

Tweets for Sales Gaming



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Executive summary



The balance of sentiment in Tweets is a more powerful driver of sales than volume alone.

Context and methodology

Twitter provides a platform for people all over the world to instantly share news, announcements, thoughts and opinions about any topic, at any time of the day. With 200 million monthly unique users worldwide sending 400 million Tweets per day, the platform captures, generates and makes accessible global word-of-mouth in a way that simply did not exist a few years ago.

Companies have started to take notice of this word-of-mouth embodied in Tweets, and the power it can have on the success of products and brands. However, there is little available research that quantifies the impact of Tweets on actual business outcomes.

Twitter commissioned Deloitte to undertake a study to test whether Tweets have a predictive impact on the sales performance of video games that is additional to and separate from the effect of other drivers of demand, and to quantify that predictive impact. This report provides an overview of the methodology and findings from the study.

This study uses a state-space hierarchical Bayesian modelling approach to isolate and quantify the impact of positive, negative and neutral Tweets and the total potential impressions generated on the sales of the 100 bestselling Xbox 360 and PlayStation 3 titles in 2012. It uses commercially available data on sales of video games and the advertising¹ of those games together with data on Tweets about the games supplied by Twitter. The Bayesian approach enables the estimation of title specific impact of different types of Tweets, while controlling for other key drivers such as market dynamics, traditional advertising spend and price. It also accommodates unpredictable shocks to demand caused by for example competitive title launches that otherwise could bias the estimated impacts. The result is a robust quantification of the impact that Tweets have on the sales of any particular title.

Key findings

The results show that Tweets are statistically significant and commercially relevant drivers of the sales of video games in the UK. In other words, Tweets capture and can generate valuable word-of-mouth effects that directly impact demand, and that impact can be quantified.

The balance of sentiment in Tweets is a more powerful driver of sales than reach (or volume) alone, with positive Tweets having generally a higher impact than negative Tweets. Therefore, to gain the most out of the online word-of-mouth embodied by Tweets, companies would be best served by addressing the balance of sentiment about their games through increasing the number of positive Tweets.

Table 1 summarises the impacts on sales volume from a 30% change in positive Tweets, negative Tweets and traditional advertising on each genre, as a weighted average of the estimated title level impacts. The results in the table on the impact of positive Tweets correspond to a thought experiment: "How would the sales of a title respond to a having a 30% higher number of positive Tweets about it?"

Table 1. Impact of key levers on sales volume in the first 10 weeks of release by genre

Genre	30% more positive Tweets	30% fewer negative Tweets	30% more non-Twitter advertising
Shooter	8.1%	2.4%	1.6%
Sports	6.3%	6.7%	0.7%
Racing	6.3%	3.3%	0.9%
Action	4.2%	2.0%	1.9%
Role playing	8.0%	7.5%	3.2%
Other	3.1%	3.1%	3.9%
Overall	6.1%	3.3%	1.6%

Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

¹ "Advertising" in this report refers to traditional forms of 'above-the-line' advertising spend, such as on TV spots and magazine column space. In particular, it does not include any advertising spend on Twitter

The results show that for the key genres of shooter, sports and racing games, the impact of having more positive sentiment is a multiple of the impact of increasing traditional advertising spend by an equal proportion. Across the full sample, the impact of increasing the number of positive Tweets is approximately four times the impact that would be obtained by spending more on traditional advertising in the same proportion. Additional positive Tweets are on average 9 times more effective in driving sales uplift than increasing advertising for sports games, and 5 times more effective for shooter games.

This implies that, starting from the current levels of advertising and Tweets, for a large number of titles it would be much more effective for companies to generate positive Tweets about their products, rather than spending more on traditional forms of advertising. The average results shown hide a pattern of significant title-by-title variability in the estimated sales impacts. There are many titles in each of the key genres, both large and small, where the impacts are lower than these weighted averages, and some smaller titles where the impact is much larger than these weighted averages. The title-by-title results show that each title is different in its response to Tweets and advertising.

The commercial potential of Tweets is well illustrated by two of the bestselling titles in the sample *Call of Duty Black Ops 2* and *FIFA 2013*. The results suggest that with 10% more positive tweets about *FIFA 2013*, the title could have achieved additional revenue of £1.4 million over the first ten weeks of release (1.3% uplift). This compares to a predicted revenue uplift of £341,000 from a 10% increase in traditional advertising. Similarly, with 10% more positive Tweets about *Call of Duty Black Ops 2*, it could have made an estimated additional £3.2 million in revenue over the first seven weeks of release. This compares to an estimated uplift of £826,000 from 10% more advertising.

Other key findings include that:

- Tweets from the previous week drive sales in this week, and continue to impact future sales with an average half-life of one week: the impact of Tweets in any one week halves in each week going forward.
- The immediate weeks leading up to launch is the key period that determines what contribution Tweets will make on the sales of video games, although companies may need to start building momentum much earlier to hit that critical period. This also emphasises the contribution that different modes of pre-release access can play in generating the peak amount of Tweets at the right time in the week immediately prior to release to secure maximum sales impact.
- The total exposure to Tweets, as captured by reach, impacts sales by amplifying the changes in the number of positive and negative tweets, and by amplifying the effect from the balance of sentiment expressed in Tweets. Generating higher reach without changing the balance of sentiment is only beneficial for games that have a balance of positive sentiment: gaining higher reach with a negative balance of sentiment leads to lower sales.

This study has been able to isolate and quantify the predictive impact of Tweets on sales of video games at an individual title level. The next questions that arise are: how best to affect the online word-of-mouth, what does it take to generate uplift in positive Tweets, and how do the impacts estimated for video games relate to potential impacts on other products.

The impact of having more positive sentiment can be a multiple of increasing traditional advertising in the same proportion.

This study has been able to quantify the impact of Tweets on sales at individual title level.



1. Introduction

This chapter sets out the context for this study and the ways in which the word of mouth embodied in Tweets (“Twitter buzz”) can drive sales of products, and specifically the sales of video games in the UK. This provides the basis of using buzz as a driver of sales and a lever available for companies to drive improved sales performance.

1.1 Context

Twitter provides a platform for people all over the world to instantly share news, announcements, thoughts and opinions about any topic, at any time of the day, with the world at large as well as with their group of followers. Users can follow any other user they choose, as well as search for Tweets and conversations on any topic they want.

Twitter captures and makes accessible global word of mouth to anyone willing to follow and access it. There are 200 million unique monthly active users of Twitter globally, and 400 million Tweets are sent per day². Twitter is also well suited for constant access through mobile devices – sixty percent of the 200 million monthly users login via a mobile device at least once every month³.

Tweets can impact the commercial success of a product or a company in a number of different ways. Higher volume of Tweets and higher impressions earned by Tweets through networks of followers can increase people’s awareness of new products. Opinions and sentiment expressed in Tweets also provide followers and users with valuable information about products. For example, a strong positive balance of Tweets about a new product about to launch can increase the likelihood that others will buy it, and negative comments may discourage new product trials and take up. These impacts can be complex, affecting both the overall awareness of and potential market for different products and early adaption of new products or technologies.

Video games are products whose success Twitter buzz is well positioned to impact. Each game is a unique experience, and an individual cannot know in advance of playing the game how much they will enjoy it. Social media platforms like Twitter, together with dedicated gaming websites, can be the main means of generating awareness of smaller releases and publishers with limited advertising budgets. The information contained in Twitter buzz and the increased awareness generated by it can therefore be a key driver for the commercial success of a new release.

This study investigates and quantifies the impact of the word-of-mouth captured in Tweets on sales of video games, and shows that all those ‘short bursts of inconsequential information’⁴ taken together do in fact have very real impacts on key commercial outcomes.

1.2 Study framework

Twitter has commissioned Deloitte to assess the impact that activity on Twitter, and the word-of-mouth captured and generated by that activity, has on the sales of video games. This study estimates the impact that different types of Twitter activity had on the sales of the 100 bestselling Xbox 360 and PlayStation 3 games in the UK in 2012. It uses commercially available data on sales of video games and the advertising⁵ of those games together with data on Tweets about the games supplied by Twitter.

All results on the impact of Twitter buzz in this study are presented as separate from and additional to the impact of other drivers of sales. These sales impacts are assessed using a state-space hierarchical Bayesian framework for demand analysis, where the impact of Tweets is isolated from the impact of other key drivers of sales, such as price, the amount of traditional advertising and characteristics of the games that do not vary over time such as genre and platform. In this way, the impact of Twitter buzz is tested and quantified as an additional driver of sales over and above traditionally recognised drivers of sales, crucial for an unbiased measurement of the impact of Tweets.

This study tests and quantifies separately the impact of positive, negative and neutral Tweets, as well as the impact of total potential Twitter impressions for the total volume of Tweets in each week (“reach”). These metrics together capture the potential impacts from the balance of sentiment on Twitter about a particular title, as well as the level of exposure generated through the reach of the conversation.

1.3 This report

This report is structured as follows:

- Section 2 sets out the methodology of the analysis and the data used.
- Section 3 provides an overview of the results and estimated relative impacts of types of buzz and advertising.
- Section 4 summarises the key findings and insights drawn from the analysis.

2 Data provided by Twitter

3 <http://advertising.Twitter.com/2013/02/new-compete-study-primary-mobile-users-on-Twitter.html>

4 Sano, David (February 18, 2009). “Twitter Creator Jack Dorsey Illuminates the Site’s Founding Document”. Los Angeles Times. Retrieved April 12, 2013

5 “Advertising” in this report refers to traditional forms of ‘above-the-line’ advertising spend, such as on TV spots and magazine column space. In particular, it does not include any advertising spend on Twitter

2. Data and methodology

This section sets out the methodology and data used in the study.

2.1 Data

This study used three different commercially available data sources for the analysis:

- Sales volume and value was purchased from media control GfK International. This covers the sales of the 100 bestselling Xbox 360 and PlayStation 3 titles in the UK in 2012. Due to differences between platforms and platform exclusive titles, the analysis covered 126 unique titles in total. The dataset provides weekly data by title on: sales volume, value (and therefore average retail price), release date, platform and publisher. The data captures sales of physical copies of the games only.
- Advertising spend data was purchased from Nielsen, which includes advertising by the publishers as well as retailers covered by the Nielsen methodology. These data relate to 'above the line' advertising – that is, the money spent on paying for TV, radio, press, online and other advertising spots. It does not cover 'below the line' spend on public relations, promotions, or necessarily capture the cost of producing the advertising assets. It also does not include advertising spend on Twitter. The level of detail in the data on advertising by channel varies by title, therefore these were aggregated into total advertising spend per week for each title.
- Data on Tweets for this study was provided to Deloitte by Twitter as supplied by Crimson Hexagon. This is described further in Section 2.1.1 below.

All the analysis and results presented in this report are contingent on the above data sources accurately and comprehensively reflecting the total sales and traditional advertising spend on the different titles, as well as the Tweets about the titles. While Deloitte has not been able to review the accuracy and coverage of the sales and marketing data obtained from the third party sources, the sources themselves are widely accepted as industry standard commercially available databases.

Table 2 describes the sales data used in the analysis in terms of number of titles in each genre and the weight of the genres in the overall sample.

Table 2. Coverage of the sample

Genre	Number of titles	Example titles in the genre	Weight of genre
Shooter	17	Call of Duty Black Ops 2 Halo 4 Medal of Honour Warfighter	32%
Sports	20	FIFA 2013 Pro Evolution Soccer 2013 FIFA Street 4	18%
Racing	9	Forza Motorsport 4 Need for Speed Most Wanted 2012 Dirt: Showdown	8%
Action	47	Assassins Creed III Mass Effect 3 Resident Evil 6	35%
Role playing	9	Kingdoms of Amalur Reckoning The Elder Scrolls Skyrim Fable: The Journey	5%
Other	24	Lego Harry Potter Disney Universe Soul Calibur V	2%

Source: Deloitte analysis of data from GfK

The dataset covers weekly data on sales of titles, their price, how much was spent on advertising them, and the conversation about them on Twitter.



2.1.1 Data on Tweets

The data on Tweets used in the study comes from Crimson Hexagon social media monitoring and analysis service, spanning a period of 10 weeks prior to release to 20 weeks after the release of a title. This was sourced by Twitter and provided to Deloitte as weekly count of:

- volume of Tweets identified to be about each title;
- potential impressions about each title, calculated as total volume of Tweets times the number of followers (“reach”);
- positive Tweets;
- negative Tweets; and
- neutral Tweets.

The Crimson Hexagon platform captures all Twitter activity, and their proprietary algorithms were used to identify the relevant Tweets from the full Twitter feed as well as to undertake the required sentiment analysis to classify the Tweets as above. The analysis is reliant on the accuracy of Crimson Hexagon’s sentiment analysis algorithm.

2.2 Methodology

This section describes the methodological basis for the study and findings.

2.2.1 Modelling sales of video games

The objective of this study is to test and quantify the causal effects of Tweets on the sales of video games. Video games have three key characteristics that the modelling framework has to be able to reflect for the estimated impacts to be robust:

- Video games are an experience good – it is only after experiencing the game that a consumer knows for certain how much they enjoyed it.
- The attractiveness of a game often peaks at the release, but declines significantly in the following weeks. In other words, consumer preferences towards the title change through time.
- Consumers rarely purchase the same game twice, which can lead to a rapidly shrinking potential market of new customers who are likely to buy the game but have not done so yet.

These three factors often lead to a strongly downward sloping sales profile (diffusion profile) from the week of release, which is typically the case for blockbuster titles. An alternative pattern is also observed, with the peak sales occurring just a few weeks after the game is launched. These so called ‘sleeper titles’ become more interesting to the consumer over time, possibly due to word-of-mouth effects generated by early adopters that raise awareness about the game and reduce the uncertainty in the expected quality of the game.

The likely significant differences in the sales profiles between titles require a modelling approach that is both flexible enough to accommodate title level variations, whilst retaining a structure that maximises the efficiency of the estimates. The modelling approach also has to be able to control for the effects of other key drivers of sales, such as price, advertising and genre, so that the additional predictive impact (if any) of Twitter buzz can be identified and quantified.

To accomplish this, Deloitte has specified and estimated a state-space hierarchical Bayesian model. This permits a large range of different sales profiles and is applied where the number of eventual sales is not known. It also allows the impacts of advertising and social media to vary over time to accommodate changing consumer preferences, or unpredictable shocks to the market such as a launch of a rival game or a competitors’ advertising campaign. The ability of the model to accommodate this time-varying nature, both improves forecast accuracy and leads to better estimates of the causal effect of a change in the Twitter or media variables.

The Bayesian model overcomes key limitations that alternative modelling approaches suffer from in quantifying robust causal effects at title level.

A second level structure – hence the hierarchical specification – is also used, which allows the effect of each driver of sales to differ across titles, but be governed by a distribution that is dependent upon the platform and genre of the title. The Bayesian hierarchical model first computes the average effect of the included titles at the genre and platform level. Then for each title within a genre and platform grouping, this relationship is adjusted by combining the average effect with an estimate based on the sales history of that particular title. This process of joint estimation leads to values that are far more reliable than estimates computed from title data only. This improves both the efficiency of the estimates, and allows the effects of social media (and other drivers of demand) to be estimated for titles with very few historical sales observations – overcoming key limitations that alternative modelling approaches suffer from.

In particular, the Bayesian model provides:

- an approach to estimate title specific impacts of sales drivers for hundreds or thousands of games;
- reliable estimates for titles with very few observations;
- the ability to measure changes in the effectiveness of social media over a game’s lifecycle;
- a framework for forecasting sales or the impacts of social media pre-release;
- a process to accommodate ‘structural breaks’ or changes in market conditions; and
- a mechanism to impose prior views on the range of values that the estimates can take, for example that the impact of a higher price on sales must always be negative (other factors being equal).

The model

The final model specification used by Deloitte consists of two parts. The first measures the potential market of customers remaining who have not yet bought the game. Characteristics of the game that do not vary through time inform the potential market estimate. The second predicts the fraction of this potential market that will purchase the game this period. This fraction, known as the ‘hazard function’, measures the probability that an individual who has not yet bought the title will buy the title this week. It is determined by several factors including:

- the age of the title;
- the price of the video game;
- the amount of advertising for the title on TV, radio, in the press and online;
- twitter activity measured by the number of positive, neutral and negative Tweets and reach; and
- an error term that this captures the effect of all other factors that impact the hazard.

In line with industry practice, advertising enters the model as a stock variable that is defined as the weighted sum of past media spend, where the weight on spend in each past week declines geometrically over time. This is described by:

$$\text{AdStock}_{jt} = \phi_{\text{Adj}} \text{AdStock}_{jt-1} + \text{Spend}_{t-1}$$

where the parameter ϕ_{Adj} measures the ‘carry over’ effect of previous spend. A value close to zero implies that previous spend has no effect on sales in the current period. Conversely, a value close to one suggests that spend has a lasting effect over time.

The impact of social media is also measured using a stock-variable that reflects the historical exposure to the sentiment balance. The specification of the variable is highly flexible, as the effect of positive, neutral and negative Tweets are allowed to have a differential impact from each other as well as varying between titles. Reach is also included which magnifies the effect of the sentiment. In particular:

$$\text{TwitterStock}_{jt} = \phi_{\text{TW}_j} \text{TwitterStock}_{jt-1} + (a1_{\text{Pos}_j} \text{Pos}_{jt-1} + a2_{\text{Neu}_j} \text{Neu}_{jt-1} + a3_{\text{Neg}_j} \text{Neg}_{jt-1}) \text{Reach}_{jt-1}^{\lambda_j}$$

This specification of the Twitter stock variable allows for a separate testing of the relevance of positive Tweets, negative Tweets, neutral Tweets and reach through the coefficients α and λ . To assess the causal effect of Tweets on sales, it is necessary to test and quantify the significance of each of the components in the Twitter stock variable. For example, if reach does not have a significant impact on sales, the coefficient λ would be found to be statistically indistinguishable from zero, and similarly for the α coefficients.

2.2.2 Testing and quantifying the impacts

The Bayesian approach tests the causal effect of Tweets on sales by considering the sales that would have occurred without Tweets about the game ('but for' scenario) and compares these to the observed sales over the lifecycle of the title. The prediction of 'but for' sales is generated by allowing the effect of the stock variable and the effects of the associated components to take their full range of likely values. This generates a distribution of sales uplifts, from which the predicted impact in the 'but for' scenario is computed as the average. In all cases the average impacts produced by the method are different from zero, which indicate the significance of the Twitter stock variable and its components.

A complementary approach is to examine the distributions of the parameter values which measure the effect of stock, Tweets and reach. If the estimated distributions for a variable are symmetric and centred close to zero, the expected influence of that variable is likely to be minimal. We find that the impacts of the stock variable and the components of positive Tweets, negative Tweets and reach are significantly different from zero.

In addition to the above, the controls to ensure that the impact of the Twitter stock and its components are drivers of sales include using past values of the variable as a driver of current sales, and testing the out of sample forecast accuracy with and without the Twitter stock variable.

Equipped with the title specific estimates, they can be used to simulate 'what if' scenarios of impacts from the different key levers included in the analysis. Section 3 provides a summary of results from such simulations, covering:

- increase in the number of positive Tweets, with other drivers held constant;
- fall in the number of negative Tweets, with other drivers held constant;
- increase in traditional advertising spend, with other drivers held constant; and
- increase in reach, with other drivers held constant.

3. Overview of the results

The results show that Tweets have a statistically significant and commercially relevant predictive impact on the sales of video games in the UK. The magnitude of the impact varies by title, as does the relative strength of the different levers. This is consistent with existing research on the demand characteristics of video games in that the response of consumers to games is distinct from one game to another.⁶

This section provides an overview of the results for the key genres and summary results for the sample as a whole.

3.1 Relative impact of key drivers by genre

Table 3 below shows the weighted average impacts on sales volume over the first 10 weeks of release from a 30% change in positive buzz, negative buzz and advertising on each genre, using the estimated impacts at title level. The results in the table correspond to a thought experiment: "What is the impact on sales of having 30% more positive Tweets about a title from 10 weeks prior to release to 20 weeks after release?"

Table 3: Weighted average impact of key levers on sales in the first 10 weeks of release

Genre	30% more positive Tweets	30% fewer negative Tweets	30% more advertising	Weight of genre in the sample
Shooter	8.1%	2.4%	1.6%	32%
Sports	6.3%	6.7%	0.7%	18%
Racing	6.3%	3.3%	0.9%	8%
Action	4.2%	2.0%	1.9%	35%
Role playing	8.0%	7.5%	3.2%	5%
Other	3.1%	3.1%	3.9%	2%
Overall	6.1%	3.3%	1.6%	

Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

Putting aside the variation of the impacts by title, the results indicate that overall:

- Positive buzz increases sales, while negative buzz reduces sales. The analysis, however, did not find a consistent impact from Tweets that were classified as neutral.
- Positive Tweets generally have a higher impact on sales than negative Tweets.
- At the current and historical levels of advertising expenditure, having a higher level of positive buzz would produce a much stronger demand response than increasing the amount of advertising in the same proportion.⁷

Table 4 further highlights the relative strength of the three levers in how they impact sales volume. Over the whole sample of games, increasing the number of positive Tweets about a title by 30% would be 3.8 times as effective in driving additional volume of sales as increasing advertising by the same proportion. This result varies significantly by title, leading to differences by genre: positive Tweets can be 9 times more effective in driving sales uplift than increasing advertising for sports games, and 5 times more effective for shooter games. However, particularly in the smaller genres more advertising would be about as effective as higher number of (positive) Tweets.

The interpretation of this result is critical. It implies that typically games are advertised to an extent that spending even more on advertising would have a relatively small incremental impact on sales. However, it does not mean that traditional advertising plays a small part in the overall commercial success of video games, or that a game can be a commercial success by relying on Tweets alone. Put another way, given the current advertising levels of traditional advertising spend, the best action to drive further sales would be to focus on generating positive buzz rather than spending more on above-the-line advertising.

On average, increasing the number of positive Tweets about a title would be about 4 times as effective in driving additional sales, than increasing advertising by the same proportion from the existing levels.

⁶ For example: Harikesh Nair (2007): "Inter-temporal price discrimination with forward-looking consumers: Application to the US market for console video-games," *Quantitative Marketing and Economics*, Springer, vol. 5(3), pages 239-292

⁷ This study has not analysed the relative effort or spend required to generate uplift in sentiment in the same proportion as the change in advertising spend



Table 4: Relative impact on sales from incremental change in levers from current levels

Genre	Increasing the number of positive Tweets vs. increasing advertising	Increasing the number of positive Tweets vs. reducing negative Tweets
Shooter	5.0 times as effective	3.4 times as effective
Sports	9.2 times as effective	1.0 times as effective
Racing	7.3 times as effective	1.9 times as effective
Action	2.2 times as effective	2.1 times as effective
Role playing	2.5 times as effective	1.1 times as effective
Other	0.9 times as effective	1.0 times as effective
Overall	3.8 times as effective	1.8 times as effective

Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

These weighted average results hide significant title-by-title variability in the sales impacts. There are titles in each of the key genres, both large and small, where the impact of increasing positive buzz is lower than the impact of advertising and/or reducing negative buzz would be. The underlying title-by-title results show that each title is different in its response to buzz and advertising. The following sections examine the title-by-title variability.

Other overall results from the analysis are (not shown in above tables):

- The total exposure to Twitter buzz, as captured by the reach statistic (total potential Twitter impressions) also has a consistent impact on sales. It impacts sales by amplifying the changes in the number of positive and negative tweets, and the effect on sales volume from the balance of sentiment expressed in Tweets. The additional impact it has alone, however, is much weaker than the impact of positive or negative Tweets. For example, a 30% increase in reach alone without changing the sentiment balance of Tweets would lead to an average 0.4% increase in sales volume across the sample. Also, when the balance of sentiment is positive, having higher reach leads to higher sales, while the opposite is true with a negative balance of sentiment.
- Tweets from the previous week drive sales in this week, and continue to impact future sales with a half-life of one week on average across the titles: the impact of Tweets in any one week in each week going forward after the week immediately preceding the activity. This period of recall by Twitter users can inform when it is best to act to influence buzz.
- Advertising impacts sales with a half-life of 3 weeks on average across the titles. This implies that consumers recall advertising for a longer period than the word-of-mouth from Tweets. However, the above estimates of the relative impacts of Tweets and advertising take this effect into account.
- The metrics have an effect on the time profile of sales, bringing sales forward towards the first weeks of release.

3.2 Title level impacts for all titles

The estimated impacts on sales volume are title specific. In each genre, there are many titles, large and small, for which the estimated impacts are lower than the weighted average impact shown in Section 3.1, and some smaller titles where the impact is much larger than the weighted averages. This section sets out those title-by-title differences, showing that each title is different in how it responds to buzz and advertising.

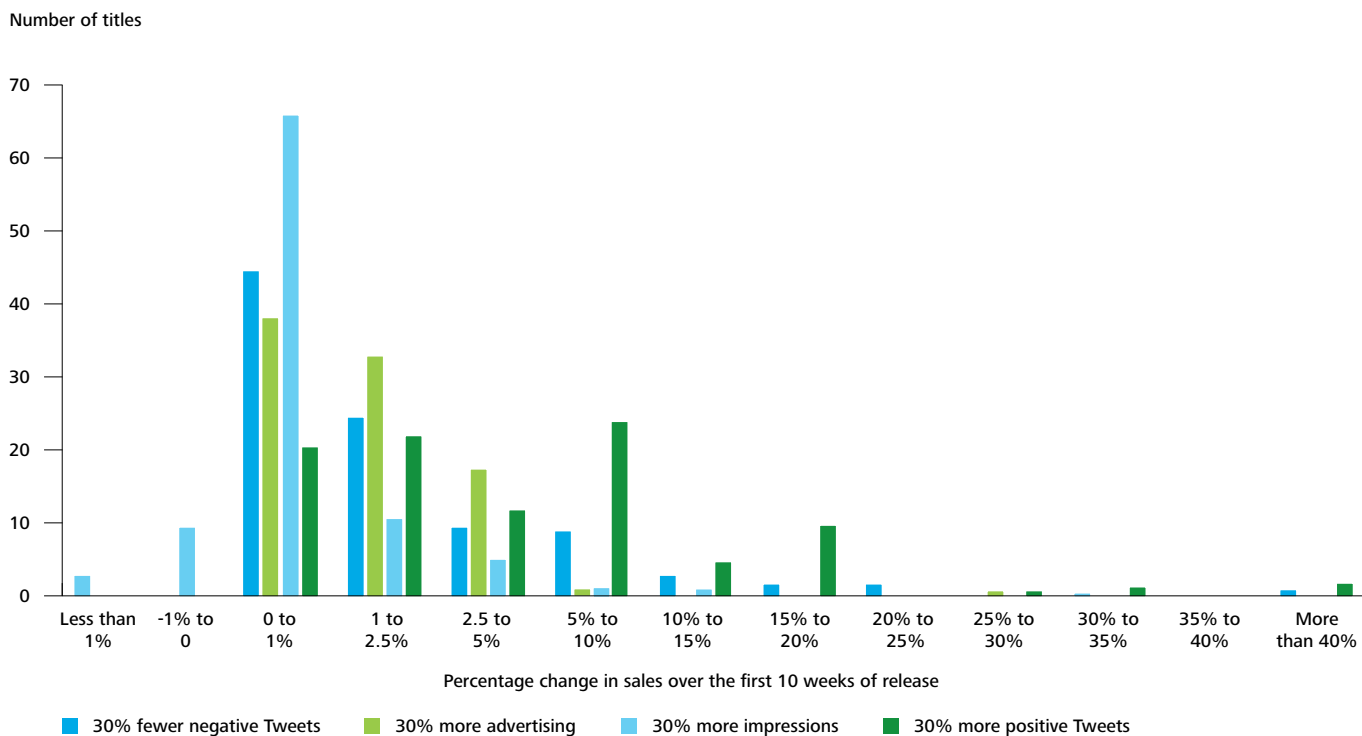
Figure 1 is a histogram displaying the range of estimated impacts of the different levers on the volume of sales for all titles included in the sample. The chart abstracts from the size of the title – each title is given the same weight regardless whether it sold a thousand or a million copies in the first 10 weeks of its release – displaying the full extent of the variability in the results by title. Figure 1 shows that, for example, there are 45 titles in the sample for which a 30% fall in the number of negative Tweets from the existing level would increase sales volume between zero and 1%. Likewise, there are 24 titles in the sample for which a 30% increase positive Tweets would lead to a sales impact between 5% and 10%.

Each title is different in its response to buzz and advertising.

The overall pattern of results described above is evident also from this chart: there are more titles with higher impacts from positive Tweets than from negative Tweets and advertising, and there are some titles, those with a negative balance of sentiment, where an increase in the number of total potential impressions (reach) would lead to a fall in sales.

Figure 1. All titles – distribution of title level impacts

All titles – Number of games by percentage impact category



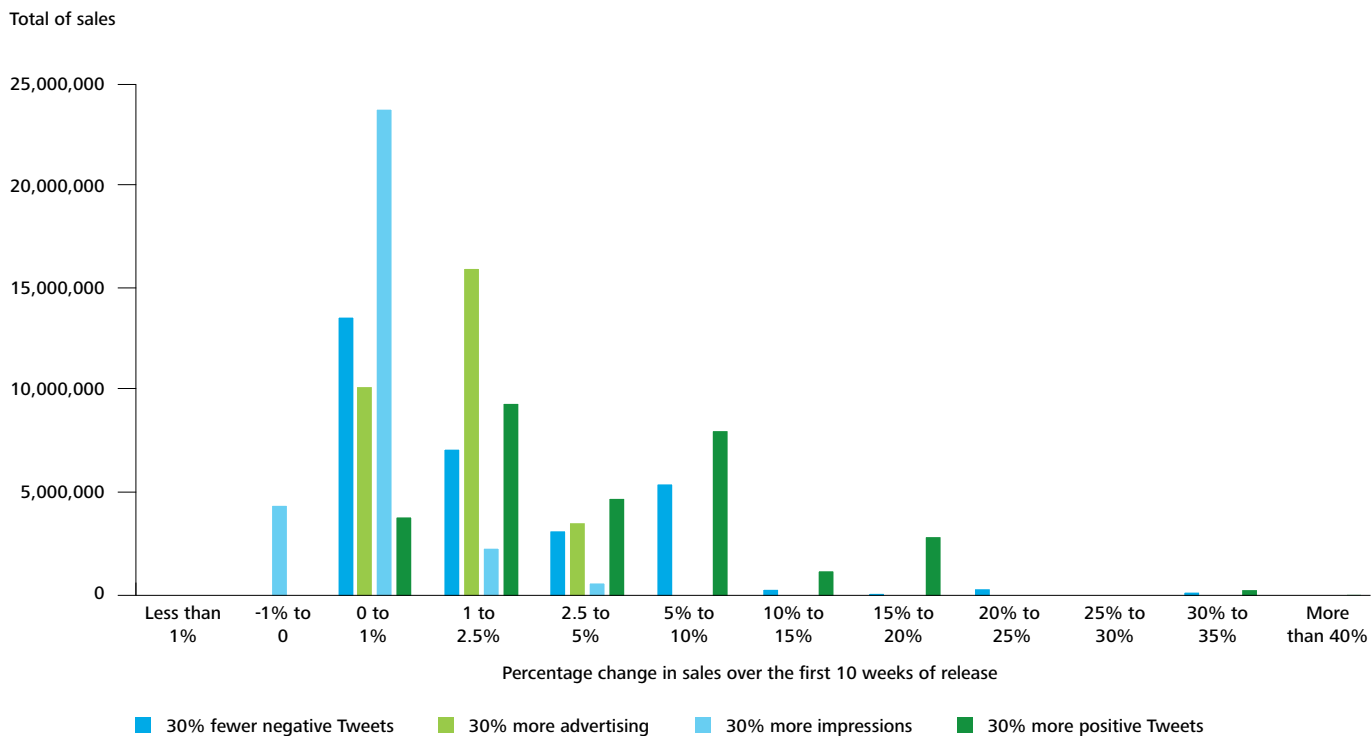
Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

Figure 2 displays the same results adjusted for the amount of sales of each title achieved in the first 10 weeks. Rather than number of titles, the lengths of the columns now measure the total actual sales volume of all titles that are impacted by the different amounts shown on the x-axis. Although the general pattern of the results is similar as in Figure 1 above, the impacts in Figure 2 are concentrated slightly more towards the smaller impacts as the titles with the largest impacts are typically small.

There are 24 titles for which a 30% increase in positive Tweets would lead to a sales impact between 5% and 10%.

Figure 2. All titles – distribution of title level impacts weighted by sales volume

All titles: Total sales of games by the percentage impact category



Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

3.3 Title level impacts for the key genres

This section provides more detail on the spread of the titles level impacts in each of the key genres.

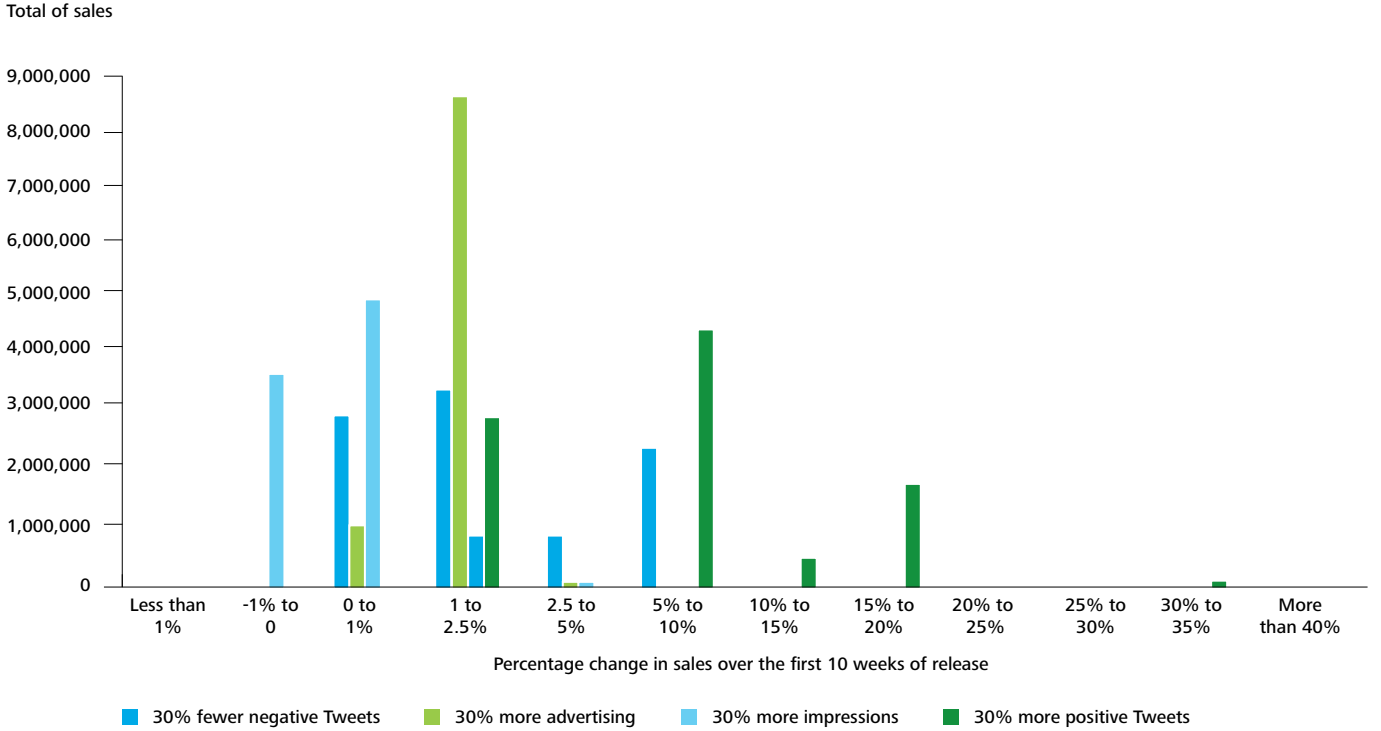
Figure 3 shows the variation of impacts by title for the shooter genre of games. The stronger impact of more positive Tweets is particularly evident, with the largest cluster of sales impacts lying between 5% and 10%, and titles accounting for over 2 million copies sold having impacts between 15% and 20%. In contrast, the impact of additional advertising on this genre is strongly clustered in the 1% to 2.5% bracket. Increasing the amount of positive buzz for shooter games would be far more effective in driving additional sales volumes for most shooter titles than spending more on advertising, given the current level of buzz and advertising.

Figure 4 replicates the chart for sports games. For sports games, the sales impact of reducing negative buzz is roughly the same as the impact of an equivalent increase in positive buzz. The impact of additional advertising is again small compared to Twitter sentiment.

Figure 5 and Figure 6 on the following page show the distribution of the title level impacts for the remaining two main genres in the sample, racing and action games. Notably there is less variability across the titles in these two genres, even though action is the genre with the highest number of titles covered by the sample. Also, for action games the impact of advertising is much closer to the impact of Twitter sentiment than for the other three main genres.

Figure 3. Shooter games – distribution of title level impacts

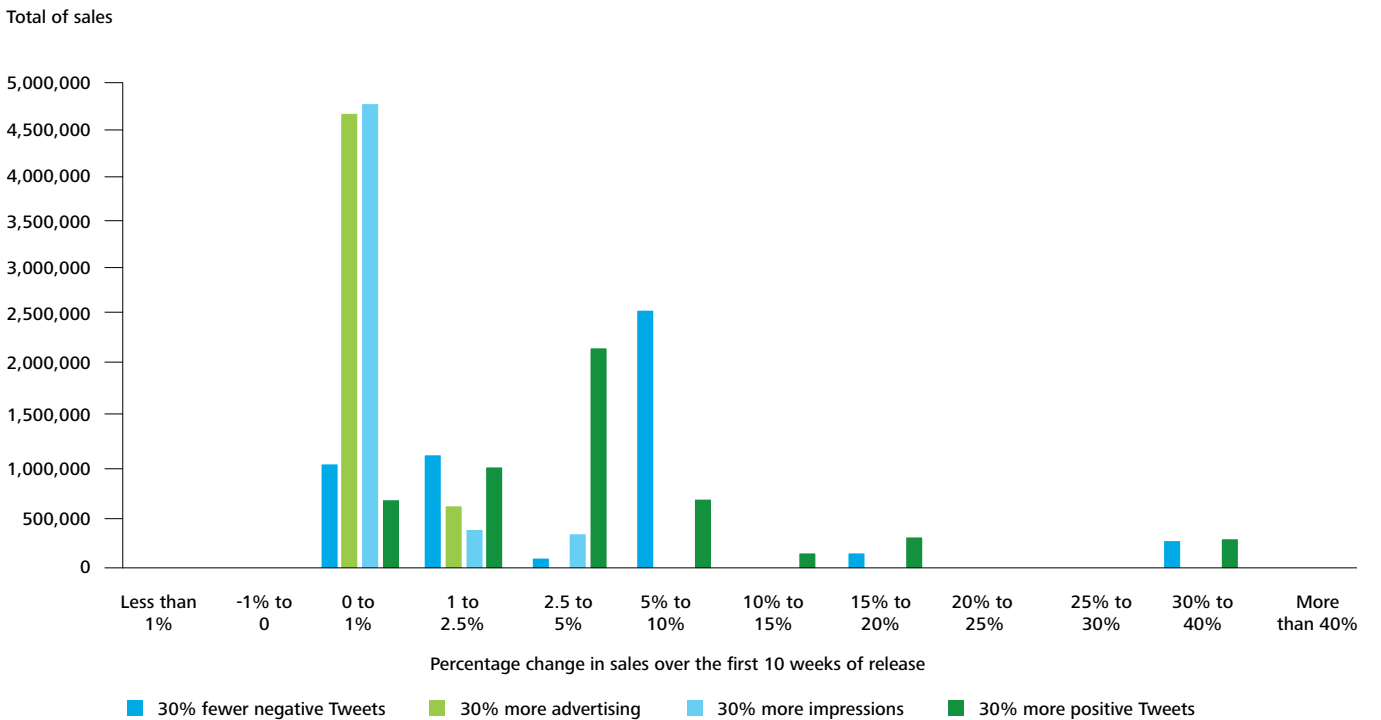
Shooter games: Total sales of games by the percentage impact category



Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

Figure 4. Sports games – distribution of title level impacts

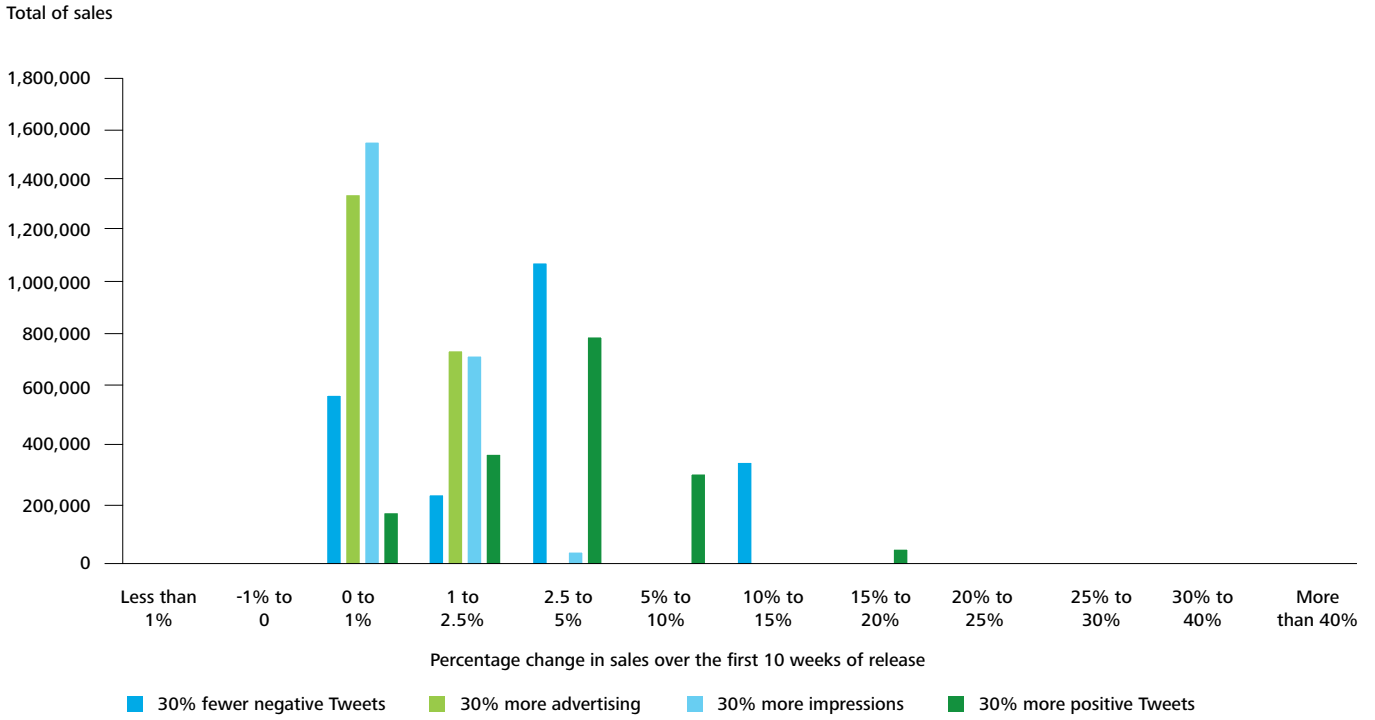
Sports games: Total sales of games by the percentage impact



Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

Figure 5. Racing games – distribution of title level impacts

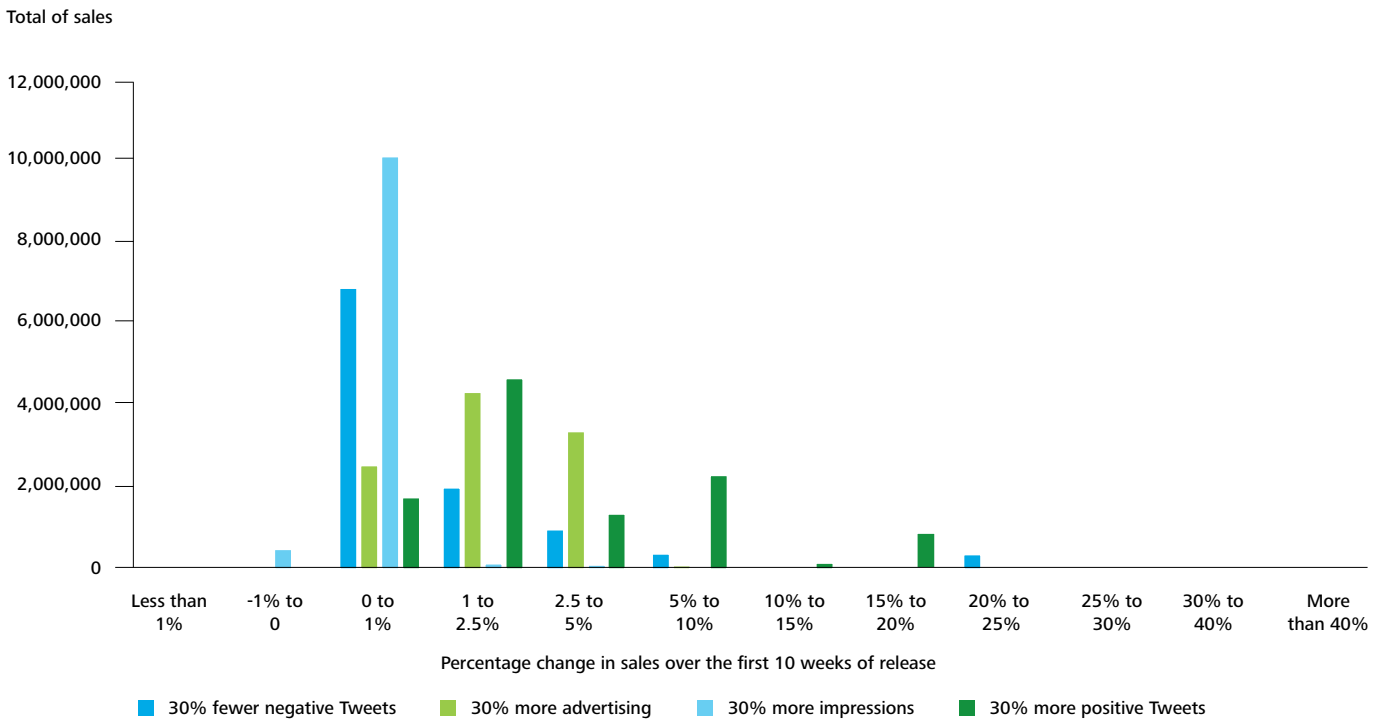
Racing games – Total sales of games by the percentage impact



Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

Figure 6. Action games – distribution of title level impacts

Action games – Total sales of games by the percentage impact



Source: Deloitte analysis of data from GfK, Nielsen and Crimson Hexagon

4. Conclusions

The results show that the impact of Twitter buzz on sales is highly specific to each title, determined by a combination of factors including characteristics of the game, level of sales, existing level of the buzz and advertising.

The key conclusions from the analysis presented in this report are:

- Tweets, and the sentiment expressed in them, provide a reliable driver of sales performance of video games. This means that Tweets capture and can generate valuable word-of-mouth effects that directly impact demand, by an amount that can be robustly quantified.

Tweets provide an additional lever for companies looking to improve the sales performance of their titles, as well as informing planning and launch activities.

- For a large number of titles, and particularly titles in the key genres of shooter, sports and racing, the impact of having more positive sentiment is a multiple of the impact of increasing advertising spend by an equal proportion. The average impact from having higher number of positive Tweets is 4 times the impact that would be driven by additional advertising. Further, Tweets can be 9 times more effective in driving additional sales volume than increasing advertising for sports games, and 5 times more effective for shooter games, given current levels of advertising and buzz.

Given the current level of advertising, for a large number of titles it would be much more effective for companies to generate positive buzz, rather than spending more on advertising.

- Even when the impact of Tweets for a title is below the genre averages, such as for two of the bestselling titles in the sample *Call of Duty Black Ops 2* and *FIFA 2013*, the upside from a higher number of positive Tweets can be highly relevant commercially.
- For example, the results suggest that with 10% more positive tweets about *FIFA 2013* the title could have achieved sales that were 1.3% higher over the first 10 weeks of release (compared to genre average of 2.1% uplift). However, due to the level of sales achieved by *FIFA 2013*, the uplift translates to £1.4 million additional revenue over the first 10 weeks of release. This compares to a predicted revenue uplift of £341k from a 10% increase in traditional advertising. Similarly, with 10% more positive Tweets, *Call of Duty Black Ops 2* would have made an estimated £3.2 million more revenue over the first seven weeks of sales. This compares to an estimated £826k uplift from 10% more advertising.

Even incremental improvements in the sentiment balance of Twitter buzz can drive real benefits impacts on sales performance.

- The balance of sentiment in Tweets is a more powerful driver of sales than reach (or volume), with positive Tweets having a higher impact than negative Tweets.

To gain the most out of the online word-of-mouth embodied by Tweets, it would be better to address the balance of sentiment about games through increasing the number of positive Tweets.

- Tweets from the previous week drive sales in this week, and continue to impact future sales with an average half-life of one week on average across the titles: the impact of Tweets in any one week halves in each week going forward.

The immediate weeks leading up to launch is the key period that determines what contribution Twitter buzz will make on the sales of video games, although companies may need to start building momentum much earlier to hit that critical period. This also emphasises the contribution that open beta testing and other modes of pre-release access can play in generating the peak amount of buzz at the right time in the week immediately prior to release.

- The total reach of Twitter buzz, reflecting potential exposure to the Tweets, has a statistically significant impact on sales that is additional to the impact of the Tweets that lead to changes in reach, but this is much weaker than the impact of the underlying positive or negative Tweets. The impact of increasing reach alone for a given balance of sentiment acts to amplify the impact of that sentiment: when the balance of sentiment is positive, having higher reach of the buzz leads to higher sales, while the opposite is true with a negative balance of sentiment.

Generating higher reach without changing the balance of sentiment is only beneficial for games that have a balance of positive sentiment: gaining higher reach with a negative balance of sentiment leads to lower sales.

This study has been able to isolate and quantify the predictive impact of Tweets on sales of video games at an individual title level. The next questions that arise are: how best to affect the online word-of-mouth, what does it take to generate uplift in positive Tweets, and how do the impacts estimated for video games relate to potential impacts on other products. These are outside the scope of this particular study.

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