Westfälische Wilhelms-Universität Münster

Institut für Organisationsökonomik

Diskussionspapier des
Instituts für Organisationsökonomik

6/2012

The Impact of Physical Attractiveness on the Popularity of Female Tennis Players in Online Media

Stephanie Kiefer/Katrin Scharfenkamp

Discussion Paper of the
Institute for Organisational Economics

Diskussionspapier des
Instituts für Organisationsökonomik
6/2012

Juni 2012

ISSN 2191-2475

The Impact of Physical Attractiveness on the Popularity of Female Tennis Players in Online Media

Stephanie Kiefer/Katrin Scharfenkamp

Abstract

The discussion about the impact of physical attractiveness on popularity of competitive athletes has received much attention from scholars as well as from media around the world. We provide new insights to this debate by estimating correlation-coefficients and regression-models to test whether and to which extent physical attractiveness of professional female tennis players affects their popularity in online media. Based on a sample of the top 100 *WTA* single ranking of one selected calendar week in 2011 we find that physical attractiveness increases significantly the popularity on *Facebook, WTA news, Kicker.de,* the homepage of the *Tennis Life Magazine* and *Google*.

JEL-Codes: I23, I20, A11, C81, M00

Der Einfluss physischer Attraktivität auf die Popularität von Tennisspielerinnen in Onlinemedien

Zusammenfassung

Der Einfluss physischer Attraktivität auf die Popularität von Sportlern bekommt von Wissenschaftlern, aber auch von den Medien viel Aufmerksamkeit und wird viel diskutiert. Durch die Berechnung von Korrelationskoeffizienten und Regressionsmodellen untersuchen wir diesen Einfluss bei professionellen Tennisspielerinnen in verschiedenen Onlinemedien und tragen dadurch neue Erkenntnisse zu dieser Diskussion bei. In unserem untersuchten Sample, welches sich auf die Top 100 Tennisspielerinnen des *WTA* Single Ranking einer ausgewählten Kalenderwoche aus dem Jahr 2011 bezieht, können wir einen signifikanten Einfluss der physischen Attraktivität auf die Popularität in den Medien *Facebook*, *WTA news*, *Kicker.de*, der Homepage des *Tennis Life Magazine* und *Google* feststellen.

Im Internet unter:

http://www.wiwi.uni-muenster.de/io/forschen/downloads/DP-IO_06_2012.pdf

Westfälische Wilhelms-Universität Münster
Institut für Organisationsökonomik
Scharnhorststraße 100
D-48151 Münster

Tel: +49-251/83-24303 (Sekretariat)
E-Mail: io@uni-muenster.de
Internet: www.wiwi.uni-muenster.de/io

The Impact of Physical Attractiveness on the Popularity of Female Tennis Players in Online Media[*]

1. Introduction

Already in 1921, Fleming Allen Clay Perrin states: "Most of us respond unambiguously to physical beauty and ugliness, to a pretty face or a well-proportioned body" (Perrin 1921, p. 204). Thus, it is by no means astonishing that researchers conclude that the media coverage of female athletes often shows stereotypes which underline physical appearance and attractiveness, but not athletic skills (see e.g. Bernstein 2002, p. 421). Moreover, Gillan (1999) maintains that female athletes can use physical attractiveness and sex appeal to increase their media coverage and to get more attention from potential sponsors. Besides, the author states that female tennis players are using this bonus already for a while and she advices other female athletes to follow their example. By using their glamour, especially female athletes get higher interest from sponsors.

The main contribution of this article is to demonstrate that physical attractiveness of professional female tennis players influences their individual popularity in selected online media.

The paper is organised as follows: The second section provides literature referring to our object of investigation. In the third section hypotheses will be built. The description of the sample composition and its descriptive statistics follow thereafter in section four. Next, the empirical results will be shown in the fifth section before lastly a conclusion will be drawn.

2. Literature Review

Literature about popularity and physical attractiveness, which are the main focus and basis in this study, are presented in this section. First of all, studies about popularity in the field of sport economics are presented in this section. Afterwards, a summary of important findings about physical attractiveness in the fields of psychology, sociology, political sciences and personnel economics is given.

[*] We are very grateful to Alexander Dilger for helpful comments and suggestions that noticeably improved this article. In addition, we thank Laura Lütkenhöner and Waeel Dohair for supporting us in the technical conversion of the online-questionnaire. Furthermore, we want to thank all test persons who participated in our online-survey. Only we are responsible for any remaining error.

Sport economists often examine popularity in connection with wages and market values of athletes. Several studies analyse whether popularity or performance are the reason for differences in wages or market values in sports (see e.g. Lucifora & Simmons 2003; Garcia-del-Barrio & Pujol 2007; Lehmann & Schulze 2008; Franck & Nüesch 2008, 2012; Kuethe & Motamed 2010; Prinz et al. 2011). To explain differences in wage and market value, they use approaches from Adler (1985, 2006) and Rosen (1981). These approaches differ insofar as Rosen reasons this phenomenon with marginal talent differences whereas Adler explains wage differences with media coverage and network effects. In the research of Garcia-del-Barrio & Pujol (2007), Lehmann & Schulze (2008), Franck & Nüesch (2008, 2012) and Prinz et al. (2011) popularity is analysed on the basis of media coverage. In order to identify media coverage, the authors focus on different types of media such as Google hits, homepages, citations in newspapers or professional journals (for an overview see e.g. Prinz et al. 2011). Kuethe & Motamed (2010) illustrate media coverage by analysing the annual allstar game. In addition Prinz et al. (2011) investigate network effects in terms of Facebook likes. However, none of these studies goes further into detail of the factor popularity and examine how it is composed.

Garcia-del-Barrio and Pujol (2009) analyse the media value of 1,400 professional tennis players by determining to which extent the performance influences the media value. For the calculation of the media value they use the so-called ESI-rg methodology. The ESi-rg methodology identifies the media value by using information about popularity and notoriety. Their results show that current and past performance has a significant influence on notoriety and popularity, but not solely. The number of tournaments and other personal individual characteristics are important for the media value as well. Garcia-del-Barrio and Pujol (2009) also state that personal individual characteristics are more important for female tennis players than for male ones.

One of the relevant personal individual characteristics could be physical attractiveness. Already in 1921 Perrin integrated physical attractiveness as one factor that affects popularity (Perrin 1921, pp. 216 et seq.). In the research fields of psychology, sociology, political sciences and personnel economics many different studies show that physical attractiveness has a positive influence on several life situations and the development of a career.

Hakim (2010) examines how you can use physical attractiveness for personal interests. Therefore she introduces, beside human and social capital, erotic capital as well. Dipboye et al. (1977) arrive at the conclusion that attractive applicants are more preferred than less

attractive applicants in a job interview. DeGroot and Motowidlo (1999) show that visual aspects, for example the physical attractiveness, are related to the evaluation of the applicants' performance. Felton et al. (2004) find out that sexy-rated professors get a higher quality and easiness scores from the evaluating students on the webpage RateMyProfessors.com. In another study Hamermesh and Parker (2005) examine the influence of the teaching staff's physical attractiveness on their course evaluations. They conclude that the course evaluation is not independent from physical attractiveness. If the teaching staff is more attractive, their courses tend to get a better evaluation. Efran and Patterson (1974) can identify that the candidates' physical attractiveness has a positive influence on their results at the Canadian federal election in 1972. Berggren et al. (2007) find a similar result for elections in Finland. In another study, Maner et al. (2003) show that physically attractive people get more attention than less attractive ones. Moreover, actions of attractive individuals are better noticed and reminded. Eagly et al. (1991) analyse in a meta analytic review physical attractiveness related to stereotypes. The results show that physically attractive people are better evaluated than less attractive persons concerning social characteristics like popularity and sociability. Specifically, research on pupils shows that physical attractiveness influences the evaluation of popularity (see e.g. Boyatzis, 1998).

Similar results can be found in the field of sports. Fink et al. (2004) demonstrate that athletes' performance and physical attractiveness have a positive influence on the ability for using athletes as a sport event's endorser. However, they also identify that performance has a higher impact on the qualification as a sport event endorser than physical attractiveness.

Female athletes are often described in the media by using stereotypes related to their physical attractiveness (see e.g. Bernstein 2002). Different studies show that the media report more on attractive female athletes than on less attractive but more successful colleagues. Another study figures out that during the Olympic Games 2000 in Sydney more photos of the American female high jumper Amy Acuff were published than photos of the more successful American female Sprinter and long jumper Marion Jones (see Bernstein 2002).

Moreover, Vincent et al. (2007) find out that different British newspapers (*The Times*, *Daily Mail* and *The Sun*) reported more on Anna Kournikova during Wimbledon 2000 than on other players although she lost her first round match, that means these British newspapers wrote more about Anna Kournikova than about the Wimbledon champions 2000 Pete Sampras and Venus Williams (see Vincent et al. 2007).

3. Hypotheses

Apart from the general assumption that physical attractiveness influences the popularity in online media, it can be supposed that an above average degree of physical attractiveness leads to a significant higher number of mentions in online media than a below average value. Therefore we analyse the existence of structural differences between female tennis players with a below or above average level of physical attractiveness.

H1: The popularity's (in online media) medians of below average physical attractive and above average physical attractive female tennis players are equal.

The performance of female tennis players is not the sole factor that influences their individual media value. Other non-sport related factors also have an impact on the media value of athletes (see Garcia-del-Barrio & Pujol 2009, pp. 10 et seq.). As discussed in the last section, physical attractiveness has an increasing influence on different items. Because of these findings we assume that physical attractiveness is one important non-sport related factor that affects the popularity of female tennis players. Vincent et al. (2007) even claim that "… female tennis players who either conform to or exaggerate idealized heterosexual feminine appearance receive the most media attention" (p. 289). Thus, the second and third hypotheses predicate no correlation of physical attractiveness with the female tennis player's popularity and no increasing influence on it, particularly in online media.

H2: There is no association between the physical attractiveness and their popularity in online media.

H3: The physical attractiveness of female tennis players has no significantly increasing influence on their popularity in online media.

By using the match-up hypothesis,[1] Fink et al. (2004) find out that the expertise of female athletes is more important to be booked as an endorser for women's sport events than their physical attractiveness (see pp. 363 et seq.). They come to this result by the fact that the athlete's physical attractiveness has no high relevance for the event itself or for the result of the game. Garcia-del-Barrio and Pujol (2009) arrive at the conclusion that the current and past performance of tennis players are the most important factors for the level of media value (see pp. 11 et seq.). Different studies figure out that age and perceived physical attractiveness have

[1] The match-up hypothesis predicts the effectiveness of e. g. different brand spokespersons (see e.g. Fink et al. 2004).

a negative relationship, especially for women (see e.g. McLellan & McKelvie 1993; Mathes et al. 1985). For example McLellan and McKelvie (1993) find out that older faces rated less attractive than young ones. Following these results the forthcoming fourth and fifth hypothesis reveal that neither the prize money career nor the age of a female tennis player is associated with the popularity in online media. Furthermore the sixth hypothesis affirms that the performance and success in terms of prize money of the previous career has a stronger impact on the number of mentions in particular online media than physical attractiveness and age.

H4: There is no association between the age of a female tennis player and their popularity in online media.

H5: There is no association between the prize money that female tennis players earned during their career and their popularity in online media.

H6: The prize money that female tennis players earned during their career has a stronger influence on their popularity in online media than their physical attractiveness and age.

4. Sample composition and descriptive statistics

Our sample of data consists of female tennis player who were ranked in the top 100 of the *WTA* singles ranking at the 35th calendar week in 2011.[2] This section describes the collection of data as well as the results of the descriptive statistics for the sample, which are shown in the following Table 1.

[2] The detailed ranking is presented in the archive of Kicker.de (2012).

Table 1: Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
***Facebook* Likes**	100	84,169.03	544,327.65	0.00	5,332,198.00
Mentions on *Google*	100	1,259,975.00	1,906,819.00	12,400.00	15,100,000.00
Mentions on *WTA news*	100	155.01	145.60	7.00	624.00
Mentions on *Kicker*	100	71.18	101.53	0.00	505.00
Mentions on *Sports Illustrated*	100	146.67	362.72	2.00	2,342.00
Mentions on *Tennis Life Magazine*	100	8.16	12.30	0.00	50.00
Physical Attractiveness	100	3.07	1.09	0.99	5.36
Age	100	24.97	3.69	19	41
Prize Money Career in $	100	3,591,288.83	5,494,512.35	132,299.00	33,362,254.00

Dependent Variables

Data that illustrate the popularity of each tennis player in online media were likewise acquired during the 35th calendar week in 2011. Two types of online media were differentiated that reflect the interest of private persons in female professional tennis players like social networks and those which reflect the interest of sport journalists.

Since 2008 *Facebook* is the most popular social network (see Weinberg 2010). While this social network has 63.6 per cent monthly penetration of the internet users in Europe at the end of 2010, it enlarged its number of active users worldwide up to over 845 million monthly at the end of 2011 (see e.g. comScore, 2011, p. 9; Facebook 2012). *Facebook* offers private persons as well as corporations the registration of a profile. Thus, corporations or popular persons such as professional tennis players are able to publish content on an online pin board and upload photos and videos to share them with the community of this network (see e.g. Hellmueller & Aeschbacher 2010). Interested parties, mostly private persons and especially fans, have the opportunity to connect with e.g. professional tennis players by clicking on a button named like (see e.g. Weinberg 2010). In this paper we elevated the number of like-followers of each female tennis player in this social online-network. Because of the fact that the majority of *Facebook*-members are private individuals, we assume the number of

individuals as an indicator for the number of persons who have a private interest in the tennis players and want to be closer or want to establish contact with them. On average, we observe 84,169.03 followers on Facebook.

The popularity in sport journalism we measured by mentions at the homepage of the *WTA news* as well as the homepages of sport magazines like the German *Kicker*, the *Tennis Life Magazine* and the *Sports Illustrated*. These data were elevated during the 35th calendar week 2011. This type of media represents the professional interest in tennis players with simultaneous consideration of the readers' information demand, their preferences, but also the profit maximizing strategy of each magazine.

The website WTAtennis.com belongs to the Women's Tennis Association (WTA), which "is the world's leading professional sport for women with over 2,400 players representing 99 nations competing for over $90 million in prize money at 53 events and four Grand Slams in 33 countries" (WTA Tour 2012). In our sample, the average number of mentions on the homepage of the *WTA news* is 155.01.

Kicker.de is a homepage that belongs to the German sport magazine *Kicker*. The sport-website has an average of 3.11 million users per month. It concentrates mainly on football but provides also much information on other sports like tennis, ice hockey, cycling, basketball and winter sports (see e.g. Olympia Verlag 2012; AGOF 2011). The mentions on *Kicker.de* in our sample are 71.18 on average.

Moreover, we analyse mentions on *SI.com* which is the website of the similar named sports magazine *Sports Illustrated*. This website belongs to CNN Digital Network, which is part of the Turner Digital Network (see e.g. Audit Bureaus of Circulations 2011). A mean of 146.67 mentions on the homepage of *SI.com* can be observed for the analysed sample.

In addition, we analyse on the website *tennislife.com* that belongs to the *Tennis Life Magazine*. The website of this magazine has been selected for the forthcoming analysis because it is "the second largest tennis magazine in America and the World's Number One tennis magazine". The circulation of the magazine overran 180,000 in 2009 (see Tennis Life Magazine 2009). An average number of 8.16 mentions can be observed here.

Finally, the popularity in online media of each tennis player is completed by the number of results on *Google*. *Google* is the most popular search engine on the internet and the corporation realised a total global market share of 78.64 per cent in April 2012 (see e.g. Kwak

et al. 2010; Net Applications 2012). The number of mentions for each female tennis player is collected with the help of the keyword-code *WTA + news + name of the tennis player – facebook – twitter*. In other words, we consider all results that include the keywords *WTA*, *news* and the name of each tennis player. The documented results do not include mentions in conjunction with *Facebook* or *Twitter* and so results that imply one kind of mainly private interest of individuals.[3] Admittedly, it cannot be excluded that these numbers of results not only imply mentions in journalistic sources but also mentions of private persons on homepages or forums outside of *Facebook* or *Twitter*. It follows, that the measured number of results on *Google* represents the number of mentions in news. Consequently, the measurement of this online media will be generally assigned to the category of professional interest in tennis players. An average number of 1,259,975 results can be found on *Google*.

Explanatory Variables

As an indicator for performance we collected the prize money that each tennis player has earned during her former career before the 35th calendar week in 2011. Source of these data were the individual tennis players' profiles on the homepage of the *WTA*. This earned prize money is applicable to measure the former performance and especially the success of each female tennis player. This assumption is caused by the fact that this item includes the number of tournaments or matches that a tennis player took part in. Simultaneously, the prize money earned in the career indicates not only the number of matches but also the number of success as well as the importance of each victory. In other words, the victory in a popular tournament or match is endowed with higher prize money than less important matches. For the current sample we observe an average amount of 3,591,288.83 US Dollars.

The physical attractiveness of each woman was evaluated with the help of an online-questionnaire. Following Hakim 2010 that facial attractiveness stands for beauty and remains static it can be easily grasped by test persons in contrast to sexual attractiveness (see Hakim 2010, p. 2). Therefore we ascertained portraits based on the ranking of the 35th calendar week 2011. Criteria for the selection of pictures were that the face and neck of each woman were photographed in a frontal position. By using the player's profiles of the *WTA's* homepage or the German sport magazine *Kicker* at least one portrait could be found for each of the 100 women. The background of the picture and worn clothes were standardised as well as

[3] The data ascertainment included originally the number of followers in the social network Twitter. Because of the little number of tennis players who had an account at this moment this online media (44 persons) will not be evaluated in the following analysis.

jewellery was blanked to minimise distortion of the evaluation. We tested five different subsamples including twenty different tennis players per sample in separated questionnaires. These questionnaires varied in four versions to control for distortions caused by the position that a picture had in each questionnaire. Ultimately, each picture was shown at the beginning, in the middle or at the end of a questionnaire. In sum, twenty different questionnaires were prepared.

In the following, the structure of the utilised online-questionnaire will be described. Within a short introduction and address of welcome the participants were informed about the intention and aim of the questionnaire to evaluate the attractiveness of twenty women. However, the respondents were not informed that these women are professional tennis players at this point of the questionnaire. This information was kept back from the test persons to minimize the influence of recognition and popularity that could distort the pure evaluation of attractiveness. Beside the order of questions was explained. First, the test persons gave particulars about the age, gender and university, where they study or studied. The considered main target group included (former) students of the Ruhr-University Bochum, the University of Münster, the University of Osnabrück and other German universities. The attractiveness was measured on a scale from zero for very unattractive to seven for very attractive. We chose a Likert scale without a mid-point to minimise distortions caused by the social desirability bias of the test persons. Consequently, neutral answers were excluded (see Garland 1991). After evaluating twenty portraits the test persons were asked whether they had recognised any of the women to control for the before-mentioned distortive impact on the evaluation of physical attractiveness. Finally, the following questions asked whether the subjects are interested in sports, play tennis or watch tennis on TV. These questions were also introduced to control for the effect of recognition and a more detailed segmentation of the test persons. Each online-questionnaire ended with an acknowledgement for the participation.

The twenty online-questionnaires were activated from the 10th to 24th of November 2011. Beforehand, a detailed presentation of the project and the ask for permission to use the personal e-mail-addresses of students of the universities in Bochum, Münster and Osnabrück were accomplished in lectures, tutorials as well as meetings of the student representatives and student associations of the economic and management faculties. During the before-mentioned period 925 access authorisations were generated for each participant. Thus a multiple participation of all test persons can be excluded. 806 access authorisations were sent to test persons via e-mail. In addition 119 printed access authorisations were distributed in a

management lecture of the University of Osnabrück. In sum, 396 persons answered the online-questionnaire which comes up to a return-rate of 42.81 per cent. Following Rosar et al. (2010), 24 evaluations are enough to reach a robust attractiveness rating score (p. 57).

In fact, the rate of return includes a high rating quantity. Every picture was evaluated at least 60 to maximally 90 times. All evaluations were summed up by calculating the mean for each female tennis player. The minimum average evaluation of one female tennis player accounts 0.99 while the highest average score is 5.36. Therefore, an average degree of physical attractiveness of 3.07 can be observed for our sample. For the calculation of this mean we considered all test persons that participated in the online-survey because the majority of evaluations showed no significant differences between particular subgroups of test persons. This insight could be attained by using t-tests to find out whether subgroups of test persons who e.g. recognised one of the tennis players evaluated significantly differently than the reference group of persons who did not recognise the evaluated women as popular tennis players. The same methodology was used to test differences between test persons who declared to be (not) interested in tennis, (not) to play tennis or (not) to inform themselves about tennis via any media.[4] Finally, only four to thirteen per cent of the participants (depending on the separation criteria) evaluated significantly differently than the reference group so that distortions caused by the recognition can be excluded.

5. Empirical Results

In this section the validation of the hypotheses will be investigated. For the assessment of eventual structural differences between female tennis players with a below or above average level of both the physical attractiveness as well as prize money of career on the popularity in online media, we compared the mean ranks with the help of the Mann-Whitney-U-Test[5] (see Black 2010, pp. 678 et seq.; Weiers 2011, pp. 521 et seq.). The groups of below or above average attractive tennis players have been separated by using the median of the effectively utilized scale of values. This method has been chosen to ensure an equal size of each group due to the fact that a separation based on the means would have led to strongly unbalanced groups. The median of physical attractiveness was calculated on the basis of the effectively utilised scale of the respondents. As it can be seen in Table 1 this scale starts at a minimum of

[4] A detailed overview of the number of significant and insignificant results of the above-mentioned t-tests is presented in Table A1 in the appendix.
[5] Even though the analysed items are metric scaled they are not normally distributed so that a t-test cannot be used here.

0.99 and ends at a maximum of 5.36. Finally the median of physical attractiveness is 2.95. The results of the Mann-Whitney-U-test to compare the mean ranks of below and above average physical attractive tennis players are presented in Table 2.

Table 2: Comparisons of mean ranks of physical attractiveness

Variable	Degree of physical attractiveness	Obs.	Mean Rank	Sum of Ranks	Mann-Whitney-U	Wilcoxon-W	Z	Asym. Sign. (2-tailed)
Facebook	Below median	51	40.16	2,048.00	722.00	2,048.00	-3.637	.000
	Above median	49	61.27	3,002.00				
	Total	100						
WTA news	Below median	51	46.56	2,374.50	1048.50	2,374.50	-1.386	.166
	Above median	49	54.60	2,675.50				
	Total	100						
Kicker.de	Below median	51	48.46	2,471.50	1,145.50	2,471.50	-.717	.473
	Above median	49	52.62	2,578.50				
	Total	100						
SI.com	Below median	51	45.45	2,318.00	992.00	2,318.00	-1.776	.076
	Above median	49	55.76	2,732.00				
	Total	100						
Tennis Life Magazine	Below median	51	46.75	2,384.00	1,058.00	2,384.00	-1.332	.183
	Above median	49	54.41	2,666.00				
	Total	100						
Google	Below median	51	46.60	2,376.50	1,050.50	2,376.50	-1.372	.170
	Above median	49	54.56	2,673.50				
	Total	100						

Focusing on the comparisons of the mean ranks of mentions for below and above median physical attractive tennis players, the first hypothesis is confirmed for the *WTA news*, *Kicker.de, Tennis Life Magazine* and *Google*. That means that no significant differences concerning the number of mentions between below median physical attractive female tennis players and those above can be identified. By contrast, the mean rank of above median physical attractive female tennis players (61.27) is significantly higher (on the one per cent level) than this of below average physical attractive female tennis players (40.16) for the number of followers on the social network *Facebook*. Referring to *SI.com* the same result can be observed with an asymptotic significance of 7.6 per cent. Tennis players who are above median physical attractive realise a mean rank of 55.76 mentions in contrast to below median physical attractive ones who reach a mean rank of 45.45 mentions.

The validation of the second, fourth and fifth hypotheses is analysed by the application of Spearman's Rho correlation coefficient (see Mood et al. 2010, pp. 525 et seq.).[6] By extension, the correlations between the popularity in the already mentioned online media and the physical attractiveness, the age or the prize money that a female tennis player earned during her previous career have been tested. The Spearman's Rho coefficients for each test are presented in the following Table 3.

Table 3: Spearman's Rho Coefficients

	Physical Attractiveness	Age	Prize Money Career in $
Facebook Likes	.466***	.045	.582***
Mentions on *WTA News*	.232**	.256**	.797***
Mentions on *Kicker.de*	.190	.219**	.753***
Mentions on *SI.com*	.271***	.283***	.885***
Mentions on *Tennis Life Magazine*	.262***	.177	.752***
Mentions on *Google*	.211**	.238**	.464***

*Notes: ** and*** denote significance at the 5 per cent and 1 per cent levels respectively.*

The results show that physical attractiveness and the number of likes on *Facebook* are associated with a medium strength (0.466) on the one per cent level. This association is the strongest among the investigated online media. In addition the associations between physical attractiveness and the number of mentions on *SI.com* (0.271) as well as the homepage of the *Tennis Life Magazine* (0.262) are weak but significant on the one per cent level. Moreover physical attractiveness is associated weakly with the number of mentions in the *WTA news* (0.232) or number of results on *Google* (0.211). These results are significant on the five per cent level. Finally, no significant association exists between the degree of physical attractiveness and the number of mentions on the homepage of *Kicker.de.*

In addition, the associations between the age and the number of mentions in the *WTA news* (0.256), *Kicker.de* (0.219) or *Google* (0.238) are weak on a significance level of five per cent. Moreover, physical attractiveness and the number of mentions in *SI.com* are correlated weakly (0.283) on the one per cent level. Nevertheless, no significant correlation between the age and the number of mentions in *Tennis Life Magazine* and the number of likes on *Facebook* can be found.

[6] The analysed items are metrically scaled, but not normally distributed so that an application of the Pearson correlation coefficient cannot be recommended.

Indeed the prize money that the tennis player earned during her previous career shows medium to very strong associations with the number of mentions in the analysed media. The weakest results of correlation can be observed for the prize money career and the number of likes on *Facebook* (0.582) as well as the number of results on *Google* (0.464) with a significance of one per cent. Conversely, strong associations are given for the WTA news (0.797), *Kicker.de* (0.753) and *Tennis Life Magazine* (0.752). These Spearman's Rho coefficients also are significant on the one per cent level. Finally, a very strong association can be found between the prize money career and the number of mentions in *SI.com* with a significance level of one per cent.

The estimation of the impact of physical attractiveness on the popularity of female tennis players in several online media as well as its intensity compared to the former individual performance will be analysed with the help of OLS regressions (a methodological introduction is given in e.g. Cameron & Trivedi 2009). By extension models will be estimated for the online media: *Facebook, Kicker.de, Tennis Life Magazine, SI.com, WTA news* and Google. The dependent variable of each model will be the number of mentions on the particular homepage of the above-mentioned online media. Because of the theoretical foundation we control in all models for time effects as well as the performance of each player in her former career in terms of the prize money. In addition we control for the age of each tennis player to consider time effects and the influence of physical attractiveness caused by youth. So the following regression function will be tested:

*number of mentions = constant + b1*physical attractiveness + b2*age*

*+ b3*prize money career*

In sum six OLS-regressions were estimated whose results follow in the forthcoming passages.

Facebook

As already mentioned the influence of physical attractiveness on the number of likes on the online-network *Facebook* will be analysed in the following regression model. Beforehand, an initial inspection of the descriptive statistics showed that the maximum value of 5,332,198.00 likes is much higher than the mean (84,169.03). Following this indicator, we detect the maximum value (that belongs to Maria Sharapova) as an outlier in the regression of the entire sample. This value is regarded as an outlier since it deviates more than three standard

deviations from the mean and therefore was removed from the sample and forthcoming analysis. (See Anderson et al. (2012), p. 107)

Below-mentioned the results of the OLS-regression for the network *Facebook* are presented in Table 4.

Table 4: Effect of physical attractiveness on number of followers on Facebook

Variable		
		Std. Coeff.
Constant	-11957.524	
Physical Attractiveness	16766.262**	.146
Age	-2811.387	-.084
Prize Money Career	.018****	.775
Significance	.000	
N	99	
Adjusted R^2	.609	

*Notes: ** and **** denote significance at the 5 per cent and 1 per mill levels respectively.*

Following up the results of the Mann-Whitney-U-test that female tennis players who are physically surpassing attractive have significantly more *likes* than those below and the highly significant Spearman's Rho coefficient (0.466) physical attractiveness has a significant influence (on the five per cent level) on the number of likes on *Facebook* in the regression model. Alike, the former performance in career in terms of the prize money has a significantly increasing impact on the popularity on *Facebook* on the one per mill level. No significant impact of the age on the number of *likes* on *Facebook* can be observed. In conclusion, the third hypothesis that physical attractiveness has an increasing impact on the number of likes on *Facebook* can be confirmed.

Besides, the sixth hypothesis can be supported because the standardised regression coefficient of the control variable prize money career is higher (0.775) than that of physical attractiveness (0.146). Irrespective of significant impact it follows then that the former performance and success of female tennis players has a quantitatively higher impact on the number of likes on *Facebook* than physical attractiveness.

Kicker.de

In the same way the impact of physical attractiveness on the number of mentions on the homepage of the German journal *Kicker* was analysed. Beforehand we detected and removed

three cases whose data points deviated more than three standard deviations from the mean (see Anderson et al. (2012), p. 107). The excluded female tennis players are Andrea Petkovic (347 mentions), Jelena Jankovic (388 mentions) and Sabine Lisicki (313 mentions). The results of the OLS-regression are shown in Table 5.

Table 5: Effect of physical attractiveness on number of mentions on the homepage of *Kicker.de*

Variable		
		Std. Coeff.
Constant	43.435	
Physical Attractiveness	7.006*	.084
Age	-2.206**	-.091
Prize Money Career	1.494E-005****	.913
Significance	.000	
N	97	
Adjusted R^2	.825	

*Notes: *, ** and **** denote significance at the 10 per cent, 5 per cent and 1 per mill levels respectively.*

The results of this regression show that physical attractiveness has an increasing influence on the number of mentions on *Kicker.de*. This impact is significant on the ten per cent level. The control variable prize money career has a significantly elevating influence on the one per mill level here as well. Even the control variable age has a significantly decreasing impact on the number of mentions in *Kicker.de* on the five per cent level. In other words, the older a female tennis player the lower the number of mentions is on *Kicker.de*. Hence the third hypothesis is supported.

Thus a confirmation of the sixth hypothesis is given, because the quantitative influence of the prize money that a tennis player earned during her career (0.913) is higher than the impact of physical attractiveness (0.084) on the number of mentions on *Kicker.de*.

SI.com

First, the analysis of outliers, which are defined as data points that deviate more than three standard deviations from the mean, showed that three female tennis players had to be excluded from the sample (see Anderson et al. (2012), p. 107). These were Maria Sharapova (1505 mentions), Svetlana Kuznetsova (480 mentions) and Venus Williams (2342 mentions).

Table 6 presents the results of the OLS regression, including the mentions on *SI.com* as a dependent variable.

Table 6: Effect of physical attractiveness on number of mentions on the homepage of *SI.com*

Variable		
		Std. Coeff.
Constant	46.197	
Physical Attractiveness	2.932	.013
Age	-4.478**	-.066
Prize Money Career	5.280E-005****	.973
Significance	.000	
N	97	
Adjusted R^2	.916	

*Notes: ** and **** denote significance at the 5 per cent and 1 per mill level respectively.*

Physical attractiveness of female tennis players has no significant impact on the number of mentions on the homepage of the journal Sports Illustrated in this regression model. In fact only the variables that control for the prize money that has been earned in each career as well as the age influence the number of mentions on this homepage significantly. Therefore the third hypothesis that physical attractiveness has a significant influence on their popularity on SI.com cannot be confirmed here.

Due to the fact that the former performance and success of a female tennis player (0.973) has a quantitative higher impact on the number of mentions on SI.com than physical attractiveness (0.013), the sixth hypothesis can be confirmed for each of the three regression models.

WTA news

Along the same lines, the impact of physical attractiveness, age and the earned prize money of career on the number of mentions on the homepage WTA news are estimated in the following section.

In addition we tested the sample for outliers. Finally, we identified two cases that were removed from the sample. In this analysis we cannot consider the female tennis players Elena Vesnina (422 mentions) and Elena Baltacha (415 mentions) because their data points deviate

more than three standard deviations from the mean (see Anderson et al. (2012), p. 107). Table 7 shows the results of the OLS regression.

Table 7: Effect of physical attractiveness on number of mentions on the homepage of *WTA news*

Variable		
		Std. Coeff.
Constant	27.072	
Physical Attractiveness	17.184**	.137
Age	.068	.002
Prize Money Career	1.832E-005****	.745
Significance	.000	
N	98	
Adjusted R^2	.599	

*Notes: **and **** denote significance at the 5 per cent and 1 per mill levels respectively.*

The results of this regression model show that physical attractiveness has a highly significant effect (on the five per cent level) on the number of mentions on the homepage of the *WTA news*. Besides, the prize money that a tennis player earned until that date has an elevating and also significant impact on the dependent variable. The control variable age has no significant impact on the number of mentions in *WTA news*. Consequently, the third hypothesis that declares that physical attractiveness increases the number of mentions in *WTA news* can be supported.

Considering the standardised regression coefficients of both the independent and control variable, it can be seen that the sixth hypothesis can also be confirmed for *WTA news* in this regression model.

Tennis Life Magazine

Analogously to the previous analysis the influence of physical attractiveness on the number of mentions on the homepage of the journal *Tennis Life Magazine* is tested with the help of an OLS regression model.

Likewise in the other models, we detected outliers first. Caroline Wozniacki (43 mentions) and Victoria Azarenka (36 mentions) show data points that deviate more than three standard deviations from the mean. Consequently, they were excluded from the forthcoming analysis (see Anderson et al. (2012), p. 107). Table 8 summarises the results.

Table 8: Effect of physical attractiveness on number of mentions on the homepage of *Tennis Life Magazine*

Variable		
		Std. Coeff.
Constant	5.658	
Physical Attractiveness	.950**	.089
Age	-.309**	-.099
Prize Money Career	1.923E-006****	.915
Significance	.000	
N	98	
Adjusted R^2	.815	

*Notes: ** and **** denote significance at the 5 per cent and 1 per mill levels respectively.*

Referring to the results of this regression it can be seen that physical attractiveness has an increasing influence on the number of mentions on the homepage of the *Tennis Life Magazine*. The significance level of this effect accounts for five per cent. Likely to *Kicker.de*, the age has a significantly decreasing influence (on the five per cent level) on the number of mentions on the homepage of the *Tennis Life Magazine*. In addition the control variable prize money career increases significantly the number of mentions on this homepage on the one per mill level. Consequently, the third hypothesis can be supported for the homepage of the *Tennis Life Magazine*.

However, the standardised regression coefficients of the control variable prize money career (0.915) are higher than those of physical attractiveness (0.089). So the sixth hypothesis can also be confirmed for the homepage of the *Tennis Life Magazine*.

Google

In this last subsection it is tested whether physical attractiveness has an impact on the number of results in the online-search-engine *Google*.

Beforehand, we investigated outliers whose data points deviated more than three standard deviations from the mean. In sum, only Maria Sharapova (15,100,000 mentions) had to be excluded from the forthcoming regression analysis. (See Anderson et al. (2012), p. 107) Along the same lines, the results are illustrated in Table 9.

Table 9: Effect of physical attractiveness on number of mentions on Google

Variable		
		Std. Coeff.
Constant	-521346.054	
Physical Attractiveness	203200.477**	.169
Age	19385.298	.055
Prize Money Career	.155****	.638
Significance	.000	
N	99	
Adjusted R^2	.477	

*Notes: ** and**** denote significance at the 5 per cent and 1 per mill levels respectively.*

The results indicate that the number of mentions on Google is significantly affected by the level of physical attractiveness of each female tennis player. In this regression model physical attractiveness has an elevating influence on the dependent variable. This effect is significant on the five per cent level. Conversely, the age has no significant impact on the number of results in this search engine. Like in the other models before, the control variable of prize money career has an increasing impact on the dependent variable with a significance of one per mill. Therefore the third hypothesis can be supported here, too.

Finally the hypothesis that the prize money that female tennis players earned during their career (0.638) has a stronger influence on their popularity on Google than their physical attractiveness (0.169) can be confirmed here as well.

6. Conclusions

While there has already been a discussion about the influence of physical attractiveness on the popularity of competitive athletes, there only have been few comparable investigations on professional female tennis players. This article uses data from the top 100 *WTA* single ranking of the 35th calendar week in 2011 to estimate whether physical attractiveness of professional female tennis players has an impact on their popularity in several online media.

One hypothesis was tested to point out structural differences between below and above median physical attractive female tennis players concerning the number of mentions in online media. The results of the Mann-Whitney-U-tests are that female tennis players with an above median level of physical attractiveness are significantly mentioned more often on *SI.com* as

well as they are liked more frequently on *Facebook*. So the hypothesis that the medians of below average physical attractive and above average physical attractive female tennis players are equal can be denied for these two types of online media. Nevertheless the same hypothesis has to be confirmed for all other investigated online media.

Furthermore we can show that physical attractiveness and the number of likes on *Facebook* are correlated with a medium strength (0.466) on the one per cent level by using the Spearman's Rho correlation coefficient. In comparison to the Spearman's Rho correlation coefficient of the other investigated online media this result is the strongest one. Accordingly, this association is supported by the result of the corresponding OLS-regression where the impact of physical attractiveness as well as the age and the prize money career on the popularity on *Facebook* were tested. We found out that physical attractiveness and the prize money that a female tennis player earned during her previous career have a significant influence on the number of likes on *Facebook*. Conversely, only the age has no significant influence the popularity in this social network. These results may lead to the conclusion that the individual physical attractiveness has a comparable high importance and therefore correlation with the number of followers that a female tennis player can acquire on *Facebook*. Nevertheless, the impact of performance overweighs the influence of physical attractiveness and the age on the number of likes on *Facebook*. Hence, individuals may evaluate the previous performance as more important than the physical attractiveness when it comes to the decision whether or not they want to follow a female tennis player. Furthermore it might be reasoned that private persons tend to discriminate female tennis players because of their physical attractiveness. Admittedly, further investigation is necessary to confirm this assumption.

Oppositional results from the homepage *SI.com* are presented here. By using the Spearman's Rho correlation coefficient the correlation between physical attractiveness and the number of mentions on *SI.com* is accounted by a weak result of 0.271 on the one per cent level. Surprisingly, we cannot find any significant impact of physical attractiveness on the number of mentions on this website for this regression model. As opposed to this, the age and previous performance in terms of the prize money career show a significantly increasing impact on the number of mentions on *SI.com*. Similarly, it can be reasoned that the journalists of the homepage *SI.com* consider the individual physical attractiveness of a female tennis player less than her previous performance when it comes to the decision whether or not they

want to report on her. Consequently, no discrimination because of physical attractive but of the age can be identified here.

Regardless we find weak associations between the physical attractiveness and the number of mentions on the homepage of the *Tennis Life Magazine* (0.262) as well as the *WTA news* (0.232) that are supported by the corresponding OLS regression models. According to Vincent et al. 2007 we confirm our hypothesis that declares that physical attractiveness has a significant increasing influence on the popularity of professional female tennis players in these online media. Obviously, the editorial departments of these websites consider physical attractiveness besides the performance of each tennis player when it comes to the decision whether they report on them or not. In these two online media a discrimination of less physical attractive tennis players who perform equally to more physical attractive tennis players might be possible.

The most interesting result is given by the investigation of the homepage *Kicker.de*. First of all, the Spearman's Rho correlation coefficient shows no significant association between the degree of physical attractiveness and the number of mentions on this homepage. Surprisingly, the corresponding regression model presents that physical attractiveness as well as the prize money career have significant raising impacts on the number of mentions on *Kicker.de*. Likewise the age has a significant decreasing impact on the number of mentions on this homepage. In sum, the editors of this homepage discriminate for the age of a female tennis player. In other words the older a female tennis player the less she is mentioned on *Kicker.de*. Moreover physical attractiveness has no individual association with the popularity but it becomes relevant when the effect of the previous performance and the age are considered as well. Therefore we concede that further research and the consideration of further items might lead to more revealing results.

The number of results on *Google* is weakly correlated with the physical attractiveness of a female tennis player (0.211). Supporting this result, we find that physical attractiveness as well as the previous performance of a female tennis player significantly increase the number of results in this searching engine. Due to the fact that not only journalistic homepages but also private websites might be included in the number of results only vague conclusions can be given. Evidently, discrimination against less physical attractive female tennis players can be found on the World Wide Web. These results raise the issue why discrimination because of physical attractiveness can be ascertained here while it cannot be proved for editors of homepages like *SI.com*. Considering the fact that more research is necessary to prove the

following assumption, it can be reasoned that these results indicate a general discrimination against less physical attractive female tennis players in online media.

Nevertheless we can replenish the results of Fink et al. 2004 who observed that expertise of female athletes is more important than physical attractiveness concerning the probability to be booked as a testimonial or to acquire audience for the sportive event itself. The standardised regression coefficients of the variables that controlled for the former performance and success of each female tennis player were higher than those of physical attractiveness in each estimated regression model. As a further result it can be observed that irrespective of the significance of each effect, the prize money that a female tennis player earned during her entire career has a stronger influence on the number of mentions than physical attractiveness.

These investigations and consequently these results are limited because of different reasons and give incentives for further research. Further analysis could be complemented by the consideration of the media coverage of female tennis players besides the match field that could increase the popularity in the analysed online media. This would include e.g. being a testimonial for sponsors or other advertising contracts.

In addition the effect on physical attractiveness on the popularity on further online- or even non-electronic media like newspapers or journals could be investigated too.

In this paper we estimate the effects for one week. Following this neither alterations of popularity, nor a comparable value of increase among the tennis players is considered in this analysis. One more prospect would be to estimate the changing impact of physical attractiveness on popularity in online media over time by including different rankings of the WTA-list in the analysis. In addition it could be interesting to find out whether above average physical attractive female tennis players realise a faster increase of popularity over time than the reference group.

7. Appendix

Tested Groups	Obs.	Number of significant results for: Equal variances assumed	Number of significant results for: Equal variances not assumed	Number of insignificant results
'recognized' vs. 'not recognized'	100	2	10	88
'interested in sports' vs. 'not interested in sports'	100	3	12	85
'playing tennis' vs. 'not playing tennis'	100	0	13	87
'watching tennis on tv' vs. 'not watching tennis on tv'	100	0	4	96

Table A 1: Results of the t-tests to point out different evaluations of test persons
Notes

References

Adler, M. (1985): „Stardom and Talent", American Economic Review 75 (1), S. 208-212.

Adler, M. (2006): „Stardom and Talent", Handbook on the Economics of Art and Culture, Ginsburgh, V./Throsby, D. (Hrgs.), Amsterdam, Niederlande: Elsevier.

AGOF e.V. (2011): „Internet Facts 2011, Angebotsranking", Arbeitsgemeinschaft Online Forschung e.V., im Internet unter http://www.agof.de/angebotsranking.619.de.html (letzter Aufruf am 16.04.2012).

Anderson, D. R./Sweeney, D. J./Williams, T. A. (2012): „Essentials of Statistics for Business and Economics", 6. Auflage, Mason: South-Western Cengage Learning.

Audit Bureaus of Circulations (2011, 31. Dezember): „Consumer Magazines – Research Results", im Internet unter http://abcas3.accessabc.com/ecirc/magtitlesearch.asp (letzter Aufruf am 16.04.2012).

Berggren, N./Jordahl, H./Poutvaara, P. (2007): „The Looks of a Winner: Beauty, Gender, and Electoral Success", CESifo Working Paper Nr. 2002, München.

Bernstein, A. (2002): „Is It Time for a Victory Lap? Changes in the Media Coverage of Women in Sport", International Review for the Sociology of Sport 37 (3-4), S. 415-428.

Black, K. (2010): „Business Statistics for Contemporary Decision Making", 6. Auflage, Hoboken: John Wiley & Sons.

Boyatzis, C.J./Baloff, P. /Durieuy, C. (1998): „Effects of Perceived Attractiveness and Academic Success on Early Adolescent Peer Popularity", Journal of Genetic Psychology 159 (3), S. 337-344.

Cameron, A.C./Trivedi, P.K. (2009): „Microeconometrics – Methods and Applications“, 9. Auflage, New York: Cambridge University Press.

comScore (2011): „Europe Digital Year in Review 2010“, comScore, Inc., Reston, Virginia, im Internet unter http://www.iabrus.ru/File.ashx?ID=221 (letzter Aufruf 16.04.2012).

DeGroot, T. /Motowidlo, S.J. (1999): „Why Visual and Vocal Interview Cues Can Affect Interviewers' Judgments and Predict Job Performance“, Journal of Applied Psychology 84 (6), S. 986-993.

Dipboye, R.L./Arvey, R.D./Terpstra, D.E. (1977): „Sex and Physical Attractiveness of Raters and Applicants as Determinants of Resumé Evaluations“, Journal of Applied Psychology 62 (3), S. 288-294.

Eagly, A.H./Makhijani, M.G./Ashmore, R.D./Longo, L.C. (1991): „What Is Beautiful Is Good, But…: A Meta-Analytic Review of Research on the Physical Attractiveness Stereotype“, Psychological Bulletin 110 (1), S. 109-128.

Efran, M.G./Patterson, E.W.J. (1974): „Voters vote beautiful: the effect of physical appearance on a national selection“, Canadian Journal of Behavioural Science 6 (4), S. 352-356.

Facebook (2012): „Fact Sheet“, im Internet unter http://newsroom.fb.com/content/default.aspx?NewsAreaId=22 (letzter Aufruf am16.04.2012).

Felton, J./Mitchell, J./Stinson, M. (2004): „Web-based student evaluations of professors: the relations between perceived quality, easiness and sexiness“, Assessment & Evaluation in Higher Education 29 (1), S. 91-108.

Fink, J./Cunningham, G./Kensicki, L. (2004): „Using Athletes as Endorsers to sell Women's Sport: Attractiveness vs. Expertise“, Journal of Sport Management 18 (4), S. 350-367.

Franck, E./Nüesch S. (2008): „Mechanisms of Superstar Formation in German Soccer: Empirical Evidence“, European Sport Management Quarterly 8 (2), S. 145-164.

Franck, E./Nüesch S. (2012): „Talent and/or Popularity: What Does It Take to Be a Superstar?“, Economic Inquiry 50 (1), S. 202-216.

Garcia-del-Barrio, P./Pujol, F. (2007): „Hidden Monopsony Rents in Winner-take-all Markets – Sports and Economics Contribution of Spanish Soccer Players“, Managerial Decision Economics 28 (1), S. 57-70.

Garcia-del-Barrio, P./Pujol, F. (2009): „Money prizes and media value in tennis: who leads the spectacle?“, IASE Conference Paper Nr. 0828, Gijon, Spain, im Internet unter http://www.alde.es/encuentros/anteriores/xiveea/trabajos/g/pdf/122.pdf (letzter Aufruf am 21.05.2012).

Garland, R. (1991): „The Mid-Point on a Rating Scale: Is it Desirable?“, Marketing Bulletin 2 (1), S. 66-70, Research Note 3.

Gillan, A. (1999, 26. August): „Sex Appeal ‚Pays in Sport'“, The Guardian, im Internet unter http://www.guardian.co.uk/uk/1999/aug/26/audreygillan (letzter Aufruf am 16.04.2012).

Hakim, C. (2010): „Erotic Capital“, European Sociological Review 26 (5), S. 499-518.

Hamermersh, D.S./Parker, A.M. (2005): „Beauty in the classroom: Instructors' pulchritude and putative pedagogical productivity“, Economics of Education Review 24, S. 369-376.

Hellmueller, L.C./Aeschbacher, N. (2010): „Media and Celebrity: Production and Consumption of ‚Well-Knownness'“, Communication Research Trends 29 (4), S. 3-34.

Kicker.de (2012): WTA Rangliste, 2011, 35. Kalenderwoche, im Internet unter http://www.kicker.de/news/tennis/ranglisten/2011/35/2/tennis_weltrangliste.html (letzter Aufruf 22.05.2012).

Kuethe, T./Motamed, M. (2010): „Returns to Stardom: Evidence From U.S. Major League Soccer“, Journal of Sports Economics 11 (5), S. 567-579.

Kwak, H./Lee, C./Park, H./Moon, S. (2010): „What is Twitter, a Social Network or a News Media?“, Proceedings on the 19th international conference on World Wide Web, Raleigh, North Carolina,USA, im Internet unter http://cs.wellesley.edu/~cs315/Papers/ What%20is%20twitter-a%20social%20net% 20or%20news%20media.pdf (letzter Aufruf am 21.05.2012).

Lehmann, E./Schulze, G. (2008): „What Does it Take to be a Star? – The Role of Performance and the Media for German Soccer Players“, Applied Economics Quarterly 54 (1), S. 59-70.

Lucifora, C./Simmons, R. (2003): „Superstar Effects in Sport – Evidence From Italian Soccer“, Journal of Sports Economics 4 (1), S. 35-55.

Maner, J K./Kenrick, D T./Becker, D.V./Delton, A.W./Hofer, B./Wilbur, C.J./Neuberg, S. L. (2003): „Sexually Selective Cognition: Beauty Captures the Mind of the Beholder“, Journal of Personality and Social Psychology 85 (6), S. 1107-1120.

Mathes, E.W./Brennan, S.M./Haugen, P.M./Rice, H.B. (1985): „Ratings of Physical Attractiveness as a Function of Age“, Journal of Social Psychology 125 (2), S. 157-168.

McLellan, B./McKelvie, S.J. (1993): „Effects of Age and Gender on Perceived Facial Attractiveness“, Canadian Journal of Behavioural Science 25 (1), S. 135-142.

Mood, A.M./Graybill, F.A./Boes, D.C. (1974): „Introduction to the Theory of Statistics“, 3. Auflage, New York: McGraw-Hill.

Net Applications (2012): „Desktop Search Engine Market Share“, im Internet unter http://www.netmarketshare.com/search-engine-market-share.aspx?qprid=4&qpcustomd=0 (letzter Aufruf am 03.05.2012).

Olympia Verlag (2012): „Kicker- Das steht seit über 90 Jahren für Fußball pur“, im Internet unter http://www.olympia-verlag.de/Kicker/index.aspx (letzter Aufruf am 16.04.2012).

Perrin, F.A.C. (1921): „Physical Attractiveness and Repulsiveness“, Journal of Experimental Psychology 4 (3), S. 203-217.

Prinz, J./Deutscher, C./Weimar D. (2011): „Popularity kills the Talentstar? Einflussfaktoren auf Superstargehälter in der NBA“, Arbeitspapier, Duisburg-Essen: Universität Duisburg-Essen, Mercator School of Management, Department of Managerial Economics.

Rosar, U./Hagenah, J./Klein, M. (2010): „Physische Attraktivität und individuelles Leistungsverhalten oder: warum und wann unattraktive Männer die besseren Fußballer sind“, Soziale Welt 61 (1), S. 51-68.

Rosen, S. (1981): „The Economics of Superstars“, American Economic Review 71 (5), S. 845-858.

Tennis Life Magazine (2009, 14. Mai): „Tennis Life Magazine and USTA Florida Join Forces! Circulations tops 180,000“, im Internet unter http://www.tennislife.com/industry-news/91-tennislifemagazineand-ustaflordajoinforces (letzter Aufruf 16.04.2012).

Vincent, J./Pedersen P.M./Whisenant, W.A./Massey, D. (2007): „Analysing the print media coverage of professional tennis players: British newspaper narratives about female competitors in the Wimbledon Championships“, International Journal of Sport Management and Marketing 2 (3), S. 281-300.

Weiers, R. (2011): „Introduction to Business Statistics“, 1. Auflage, Mason: South-Western Cengage Learning.

Weinberg, T. (2010): „Social-Media-Marketing – Strategien für Twitter, Facebook & Co.“, 1. Auflage, Beijing: O’Reilly.

WTA Tour (2012): „ About the WTA“, im Internet unter http://www.WTAtennis.com/page/AboutTheTour/0,,12781,00.html (letzter Aufruf am 16.04.2012).

Bisher erschienen:

Diskussionspapiere des Instituts für Organisationsökonomik

DP-IO 6/2012 The Impact of Physical Attractiveness on the Popularity of Female Tennis Players in Online Media
Stephanie Kiefer/Katrin Scharfenkamp
Juni 2012

DP-IO 5/2012 Förderung von Wissenschaft zu nationalen und europäischen Fragen
Alexander Dilger
Mai 2012

DP-IO 4/2012 Untersuchung von Indikatoren zur Qualitätsmessung von Reitschulen in Deutschland
Stephanie Kiefer
April 2012

DP-IO 3/2012 Rigor, wissenschaftliche und praktische Relevanz
Alexander Dilger
März 2012

DP-IO 2/2012 Socio-Demographic Characteristics and Human Capital of the German Federal Government's Members
Katrin Scharfenkamp/Alexander Dilger
Februar 2012

DP-IO 1/2012 Die Zitationshäufigkeit als Qualitätsindikator im Rahmen der Forschungsleistungsmessung
Harry Müller
Januar 2012

DP-IO 12/2011 Ein Forschungsleistungsranking auf der Grundlage von Google Scholar
Alexander Dilger/Harry Müller
Dezember 2011

DP-IO 11/2011 Besonderheiten der Bewerbung um Promotionsstellen und -gelegenheiten
Alexander Dilger
November 2011

DP-IO 10/2011 1. Jahresbericht des Instituts für Organisationsökonomik
Alexander Dilger/Stephanie Kiefer/Katrin Scharfenkamp
Oktober 2011

DP-IO 9/2011 Corporate Governance and Employee Power in the Boardroom
An Applied Game Theoretical Analysis
Benjamin Balsmeier/Andreas Bermig/Alexander Dilger/Hannah Geyer
September 2011

DP-IO 8/2011 Ein Ranking von Hochschulen und (Bundes-)Ländern am Beispiel der Betriebswirtschaftslehre
Harry Müller/Alexander Dilger
August 2011

DP-IO 7/2011 Befragung der Kommission Hochschulmanagement zu VHB-JOURQUAL
Alexander Dilger
Juli 2011

DP-IO 6/2011 Director Interlocks and Executive Turnover in German Public Corporations
A Hazard Analysis for the Period from 1996 to 2008
Benjamin Balsmeier/Achim Buchwald/Alexander Dilger/Jörg Lingens
Juni 2011

DP-IO 5/2011 Personalökonomik
Stärken, Schwächen und ihr Platz in der Personalwirtschaftslehre
Alexander Dilger
Mai 2011

DP-IO 4/2011 Familienbewusste Personalpolitik und Unternehmenserfolg
Eine empirische Untersuchung
Christian Lehmann
April 2011

DP-IO 3/2011 Welche Unternehmen berufen Vorstandsvorsitzende und andere Vorstände als externe Kontrolleure?
Eine empirische Analyse der Präsenz von externen Vorständen in den Aufsichtsräten deutscher Großunternehmen
Achim Buchwald
März 2011

DP-IO 2/2011 Hat Julia aufgrund ihres Vornamens Wettbewerbsvorteile gegenüber Ayse und Chantal? Ein Experiment auf dem Beziehungs-, Nachhilfe- und Wohnungsmarkt
Laura Lütkenhöner
Februar 2011

DP-IO 1/2011 Die dunkle Seite der Gerechtigkeit
Alexander Dilger
Januar 2011

DP-IO 3/2010 On the Overconfidence-Effect in Teams
Hanke Wickhorst
Dezember 2010

DP-IO 2/2010: Leistung, Identifikation oder die Unsicherheit über den Spielausgang – was zählt wirklich? Relevante Einflussfaktoren auf die Zuschauerzahlen in der Basketball-Bundesliga
Hannah Geyer
November 2010

DP-IO 1/2010: A Citation Based Ranking of German-speaking Researchers in Business Administration with Data of Google Scholar
Alexander Dilger/Harry Müller
Oktober 2010

Herausgeber:
Prof. Dr. Alexander Dilger
Westfälische Wilhelms-Universität Münster
Institut für Organisationsökonomik
Scharnhorststr. 100
D-48151 Münster

Tel: +49-251/83-24303
Fax: +49-251/83-28429

www.wiwi.uni-muenster.de/io