# Using Twitter in the acceleration of marketing new products and services

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**Abstract.** The popularity of social media and microblogging services, like Twitter, has increased in a fast manner over the last couple of years. Their use in innovation process and marketing has also gained a lot of attention. However, product and service acceleration -i.e. bringing a product or service faster to the market- with the help of social media and especially by using Twitter has not been researched much, in spite of the fact that new marketing techniques like growth hacking -which aims on low-cost and innovative alternatives to traditional marketing- have reached popularity. In this paper, we define the concept of acceleration and analyse via literature and a real-life, explorative case study, how Twitter could be used for accelerating products and services. Our case study analyses the experiences and data from four Twitter accounts created for accelerating two software applications. According to our research, Twitter has potential for product and services acceleration, but it requires taking into account many aspects and challenges that are summarized in this paper.

**Keywords.** Twitter, Acceleration, Social Media, Innovation.

## 1    Introduction

Social media has become a very popular channel for engaging consumers with brands and products. According to Kaplan and Haenlein (2011) social media is an umbrella term that includes various applications, such as blogs, social networking websites, content sharing websites for videos and photos, consumer product or service ratings websites, Internet discussion boards and forums, company sponsored discussion boards and chat rooms. In go-to-market and promotion, social media provides companies great new opportunities as it enables companies to talk directly to their customers, and customers to talk to each other (Mangold and Fauds, 2009). Successful adoption of social media also increases the turnover of companies (Tsimonis and Dimitriadis, 2014), but in order to succeed, companies need to understand how to communicate and follow the discussion in social media (Kietzman et al., 2011). Viral marketing (Rayport, 1996) or electronic "word-of-mouth" communication, whereby a marketing message is transmitted in an exponentially expanding manner at seemingly small cost, has become possible with social media and social networking services.

Our paper looks at the use of social media for the acceleration of marketing new products and services. With this term, we refer to a combination of processes, tools and methods that help companies get new products to the market effectively. The effectiveness comes from being able to reach potential users quickly and to get feedback of the product and its features, so that it will be possible to react quickly to the needs of the users. Social media, and Twitter in particular, seem like a big opportunity for product acceleration.

Since its launch on July 13[th,] 2006, Twitter has become a popular microblogging service. The potential for viral marketing is one of the main factors increasing the interest of corporations in the microblogging service Twitter (Asur and Huberman, 2010). Twitter had 645 million registered users in 2014 (Statistic Brain, 2014) of which 271 million are active on a monthly basis (Twitter, 2014). The users of the service can publish short messages, called *tweets,* with the maximum size of 140 characters. Users can also easily resend (i.e. *retweet*) other users' tweets, which is the key feature in spreading messages quickly within the service (Asur and Huberman, 2010) and to extend the spread outside the direct followers of the original tweeter (Bruns and Burgess, 2012).

The magic of Twitter was its simplicity, but what has made the service really grow is the fact that the users can follow any other user without approval (Bodnar and Cohen, 2011). Twitter is widely used in interaction between brands and consumers, but when dealing with new products and services with no existing followers, its use for acceleration becomes more challenging.

Each Twitter user may create a brief profile including full name, location, web page, and short (140 character) biography. Twitter shows information about each user, who has not limited the visibility of their data, the number of tweets and photos/videos they have published, the numbers of followers and following, as well as, who they are, the number of favourites and lists followed. Users can communicate publically by using the @username notation, or between the followed and followers using private messages. Twitter tracks phrases, words, and hashtags (a word marked with #) and shows the most popular ones as "trending topics" (Kwak et al., 2010). A hashtag becomes a link, making it easy to see what other users are currently posting in relation to the hashtag. This is the second important way to reach beyond direct followers (Bruns and Burgess, 2012).

Earlier, a tweet could contain only text and links, but since 2014, it became possible to also include pictures. The limited message size in Twitter is both an advantage and disadvantage. Users need to condense their message to a very short space and this usually limits the tweet to include only one topic. However, short message may be hard to understand (Jussila et al., 2013).

Twitter was selected as the research topic of this paper for various reasons: a Twitter user account is quick and easy to set up, there is no need to link the user account to a real personal or corporate identity and the user is free to follow any other user without mutual agreement. These features are beneficial when aiming at gaining visibility to a new product in the early phase and without big advertising campaigns.

This paper aims at understanding whether Twitter is a good tool for acceleration of a new product by answering to the following research questions:

> *RQ1: What are the challenges of using Twitter as a tool for acceleration?*
>
> *RQ2: What kind of lessons learned can be extracted for using Twitter as a tool for acceleration?*

The remainder of this paper is structured as follows. Chapter 2 presents related research on the topic. Chapter 3 of this paper presents the research questions, method and design. Chapter 4 presents two case studies where Twitter has been used in acceleration. Chapter 5 discusses the results and limitations and draws the conclusions and presents directions for further work.

## 2    Related literature

The following section presents related literature from the topics of social media with

the emphasis on Twitter and acceleration.

## 2.1    Social media and Twitter

Literature on Twitter is wide and extensive, so we present here the most referred articles and articles that relate to acceleration of services and products.

Huberman et al. (2008) analysed in their paper the social interaction of people in Twitter by collecting and analysing a large data set from the Twitter. Their data set consisted of 309,740 users. This research showed that most of the links declared within Twitter were meaningless from an interaction point of view and that the driver of usage is a sparse and hidden network of connections underlying the declared set of friends and followers.

Jansen et al. (2009) investigated microblogging as a form of electronic word-of-mouth for sharing consumer opinions concerning brands. They analysed the overall structure of the microblog postings, the types of expressions and the movements of positive or negative sentiments in more than 150,000 microblog postings containing branding comments, sentiments and opinions. They found out that microblogging is an online tool for customer word of mouth communications and discuss the implications for corporations using microblogging as a part of their overall marketing strategy.

Asur and Hubermann (2010) demonstrate in their paper how social media content can be used to predict real-world outcomes. Asur and Hurbemann (2010) focused on predicting box-office revenues for movies using the chatter from Twitter. The survey extracted 2.89 million tweets referring to 24 different movies released over a period of three months. According to the survey there is a strong correlation between the amount of attention a given topic has (in this case a forthcoming movie) and its ranking in the future.

Cha et al. (2010) presented in their paper an empirical analysis of the influence patterns in Twitter by making an in-depth comparison of three measures of influence: in degree, retweets, and mentions. Their Twitter dataset consisted of 2 billion follow links among 54 million users who produced the total of 1.7 billion tweets. Their analysis showed that the most influential users can exercise significant influence over a variety of topics, but that influence is not gained spontaneously or accidentally, but through concerted effort.

Kwak et al. (2010) studied the topological characteristics of Twitter and its power as a new medium of information sharing by analysing 106 million tweets. The results of Kwak et al. (2010) show that once retweeted, a tweet gets retweeted almost instantly, implying fast diffusion of information after the first retweet.

Spaulding (2010) studied how various types of virtual communities can create value for business. The study included transaction oriented communities like eBay[1], interest oriented communities like topic specific discussion board, relationship oriented communities like social networking sites and fantasy oriented communities like those in a virtual world like Second Life[2]. The study showed clearly that in order to succeed companies must play by the rules of the community. The author's conclusion was that a mix of interest and relationship oriented communities offered the best potential for companies to find and train customers to co-operate and support their products.

Soboleva and Burton (2011) analysed in their research the use of Twitter in 12 accounts held by six organizations in the USA and Australia. According to Soboleva

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[1] http://www.ebay.com/

[2] http://secondlife.com/

and Burton (2011) Twitter can ideally provide a highly interactive one-to-many information channel by using a combination of retweets, hyperlinks and hashtags to promote positive messages. Twitter can also provide easy access to information by pushing the users to an internal web site. Lack of consistency across company accounts suggests that many organisations themselves are not sure of their best Twitter strategy (Soboleva and Burton, 2011).

Li and Li (2014) studied consumers' evaluation of brands by evaluating how consumers reacted to the tweets of a (fictitious) brand when dividing the users into two groups based on their level of Twitter use (light or heavy). Their study supported the hypothesis that heavy users have a more communal relationship with Twitter than light users, and this reflects to their reactions to brand messages. A heavy user is almost, as likely to retweet a communal message, as an exchange message with an offer. Light users relationship with Twitter is described as an exchange relationship, which means that they expect to get some benefit of their actions. Li and Li (2014) conclude by pointing out that when using a social media site for interacting with existing and potential customers, it is important to understand why and how people are using a particular social media service and to match the company presence and activities to that. They suggest using communal messages if the aim is to build a strong brand community and messages emphasising benefits, when the aim is to increase brand awareness or launch a new product.

Roberts and Candi (2014) surveyed managers in 351 European companies about their companies' use of social networking sites in new product development (NPD) in three different aspects: market research for NPD, customer collaboration in NPD and New product launch, as well as, of their results in these areas. The best success had been gained in using social network sites for new product launch. Customer collaboration in social networking sites had contributed to increased innovativeness, whereas no benefits had been gained in market research. The study indicated that companies had not fully learned to utilise social media in the more complicated aspect, such as, market research. The use of social networks is easier when launching the actual product as options like user reviews can be encouraged and spread through user networks. The authors urge companies to think carefully in which tasks to involve users via social media. Obviously, focusing at social media channels with enough users that belong to the intended target audience is important. The use of an open social media environment also brings about risks in the form of false, misguiding and not authentic contributions and even malicious users.

### 2.2     Acceleration

In the literature, the concept of **acceleration** has various meanings and therefore the concept needs clarification. We have defined acceleration (Apilo et al. 2015) as a combination of processes, tools and methods that help companies go faster to the right market. Our approach is planned to fit all kind of companies from start-ups to mature organisations. Figure 1 below presents the acceleration concept used in this article.

The main phases of the continuous learning process in acceleration are opportunity mapping, business model, minimum viable product (MVP) and validated learning.

Opportunity mapping defines a space of possibility by helping to zoom in on the problems that the users want to solve and to identify the spaces where competition is still limited. Opportunity mapping also rearticulates problems and needs in a generative and future-oriented way (Anon, 2015).

According to Al-Debei et al. (2008, p.8-9) a "business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization, as well as all core products and/or services the

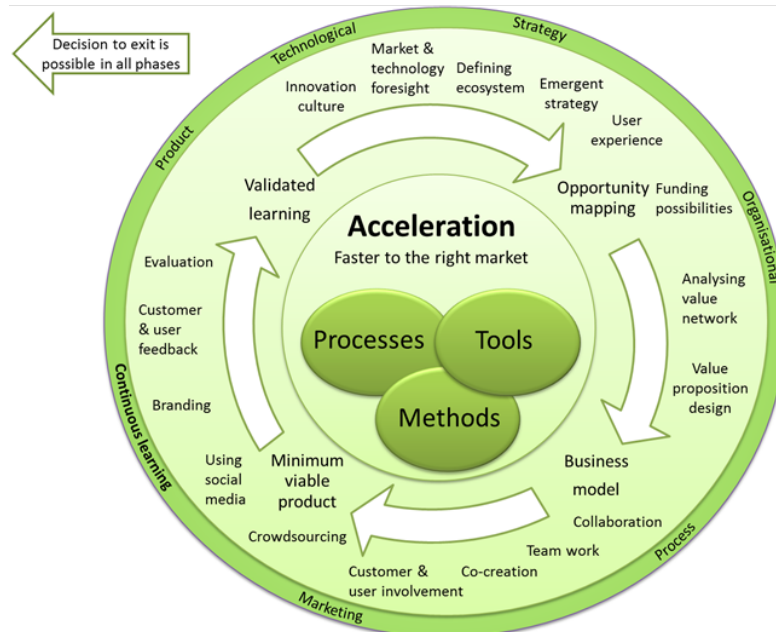organization offers based on these arrangements that are needed to achieve its strategic goals and objectives."



**Fig 1**. Acceleration concept.

The business model reflects management's idea about what customers want and how an enterprise can best meet these needs and get paid well for doing so (Teece 2010). The business model canvas developed by Osterwalder and Pigneur (2010) has become a very popular business modelling tool.

MVP is "the version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort "(Ries, 2009). MVP contains only the critical features of a product (Blank, 2013).

Ries (2011, p.46) defines validated learning as "a rigorous *method for demonstrating progress* when one is embedded in the soil of extreme uncertainty in which start-ups grow". The idea of validated leaning is to learn by trying out an initial idea and then measuring it to validate the effect. Validated learning is especially popular on the Internet, where visitor behaviour can be tracked by analytics software and real functionality of the website features can be analysed by e.g. using statistics.

In using Twitter, the biggest potential of acceleration relates to the MVP phase, when a working service or product has been defined and built and made available for real users. Even though the product or service has not yet been completed to the full, it can give users the core idea and practical experience of using it.

In software development, MVP is often referred to as beta: it generally begins when the software is feature complete, but may contain bugs and performance issues. Beta release is a pre-release of software that is given out to a large group of users to try it under real conditions. Beta testing may be done in various levels of openness: it may be 'by invitation only', beta users may ask to get access by registering at an open website, or the product is launched as a beta version for anyone to use. For Android applications (apps), Google gives the opportunity to launch alpha and beta versions of

an app through Google Play[3]. The difference to normal versions is that alpha and beta testers cannot rate the app and in this way it cannot hamper the future success of the app. Other channels, including Google services like Google+ or Twitter need to be set up in order to gather the user feedback on these alpha and beta apps.

In the case study of this paper, a marketing technique called growth hacking has been used as the model for action in gaining exposure for an idea or product (Mohout, 2014). Growth hacking, uses analytical thinking, product engineering and creativity so as to sell products and gain exposure (Biyani, 2013; Rowan, 2014). Growth hackers focus on low-cost and innovative alternatives to traditional marketing, e.g. utilizing social media and viral marketing instead of buying advertising through more traditional media, such as, radio, newspaper and television (Biyani, 2013). Growth hacking has, according to Mohout (2014), five phases: acquisition, activation, retention, revenue and referral. In the acquisition phase, the idea is to get in touch with the customer (e.g. by using Twitter). In the activation phase, the goal is to provide the users with a great first experience and in the retention phase, to get them to come back. The revenue phase aims at making money and the referral phase at getting users to tell others about your product. The phases of growth hacking do not necessary follow each other strictly in this order; particularly the referral phase can occur before the revenue phase. Bulygo (2013) has gathered 35 resources with ideas and approaches by using growth hacking and becoming better in it.

As acceleration is not a well-established term, related literature has been searched in this article by using a wider terminology.

Datta (2009) investigates in his article how a company's ability to explore and exploit affects its ability to commercialize innovations. Datta (2009) found out that IT based knowledge capability is found to positively moderate the relationship between ability to explore and exploit and commercialization of innovations.

Engel (2011) investigates in his article the ten leading strategies employed by venture capitalists and entrepreneurs to test new ideas and commercialize innovations quickly. The most successful innovations are, according to Engel (2011), those that go beyond technical discovery so as to embrace business model innovations that disrupt supply chains and create new markets.

The articles of Fitzgerald (2013), KPMG (2014) and Pantaleo and Pal (2008) analyse acceleration. Fitzgerald (2013) analyses in his article the implementation of digital acceleration teams at Nestle. A report by KPMG (2014) presents how to accelerate implementation of eHealth solutions. Pantaleo and Pal (2008) analyse in their book the global change of acceleration and its impact on the innovations and their marketing.

*The "Digital aspects of acceleration"* by Webb (2011) presents comprehensive case examples of how organizations have deployed Digital Innovation methodologies to grow both sales and profit and how organizations are using digital media, Web 2.0 and social media to connect to their customer communities and internal stakeholders.

## 3      Research method and data collection

In this study we wanted to evaluate opportunities and challenges of using Twitter in acceleration of marketing new products in connection to the MVP phase when the product is offered using a fictitious brand that does not have presence or existing user networks. This situation is faced by a new company or a company that wants to test

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[3] http://developer.android.com/distribute/tools/launch-checklist.html

new product ideas with real users in a sector that does not know well and does not make a direct link to its existing brand(s) or user communities. In this study, the term product means application as the products of our case study are software applications.

The aim of this paper is find out, if Twitter is a good tool for acceleration of a new product without existing followers, and for this purpose, we have defined our research questions as follows:

> **RQ1:** *What are the challenges of using Twitter as a tool for acceleration?*

> **RQ2:** *What kind of lessons learned can be extracted for using Twitter as a tool for acceleration?*

Case studies have proven to be useful in situations in which the target is to understand a contemporary phenomenon in complex, real-world settings, especially when the boundaries between the context and the phenomenon are not clear (Yin, 2003; Eisenhardt, 1989). An *exploratory case study* aims towards seeking new insights, understanding what is happening and generating new hypotheses and ideas for future research (Robson, 2002).

The research presented in this paper was conducted as an explorative case study of two different case projects that have focused on using Twitter for acceleration of two new applications. Two case projects and their four Twitter accounts were the units of analysis in this study. However, since each of them had a single goal of understanding how social media can be used in acceleration, the case study can be seen as holistic (Yin, 2003). The experiences of the account maintainers are qualitative data in the form of notes. The performance of the tweets, as well as, the characteristics of the followers were analysed by using numerical data to describe these cases and not to make general conclusions of Twitter users and tweet performance. Two of the authors of this paper had created and maintained the four Twitter accounts analysed in this study. This means that we had all the available private and public information in relation to the accounts.

Two datasets were obtained in order to analyse the tweet performance and follower characteristics. Twitter offers the impression and engagement data to each account owner of their original tweets. We call this dataset internal data. It contains information of various types of interactions and activities that Twitter users have made with the tweets. Some statistics were available since the accounts were created, but complete interaction data was available only starting from the end of August 2014.

In addition to the internal dataset, we gathered data through the open Twitter API of the followers of each account. This will be called the API dataset. The API dataset gives a different view than the internal dataset and complements it. The internal dataset describes how the original tweets made by the account "performed", whereas the API dataset lets us examine followers' features and activities.

Detailed analysis of user behaviour utilising users' digital footprints is widely used with success to understand user needs and to develop websites for maximum impact (Wilson, 2010; Bucklin and Sismero, 2009). In the case of Twitter, we need to adapt our analysis to what data Twitter offers. Our case can be regarded as analogous to making research on advertising. Traditionally the number of people who saw an advertisement has been a central measure; in online environments, also the actions that users take based on an advertisement can be measured. Twitter provided data offers both types of data and they will be utilised in this study.

The case study dealt with four Twitter accounts: *Funnyhat Dudes*, *Bass Manic Gorilla*, *Secure Selfie Crew* and *Privacy for Cats* used for promoting two apps, *Funny Hat Stickers* and *Secure Selfie Camera*. These apps had been developed as a part of a company's internal light-weight development process, where small apps aimed at

totally new customer groups and markets are developed in order to explore new opportunities. The budget for product development is small and one of the challenges faced by the developers is how to test whether their app gain any traction among real end users. Getting users' attention to new apps in a crowded online store, like Google Play, is very hard and because of the limited budget, there is no opportunity to advertise these apps, or to grow and maintain a longer-term user community. The developers, however, needed quick and efficient ways to bring their product to the attention of potential users. Twitter with its hundreds of millions users and easy and a quick-paced interaction seems like a potential place for finding users and a test market for the app with a small budget, giving also the opportunity to the developers to interact with the potential users directly.

Funny Hat Stickers was developed and published at Google Play[4] in May 2014 and Secure Selfie Camera[5] in November 2014. At the end of January 2015 the Funny Hat Stickers application had been downloaded 10,553 times and the Secure Selfie Camera 1,212 times. Twitter has been utilized to obtain visibility to the apps and to encourage people to try the applications themselves.

The developers set up two Twitter accounts to promote the Funny Hat Stickers app: Funnyhat Dudes[6] (@funnyhatdudes) and Bass Maniac Gorilla[7] (@heavyshrimp). The Secure Selfie Camera app has been promoted with two Twitter accounts: Secure Selfie Crew[8] (@SelfieSec) and Privacy for Cats[9] (@KittenPrivacy).

**Table 1**. Description of the analysed accounts.

| Account | Description |
|---|---|
| @funnyhatdudes | *"We love #appdev for #android. Download our free Funny Hat Stickers http://bit.ly/1mMoczi."* <br><br> - An app developer account <br> - Includes link to the app in the Google Play. |
| @heavyshrimp | *"An almost retired #bassist and a #funart & #fanart wannabe w/ http://bit.ly/1mMoczi: #happiness & #fun belongs to #rock & #metal. #followsback great stuff! ".* <br><br> - Targets people who are interested in heavy music and playing with photos and finding funny things. <br> - A shortened link (bit.ly/1mMoczi ) is included, and it leads to the app in Google Play |
| @SelfieSec | *"Creators of the Secure Selfie Camera app for #Android. We exist to protect #photos that need the extra care: #private, #intimate, #confidential, or #sensitive."* <br><br> - Description is directly linked to the app |
| @KittenPrivacy | *"A #cat owner and privacy advocate! A member of @selfieSec crew. Hey #cats, be aware of your privacy when taking intimate #catselfies!"* <br><br> - Also refers to the Secure Selfie Camera app, but takes a less serious approach by combining privacy with the popular cat images |

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[4] https://play.google.com/store/apps/details?id=com.dfdata.funnyhat

[5] https://play.google.com/store/apps/details?id=com.dfdata.secureselfiecam&hl=en

[6] https://twitter.com/funnyhatdudes

[7] https://twitter.com/heavyshrimp

[8] https://twitter.com/SelfieSec

[9] https://twitter.com/KittenPrivacy

The maintainers of the accounts grew the number of followers by starting to follow users that somehow seemed relevant to the user account and by retweeting and making favourites of other users' tweets. Also tweets mentioning other users were posted directly. The aim was to try to get other users as followers, since followers will see future tweets in their Twitter home page and in this way there will be an opportunity to get them interested in testing the developed apps.

Getting followers was done according to Twitter guidelines[10], in other words, no automation and no mass friending or unfriending or aggressive churning. It is, however, necessary to unfriend such followers who do not follow the account after the account is following more than 2,000 users. This is because Twitter starts to limit the ability to follow new users if the ratio of followers and following does not fulfil the Twitter defined value.

## 4 Case study results

This section presents the lessons learnt from managing the case accounts and after that, goes more into details by presenting the quantitative analysis of the tweets and followers of the Twitter-accounts

### 4.1 Lessons learnt from managing the case accounts

The experience from maintaining the four case accounts confirmed the usefulness of the following practical hints/guidelines given in the literature (Angels, 2014; Bodnar and Cohen, 2011; Bullas, 2012; Malhotra et al., 2012). To get attention it was important to have interesting wordings, use attention words (like WOW), create a sense of anticipation, incentivize and optimize the use of keywords. To gain followers it was useful to take advantage of existing networks and use available tools to assist in managing the Twitter followers and following. The more credible the account looked with existing followers, the more likely new users were to follow it back. Creating a human connection and remembering that people want to be recognized and tweeting with purpose and passion contributed to the positive attention from other users.

Creating and sharing content that was relevant to followers and good enough to be retweeted was important. "Evergreen" content was helpful, as it could be used in tweets several times and any time. Multimedia content and photo tweets got more attention than text only. Posting tweets with different focuses like educating, entertaining, inspiring and not just informing was good. The attention that a tweet gets depends also on luck and the account holders could not in advance guess, which tweets would get the most attention. This means, that it is important to be very active and try many things and not to be afraid of mistakes.

Internal training will be needed to encourage developers to participate in Twitter. The training should give ideas as to how to invent good tweets, how to utilise Twitter features, such as, photo embeds and how to utilise the same content multiple times without being too repetitive. Guidelines as to how to best grow the follower base considering Twitter rules and restrictions need also be given, as well as, various practical tips on how to use the system and its strengths and avoid limitations.

If several people concurrently post to one account, common shared idea of the account interests and topics for tweets should be agreed, as well as, the general

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[10] https://support.twitter.com/articles/68916-following-rules-and-best-practices

atmosphere that the account tries to create. The overall tone for the account should be defined.

Practice showed that there are also limitations on use of Twitter. First, even though there is a social element in Twitter, it turned out not to be a suitable platform for getting user feedback on the apps. When developing software, the primary channel for feedback must be within the app. Second, the success of a Twitter account in promoting an application can only be partly measured as Twitter statistics only captures the direct app installs. The Twitter analysed statistics only showed few downloads but the total number of the Funny Hat Stickers app downloads has reached more than 10,000. The Funny Hat Stickers app has been promoted only via Twitter, so the impact of the Twitter presence and accounts has probably played an important role in making the app known and encouraging downloads.

### 4.2      Case Twitter accounts

This section presents the main characteristics of the analysed Twitter accounts and the impressions and user engagement related to their tweets.

**Main characteristics.** The number of tweets that had been published through the four case accounts varied from 233 to 989 including retweets;  the numbers of followers varied from 1085 to 2554 and of following from 1425 to 2805 (Table 2). In all cases, the number of users being followed was higher than that of followers, which is to be expected with this type of a new account. The numbers of followers are higher for the less serious accounts than for the more official ones.

**Table 2.** The numbers of tweets including retweets, followers, following (followed users) and favourites of the four case accounts.

|  | @funnyhat-dudes | @heavy-shrimp | @SelfieSec | @Kitten-Privacy |
|---|---|---|---|---|
| **Tweet count** | 989 | 524 | 744 | 233 |
| **Followers** | 1 841 | 2 554 | 1 085 | 2 290 |
| **Following** | 2 019 | 2 805 | 1 425 | 2 493 |
| **Favourites** | 497 | 1 062 | 97 | 1 533 |

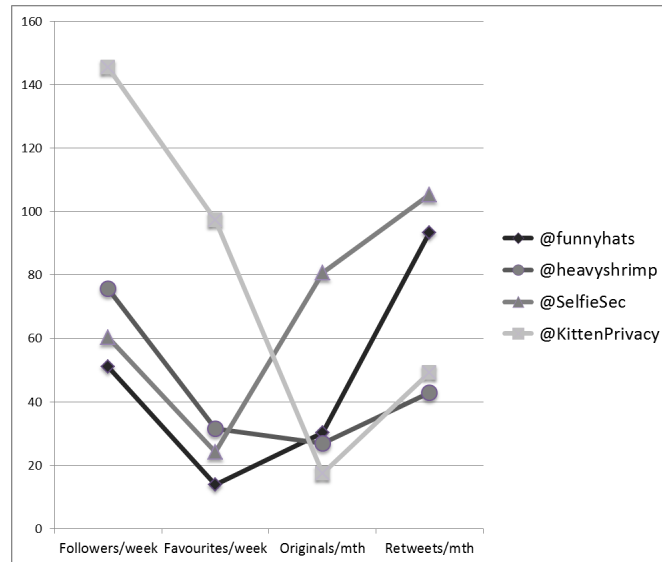Figure 2 shows some key activities for the four accounts.

**Fig. 2**. The average numbers of *followers/week* and *favourites/week*, and of *original tweets/month* and *retweeted tweets/month* for the four case accounts between account set up and mid-December 2014.

The number of followers had increased most rapidly for the @KittenPrivacy account. Lessons learnt from developing the previous Twitter accounts were used there, such as, quickly unfollowing the followers that had not followed the account. The @KittenPrivacy account had been the most active account in marking favourites. Both original and retweets had been published most frequently through the @SelfieSec account, but it has the smallest number of followers. The difference in the popularity of the @KittenPrivacy and @SelfieSec accounts is most likely because of the difference in the topic; the privacy of photographs is a much more difficult topic than funny photos of cats and therefore, it does not attract followers as easily.

**Impressions and engagements.** The internal dataset provided detailed information of the tweet impressions and user engagement with tweets. Impressions indicate to how many people the tweet was shown. Engagement is a summary measure of the different ways and numbers of engagement that users may do with tweets, such as, retweeting and making a favourite, but also clicking the user profile, URL or hashtag in the tweet.

Table 3 provides the statistics of the overall performance of the tweets. Single tweets published through the @funnyhatdudes and @SelfieSec accounts had received the highest number of impressions, but when measured with the mean or median, the @KittenPrivacy account had reached the highest impression and engagement levels. @KittenPrivacy had also reached the highest score in the engagement for one single tweet. The three other accounts had all very similar averages for impressions and engagement.

**Table 3.** The number of tweets and the impressions and engagement statistics for the four case accounts.

|  | @funnyhatdudes | | @heavyshrimp | | @SelfieSec | | @KittenPrivacy | |
|---|---|---|---|---|---|---|---|---|
| **Tweet count** | 242 | | 128 | | 296 | | 53 | |
|  | Impressions | Engagement | Impressions | Engagement | Impressions | Engagement | Impressions | Engagement |
| **Max** | 39 301 | 66 | 4 258 | 144 | 11 658 | 194 | 5 470 | 264 |
| **Min** | 13 | 0 | 8 | 0 | 11 | 0 | 36 | 0 |
| **Mean** | 518 | 7,1 | 490 | 7,6 | 494 | 5,8 | 1 352 | 59,2 |
| **Median** | 251 | 5 | 241 | 5 | 154 | 2 | 1 002 | 32 |

The @KittenPrivacy account got the highest overall engagement values also when measured as the percentage of tweets that got at least one user interaction, as can be seen in Table 4. @SelfieSec, the account that aimed at promoting the same app, but with a more serious approach, got the lowest level of interaction in most categories. Out of the @SelfieSec tweets, 31% did not get any reaction. URL clicks and user profile viewing was the most common ways of user interaction for this account.

**Table 4.** The percentage of tweets that got an engagement activity by at least from one user (the highest value in bold and the lowest value underlined).

|  | Engagement | Retweet | Reply | Favourite | User profile click | URL click |
|---|---|---|---|---|---|---|
| **@funnyhatdudes** | 93% | 24% | 15% | 43% | 35% | 51% |
| **@heavyshrimp** | 91% | 34% | 28% | 55% | 45% | 37% |
| **@SelfieSec** | 69% | 30% | 5% | 22% | 30% | 34% |
| **@KittenPrivacy** | **94%** | **72%** | **38%** | **81%** | **68%** | **57%** |

|  | Hash tag clicks | Detail expand | Perma-link click | Embedded media click | App install | Follow |
|---|---|---|---|---|---|---|
| **@funnyhatdudes** | **26%** | 58% | 0% | 52% | 0% | 1% |
| **@heavyshrimp** | 4% | 60% | 2% | 26% | 0% | 5% |
| **@SelfieSec** | 15% | 29% | 0% | 8% | **1%** | 1% |
| **@KittenPrivacy** | 6% | **89%** | 4% | 62% | 0% | 9% |

Figure 2 showed that the @KittenPrivacy account had been much more active in making favourites than the other accounts. Table 4 shows that this activity has been mutual: 81% of the tweets published by the @KittenPrivacy account were favourited by at least one user. Also the values for retweeting (72% of the tweets) and detail expands (89%) were very high for this account. Detail expands and marking as a favourite were very popular ways of interaction also for the @heavyshrimp account, but the overall levels were lower.

Also the @funnyhatdudes account tweets had a high overall engagement level, but the interactions were more evenly spread among the different options than for the

@KittenPrivacy account tweets. Detail expands, embedding media and URL clicks were the most popular activities in connection to the @funnyhatdudes tweets, but it was very low in retweeting.

The success in app installs, the main goal of setting up the accounts, was low, only a few click through the official user accounts. Two @SelfieSec tweets had led to somebody clicking the link to app store. One @funnyhatdudes tweet had got two persons to click the link to the Google app store. These tweets had clear text that asked the user to get the app. There were other tweets with a similar clear message, so it does not automatically lead to action, but, helps in getting people to act.

### 4.3 Case accounts' followers

This section presents the main features of the followers of the case accounts and of those users who retweeted case account tweets or replying to them.

**Followers' main features.** The API dataset from Twitter describing the followers of each case account was gathered at mid-January, 2015. Table 5 presents the information retrieved of each follower for the analysis.

**Table 5**. Data retrieved of each follower through the Twitter API.

| |
| --- |
| *User account age* |
| *Language* |
| *Number of tweets in total* |
| *Number of followers* |
| *Number of following users* |
| *Number of favourites* |
| *Number of lists* |
| *Number of tweets in last 90 days (max. value 400 tweets)* |
| *Retweet percentage of the last 400 tweets (or less if the user had published less than 400 tweets)* |
| *Number of replies to the brand account in the last 400 tweets (or less if the user had published less than 400 tweets)* |
| *Number of retweets of brand tweets in the last 400 tweets (or less if the user had published less than 400 tweets)* |

The value of 400 tweets is the upper limit to the number of tweets during the last 90 days; this value comes from a practical limitation of the Twitter API, which lets one request tweets in a batch of 200 tweets. To see how many tweets each user had made during the last 90 days, we fetched two batches of 200 tweets from each user and counted how many of them had been posted during the last 90 days. Some users had, however, posted 400 tweets in less than 90 days, so the value of 400 means that the users had most likely posted more than 400 tweets during the last 90 days. It is also good to remember that some users had not posted 400 tweets during all their time in Twitter.

The basic characteristics of all followers of the four case accounts combined are presented in Table 6. Little more than half of the users were following less than 2,000 users, which is the area where Twitter does not limit the users' ability to follow additional users.

We have also included as a comparison, the estimate of the number of followers in Twitter for all accounts according to a study[11] published in 2013. We can see that the

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[11] http://radar.oreilly.com/2013/12/tweets-loud-and-quiet.html

followers of the case accounts had many followers when compared to the general level. This difference was expected as there are many user accounts in Twitter that are used little and such accounts are unlikely to follow other users. Even though we take this into consideration, the overall level of tweets, followers and following can be considered high for the case accounts.

**Table 6.** Key characteristics of the Twitter users that followed the analysed case accounts in the API dataset.

|  | 10% | 20% | 40% | **50%** | 60% | 80% | 90% | 95% | Max 99.9% |
|---|---|---|---|---|---|---|---|---|---|
| **Days in Twitter** | 168 | 263 | 527 | **712** | 934 | 1 515 | 1 961 | 2 114 | 2 989 |
| **Tweets** | 86 | 263 | 1,190 | **2,289** | 4,084 | 15,549 | 35,873 | 61,832 | 627,252 |
| **Following** | 323 | 636 | 1,507 | **1,968** | 2,876 | 17,197 | 56,988 | 121,010 | 940,774 |
| **Followers** | 183 | 410 | 1,068 | **1,681** | 3,164 | 20,675 | 71,579 | 147,283 | 2,139 724 |
| **All Twitter users' followers** | *3* | *9* | *36* | ***61*** | *98* | *246* | *458* | *819* | *24,964 (99.9%)* |

Huge differences in the user activities could be seen in the data. Some account owners had been extremely active: almost 30% had been sending more than 10 tweets per day during their whole time in Twitter. About one third of the followers of the case accounts had got more than 10 followers per day, or follows more than 10 new users per day. The top values for followers/day are higher than for following/day, which is natural as one popular account may be followed by numerous new users every day, but there is a limit as to how many accounts one person can follow during one day. The top values for following per day are actually higher than what can be regarded as feasible to a real person to manage without automation.

The @KittenPrivacy account followers had the lowest average value and the narrowest range of values for daily new followers and following. The values were not much higher for the @heavyshrimp account followers. The @funnyhatdudes account followers had the highest values and widest range of the four case accounts in these measures.

The numbers of followers and following have a high correlation as it can be seen in Figure 3 where a scatterplot of the number of following and followers in log10 is presented. The scatterplot reveals clearly the Twitter policy of limiting the users' ability to follow new users after they have reached the limit of following 2,000 users. Below this value, users can follow other users freely even though they would not have any followers.

At the lower end, the following is higher than the number of followers. This is typical for new and personal accounts. These are users who rather follow than want to be actively followed by others, or are in the process of building their network by first starting to follow others and hoping to increase their number of followers that way. In the high end, there is less variation in the follower-following relationship because of the Twitter policy. The hugely popular accounts with much more followers than following are located above the main line in the graph.
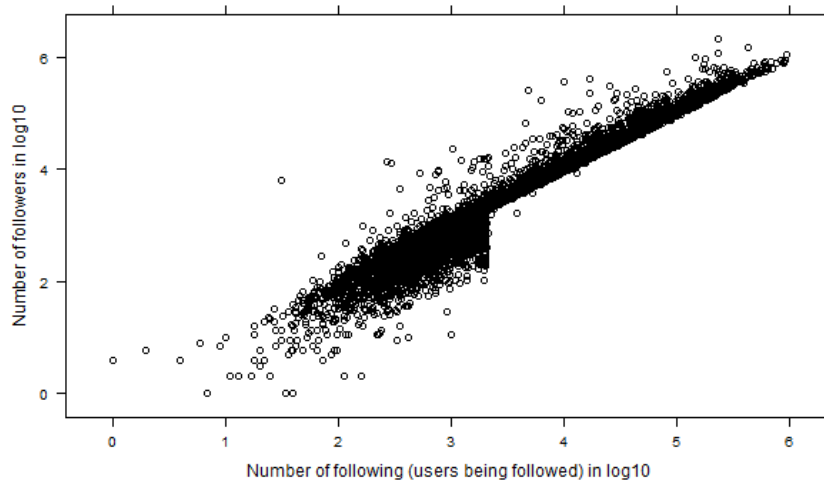
**Fig. 3.** Scatterplot of the number of following and followers, both values in log10 (e.g. log10(2000) = 3.3).

There were big differences between the case accounts as to how their followers were positioned in relation to this limit of following 2,000 users. 37% of the @funnyhatdudes followers, 55% of the @heavyshrimp followers, 40% of the @SelfieSec followers and 68% of the @KittenPrivacy followers were following fewer than 2,000 other users.

**Retweeting and replying followers.** The aim of the case accounts was to get followers who would be interested in testing the new apps. The API dataset does not include information about app downloads, but it tells about, which users retweeted case account tweets or replied to them. Retweeting and replying are important indications of interaction and interests, so we wanted to see what the main characteristics of these followers are, and if and how they differ from the average.

Table 7 shows the key figures relating to retweeting of and replying to case account tweets for the different accounts. The numbers of users who retweeted or replied to the brand account tweets were small, only about one percent of the followers of each account. When looking at the data, it is good to remember that our API dataset includes only the direct followers of the brand account. The real figures for retweets are higher, because retweeting spreads in networks and it is not only done by the direct followers.

**Table 7**. The numbers of unique case account tweets that were retweeted or replied to, the total numbers of retweets and replies and the numbers of unique direct followers, who retweeted or replied to the case account tweets.

|  |  | Retweets | Replies |
|---|---|---|---|
| **@funnyhatdudes** | Unique tweets that got retweeted or replied to (Internal dataset) | 59 (24.4%) | 36 (14.9%) |
|  | Times retweeted/replied (Internal dataset) | 117 | 41 |
|  | Unique retweeting of replying users (API dataset) | 22 (1.1%) | 16 (0.8%) |

| @heavyshrimp | Unique tweets that got retweeted or replied to (Internal dataset) | 43 (33.6%) | 36 (28.1%) |
|---|---|---|---|
| | Times retweeted/replied (Internal dataset) | 64 | 43 |
| | Unique retweeting of replying users (API dataset) | 13 (0.5%) | 14 (0.6%) |
| @SelfieSec | Unique tweets that got retweeted or replied to (Internal dataset) | 88 (29.7%) | 14 (4.7%) |
| | Times retweeted/replied (Internal dataset) | 146 | 16 |
| | Unique retweeting of replying users (API dataset) | 14 (1.3%) | 4 (0.4%) |
| @KittenPrivacy | Unique tweets that got retweeted or replied to (Internal dataset) | 38 (71.7%) | 20 (37.7%) |
| | Times retweeted/replied (Internal dataset) | 609 | 34 |
| | Unique retweeting of replying users (API dataset) | 24 (1.0%) | 23 (1.0%) |

On average, the retweeting users had much less followers that the account followers as a whole (Table 8). The median numbers of followers were between 195 and 602 followers for the retweeting and replying users, when they were 1,020 and 6,128 for all the followers.

**Table 8.** The statistics of the numbers of followers for the users who had retweeted or replied to case account tweets.

| | @funnyhat-dudes | @heavyshrimp | @SelfieSec | @Kitten-Privacy |
|---|---|---|---|---|
| **Number of users** | 27 | 22 | 13 | 42 |
| **Min number of followers** | 4 | 4 | 1 | 49 |
| **Mean number of followers** | 497 | 2,869 | 2,738 | 967 |
| **Max number of followers** | 2,468 | 36,641 | 30,938 | 5,131 |
| **Median number of followers** | 195 | 514 | 199 | 602 |
| | | | | |
| **Median number of followers for all the followers of the account** | 6,128 | 1,520 | 4,513 | 1,020 |

These users were retweeting more than all users in average, as can be seen in Table 9. Only 14% of the followers who had retweeted or replied to the case account tweets were following more than 2,000 other users, which is considerably less than the 43% of the whole dataset.

**Table 9**. Statistics of the retweet percentage for all users and those who had retweeted case account tweets.

|  | Min. | 1st Quarter | Median | Mean | 3rd Quarter | Max. |
|---|---|---|---|---|---|---|
| **All users** | 0.0 | 17.4% | 38.0% | 41.0% | 59.4% | 98.3% |
| **Those retweeting case account tweets** | 3.3% | 36.8% | 53.5% | 52.7% | 65.8% | 98.3% |

Figure 4 shows the difference in tweeting activity during the last 90 days of all the followers of the four case accounts and of those followers who had either retweeted the case account tweets or replied to them. The total user base is concentrated at the extreme ends of the activity scale: around 40% of the users tweeted at least 400 tweets during the last 90 days making it the biggest group followed as the second by those users who had tweeted 1-50 times during the last 90 days.

The users who had retweeted the case account tweets or replied to them, showed a somewhat different behavioural pattern: the biggest group was those who had tweeted 1-50 times and the second largest group was tweeting 51-100 times during the last 90 days. The most active group with 400 or more tweets in 90 days was the third largest.
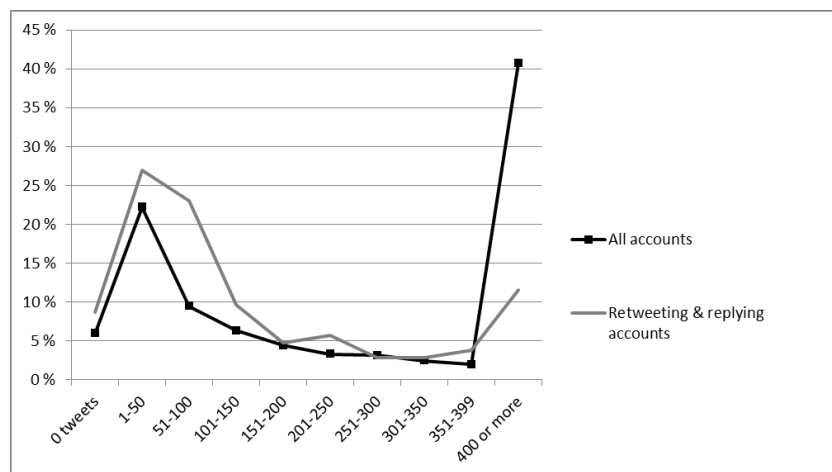


**Fig. 4.** The share of users in the different activity classes (tweets during the last 90 days) for all follower accounts and for those who retweeted case account tweets or replied to them.

When we summarise characteristics of the retweeting and replying users in comparison to all users in the dataset, we can see that the retweeting users tended to have a fairly low number of followers, most of them followed fewer than 2,000 accounts, they retweet fairly much in general, and their overall tweeting activity is not likely to be more than 100 tweets/90 days or about 1 tweet per day.

## 5      Discussion and conclusions

This paper analysed the potential of Twitter in acceleration of marketing of new products and using it in growth hacking. The huge number of users and the ease of

use make Twitter a potentially efficient channel for marketing new products and ideas, but using it for this purpose is not trivial, particularly for brands and products that are not widely known.

We chose Twitter as a channel, because of its potential for quick viral spreading of tweets, as well as, because it is quick and easy to set up an account there and the account does not necessary have to be linked to any real identity or company. Social media sites that mix interests and relationships could be very suitable for companies (Spaulding, 2010) and Twitter fills this criterion, but because of its size, unorganised structure and its special type of content (short texts, links and photos), locating the potential communities where interests and relationships are well combined, is not trivial.

To answer our research questions, we conducted a literature analysis and a case study of four Twitter accounts that had been set up for marketing two new applications downloadable at Google Play. The case study analysis was based on the experiences of the account owners and additional insights were sought by looking at the available data on tweet performance and follower characteristics.

Our first research question asked what the challenges in using Twitter as a tool for acceleration are. The key challenge is growing the number of followers with reasonable effort and to get such followers that are interested in the promoted app, or at least eager to spread awareness of the app by retweeting. It is impossible to know in advance who will be a useful follower; so many followers need to be accumulated. The intuition is that it is good to have followers that are being followed by many, but in practice, such users often also follow a huge number of accounts, which means that it is hard to get their attention or make them retweet one's tweets. Without retweeting there is no benefit of their huge networks. The experience of the account maintainers confirmed, that only few connections in Twitter are meaningful. Many user accounts have been created for getting attention to their own products or ideas, so they are not that potential as a target group. Getting followers, depends a lot on the topic and how it is presented: the @KittenPrivacy account got much more followers than the @SelfieSec account. Now that Twitter supports posting photos, the posts with photos draw, in many cases, much more attention than text based tweets, which gives an upper hand to topics that can be expressed with interesting photos.

The second challenge is to predict the retweeting behaviour and viral spread of the tweets. Our case study showed that users, who retweet a lot in general, were also more likely than non-retweeting users to retweet the case accounts tweets. The tweeting behaviour was polarised with two main groups: very active tweeters with more than four tweets every day and fairly passive users with less than one tweet every second day. Those users that retweeted our case account tweets were typically not the extremely active users. They were typically publishing not more than one tweet/day and also they had reasonable numbers of followers and following-fewer than 2,000. Unfortunately Twitter does not show directly information of users' retweeting activity or tweeting frequency, making it harder to spot users with favourable characteristics.

As the viral spread of tweets is not guaranteed and based on the experience, it is hard to guess in advance, which tweets will start to spread and the successes were something of a surprise to the account owners as well. To gain followers and make tweets spread, it is necessary to be very active by connecting to new users and generating new tweets. This all takes time and effort, so even though the direct use of Twitter does not cost anything, costs accrue from the work that is needed.

Third challenge is that as the platform is owned and managed by Twitter, who can define and change the rules as they see best. One such rule is the limit of 2,000 following, after which the account cannot start to follow new users unless it has

almost as many followers. The effect of this limit could be seen very well in the data depicting the numbers of followers and following. The opportunity to tweet with photos is another recent change that has taken place in Twitter and has a big impact on user behaviour and what gets noticed.

Our second research question asked, what lessons can be extracted from using Twitter as a tool for acceleration. As Twitter is a very quick-pace and even chaotic environment, the main lesson learnt is to be very active and try different things. Many factors and luck play a role in determining how much attention a tweet will get, so the main thing is to be active. Some guidelines can and should be given to employees based on what generally works well. If several people maintain one account, they must share common understanding of the aims of the account and its behavioural style. Our analysis confirmed the conclusion of Roberts and Candi (2014) that social networking sites are hard to use successfully to get feedback from users. The maintainers of our case accounts did not get any feedback or other input to app development from the followers in Twitter, so other channels are clearly needed. In software products, integrating feedback into the app is a well-functioning approach.

A limitation of this study is that the four analysed Twitter accounts had only been running less than a year and conclusions of their long-term success cannot yet be drawn. Also the direct connection between the Twitter activities and downloads is hard to measure conclusively, as the Twitter internal statistics only capture the direct, immediate impact. Second, we analysed only the numeric aspects of the followers' networks and tweeting activity. By analysing the actual content in the tweets, additional insights could have been gained of the account owners' motivations for their presence in Twitter and how valuable followers they are, either as potential users of the promoted software, or as retweeters sharing tweets further into their networks. The third limitation of this study is that the amount of samples was quite small to draw comprehensive conclusions of user behaviour in Twitter in general.

There are several directions for future research to better understand the user behaviour in Twitter and how to use it more efficiently for the acceleration of marketing apps. A research setting with data collection over a longer period of time from both Twitter and Google play and taking varying actions in Twitter to get attention and followers would give deeper insights of the efficient ways of growing the follower's network and making tweets spread more efficiently.

A larger sample of Twitter accounts and a more detailed analysis of how the follower networks develop over a longer period of time would help to confirm the results of this study. This should entail looking more closely at follower characteristics, such as tweeting frequency and retweeting behaviour and the structures of their networks. Also analysing the tweet contents would help understand the user behaviour and motivations and identify different types of user accounts.

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