Social Media Engagement and Film Box Office

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Abstract

This paper examines the effect of social media, specifically engagement rates for Facebook, Instagram, and Twitter on box office revenue. Larger engagement rates lead to greater brand awareness, word of mouth marketing, and better relationships with customers and so we believe engagement rates can be an effective metric to help predict box office performance. We calculated Pearson correlation coefficients for daily engagement rates across the aforementioned platforms and daily domestic box office for 12 films released between February and March 2020. The results indicate that there exists a positive correlation between social media engagement rates and box office revenues for all three social media platforms being studied, of which Instagram had the strongest correlation.

Keywords: Social media, Movies, Box Office, Engagement rate, Instagram

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Since Facebook's launch in 2004 followed by Twitter in 2006 and Instagram in 2010, it is rather obvious that social media has changed the world. From the way we communicate with friends and family to how we make decisions to how information is shared, social media has slid into virtually all facets of society and transformed them. Social media has allowed word-of-mouth to go beyond small group conversations amongst friends, family, and coworkers by the water cooler to a large networked conversation between hundreds, thousands, and even millions of users. Users have a platform to voice their opinions, seek information, and share either their own content - videos, photos, GIFs, memes - or that of others. As of 2019, 72% of American adults use some type of social media (Pew Research Center, 2019). Given the proliferation of social media, it seems only wise that businesses tap into these platforms to carry out business objectives, of particular interest marketing objectives. Just like amateur users, professionals can also share content on behalf of their business to connect with its customers or clients, share product information, and/or increase brand awareness. What has businesses so excited about social media is that these platforms also serve as virtually unlimited data sources that they can exploit to help make decisions including that of who to target and how to deliver their messages.

The film industry accounts for some of these businesses as evidenced by the variety of research available exploring the relationship between social media and box office. Furthermore, there are cases where film marketers have used social media as an important component of their overall marketing strategy. *The Hunger Games: Catching Fire* implemented a strategy called brand storytelling which consists of "a mix of social media campaigns undertaken across a variety of [social media] platforms." The result was a low-cost alternative to other advertising methods like TV and physical advertising that helped the film set the record for the biggest

opening weekend for any movie released in November 2013 (Sawhney & Goodman, 2016, p.1).

Paranormal Activity (2007) famed as one of the most profitable films in movie history also used

social media. Fans were encouraged to "tweet your scream" and join the film's Facebook page

(Thompson, 2009). Disney's *Alice in Wonderland* had campaigns on Twitter and Facebook that

allowed users to become loyal subjects of the red queen, the white queen, or a disloyal subject of

the mad hatter, rewarding the largest army of followers with access to an exclusive trailer

(Souza, 2012). The campaign went viral and Alice in Wonderland grossed over $1 billion in

global box office, a rare achievement for films. Domestically, it was the third highest-grossing

film in Walt Disney Studios' history as of 2010 (The Walt Disney Company, 2010).

These examples indicate that if used effectively, social media has the ability to deliver

promising benefits to the film industry and it is of considerable interest to assess how these

benefits take shape. As social media continues to grow and evolve, it is important to continually

investigate how these platforms influence consumers and ultimate financial performance. In this

work, we will be studying whether and to what extent social media presence affects feature film

performance at the box office. An objective is to bring a more current perspective to the existing

literature by using Instagram as one of the sources of data. This will be accomplished by

analyzing daily box office revenues of films released between February and March 2020

alongside corresponding social media engagement rates. We believe that there is a positive

correlation between the two variables which can help film marketers make better informed

decisions when it comes to implementing social media into their strategies.

Literature Review

When describing the complexity of films in the context of the product market, a rather clear perspective is offered by media executive and author Jeffrey C. Ulin (2019):

> Film and television are classic experience goods, as distinct from ordinary goods. An experience good is a product that the consumer cannot accurately or fully assess until consuming it, whether that is via watching a film or TV show or reading a book. Given the nature of creative goods – that nobody knows what will be a success – and the fact that you cannot really know whether you will like a property until you digest it yourself, it is natural for us to look for signals and references to make better bets before investing our time. (p.106)

Just as natural as it is for us as viewers to look for signals that a movie is worth our time and money, researchers continue to investigate whether there are early signals that a movie will end up being worth the time and financial risk taken by its creatives and investors.

Previous studies have examined if and how certain social media metrics affect box office revenues for films and some aim to discern whether these metrics can be used to predict future box office performance. A common pattern was the use of Twitter data as an independent variable. Apala et al. and Kaplan (2013) both used the number of followers to assess the popularity of the directors and actors/actresses involved in a film and tested if greater popularity could increase box office revenue. In their study of consumer engagement behavior in social media Oh et al. (2016) also used Twitter followers as an independent variable but looked at the number of followers for the movie profile to assess popularity of the film rather than the individuals associated with the film. The study also quantified consumer engagement behaviors - CEB, specifically word of mouth, by recording the number of public tweets shared by Twitter

users about the films in question. Baek et al. (2017) measured word of mouth through the number of tweets about the films recorded as well. Thus, Twitter seems to strike great interest among those looking for indicators of box office success and there are results across various studies that indicate that the correlation between the independent variables described above and box office are positive. Apala et al. (2013) constructed a predictive model using data from Twitter to identify that the popularity of leading actresses is significant to the success of a movie. The more Twitter followers an actress had, the greater the likelihood that the film would be considered a financial success. It is interesting to note that the study did not specify whether the same applied to male actors, but it did conclude that a movie starring an actor with low popularity (low Twitter following) was more likely to be considered a "flop" at the box office. Similarly, Kaplan's (2013) model indicates that for every Twitter follower of an actor, actress, or director of a film, the film added $2.66 to its total domestic box office. The thesis of Oh et al. (2016) reveals otherwise, however. Twitter followers had a minimal effect and did not have a positive correlation with opening weekend gross box office nor first month gross box office. Nevertheless, the number of public tweets about a movie did reveal a positive effect on the opening weekend box office and the first month box office. Similarly, Baek et al. (2017) study shows that word of mouth on Twitter also had a positive impact on box office which was strongest at the initial stage of a movie's release –the initial stage was defined as the first 3 weeks of its theatrical run. The difference in findings can possibly be attributed to the fact that Apala et al. and Kaplan's research looked at the Twitter followers of individuals while Oh et al. looked at the Twitter followers of the movies' profiles. This comes to show that the type of measurements collected from Twitter do not carry the same effects across box office revenues. The number of followers an actor or actress has and the number of tweets about a movie may have a greater

effect than the number of followers the film has based on these studies. Consequently, it is important to look at Twitter data with a keen eye when it comes to its relationship with box office.

The study conducted by Wong et al. (2012) brings attention to the former point, which argues that movie tweets may not tell "the whole story." By closely analyzing a collection of almost 2 million tweets about a sample of 34 films as well as the films' box office figures and user ratings from IMDb and Rotten Tomatoes, Wong et al. found that marketers need to be careful about basing conclusions exclusively on tweets. When looking at the proportion of positive tweets and ratings, the data reveals that even if a movie has a low proportion of positive tweets before watching to positive tweets after watching - "the hype approval factor" - and low IMDb ratings, it can still become financially successful. The success was ambiguous for movies that had a low hype approval factor but a high IMDb rating or vice versa; they could either be financially successful or unsuccessful. It was only when both the hype approval factor and the IMDb rating was high, that all the movies meeting these criteria were financially successful. Twitter alone was not sufficient to predict box office success within this study. With this in mind, it seemed reasonable that the studies examined looked at the effects of other social media platforms besides Twitter.

In addition to analyzing Twitter data, Oh et al. (2016) also tested the effects of Facebook likes and the number of Facebook users that have taken actions on Facebook related to the movie (liking the movie's profile, sharing a post from the movie's profile, posting on a wall about the movie, etc. which the study refers to as "FB Talk"). They also examined YouTube view and comment counts. It is interesting to note that when FB Talk and YouTube comments were tested in combination with the number of tweets about the films in the study, the positive effect of

Twitter found beforehand was undermined. In other words, the number of tweets had a positive

effect on opening gross and first month gross when tested in isolation. But when tested with FB

talk and YouTube comments, the positive effect is overridden. This further supports Wong's et al.

(2012) finding that tweets alone are not a reliable predictor of box office revenue. YouTube

views for videos on each of the movie's profiles and the number of comments on these videos

both had a strong effect and were positively correlated with opening box office. In fact, Oh's

(2016) results suggested that one unit of YouTube views was related to $2.00 in gross revenue

and one unit of YouTube comments was related to as much as $1,871 in gross revenue for each

movie. Similarly, one unit of Facebook likes was related to $1.00 and one unit of FB talk was

related to $33.00.

Apala's et al. (2013) predictive model also factored in data from YouTube, specifically,

views of official movie trailers as a measure of movie popularity as well as overall sentiment

about a film derived from YouTube viewers' comments. However, their experiments revealed

that these factors were not relevant to box office performance in the face of other variables like

the popularity of actors in the film as referenced above and when the film was of a previously

successful genre or a sequel. It is unclear what specific videos were tracked in Oh's et al. (2013)

study, whether they were trailers, behind-the-scenes, sneak peek clips, interviews, etc. But the

difference in the kind of videos tracked and the fact that Oh et al. looked at the count of

comments while Apala et al. looked at the sentiment of the comments could contribute to the

difference in findings.

In their thesis, Ding et al. (2016) took a different approach and focused their efforts on a

single social media metric, the Facebook like. Ding et al. recorded the total number of likes on

each of the sampled movies' IMDb pages from one month up to one day before the release of the

film. They refer to this as "prerelease likes" and examine its effects on box office revenues across different time periods - the opening day, the opening week, the opening month, and the final total box office. Ding et al. found that the number of prerelease likes one day before release as well as one week prior to release have a strong positive correlation with box office performance. For every 1% increase in the number of prerelease likes in the week before release, opening week box office performance increased by about 0.2%.

It seems that the overall literature reveals that social media does indeed have some kind of impact on box office revenue. The most popular social media platforms in question were Facebook, Twitter and YouTube. Given that Facebook was the leading social media platform in 2013, when most of the studies cited above were conducted, researchers' interest in its applications for the film industry is warranted. Similarly, Twitter attracted almost a fifth of online users that same year (Pew Research Center, 2019) and YouTube was the top-ranked video content provider in August 2014 (Comscore, 2014). For some investigators, the impact of these platforms is weighted more towards what it can do for a film's initial box office rather than the total box office performance as we see in Oh et al., Baek et al., and Ding's et al. studies. Box office revenue is almost always greatest at opening - for a standard wide release - and drops significantly thereafter. In fact, opening weekend box office accounts for, on average, between 10 and 20% of the total box office. "Because a major studio film frequently needs to recoup upwards of $300 million between production and marketing costs...openings are critically important" (Ulin, 2019, p.152). If social media can drive initial box office revenues, the movie's financial success has a better chance of being sustained over time. Nevertheless, as indicated by the differing results among the literature, there are a lot of fine lines, exceptions and confounding variables and coming up with a common consensus let alone a reliable way to use social media

to predict box office proves to be a complex endeavor. This study will attempt to simplify the process. In an effort to streamline the many variables tried and tested, we will examine a single universal metric that can be measured across all social media platforms: the engagement rate.

Rationale and Hypotheses

Existing literature largely revolves around data collected from Facebook, YouTube, and Twitter. This study will take data from the same platforms but will also examine Instagram data. Its use by adults has grown significantly since these studies were conducted. A large amount of the empirical research examined pertaining to social media and box office has been conducted between 2000 and 2015, a time when perhaps Instagram may have not been as significant compared to the other social media platforms. Afterall, Instagram was founded in 2010, 4 years after Twitter, the latest to launch out of the three former platforms mentioned. By February 2019, 37% of U.S. adults were using Instagram whereas Twitter had a 22% share (Pew Research Center, 2019). Instagram is relevant to the film industry as its users have the ability to follow films' Instagram profiles and like, comment, and share content about films they are interested in, just as they would on Facebook or Twitter. Oh et al. (2013) and Ding et al. (2016) both found that the number of Facebook likes for a film's profile had a positive relationship with box office revenue. It is worth studying if the same applies to Instagram likes. If we want to continue measuring social media's effect on box office, we must take into account how social media usage has changed over time and incorporate new players. By adding Instagram to the conversation, this study aims to make the current literature more timely.

Multiple variables have been evaluated for their effects on box office: quantity of likes and comments, sentiment of these comments, ratings on review sites, number of followers, and

the list goes on. The assortment of data is helpful in that film marketers can pinpoint what specific metrics can help predict the financial success of their films. However, there is also a large variety of results in these experiments and so coming up with a comprehensive and dependable analysis requires much caution. By examining engagement rate across Facebook, Twitter, and Instagram, this study will add yet another metric to the literature. However, the advantage of engagement rate is that it encompasses other metrics that were previously tested alone and can be calculated for most social media platforms. Engagement rates include the number of likes and comments and factors in other interactions such as reactions, clicks, and shares for Facebook or clicks anywhere on a tweet for Twitter. In fact, engagement rate could arguably be more worthwhile to examine than the number of followers as studied by Apala et al. and Kaplan (2013). According to former Forbes contributor Escobedo (2017), "fan growth doesn't matter if your audience isn't consuming your content. Let's say you have 80,000 fans. If you post something and it gets zero engagement, your followers have zero value." Larger engagement rates lead to greater visibility, brand awareness and affinity, word of mouth marketing, credibility, and better relationships with customers, in this context moviegoers (Sprout Social). All these benefits have the potential to convert those engaged moviegoers to customers purchasing a movie ticket. Following this logic, this study will test the following hypotheses:

Hypothesis 1:

Engagement rates on Facebook are positively correlated with box office revenue. Larger engagements rates are associated with larger box office revenues.

Hypothesis 2:

Engagement rates on Instagram are positively correlated with box office revenue. Larger engagements rates are associated with larger box office revenues.

Hypothesis 3:

Engagement rates on Twitter are positively correlated with box office revenue. Larger engagements rates are associated with larger box office revenues.

Methods and Procedures

To test hypotheses 1 through 3, daily domestic box office revenue will be used as the dependent variable and daily engagement rates for Facebook, Instagram, and Twitter will serve as 3 different independent variables. Box office revenue and social media data was collected for movies releasing during the months of February and March 2020. The movies were selected from Rotten Tomatoes' weekly list of films opening in theaters (https://www.rottentomatoes.com/browse/opening). 2 to 3 films were chosen per week for 5 weeks from February 10 to March 15, for a total of 12 films. Minimum criteria for the selection of the movies were as follows: (1) Friday release date, (2) the distributor had to be one of the major Hollywood studios – 20th Century Fox (currently owned by the Walt Disney Company but listed separate for the purposes of this study as the movies released during the period were conceived and developed by 20th Century Fox before its acquisition by Disney), Walt Disney Pictures, Columbia/Sony Pictures, Warner Brothers, Paramount Pictures, and Universal Pictures – or any of their subsidiaries such as Disney's Pixar or Universal's Focus Features to name a few as well as mini majors like Lionsgate and STX Entertainment (3) social media presence on at least one of the social media platforms in question: Facebook, Twitter, and Instagram. No

preference was given to genre, although as much variety in genre as possible was attempted. When selecting the films every week, choosing more than one movie with the same genre was avoided. Wide releases were preferred, but two limited release films, *Emma* and *Wendy* were also included in the study for lack of wide release films during Weeks 2 and 3. *Emma* was initially a limited release but then went wide on March 6th. The sample of films are listed in Table 1.

Daily domestic box office revenue was recorded for each film, using Box Office Mojo (https://www.boxofficemojo.com/). These values were collected up to and including March 19. This year, the novel coronavirus, COVID-19 disrupted people's lives, national economies, governments, industries, and businesses large and small across the globe. The film industry was no exception as theaters across the nation were considered non-essential businesses by authorities and were forced to close. Thus, box office data could only be collected up until March 19 as revenue on films' theatrical runs were suddenly and drastically cut.

In this study, social media data collected focused on engagement rates for Facebook, Instagram, and Twitter. Engagement rates were collected from Rival IQ, a platform delivering social media analytics (https://www.rivaliq.com/). Engagement refers to the total interactions such as likes and comments on a published post. This quantity is then divided by the total numbers of followers and expressed as a percentage. These calculations were not performed manually; Rival IQ reports the engagement rate per follower. The engagement rates correspond to the official social media profiles of each movie. These profiles were found by referring to each film's webpage which listed social media accounts that fans can follow. The social media profiles for each film in this study are listed in Table 2. Engagement rates were collected daily beginning on the films' release dates up to and including March 19, corresponding with the collection of box office data. As seen in the study conducted by Ding et al. (2016), prerelease social media

activity also affects box office revenue. To test whether the same applies within this study, the average engagement rate on each social media platform for the 30-day time period prior to release for each of the films was also collected. These measurements will serve as additional independent variables.

Using the data collected, three Pearson correlation tests were calculated for each film to produce the quantitative results. The first correlation was calculated between daily engagement rates on Facebook with daily box office revenue. The second and third correlations followed the same structure, one of them using engagement rates on Instagram and the other using that of Twitter. An additional three correlation tests were conducted for prerelease social media engagement. Using the average engagement rate for the 30-day time period before release for each film, correlations were calculated between that of each social media platform and the opening (1_{st} day) box office.

Results

Of the three social media platforms in this study, Instagram showed the highest correlation between daily engagement rate and daily domestic box office with an average correlation coefficient of 0.57 as compared to 0.45 and 0.47 for Facebook and Twitter, respectively. Table 3 displays the correlations found for each film and Table 4 shows descriptive statistics for these correlations organized by social media platforms. For clarity, we will classify a correlation coefficient with a magnitude less than 0.40 as weak. Values between 0.40 and 0.70 are considered moderate and values greater than 0.70 represent strong correlations. Based on the averages we calculated, the correlations between daily engagement rate and daily box office across the social media platforms in question are moderate, yet positive, supporting hypotheses 1

through 3. However, certain films stand out as the correlation between engagement rate and box office is higher. *The Photograph*, *Brahms: The Boy II*, *The Way Back*, and *The Hunt* had correlation coefficients greater than 0.70 across Facebook and Instagram. Conversely, there are films in the sample where the correlation between engagement rate and box office was very weak. *Wendy* had correlation coefficients at or below 0.31 for all social media platforms and correlations for *Emma* did not exceed 0.05; Facebook engagement rates for *Emma* actually had a negative relationship with box office. *I Still Believe* also had weak correlations: -0.38, -0.12, and 0.14 for Facebook, Instagram, and Twitter, respectively.

There was no positive correlation found between the average engagement rate 30 days prior to release and the opening box office. Correlation coefficients were negative and were no greater than 0.25, indicating a very weak correlation. These values are shown in Table 5.

Discussion and Conclusion

Although the average correlations support the hypotheses, it is important to address some of the outliers. The lowest correlations were for limited release films. This could indicate two things: (1) social media engagement rates may not be an appropriate metric to predict box office revenue for limited release films and (2) the correlation calculation must be modified to account for the smaller number of theaters showing limited release films. In an effort to achieve the latter, an additional Pearson correlation was calculated for the daily engagement rate values and instead of daily box office, the daily box office per theater was used. This decision was similar to that of Kaplan (2013) who also used domestic gross per theatre in his study to "decrease the disparity between large release blockbusters and limited release films" (p.12). Although the correlations were higher, they were still not high enough – other than that of *Wendy* for Instagram with a

correlation coefficient of 0.56 – to conclude that there exists a moderate or strong positive correlation between engagement rates and box office for limited release films. For consistency, this correlation was also found for the wide release films in the sample. Table 6 shows the correlation coefficients followed by descriptive statistics in Table 7. Average correlation coefficients were 0.45, 0.60, and 0.50 for Facebook, Instagram, and Twitter, respectively, further supporting hypotheses 1 through 3. Once again, Instagram presented the highest correlation. When the average correlation coefficient is calculated excluding those of the limited release films, the average correlation coefficients across all three platforms are larger as seen in the descriptive statistics in Table 8. Given that the initial averages calculated were largely driven by wide release films and skewed to smaller coefficients by limited release films, the hypotheses can be refined to conclude that daily engagement rates for Facebook, Instagram, and Twitter and daily box office for wide release films have a positive correlation.

Upon comparing the films with the highest correlations – *The Photograph*, *Brahms: The Boy II*, *The Way Back*, and *The Hunt* – it was difficult to pinpoint any qualities they shared that could account for the stronger relationship between engagement rate and box office. Both *The Photograph* and *The Hunt* were distributed by Universal Pictures, but the other films were distributed by different studios. In addition, *The Invisible Man* is also from Universal Pictures and it did not have as large correlation coefficients as its counterparts. The films also varied in genre and release date. An interesting find, however, was that these films had similar budgets for print and advertising (P&A). Table 9 lists negative costs and P&A for all the films in the sample as disclosed by S&P Global's Film Release Report.

It was surprising that prerelease social media engagement rates did not correlate with opening box office revenues. However, in accounting for differences in the number of theaters

showing the films, moderate positive correlations were found between the prerelease engagement rates and the opening box office revenue per theater as seen in Table 10. Unlike previous results, the highest correlation was amongst Facebook and Twitter rather than Instagram. Thus, engagement on Instagram seems to have a weaker effect on opening box office than engagement on the other social media platforms. This may suggest that moviegoers engage with movie profiles on Facebook and Twitter before the film is released and turn to Instagram more after release.

Again, although the correlation coefficients support hypotheses 1 through 3, the numbers indicate only a moderate association. It is possible that the coefficients were not higher than expected as the data collected was affected by disruptions brought upon by the COVID-19 pandemic and thus our study faced limitations. It would have been ideal to capture engagement rates and box office revenues for a consistent time period such as 30-60 days for all films. However, due to unavailability of box office data after March 19, this was not possible. For films releasing after March 6th, box office data could only be collected for 14 days at most. *Bloodshot*, *I Still Believe*, and *The Hunt* only had seven days' worth of box office data. The sample size was also limited to the 12 films we have discussed as many of the movies slated to release in theatres in March, April, and May were cancelled or postponed. These include big franchise films like *Fast and Furious 9*, James Bond film *No Time to Die,* and Marvel's *Black Widow,* the sequel *A Quite Place: Part II*, and live-action remake *Mulan.* Box office revenues were also less than what they would have been under more 'normal' circumstances since people were increasingly encouraged to stay home over time and movie theaters either closed or reduced their seating capacity. To give a quantitative perspective, Variety reported that "ticket sales in North America hit their lowest levels in more than two decades" the weekend of March 13, a 45% decline from

the previous weekend and a 9% drop for the year-to-date box office (Rubin, 2020). With little

prospect that consumers would be heading to the movie theaters, social media engagement

related to entertainment declined as well. This is likely because people gravitated towards

content concerning the coronavirus. It is a safe and logical assumption that people are more

likely to engage with content from profiles offering information about the virus rather than posts

about films playing in theaters they are likely not going to. Across all films in this study, social

media engagement rates dropped or were 0% in cases where profiles stopped posting content at

around early March, right about the time drastic changes began to be implemented in the U.S. in

an effort to slow infection of COVID-19. These discrepancies could explain why correlation

coefficients for *I Still Believe* were so small and negative and why that of *The Hunt* were

extremely large, relative to the rest of the sample. Both films were released March 13th yet fell on

very opposite sides of the spectrum. Consequently, future research in this arena should obviously

take place in more 'normal' circumstances and consider studying a larger sample of films for a

longer period of time. Another improvement, not related to COVID-19, would be to also track

engagement rates for profiles other than the films' official accounts like fan pages. This

modification could widen the pool to those consumers that are engaging with content related to a

film outside its official profile and may choose to purchase a movie ticket.

     Despite the limitations, this study still offers valuable insight about the utility of

engagement rate as a point of comparison for box office revenue. Also, given that moderate

positive correlations were found between the prerelease engagement rates and the opening box

office gross per theater, one can surmise that engagement before a film releases can also play a

role in its financial success. Studios may be more inclined to monitor prerelease engagement

rates and can even implement marketing efforts to improve engagement amongst consumers

before a film releases to improve the odds of increased box office revenues. This study also sets

up a sound foundation for Instagram as a social media platform worthy of future research in

relation to films' financial success and keen analysis by film marketers.

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Tables

Table 1

Sampled Films

Film	Distributor/Studio	Genre	Release Date	Release Type
Bloodshot	Columbia Pictures	Action/Sci-Fi Fantasy	3/13/2020	Wide
Brahms: The Boy II	STX Entertainment	Horror	2/21/2020	Wide
Emma	Focus Features	Comedy/Drama	2/21/2020	Limited until 3/6
I Still Believe	Lionsgate	Christian/Drama	3/13/2020	Wide
Onward	Pixar	Animated	3/6/2020	Wide
Sonic The Hedgehog	Paramount Pictures	Action & Adventure/Animated	2/14/2020	Wide
The Call of the Wild	20th Century Fox	Action & Adventure	2/21/2020	Wide
The Hunt	Universal Pictures	Action	3/13/2020	Wide
The Invisible Man	Universal Pictures	Horror	2/28/2020	Wide
The Photograph	Universal Pictures	Drama/Romance	2/14/2020	Wide
The Way Back	Warner Brothers	Drama	3/6/2020	Wide
Wendy	Fox Searchlight Pictures	Drama/Fantasy	2/28/2020	Limited

Table 2

Social Media Profiles

Film	Facebook	Instagram	Twitter
Bloodshot	@BloodshotMovie	@bloodshot	@Bloodshot
Brahms: The Boy II	@TheBoyMovie	@theboymovie	@TheBoyMovie
Emma	@emmafilm	@emmafilm	@emmamovie
I Still Believe	@istillbelieve	@istillbelieve	@istillbelieve
Onward	@pixaronward	@pixaronward	@pixaronward
Sonic The Hedgehog	@sonicmovie	@sonicmovie	@SonicMovie
The Call of the Wild	@CallOfTheWildMovie	@callofthewild	No Profile[a]
The Hunt	@thehuntmovie	@thehunt_movie	@TheHuntMovie
The Invisible Man	@TheInvisibleManMovie	@theinvisiblemanmovie	@TheInvisibleMan
The Photograph	@ThePhotographMovie	@thephotographfilm	@PhotographMovie
The Way Back	@TheWayBack	@thewayback	@TheWayBackMovie
Wendy	@WendyMovie	@wendythemovie	@Wendythemovie

[a]*Call of the Wild* did not have a Twitter profile.

Table 3

Engagement Rate vs. Box Office Correlations

Film	Facebook Coeff.	Instagram Coeff.	Twitter Coeff.
Bloodshot	0.23	0.65	0.65
Brahms: The Boy II	0.79	0.84	0.37
Emma	-0.02	0.04	0.04
I Still Believe	-0.38	-0.12	0.14
Onward	0.35	0.55	0.53
Sonic The Hedgehog	0.67	0.76	0.69
The Call of the Wild	0.53	0.60	No Coeff.[a]
The Hunt	0.97	0.97	0.82
The Invisible Man	0.35	0.59	0.32
The Photograph	0.78	0.79	0.68
The Way Back	0.81	0.85	0.78
Wendy	0.31	0.27	0.15

Note: This table lists the correlation coefficients calculated between the daily domestic box office revenue and the daily engagement rate for each film per social media platform.

[a]Because *Call of the Wild* did not have a Twitter profile, a correlation could not be calculated for daily box office revenue and daily engagement rate on Twitter.

Table 4

Descriptive Statistics for Table 3 Data

Statistic	Facebook	Instagram	Twitter
Mean	0.45	0.57	0.47
Median	0.44	0.63	0.53
Standard Deviation	0.39	0.34	0.28
Minimum[a]	0.02	0.04	0.04
Maximum[b]	0.97	0.97	0.82
Count (# of Movies)	12	12	11[c]

Note: These are the descriptive statistics summarizing the correlation coefficients calculated between daily domestic box office revenue and the daily engagement rate, shown in Table 3.

[a]Minimum and [b]Maximum values are based on the magnitude of the correlation coefficients and so we disregard whether the coefficient is positive or negative.

[c]A correlation coefficient could not be calculated for *Call of the Wild* for Twitter as the film did not have a Twitter profile, hence why the count for this platform is 11 rather than 12.

Table 5

Opening Box Office (B.O.) vs. Prerelease Engagement Rate Correlations

Film	Opening B.O.	Facebook	Instagram	Twitter
Bloodshot	$3,801,099.00	1.28%	6.18%	16.40%
Brahms: The Boy II	$2,210,191.00	1.88%	3.96%	0.32%
Emma	$79,626.00	16.80%	16.00%	10.80%
I Still Believe	$3,993,234.00	1.55%	7.43%	10.40%
Onward	$12,096,726.00	2.88%	8.44%	7.22%
Sonic The Hedgehog	$20,924,364.00	2.30%	15.00%	6.14%
The Call of the Wild	$8,049,028.00	5.20%	7.28%	No data[a]
The Hunt[b]	$2,210,940.00	No data	No data	No data
The Invisible Man	$9,979,880.00	0.16%	8.04%	15.30%
The Photograph	$6,287,485.00	17.00%	8.51%	10.10%
The Way Back	$2,617,147.00	3.35%	19.00%	64.00%
Wendy	$9,754.00	4.00%	13.10%	3.92%
Correlation Coeff.		-0.27	0.01	-0.18

Note: This table lists the opening (1st day) box office with the average engagement rate over a period of 30 days before release for each film per social media platform. Correlation coefficients were calculated between the opening box office and each set of engagement rates.

[a]Because *Call of the Wild* did not have a Twitter profile, the correlation for Twitter excludes *Call of the Wild*.

[b]30 Day average engagement rates were not available for *The Hunt* due to limitations in reporting from Rival IQ. The platform cannot pull data from non-business accounts and it seems that *The Hunt*'s social media profiles were not always business accounts during the 30-day period before release. Thus, the correlations found do not take into account *The Hunt.* We do not think the lack of this data significantly impacted the results calculated.

Table 6

Engagement Rate vs. Box Office/Theater Correlations

Film	Facebook Coeff.	Instagram Coeff.	Twitter Coeff.
Bloodshot	0.23	0.65	0.65
Brahms: The Boy II	0.80	0.84	0.35
Emma	0.05	0.23	0.15
I Still Believe	-0.38	-0.12	0.14
Onward	0.35	0.55	0.53
Sonic The Hedgehog	0.67	0.76	0.68
The Call of the Wild	0.53	0.61	No Coeff.[a]
The Hunt	0.97	0.97	0.82
The Invisible Man	0.35	0.59	0.32
The Photograph	0.75	0.77	0.64
The Way Back	0.81	0.85	0.78
Wendy	0.32	0.56	0.40

Note: This table lists the correlation coefficients calculated between the daily domestic box office revenue per theater and the daily engagement rate for each film per social media platform. [a]Because *Call of the Wild* did not have a Twitter profile, a correlation could not be calculated for daily box office revenue per theater and daily engagement rate on Twitter.

Table 7

Descriptive Statistics for Table 6 Data

Statistic	Facebook	Instagram	Twitter
Mean	0.45	0.60	0.50
Median	0.44	0.63	0.53
Standard Deviation	0.38	0.30	0.24
Minimum[a]	0.05	0.12	0.14
Maximum[b]	0.97	0.97	0.82
Count (# of Movies)	12	12	11[c]

Note: These are the descriptive statistics summarizing the correlation coefficients calculated between daily domestic box office revenue per theater and the daily engagement rate, shown in Table 6.

[a]Minimum and [b]Maximum values are based on the magnitude of the correlation coefficients and so we disregard whether the coefficient is positive or negative.

[c]A correlation coefficient could not be calculated for *Call of the Wild* for Twitter as the film did not have a Twitter profile, hence why the count for this platform is 11 rather than 12.

Table 8

Descriptive Statistics for Table 6 Wide Release Data

Statistic	Facebook	Instagram	Twitter
Mean	0.51	0.65	0.55
Median	0.60	0.71	0.65
Standard Deviation	0.39	0.30	0.23
Minimum[a]	0.23	0.12	0.14
Maximum[b]	0.97	0.97	0.82
Count (# of Movies)	10	10	9[c]

Note: These are the descriptive statistics summarizing the correlation coefficients calculated

between daily domestic box office revenue and the daily engagement rate, shown in Table 6. We

have excluded values for limited release films and so this summary is for wide release films only.

[a]Minimum and [b]Maximum values are based on the magnitude of the correlation coefficients and

so we disregard whether the coefficient is positive or negative.

[c]A correlation coefficient could not be calculated for *Call of the Wild* for Twitter as the film did

not have a Twitter profile, hence why the count for this platform is 9 rather than 10.

Table 9

Negative Costs and P&A

Film	Negative Cost (USD)	P&A (USD)
Bloodshot	$45,572,000.00	$38,624,000.00
Brahms: The Boy II	$10,125,000.00	$24,737,000.00
Emma	$15,158,000.00	$145,000.00
I Still Believe	$12,175,000.00	$30,875,000.00
Onward	$177,433,000.00	$71,115,000.00
Sonic The Hedgehog	$91,152,000.00	$54,473,000.00
The Call of the Wild	$126,650,000.00	$61,908,000.00
The Hunt	$14,178,000.00	$34,822,000.00
The Invisible Man	$7,070,000.00	$45,125,000.00
The Photograph	$16,213,000.00	$37,441,000.00
The Way Back	$25,318,000.00	$33,975,000.00
Wendy	$5,075,000.00	$154,000.00

Source: S&P Global Market Intelligence Film Release Report

Table 10

Opening Box Office/Theater vs. Prerelease Engagement Rate Correlations

Film	Opening / Theater	Facebook	Instagram	Twitter
Bloodshot	$1,328.59	1.28%	6.18%	16.40%
Brahms: The Boy II	$1,027.52	1.88%	3.96%	0.32%
Emma	$15,925.20	16.80%	16.00%	10.80%
I Still Believe	$1,228.69	1.55%	7.43%	10.40%
Onward	$2,806.66	2.88%	8.44%	7.22%
Sonic The Hedgehog	$5,021.45	2.30%	15.00%	6.14%
The Call of the Wild	$2,145.26	5.20%	7.28%	No Data[a]
The Hunt[b]	$730.17			
The Invisible Man	$2,764.51	0.16%	8.04%	15.30%
The Photograph	$2,499.00	17.00%	8.51%	10.10%
The Way Back	$962.89	3.35%	19.00%	64.00%
Wendy	$2,438.50	4.00%	13.10%	3.92%
Correlation Coeff.		0.64	0.46	0.64

Note: This table lists the opening (1st day) box office per theater with the average engagement rate over a period of 30 days before release for each film per social media platform. Correlation coefficients were calculated between the opening box office/theater and each set of engagement rates.

[a]Because *Call of the Wild* did not have a Twitter profile, the correlation for Twitter excludes *Call of the Wild*.

[b]30 Day average engagement rates were not available for *The Hunt* due to limitations in reporting from Rival IQ. The platform cannot pull data from non-business accounts and it seems that *The Hunt*'s social media profiles were not always business accounts during the 30-day period before release. Thus, the correlations found do not take into account *The Hunt.* We do not think the lack of this data significantly impacted the results calculated.