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Impact of Online Influencer Endorsement on Product Sales: Quantifying Value of Online Influencer

Research-in-Progress

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Abstract

In recent years, firms are making significant investments in online influencer endorsement. The effectiveness of online influencer endorsement and ways to develop effective endorsement strategies however are not clear. In this study, we conduct an exploratory study and empirically test the impact of online influencer endorsement on product sales. Using endorsement information from microblog site, Sina Weibo and sales data from online e-commerce platforms, Taobao and Tmall, we found positive impacts of online influencer endorsements on sales and the effect of online endorsement is stronger for influencers with more followers. We also found evidence that frequently endorsing products is counterproductive to the online influencer's endorsement effort. The results of this study contribute to celebrity endorsement literature and practice.

Keywords: online influencer endorsement, social media, difference-in-difference, field study

Introduction

For decades, celebrity endorsement has been widely adopted by firms of different sizes and industries to attract customers and promote products. Historically, firms tend to sponsor actors/actresses, singers, or athletes as their spokespersons, advertising through TV, radio, printed media, and/or billboards (Erdogan 1999). Although such practices prevail today, many firms have been trying new ways to be competitive in the age of social media. A notable phenomenon is that many firms engage online influencers to endorse their products on social media platforms such as Twitter, Instagram, and Sina Weibo (Brison et al. 2016; De Veirman et al. 2017; Hwang and Jeong 2016; Jin and Phua 2014).

We define *online influencers* as influential users of a social media platform who have the ability to influence a great number of platform users on their opinions and behaviors. In addition to traditional celebrities (e.g., actors/actresses, singers, and athletes), a large portion of online influencers are pure online celebrities whose reputation stems predominately from online activities. Generally, online influencers have a lot of followers on a social media platform even though their off-line presence might be less than traditional celebrities. At times, a newly-minted online celebrity has significantly more followers than say a well-known actress. All else equal, the more followers an online influencer has, the more attention her messages will receive, as messages posted by an online influencer can be

broadcasted to every follower, who often repost these messages on their personal homepage, thereby rebroadcasting the messages to thousands of other users (Scott 2015; Wood and Burkhalter 2014). If the message is about a product, it can serve as a good case of viral marketing. Firms hence take advantage of the nature of information propagation and are transforming their marketing strategy with social media marketing through online influencer (Brison et al. 2016; De Veirman et al. 2017; Jin and Phua 2014).

Recent marketing and information systems research has focused on online influencer endorsement. For example, using experiment study, scholars examined the factors that impact consumers' source credibility perception. Such factors include online influencer popularity (De Veirman et al. 2017; Jin and Phua 2014), valance of the messages posted by online influencers (Jin and Phua 2014), and disclosure of endorsement (Hwang and Jeong 2016). Further, consumers' perceived source credibility has a positive impact on consumer purchase intention (Goldsmith et al. 2000; Harmon and Coney 1982; Jin and Phua 2014; Lafferty and Goldsmith 1999). In light of extant literature, to the best of our knowledge, no research has empirically quantified the effect of online influencer endorsement on actual product sales. Although firms have invested resources in online influencer endorsement, the payoff of online influencer endorsement on actual product sales is still equivocal. Many questions relating to online influencer endorsements still remains. For example, does investment in online influencer endorsement lead to a quantifiable increase in actual product sales? Should a firm engage *various* relatively lower cost, "mid-level" online influencer or engage a single, costly, highly influential online influencer? Additionally, what message-posting strategies should online influencers adopt while endorsing a product? Likewise, how does the endorsement frequency of an influencer impact product sales?

In this research, we conducted an exploratory study and empirically tested the impact of online influencer endorsement on product sales. In particular, we use online influencer endorsement information from microblog site, Sina Weibo and track the corresponding product sales on two major e-commerce sites, Taobao and Tmall. Sina Weibo (shorted as Weibo below) is a Twitter-like microblogging platform in China. According to the official report from Weibo (2017), by September 2017, it has 376 million active monthly active users and 165 million daily active users. A Weibo user can post messages in different formats (text, image, video, or even an article link from another website). The message is broadcasted to the followers of the originating user and can be reposted by other users or the original user. When a Weibo influencer posts a message to endorse a product, she can attach a product link, from which consumers can directly buy the product. This affords us an opportunity to track the actual product sales change after an endorsement. Our preliminary analysis shows that online influencers' endorsements were associated with increased product sales. We found that on average every 1 million followers increase the monthly product sales by 9 percent. In addition, we found that the effect is attenuated if the online influencer frequently endorses products.

Literature on Online Influencer Endorsement

Prior researchers have studied extensively on the topic of celebrity endorsement. However, as the format of celebrity endorsement changed since the emergence of new media (e.g., social media), Bergkvist and Zhou (2016) proposed a renewed definition of celebrity endorsement as, "*an agreement between an individual who enjoys public recognition (a celebrity) and an entity (e.g., a brand) to use the celebrity for the purpose of promoting the entity endorsement increase consumer purchase intention*". In this study, we adapt this definition of celebrity endorsement and define online influencer endorsement as an agreement between an individual who enjoys online public recognition (an online influencer) and an entity (e.g., a brand) to use the online influencer for the purpose of promoting the entity endorsement increase consumer purchase intention.

Online Influencer Selection

The effectiveness and payoff of celebrity endorsement depends on many factors. For example, source credibility has been shown to have a positive effect on the effectiveness of celebrity endorsement (Erdogan 1999). In particular, two components of source credibility, perceived level of expertise and

trustworthiness in a celebrity, contribute to the endorsement effectiveness (Hovland and Weiss 1951; Ohanian 1991; Roy Dholakia and Sternthal 1977). Although firms choose celebrity endorsers based on their attractiveness (Singer 1983), studies on the effect of attractiveness on brand evaluation and purchase intention have generated mixed findings. Some studies found positive effects of celebrity attractiveness (Kahle and Homer 1985; Silvera and Austad 2004), while some studies found no effect (Fleck et al. 2012; Miller and Allen 2012), and even negative effects (Rossiter and Smidts 2012). Due to data collection limitations, existing studies only examine the effect of celebrity attractiveness on consumer brand evaluation or purchase intention (De Veirman et al. 2017; Jin and Phua 2014), rather than the actual purchase behavior or product sales. Therefore, there is still lack of theoretical and empirical guidance on how to select online influencer to promote a product. Given that firms are making significant investments in online influencer endorsement, it is imperative to examine the effects of online influencer endorsements on actual product sales.

Online Endorsement Strategy

Online influencer endorsements differ from the traditional celebrity endorsements in many ways. First, it is generally easier for an online influencer to make online endorsements, compared to traditional endorsements which involve a long process of producing and broadcasting advertisements. Online influencer endorsements often appear as some online posts (with photos, videos, and hyperlinks) that are automatically pushed to their followers via social media. Second, online influencers' endorsements can appear as casual sharings of their personal life experiences, which can be perceived as less biased, more subtle and more persuasive (De Veirman et al. 2017). This is in contrast to the traditional celebrity endorsements that are projected as an overt persuasion process. In traditional media, it has been found that the persuasive power is dependent on the frequency of posting product endorsements. When celebrities endorse too many products, perceived credibility and attitude toward the endorsement become less favorable (Tripp et al. 1994). Whether this effect spills over to online endorsements remains to be seen given the higher frequency of message posting and endorsements performed by online influencer in general compared to traditional media. Nevertheless, we hypothesize that if an online influencer posts too many endorsements, the perceived credibility toward the influencer and the endorsement might decrease. As the perceived credibility of an influencer is positively related to consumers' attitudes toward an ad and purchase intention, we infer that when online influencers endorse too many products, the effectiveness of endorsement as measured by product sales would decrease.

The Financial Effect

Most studies on celebrity endorsement conduct lab experiments and measure the effectiveness of celebrity endorsement using brand evaluation (De Veirman et al. 2017; Silvera and Austad 2004; Spry et al. 2011) and purchase intention (Jin and Phua 2014; Lee and Thorson 2008; Wang et al. 2013). Because the predictive power of purchase intention on purchase behavior varies under different conditions (Infosino 1986; Morwitz et al. 2007), empirically it is more meaningful to directly use product sales as a measure of celebrity endorsement effectiveness. We found two studies that measure the effectiveness of celebrity endorsement in the form of product sales. Elberse and Verleun (2012) and Chung et al. (2013) examined the economic value of celebrity endorsement. Using 51 athletes endorsements and corresponding brand sales, Elberse and Verleun (2012) found significant increase in sales for 43 of 51 endorsements. The average increase in weekly sales is around 4%. In another study, Chung et al. (2013) examined the impact Tiger Woods had on sales of Nike golf balls and found a significant effect of celebrity endorsements on sales. The dearth of studies and the exclusive focus on athlete endorsers led Bergkvist and Zhou (2016) to call for more research on the relationship between celebrity endorsements and sales in different celebrity types. To answer this call, in this study, we focus on a comprehensive range of online influencers including actor/actress, singer, athlete, and pure online celebrity etc.

Methodology

Data collection

We collected online influencer endorsement data from Sina Weibo, a Chinese social media site that is similar to Twitter and Facebook. Originally launched as China's Twitter, it gradually incorporated features of Facebook by allowing users to post longer messages embedded with multimedia, such as images, hyperlinks, and videos. Weibo publishes top influencers in a wide range of categories and we focused on six categories which influencers are more likely to endorse a product. These categories are food & delights, beauty, make-up bloggers, stars, athletes, and sports. We extracted the top 200 influencers (based on the number of followers) from each of the six categories. Ten research assistants were recruited to help with the data collection. Each research assistant was randomly assigned 240 accounts to track the postings daily such that each account was followed by two different research assistants. The data collection time period was from September 28th, 2016 to October 31st, 2016. Research assistants were required to follow these Weibo influencers, browse their postings every day, and record all the posts with endorsements. Once an endorsement was found, the research assistant would find the endorsed product. We focused on the endorsements with a link to Taobao or Tmall, (both subsidiaries of Alibaba, China's biggest e-commerce company). If there was no product link in the endorsement, research assistants were required to search the product name in Tmall/Taobao and record the first product of search results as the product link of an endorsement (They were also required to report if the link is organic or derived from the search results). We also asked research assistant to identify a *similar product* from the recommendation list shown on the product page. The selection of *similar product* is based on product category, brand, shop, and price. A similar product must be in the same product category and sold by the same shop, has the same brand, and has a price within 20% difference from the endorsed product. The collection of data of the similar product is to allow us to use that data as a control group. The similar product represents a control product which is similar to the endorsed product in various ways (such as brand, functionality etc.) except that this is a product which is not endorsed on the social media platform. We created a software to track the product pages of the endorsed and similar product, getting sales data, inventory information, rating, and other product-related information for the following 30 days. We also used Weibo's API to get the online influencers' account information and track the Weibo endorsement messages during the data collection time period and also collected the comment and reposting information. Research assistants were required to read all the posts posted on the day and report the posts with endorsements before midnight on the same day and all the data collection programs start from midnight every day. 1311 endorsement activities were identified. 510 were removed due to incomplete data collection as at times the product endorsed could be removed from the Taobao or Tmall due to stock-outs. In total, we collected 801 endorsement activities by 165 celebrities.

Preliminary Analysis

Model and Variables

We utilized published total sales data on the product page and employed a difference-difference (DID) technique to estimate the impact of the endorsements. Taobao and Tmall only publish the total sales in the past 30 days. For each product i endorsement identified by our research assistant, we recorded the number of sales we collected on Day 1 (immediate after the endorsement) as the sales number before treatment. We then recorded the number of sales we collected on Day 30 as the sales number after treatment. For each product endorsement, we also used the similar product the control group. Specifically, the model can be written as:

$$\# Sales_{it} = \alpha + \beta \cdot Treat_i + \gamma \cdot Post_t + \delta' \cdot Treat_{V_{it}} \cdot Post_{t-V} + \theta' \cdot Z_{it} + \varepsilon_{it}$$

In the above model, $\# Sales_{it}$ is the number of sales of product i on Day t ($t = 1$ or 30). $Treat_i$ equals 1 if i is in the treatment group (i.e., an endorsed product), and 0 if i is in the control group (i.e., a similar product that was not endorsed). $Post_t$ equals 1 if $t = 30$, and 0 if $t = 1$. Z_{it} is a vector of control variables and θ' is a vector of associated coefficients. We controlled for several product page variables:

site (1 for Tmall and 0 for Taobao), price, stock, number of review, number of images, number of words and ratings (for description, service, and logistics). $Treat_{it}$ is a vector of treatment variables. The coefficient δ' is the difference-in-different estimators (Moser and Voena 2012). We tested several treatment variables. First, in the simplest form (**Model 1**), we used a dummy variable indicating if the product is an endorsed product or not. Second, we used the influencer's number of followers (*# Followers*) to estimate the impact of influencer's endorsement (**Model 2**). Third, we included the influencer's endorsement frequency (*EF*), measured as the ratio of the of product endorsements to total number of Weibo posts during the data collection period, to test how the endorsement frequency would affect the effectiveness of the endorsement (**Model 3**). Negative binomial estimator was used to estimate this model given that the dependent variable sales contains only integer values.

Table 1. Regression Results

Negative Binomial DV: # Sales	Model 1	Model 2	Model 3
Treat × Post	-0.1083 (0.1306)		
# Followers × Post		8.625e-08** (3.049e-08)	9.563e-08** (3.157e-08)
EF × Post			-2.4139* (1.0102)
site	2.7815*** (0.1065)	2.8128*** (0.1058)	2.8041*** (0.1057)
price	-0.0008617*** (0.00003618)	-0.0008603*** (0.00003618)	-0.0008515*** (0.00003640)
stock	2.163e-08 (1.396e-08)	1.858e-08 (1.220e-08)	1.790e-08 (1.195e-08)
# reviews	0.00001540*** (0.000001153)	0.00001516*** (0.000001144)	0.00001516*** (0.000001143)
# images	0.01300*** (0.002761)	0.01290*** (0.002744)	0.01258*** (0.002743)
# words	-0.00005238 (0.00007281)	-0.00004124 (0.00007289)	-0.00003607 (0.00007336)
Description Rating	-0.9888 (0.7242)	-1.3092 (0.7265)	-1.3091 (0.7258)
Service Rating	-6.2133*** (0.9962)	-5.7743*** (0.9955)	-5.8260*** (0.9938)
Logistics Rating	1.2784 (0.8535)	1.1467 (0.8515)	1.1202 (0.8501)
Treat	1.0340*** (0.09425)	0.9007*** (0.07217)	0.9332*** (0.07380)
Post	0.05079 (0.09254)	-0.08911 (0.07108)	-0.05561 (0.07287)
_cons	33.178*** (3.5513)	33.298*** (3.5378)	33.661*** (3.5541)
Observations	3204	3204	3204

Notes: t statistics in parentheses. Significance codes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Results

Our preliminary regression results reported in Table 1 show an interesting pattern. First, we did not find significant treatment effect using the basic DID specification (Model 1, $Treat \times Post = -0.1083$, $p > 0.1$). Nevertheless, in Model 2, we found a significant effect when the number of followers is included in the model ($\# Followers \times Post = 8.625e-08$, $p < 0.01$). The estimated impact is also economically meaningful. For an influencer with 1 million followers, her endorsement would increase the number of

sales by 9% ($e^{0.0863}$). Such effect is attenuated by the frequent endorsement of products ($EF \times Post = -2.4139, p < 0.05$).

Contribution and Future Research Plan

This is the first *field study* that empirically tested the effect of online endorsement on actual product sales with a wide range of different types of online influencers. In this study, we contribute to celebrity endorsement literature by extending celebrity endorsement theory to the online environment in the following ways. First, our preliminary analysis affirms that the endorsement of an online influencer increased the sales of the product. Second, we found that the effect of online endorsement is stronger for influencers with more followers and this study is different from prior studies (De Veirman et al. 2017; Jin and Phua 2014) which only examined the effect of influencer popularity on purchase intention and not actual purchases. Although it is not surprising that online influencers with more followers can bring more sales, we contribute to celebrity endorsement literature by quantifying the effect of number of followers on product sales. Third, we find evidence that frequently endorsing products is counterproductive to the effectiveness of the online influencer's endorsement effort and this is consistent with past findings on traditional celebrity endorsement that multiple product endorsements decrease celebrity and ad likability (Tripp et al. 1994). This study also has practical implications for firms investing in online influencer endorsement. It offers guidance on how to select online influencer. For example, although it is more economical to engage an online influencer with fewer followers, firms should consider the payoff for each additional follower an online influencer has on the impact of sales. Here, we quantify the value of each marginal follower on the impact of sales thereby allowing firms to better weigh their marketing costs to sales payoff. The results of this study also suggest a moderate endorsing frequency to increase the effectiveness of online endorsement.

Currently, we only performed preliminary analysis on our dataset. At current stage, we use 30 days as time window to compare the sales before and after online influencer endorsement. In the future, we will use shorter time windows, such as 3 days and 7days to do robustness check. Since we have collected details about the influencer's online activities, we are able to conduct further analysis to get more fruitful insights on online influencer endorsement strategy. Next, we plan to examine the impact of online influencer at a more granular level. We plan to incorporate details about the influencer's activities on the Weibo site (e.g., posts, likes) in our model. We also plan to investigate how the framing of the endorsement message (overt vs. subtle) might influence the effectiveness of the endorsement. Rather than overt endorsements on traditional media, online influencers' endorsements may be subtle, often appearing as casual sharings of their personal life experiences, which may be perceived as less biased and more persuasive (De Veirman et al. 2017). On the other hand, subtle references to products might be less obvious and may be ignored by the followers. Hence, it is interesting and important to figure out if an overt or subtle endorsement is more effective on product sales. Finally, the dataset allows us to explore how different endorsement formats (e.g., textual or visual) could affect the effectiveness of endorsement. The results are expected to add knowledge to celebrity endorsement literature in the online environment.

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