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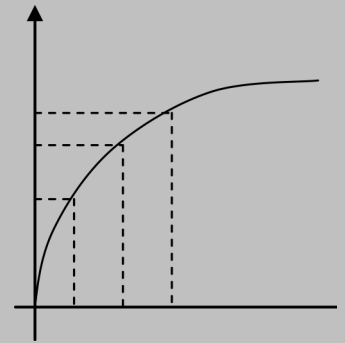
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Abstract:
Transfermarkt.de's market value (transfermarkt value) is a topic that is discussed very often in sports economics. Based on existing literature, we assume that the Transfermarkt value is a function of different input parameters, such as player characteristics, player performance, player presentation and team performance. This paper analyzes the relationship between a player's social media activity and his market value based on transfermarkt.de. Based on a dataset of 600 players from the German Bundesliga, we find that Instagram activity has a significant impact on a player's market value. On the basis of this result, we discuss several implications for professional football players on the one hand and for clubs on the other. The paper opens up a new dimension of economic research in professional football, namely, the sport economic significance of social media.

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1. Introduction

The use of social media channels (e.g., Facebook, Instagram and Twitter) has more than doubled since 2010, reaching a total of approximately 2.5 billion in 2017 (eMarketer, 2017). Celebrities such as pop stars, actors and sports athletes have embraced this trend and use social media to interact with their fans. As popularity is a component of a football player's market value offered by transfermarkt.de[1], these new channels might present an attractive opportunity to increase personal market value (Müller *et al.*, 2017). The football superstar Cristiano Ronaldo best demonstrates the financial potential of such activities for athletes: one of his sponsored posts is considered to be worth between € 350,000-500,000 (KPMG, 2018).

The present paper aims to combine approaches from entrepreneurship theory, economics and the social sciences. We assume that football players act as a "one-man entrepreneur" (e.g., a carrier of uncertainty, an innovator) with the objective of maximizing their own market value based on transfermarkt.de[2]. Therefore, we assume that the Transfermarkt value is an added value consisting of a value of action performance and presentation performance. The added value is a mix of action performance, which is difficult to measure in soccer, and the athlete's presentation in competition (presentation performance) (cf. Gebauer, 1972). Presentation of the self in football is thus an added component of market value (for presentation of the self in everyday life see Goffman, 1956).

Existing literature confirms these assumptions by identifying three main categories that determine a player's Transfermarkt value: player characteristics, performance and popularity (Müller *et al.*, 2017). Whereas player characteristics and action performance can only be improved by talent selection (e.g., age, height) and training, presentation performance and popularity can be improved after that selection mechanism. In a more formalized way, a player's market value includes the following elements:

> *Player's MV = f (Player characteristics, Player performance in the past and performance expectations in the future, Player presentation of the self, Team performance, Team presentation and popularity)*

Player performance includes personal commitment as well as interaction with teammates. Player and team presentation consist of self-perception and perception by others. The purpose

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[1] Following Ackermann and Follert (2018) and Frenger *et al.* (2019), we understand the player's market value as "an estimate by experts of the quality and the sporting possibilities that is converted into a monetary value".

[2] On the importance of transfermakt.de in the football community, see e.g., Ackermann and Follert (2018).

of this paper is to address the influence of social media activities as part of the popularity component that influences a football player's transfermarkt.de market value.

Following Krüger (1972), we understand professional athletes as more or less "one-man entrepreneurs". Of particular interest are football players since part of their income comes from individual activities (e.g., commercials), while the salary paid by their club makes up the other part. Consequently, football players can be described either as dependent entrepreneurs (i.e., relying on club payments) or independent entrepreneurs (i.e., having sufficient personal income from other activities) depending on the amount of their income coming from individual activities.

Following Simmel's (1908) thoughts on the mixture of concurrence and cooperation, two football teams can only compete with each other if they acknowledge the rules of the game. Therefore, we always have a mixture of concurrence and cooperation in which one side (leisure game with an emphasis on cooperation) and the other side (league game with an emphasis on competition) prevails. Such a mixture of concurrence and cooperation can also be found within a team; the decision as to how much emphasis should be put on the team's sporting success and how much on the personal success is also a trade-off between competition and cooperation. Thus, in certain situations, a player can play for the gallery (if a scout or a player agent watches him) or he can play for the team. This means that the marginal productivity of the athlete depends on his own efforts and those of the team members. According to the definition of risk and uncertainty (Knight, 1921), football players are carriers of uncertainty. Progressing age or unforeseeable events such as serious injuries can lead to extremely declining market values in the short or long term. As social media activities are assumed to influence a player's market value, it is of interest to what extent off the pitch performance (i.e., social media activities) can diminish the "Knightian uncertainty" of (unexpected) market value decreases.

In a more recent contribution to entrepreneurship theory, Gerbaulet (2016) describes the entrepreneur as a carrier of reputation. Regarding the use of social media channels by athletes, the question arises as to how much sporting performance is necessary to successfully leverage social media channels (for the economics of attention, see Franck, 1998). A certain (short-term) sporting success increases attention and is a prerequisite for outstanding reputation as a specific valued form of attention. Popular examples from other sports such as tennis (e.g., Eugenie Bouchard, Anna Kournikova[3]) or ski jumping (Eddie the Eagle) confirm this hypothesis (Barschel, 2017).

Furthermore, social media can also contribute to the superstar phenomenon. Rosen (1981) elaborates how small differences in quality can lead to significant earning differences. Therefore, technology in the form of mass media is a driver for these large earning differences. Social media posts can be interpreted as a new type of "technology" with no reproduction costs for the player. Adler (1985) describes a complementary superstar theory by explaining that network effects result in superstardom within a group of individuals with equal talent. Applied to social media, the theory suggests that posts by a football player can positively influence popularity by increasing fan consumption.

With regard to football, several studies have incorporated popularity as a variable determining a player's overall market value. Müller *et al.* (2017) include Wikipedia page views, the Google Trends search index, Reddit posts and YouTube videos as proxies in their analysis. Lehmann and Schulze (2007) use the number of mentions in the football magazine *Kicker,* while Franck

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[3] Both (former) tennis players experienced extraordinary popularity despite only short-term sporting success.

and Nüesch (2012) show that popularity measured by nonperformance-related mentions in sport magazines and newspapers positively influences a player's market value.

While traditional popularity measures (e.g., Google hits, newspaper mentions) have been included in the existing literature, the impact of social media is still rather unexplored. One exception is an article by Korzynski and Paniagua (2016), who analyze the impact of Facebook and Twitter on the market value of a selected sample of approximately 100 top European football players. They find that both sporting success and social media activities are required for high contract values of football superstars. Another example, although not in the context of football, is a study by Budzinski and Gaenssle (2018) discussing the popularity of social media stars based on YouTube. The following sections aim to give an indication of the influence of the most common social media platforms such as Twitter, Facebook and Instagram on a player's Transfermarkt value based on data from the German Bundesliga.

2. Method and Data

The data come from the transfer market determination of the market value via the platform "Transfermarkt.de". The linked social media channels on Twitter, Facebook, and Instagram of a player were also controlled for. The number of followers was recorded at the time of the survey. The survey of followers took place at the beginning of June (07.06.2018). This means that the data collection took place between the end of the Bundesliga season and the beginning of the World Cup in Russia. Furthermore, the age of a player, the club the player belongs to as a covariate, and the market value were measured by the estimates of the forum Transfermarkt.de. The question of how social media activities influence players' market value is divided into two hypotheses that were tested stepwise.

In the first step, we tested whether there is an effect of age on using social media channels to answer the question of whether specific social media channels are used by different generations.

Hypothesis 1:

The age of a player has an influence on his social media activity to varying degrees depending on the medium.

In the second step, we tested whether there is an impact on market value by the number of followers as a proxy for the presentation component.

Hypothesis 2:

A player's presentation component, measured by the number of followers and thus the meaning of the group of people interested in the player, has an impact on his market value as the player becomes more interesting in the media.

To test our hypotheses, two mixed effect models were calculated, with the variable "team" considered a fixed effect in the models. To calculate the mixed effect models, we used R as the statistical software and the "lmer" package.

3. Results

In the period under consideration, the 18 teams of the Bundesliga had an average team size of 28 players. Of the 600 players in the Bundesliga who participated in the survey period, 84% (502 players) had at least one of the three channels (Facebook, Instagram or Twitter). The average market value of the players was € 7.24 million (social media assets € 4.81 million), and the average age was 23.5 years (active 25.7 years). More detailed descriptive results can be found in Table 1.

Table 1: Descriptive statistics of the used parameters (market value, Facebook, Instagram, Twitter Follower in Mio.)

	N	Mean	St. Dev.	Min	Max
Market value	502	7.0	11.0	0	90
Facebook	502	0.3	1.9	0.0	32.8
Instagram	502	0.3	1.9	0.0	36.5
Twitter	502	0.1	0.9	0.0	17.0
Age	502	25.1	4.4	17	39

We found that the market value differs significantly both within the teams and between the clubs, with Bayern Munich being particularly striking. Figure 1 shows the distribution of market values within the teams using box plots with differences in median and percentile ranges between the teams. Similarly, the distribution of the logarithmic market values (Figure 2) shows a nearly normally distributed shape shifted to the right.
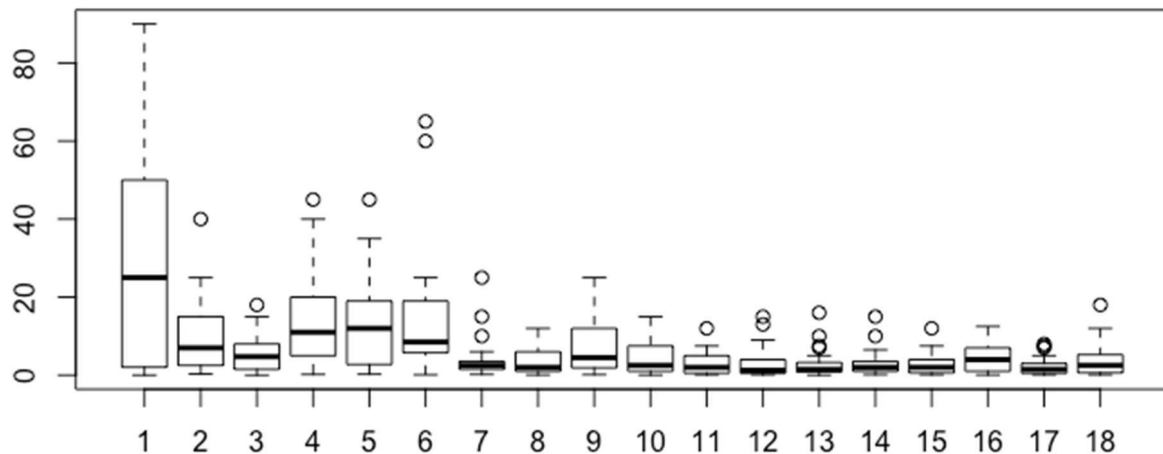

Figure 1: Boxplot of Team Variable to Market Value with 1: Bayern Munich, 2: FC Schalke 04, 3: TSG Hoffenheim, 4: Borussia Dortmund, 5: Bayer 04 Leverkusen, 6: RB Leipzig, 7: VfB Stuttgart, 8: Eintracht Frankfurt, 9: Borussia Mönchengladbach, 10: Hertha BSC Berlin, 11: Werder Bremen, 12: FC Augsburg, 13: Hannover 96, 14: FSV Mainz 05, 15: SC Freiburg, 16: VfL Wolfsburg, 17: Hamburger SV, 18: 1. FC Köln.
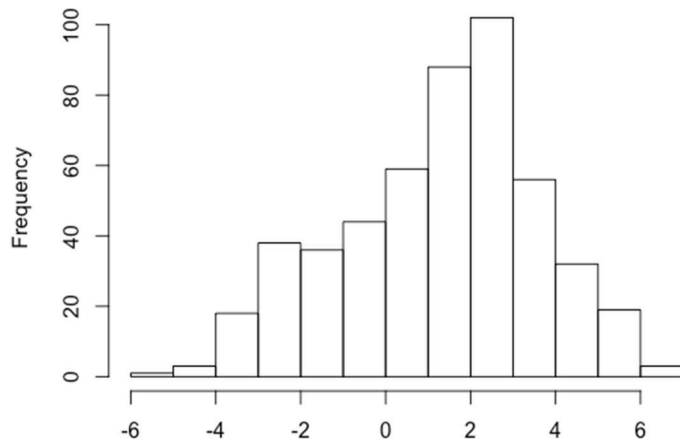
Figure 2: Histogram of the market value (logarithm) [€].

The analysis shows that as a fixed effect, the team affiliation was calculated as a covariate and that no social media channel was significantly influenced by age. Hypothesis 1 could thus not be confirmed (see table 2).

Table 2: Results of the Mixed Effect Model with dependent Variable "Media Channels", independent variable "age" and Fixed effect "Club".

Pred.	Facebook			Instagram			Twitter		
	Est.	CI	p	Est.	CI	p	Est.	CI	p
(Intercept)	0.29	-.05–.63	.095	0.27	-.08–.62	.125	0.14	-.02–.29	.087
Age	0.15	-.00–.30	.054	0.08	-.07–.24	.293	0.06	-.01–.14	.101
σ^2	2.99			3.16			0.70		
τ_{00}	0.43 Team			3			0.09 Team		
ICC	0.13 Team			0.12 Team			0.11 Team		
Observations	502			502			502		
Marginal R^2 / Conditional R^2	0.007 / 0.132			0.002 / 0.126			0.005 / 0.115		

With respect to hypothesis two, it has been shown in numerous studies that age squared is the better fit for showing the effect of age. In addition, there was a significant positive effect on the number of followers on Instagram and a significant negative effect on the number of followers on Twitter. The model quality was 20% (marginal R^2), so just a fifth of the market value explanation could be explained by the presentation performance and the age of the players while keeping the team affiliation fixed.

Table 3: Results of the Mixed Effect Model with the dependent Variable "Market Value" and the independent variables "Media Channels" and "age" (squared), and Fixed effect "Club".

Predictors	Value Estimates	CI	p
(Intercept)	9.20	6.55 – 11.85	**<0.001**
Facebook	3.25	0.66 – 5.83	**0.014**
Insta	5.24	2.50 – 7.98	**<0.001**
Twitter	-4.95	-7.25 – -2.65	**<0.001**
Age squared	-1.99	-2.58 – -1.40	**<0.001**
Random Effects			
σ^2	63.13		
$\tau_{00 \ Team}$	29.00		
ICC_{Team}	0.31		
Observations	502		
Marginal R^2 / Conditional R^2	0.196 / 0.449		

4. Discussion and Conclusion

While Frenger *et al.* (2019) emphasize the relationship between a player's performance and Transfermarkt value, the analysis presented here focuses on the presentation level of social media activities. If both performance and Instagram activity have a significant impact on market value, it can be assumed that athletic performance is substitutable to some extent by Instagram activity. Presumably, for this assumption to be true, a certain level of sporting success is required to gain attention in the first place. However, a player could subsequently leverage his popularity via Instagram. A player whose athletic performance is declining – for example, as age increases – could prolong a market value decline by investing his limited time in Instagram activities to compensate for a decrease in athletic performance. Therefore, Instagram activities could help reduce the carrier uncertainty of the player. The optimum of Instagram activities can be found where the marginal utility equals the marginal cost. Since the player's club has a high interest in the player's marketability, social media activities are also beneficial from the club's point of view.

This study is a starting point for addressing the link between social media popularity and market values as indicated by transfermarkt.de; however, further studies are required. Future research could address qualitative aspects such as the content of a post and followers' reactions to a post (e.g., sentiment analysis) to account for negative and positive feedback as well as the number of reactions.

While jobs for retired players in the football industry (e.g., coaches, managers, TV experts) are limited, most former players must consider alternative career paths (Huland, 2017). The question remains as to whether reputation acquired as an active player can be transferred to professional life after football. Therefore, an interesting question for current players might be whether building up their reputation during their sports career is beneficial for preparing their post-

sports career. Is it possible to maintain their popularity after a football career through social media activity? Philipp Lahm, who is very active on LinkedIn, and Gary Lineker, who extensively uses Twitter in his role as a sports expert, are just two examples.

While Twitter, Facebook and Instagram are subsumed under "social media channels", existing social media surveys indicate that their users differ in characteristics such as age (Global-WebIndex, 2014). Therefore, the results presented in this paper need to be further validated by a more detailed evaluation of a channel's respective audience with regard to age, nationality and gender to capture potential differences. In particular, the effect of Twitter on market value seems quite surprising and requires additional validation. Moreover, analyzing several seasons might provide further insights.

Additional studies should also consider time lags in causality between social media posts and market value changes. Most likely, a market value increase will not take place at the same time as an increase in social media popularity and vice versa.

The findings regarding these open questions will not only add to the current understanding of the effect of social media use on a player's market value but will at the same time be of high practical relevance for the players themselves.

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