lo detectado y con las conclusiones del primer estudio se decidió incluir una nueva variable, el número de retweets, que sustituyera a una anterior, el eigencentrality o centralidad de grado propio. Con la inclusión de esta variable, se podía en primer lugar, explicar de manera clara y coherente todas las métricas que había que comparar, a los expertos que iban a participar en el AHP, y en segundo lugar, se mantenía la lógica de que todas las dimensiones incluyeran variables procedentes del SNA y de la propia Twitter. Además y en tercer lugar se añadía una nueva variable no contemplada en prácticamente ningún estudio anterior que nos permitiría por tanto aportar nuevas conclusiones al respecto.

Por tanto, en cada dimensión, se asignaron dos variables que servían como métrica: el número de tweets y el outdegree para la actividad, el número de seguidores y el indegree para la popularidad y finalmente el número de retweets y el pagerank para la autoridad.

Estas seis variables proporcionan información acerca del impacto de la influencia del usuario en la conversación de Twitter. Para ello, se utilizó la metodología AHP, que nos permitía la elaboración de un índice combinando las diferentes variables de forma ponderada. Estos resultados del AHP proporcionan unos pesos basados en los juicios del panel de expertos que se utilizan en esta metodología, asegurando además la coherencia de esas opiniones mediante el ratio de consistencia, que se explica y detalla en dos de los artículos publicados.

En base a los resultados que se obtuvieron según los expertos de nuestra investigación, la dimensión autoridad (62%) destaca por encima de la popularidad (29,6%) y la actividad (8,4%) como indicadores para que un usuario pueda ser considerado como influyente en Twitter.

Dentro de estas dimensiones, y distinguiendo entre las diferentes variables, la que mayor ponderación obtuvo fue el número de retweets con un 37,3%. A continuación, el pagerank con un 24,75% y el indegree (o grado de entrada) con un 20,2%. El peso que obtuvieron las otras tres variables fue inferior siendo un 9,42% para el número de seguidores, un 5,16% para el grado de salida (outdegree) y el 3,22% para el número de tweets.

Como resultado de esta ponderación, podemos extrapolar que la influencia es esencialmente un fenómeno ligado más a la calidad que a la cantidad. Ello es así ya que en nuestra investigación la dimensión actividad, con las variables nº de tweets y outdegree, no pesa tanto en nuestro índice como las otras dos dimensiones. La dimensión que ha obtenido un mayor peso es la autoridad, con la variable de nº de retweets en primer lugar. Esta variable puede considerarse ligada a calidad de la información que se lanza, ya que genera mucho interés entre los usuarios puesto que, al considerarla interesante, la comparten retuiteándola. Vemos, por tanto, que la influencia puede asociarse a la calidad de la información. Comparando con otras investigaciones sobre Twitter en el ámbito deportivo, usualmente las variables que se utilizaban para evaluar la influencia han sido el número de seguidores (Hambrick & Pegoraro, 2014; Hambrick & Sanderson, 2013), el número de tweets (Hambrick & Pegoraro, 2014) y diferentes medidas de centralidad (Naraine et al., 2016;

Naraine & Parent, 2016; Wäsche, 2015). Con el resultado de nuestra investigación se puede indicar que, para medir la influencia del usuario en Twitter, se deben considerar otras variables que no se habían tenido en cuenta anteriormente de forma conjunta.

El tercer objetivo que nos planteábamos en nuestra tesis venía relacionado con la identificación de estos usuarios influyentes.

O.I.3: Determinar quiénes son los usuarios más influyentes en un evento deportivo de nicho y cuál es su perfil.

Con los pesos que se obtuvieron pudimos identificar a los usuarios más influyentes de cada uno de los eventos analizados. Los dos perfiles de usuarios más destacados en esta clasificación son las organizaciones deportivas y los ciclistas. Hambrick & Mahoney (2011) y Naraine et al. (2016) consideraron que el organizador del evento y los periodistas deportivos ejercerían un papel influyente en la conversación de Twitter durante los eventos deportivos. En nuestro caso, resulta curioso que en los dos eventos deportivos los usuarios más influyentes son los mismos, la UCI track y la British Cycling, si bien el año 2016 es la Federación inglesa (British Cycling) la que ocupa el primer lugar en ese ranking de la influencia y la Unión Ciclista Internacional (UCI) la segunda. Sin embargo, en el evento de 2018, las posiciones se alternan. Esto tiene una clara explicación, ya que en el Mundial de 2016 la Federación inglesa era la organizadora del evento, mientras que en el mundial de 2018 el único papel de esta federación es el de "participante" del mismo. Ese año 2018 la UCI Track es con mucha diferencia, el usuario más influyente (23,3% de influencia normalizada, mientras que el siguiente usuario tiene un 7,9%). Fue el usuario que más publicó (294 tweets) y su base de seguidores fue de tamaño medio en comparación con el resto (14.178). En el año 2016 fue la Federación inglesa (British Cycling), pero esta vez con una ponderación de la influencia normalizada del 16% mientras que el segundo perfil de ese año, la UCI, obtuvo el 8,9%. Además, hay que destacar que el usuario organizador del evento local en el año 2018, que era la cuenta wkbaanapeldoorn, solo aparece en la

posición veinticinco, siendo además y el único de Países Bajos en el ranking de 25 usuarios influyentes.

Centrando la discusión de estos resultados en la asignación a las siete diferentes categorías que habíamos planteado, y considerando el conjunto de los dos eventos, hay que destacar la presencia de cuentas de usuarios de la categoría de las organizaciones relacionadas con el ciclismo, como la British Cycling o la UCI. Entre las dos ediciones del evento, hay veintiuna cuentas de esta categoría. Son cuentas "especializadas" que presentan pesos en todos los subcriterios de manera que la "construcción" de la influencia se lleva a cabo desde todos los aspectos posibles. En segundo lugar, se destacan las cuentas de los deportistas participantes, de las cuales hay catorce.

Con los resultados obtenidos y las categorías establecidas, respondemos al tercero de nuestros objetivos. Se identifican como las cuentas mejor clasificadas las pertenecientes a ciclistas e instituciones relacionadas con el evento, además de las cuentas de las diferentes federaciones o selecciones nacionales. Este resultado podría entenderse como lógico dado que estos usuarios son los "actores" principales del evento deportivo. Es importante destacar también la gran importancia que poseen los organizadores de un evento y las cuentas relacionadas (federaciones, equipos, selecciones…) para ampliar la cobertura mediática del evento, como queda demostrado al comparar el Campeonato de Londres 2016 con el de Apeldoorn 2018. Si estas cuentas promueven la participación, se podrían amplificar de gran manera los mensajes del resto de actores implicados, con todas las implicaciones que se podrían derivar.

O.I.4: Analizar de qué manera contribuyen los grupos de usuarios anteriores al evento, desde el enfoque del deporte de nicho y qué consecuencias se pueden extrapolar para posibles acciones de marketing y promocionales en este tipo de eventos.

Con este objetivo pretendemos constatar una serie de implicaciones que se deriven de los resultados obtenidos, y que puedan servir a la hora de tomar decisiones respecto a posibles patrocinadores, acuerdos publicitarios,

cobertura mediática u otras relacionados con acciones de marketing o comunicación. Estas son dos áreas clave en las que los deportes de nicho intentan conseguir acuerdos que les permitan mejorar su cobertura y audiencias.

A partir de los resultados obtenidos, podríamos confirmar el papel relevante de las cuentas de la categoría de organizaciones e instituciones relacionadas con el ciclismo para promocionar la conversación en Twitter sobre el evento. Investigaciones como las de Yan et al. (2019), en su análisis sobre la final de la UEFA Champions League, obtenían similares resultados indicando el protagonismo de las grandes entidades deportivas en la conversación de la red de Twitter. En ese estudio era la UEFA Champions League la que ostentaba esa posición de privilegio en el ranking. De esta manera, el gran papel de los organizadores se da tanto en los grandes eventos deportivos como en los deportes de nicho. Por ello, la gestión estratégica de las redes sociales por parte de estas instituciones es un recurso fundamental de comunicación.

Otra consecuencia interesante es cómo los ciclistas participantes se convierten en un grupo con una muy importante presencia en la lista de los principales usuarios influyentes, por lo que su papel como catalizadores de la conversación online es trascendental. Podría considerarse a priori que la posición en el ranking es consecuencia de su resultado deportivo, y eso será así si el deportista posee un perfil en la red social y además tiene actividad y menciones en la misma. Sin embargo, si no presenta actividad esa capacidad de generar influencia no existirá. Por ello, el papel de la red social para ampliar la cobertura de los resultados deportivos obtenidos por los deportistas sería muy importante en términos de promoción personal futura. Estos resultados son consistentes con los obtenidos por Kang et al. (2019) para deportes de nicho. También ellos encontraron que, a pesar de su relevancia en la conversación digital, ambos tipos de actores no aprovecharon las oportunidades promocionales en comparación con las oportunidades de interacción e información.

6 Limitaciones y futuras líneas investigación

Nuestra investigación plantea varias limitaciones. Algunas se deben al mismo objeto de estudio, y otras a las metodologías empleadas.

En relación con el objeto de estudio se plantean tres limitaciones principales:

a) La dinámica temporal de las redes sociales. Una limitación de nuestra investigación es la no consideración de la naturaleza dinámica de las redes sociales. Las cosas cambian de un momento a otro, y en los eventos deportivos y las redes sociales las posibilidades de que sucedan hechos en un momento determinado o que aparezcan nuevos actores, puede ocasionar que según el momento en que se realice el análisis los resultados obtenidos puedan variar. De hecho, la red de discusión deportiva es diferente al comienzo de las carreras y durante el final. En esta línea, Abeza et al.(2014) o Yan et al.(2019) ya obtuvieron resultados diferentes según el periodo de tiempo analizado en sus investigaciones. El análisis que nosotros hemos realizado se centra en las imágenes completas de las dos interacciones, el evento de Londres 2016 y el evento de Apeldoorn 2018, ambos tras la finalización de los mismos.

b) Se analiza un tipo de prueba. Como segunda limitación y al hilo del párrafo anterior, los datos utilizados en nuestra tesis proceden exclusivamente de una prueba ciclista concreta (los Mundiales de Ciclismo en Pista). Además, las dos ediciones comparadas se celebraron en Europa, y en dos países, Reino Unido y Países Bajos, con una tradición importante en el deporte analizado, el ciclismo en Pista. De hecho, ambos se encuentran entre los cuatro países, concretamente tercero y cuarto, con más medallas obtenidas históricamente.

c) Solo se centra en Twitter. Como tercera limitación habría que destacar que en nuestra investigación los resultados son específicos de una única

red social: Twitter. Cada red social presenta variables y modos de compartir contenidos que son distintos, por lo que podría resultar que las variables y su peso a la hora de analizar la influencia fueran diferentes según la red objeto de estudio.

Respecto a las metodologías utilizadas, el SNA y AHP, deberíamos asimilar que nuestra investigación asume las limitaciones propias de estos dos métodos. Por un lado y respecto al SNA, una de las principales limitaciones es que esta técnica no analiza el contenido de las interacciones. El análisis de grafos proporciona información de la relación entre los agentes presentes en la red, pero no contempla el contenido de esas relaciones, en nuestro caso, las menciones y los retweets.

Otra limitación derivada del uso que hemos dado al SNA tiene que ver con la automatización de las cuentas, también conocidas como bots. Este problema se da cuando en una red social surgen temas que tienen gran interacción. Hay cuentas automatizadas que generan mensajes ficticios sobre un tema o en torno a un hashtag, pretendiendo crear una atención que también es ficticia. Pretenden aprovecharse del interés generado en torno a un tema para conseguir tráfico hacia otros sitios. Con el corpus analizado en nuestras investigaciones, más de 55.000 tweets en el evento de Londres y casi 20.000 en el de Países Bajos, no fue posible la realización de un proceso de filtrado exhaustivo para la detección de posibles cuentas que realizaran este tipo de prácticas.

En relación al AHP, debemos asumir dos de sus principales limitaciones. Por una parte, la de que esta metodología es ideal para la comparación de un número no muy alto de criterios y alternativas, pero donde un gran número de posibilidades implicaría un gran número de comparaciones. En nuestra investigación el estudio se limita a las tres diferentes dimensiones (criterios) y dentro de cada dimensión a sus dos variables (subcriterios). Sin embargo, si el número de criterios y subcriterios hubiera sido muy elevado, el proceso se hubiera complicado en exceso para los expertos. Al poder disponerlos de

manera jerárquica, se puede facilitar la organización y las comparaciones, tal y como ha sido nuestro caso. La otra limitación del AHP es que asume la independencia en preferencia entre los criterios y esta independencia no es del todo real. Por este motivo, Saaty (2004) desarrolló posteriormente otra metodología que parte del AHP. Esa metodología, conocida como ANP (Analytic Network Process), permite contemplar la influencia entre cualquiera de los elementos de la red. En este método, una red se compone de *clusters*, elementos y enlaces. Sin embargo, su realización exige cuestionarios más largos y complejos que los del AHP para poder evaluar todos los aspectos mencionados. Debido a la facilidad de aplicación se consideró como de mayor interés y conveniencia la utilización de la metodología AHP, dada además la complejidad de otros aspectos de nuestra investigación como la de ser un deporte de nicho poco conocido y la dificultad de definir la influencia en Twitter.

Como futuras líneas de investigación destacaríamos las que resultarían de reducir las limitaciones detectadas. Así sería interesante realizar un enfoque similar comparando diferentes eventos deportivos (por ejemplo, los Campeonatos Europeos con los Mundiales) para determinar si tienen el mismo patrón de influencia. Además, esta comparativa se podría realizar tanto dentro como fuera del mundo ciclista. Las preguntas de investigación para responder en el futuro podrían ser si la red funciona de manera similar para otros eventos ciclistas, ya fueran pruebas de ciclismo en pista como los Europeos, o como las grandes pruebas del ciclismo en carretera como el Giro d'Italia, el Tour de Francia o las clásicas ciclistas de un día de duración.

Como hemos comentado en las limitaciones, nuestra tesis analiza una red social, Twitter, pero en la actualidad también son relevantes Facebook o Instagram (Anagnostopoulos et al., 2018). Por ello la comparativa o el análisis de otras redes también resultaría de interés y de posible objeto de investigación.

La dimensión temporal también podría incluirse para comparar la red en diferentes períodos de tiempo. Así, se podría analizar cómo evoluciona la conversación online a lo largo del evento (Chew et al., 2017).

También el análisis y comparativa entre países o continentes, con mayores diferencias respecto al deporte objeto de estudio, o incluyendo datos sociodemográficos de los usuarios podría ser una futura línea de investigación que nos permitiera discernir si la influencia en redes puede variar por características geográficas o incluso culturales. En estudios futuros, convendría aplicar la técnica ANP y así comparar los resultados obtenidos frente al AHP.

Otra posible línea de investigación podría ser incorporar técnicas de análisis de contenido a las interacciones de los usuarios. De esa forma, podríamos asociar diferentes tipos de mensajes a los usuarios identificado como influyentes por el SNA. En esta línea se podrían aplicar técnicas de análisis del sentimiento, que evalúan la carga emocional contenida en un determinado mensaje. En nuestro estudio, podría ser de interés analizar el sentimiento asociado a las menciones de los usuarios, ya que esta información podría reflejar una influencia "positiva o negativa" de ese usuario. De esa forma, el estudio de la influencia se vería enriquecido por el tono emocional de los mensajes e introduciría nuevos aspectos de este fenómeno.

Por último, otra línea de investigación podía ser el análisis del alcance de las publicaciones en Twitter de los diferentes usuarios influyentes sobre sus comunidades. De esta forma, se podría estimar mejor el impacto, tanto en términos de cobertura mediática como de patrocinios, ya sea del evento en sí o de un deportista en particular.

7 Conclusiones

El análisis e investigación realizados, la publicación de nuestros tres artículos y la realización de nuestra tesis, ha permitido constatar que nos encontramos en un momento en el que suceden tres hechos muy importantes en torno a la comunicación en los eventos deportivos. Estos son:

(i)   Las plataformas de redes sociales han consolidado su gran penetración entre los diferentes públicos y sectores de nuestra sociedad.

(ii) El término influencia y con él los denominados "influencers" o personas con capacidad de ejercer influencia, generan gran importancia e interés en torno a todas las acciones de comunicación y del llamado social media marketing,

(iii) Los eventos deportivos se han convertido en un lugar de gran participación e interacción de los usuarios en las redes sociales en general, y de una de ellas, Twitter, en particular.

Nuestra tesis buscaba aunar estos tres hechos para obtener unas conclusiones en torno al término influencia en los eventos deportivos, y a partir de estas, facilitar a los diferentes actores implicados en los mismos unos parámetros para obtener un mayor rendimiento en el uso de las redes sociales. Todo ello en torno a un evento deportivo de nicho y en el uso de una red social específica, Twitter, cuyo uso ha evolucionado como herramienta con la que seguir la actualidad más inmediata en general, y los eventos deportivos en particular.

Para ello, se quería identificar unas dimensiones con una base científica, que nos permitiera utilizarlas de una manera empírica en la medición de la influencia en redes sociales. A partir de las dimensiones de autoridad, popularidad y actividad, se han identificado seis variables, tres procedentes de la teoría de grafos subyacente en el análisis de redes sociales (SNA) y tres procedentes de los datos de uso de la red social Twitter. Las seis variables

formaban parte por pares, de las tres diferentes dimensiones, , y se consiguió ponderar las mismas, concluyendo y jerarquizando a la hora de considerar un usuario como influyente de la siguiente manera: la autoridad en primer lugar, la popularidad en segundo lugar, y la actividad en tercero.

Con nuestra tesis, hemos constatado cómo la influencia en Twitter se construye desde una variedad de perspectivas. Al utilizar además de la metodología del SNA la metodología del AHP, pudimos elaborar un índice para evaluar el grado relativo de influencia de un usuario que participa en la conversación de Twitter, considerando que las variables referidas a la autoridad (número de retuits y PageRank) presentaban una influencia en Twitter más importante que las referidas a la actividad (número de tuits y outdegree).

A pesar de la complejidad y posible contextualización del fenómeno de la influencia, el uso de AHP nos proporcionó una herramienta útil para identificar a los usuarios más influyentes en Twitter. Con la evaluación de estas dimensiones y las variables que las componen, se consiguió elaborar un ranking de los perfiles con mayor influencia en un evento deportivo. Por último, se agruparon todos estos usuarios en diferentes categorías, extrapolando una serie de conclusiones en base a esta categorización, durante los eventos deportivos objeto de análisis y estudio.

Según los estados del arte analizados, se había visto que normalmente las variables más importantes utilizadas en la gestión deportiva para evaluar la influencia eran el número de seguidores (Hambrick & Pegoraro, 2014; Hambrick & Sanderson, 2013), el número de tweets (Hambrick & Pegoraro, 2014) y diferentes medidas de centralidad (Naraine et al., 2016; Naraine & Parent, 2016; Wäsche, 2015). Según estos estudios, podíamos observar cómo cambiaban mucho la ordenación de los usuarios más influyentes en función de las variables analizadas. Hay que entender, por tanto, que la influencia es un fenómeno contextualizado, y además formado por diferentes variables donde en algunos casos la pertenencia o tenencia de un alto grado en uno de ellos no garantiza el ser un usuario influyente. De hecho, en un evento deportivo si pensáramos solo en aquellos perfiles que participan activamente,

ya nos estaríamos limitando a instituciones relacionadas con los eventos, con medios de comunicación especializados o con periodistas. Es decir, estaríamos descartando a los deportistas ya que no tuitean durante las competiciones. Sin embargo, se les considera a priori influyentes y se los menciona con frecuencia en la conversación de Twitter. Por lo tanto, pertenecer a un determinado perfil de usuario, como periodista, atleta, medio de comunicación o institución relacionada, no garantiza que esa cuenta sea un influencer durante el evento deportivo si no participa (activa o pasivamente) en la conversación.

Sin embargo, y aunque pertenecer a un grupo determinado no implica ser catalogado como una persona influyente en un evento deportivo a priori, nuestra tesis sí proporciona implicaciones gerenciales al respecto. Esta investigación es útil para los investigadores de mercado interesados en identificar quién influye más en la conversación de Twitter. Así, en primer lugar, las cuentas de los ciclistas y equipos nacionales más mencionados y con más autoridad podrían ser especialmente relevantes para aquellas empresas interesadas en el patrocinio de eventos, la identificación de marca y la transmisión de sus valores corporativos. Ambos (equipos nacionales y ciclistas) deben prestar atención a sus cuentas de Twitter como parte de su comunicación estratégica por su impacto en la conversación. En segundo lugar, la promoción del evento no es responsabilidad de los deportistas, dado que la misión principal de estos es la participación en la competición. Más bien esta responsabilidad debería recaer en la institución relacionada con el evento, pero como ya se ha comentado si conseguimos la implicación los deportistas en la utilización de la red, la posibilidad de amplificar los mensajes, y obtener un mayor alcance es muy grande.

En este sentido, nuestra investigación revela el importante papel que pueden jugar las redes sociales a la hora de promocionar un deporte de nicho sin oportunidades de consideración en los medios tradicionales. Si se desarrolla una estrategia oportuna a través de las personas influyentes adecuadas en las redes sociales, puede tener un gran alcance de usuarios obteniendo por tanto un crecimiento en cuanto a cobertura mediática obtenida. Con ello, se consiguen traspasar las barreras de los medios convencionales con mayor

cobertura mediática a priori, y por tanto rentabilizar y asegurar oportunidades para posibles patrocinadores.

Por tanto, aun teniendo en cuenta la complejidad de la identificación de los usuarios más influyentes en un evento deportivo, nuestros resultados tienen un gran valor. Considerando el criterio de autoridad, con el número de retuits como variable principal, y con las características (categorías y procedencia) de los usuarios influyentes, se podrían considerar estos resultados como guía adecuada, por una parte, para los medios que utilizan Twitter como herramienta para distribuir sus contenidos, y, por otra, para las marcas que buscan presencia en un evento.

En situaciones como la actual, donde los medios de comunicación tradicionales recurren cada vez más a las redes sociales para recuperar las audiencias perdidas, y donde usuarios, organizaciones, aficionados, eventos o clubes pueden generar gran interacción en las redes, entender el complejo fenómeno de la influencia en estas redes sociales se convierte en un factor estratégico para todos los grupos de interés involucrados en la organización de un evento deportivo. Nuestra tesis contribuye sin duda, a aportar valor en este caso.

8 Referencias

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