

# Facebook and extension of social ties: Implications on group norms and purchasing behavior

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## FACEBOOK AND EXTENSION OF SOCIAL TIES: IMPLICATIONS ON GROUP NORMS AND PURCHASING BEHAVIOR

Online word-of-mouth (WOM) occurs increasingly often on social networking sites, but changes in purchasing behavior caused by the migration of WOM from offline to online is currently unclear. This study examines the effect of social influence on the decision making process in the context of both offline and online environments. Using data from 20, high-school student targeted, events within a period of 5 years with a total of 25 671 purchases the study shows that social influence and group norms affect the decision making process. Further on the results show a correlation between online activities and purchasing behavior as well as a change in the scope of the group that affects decision making due to the popular adaptation of Facebook. Using this correlation a forecasting model is created for the estimation of purchasing behavior based on online activity.

Keywords: Facebook, Social influence, electronic word-of-mouth, internet, social networks

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## INTRODUCTION

Internet and social media have become an integrated part of modern society. In Finland 81 % of all households are connected to the internet (Tilastokeskus 2010). While the internet is organized mainly around content, social networking sites operate around users forming networks (Mislove & al, 2007) and are therefore a popular platform for interaction, and collaboration between friends (Wilson & al, 2009). Social networking sites have rapidly gained in popularity in the past years (Hitwise, 2012). In 2011 89% of Finns between the age of 16 and 24 years were registered on at least one social networking site and 84% of the same population was attending to the social networking site weekly (Tilastokeskus 2011). Not only do social networking sites have an active and large user group, but they also command a large part of all online traffic. A study conducted by Hitwise (2012) showed that in the United States the social networking site *Facebook* alone accounted for one 20% of all page views.

To understand how social networking sites became part of the consumer's decision making process and how they affect that process, one needs to understand the fundamentals behind the process. The consumer decision making processes when buying a product or service is based on cognition and affect (Shiw & Ferorikhin, 1999; Wertenbroch, 2000). The cognitive factors tend to be more dominant in situations where information is readily available and processing resources are high (Shiw & Ferorikhin, 1999). Some information on services is more readily available than others. For example the price of a service is often easy to attain whereas the relative quality between competing products can be harder to perceive (Nelson, 1970). The internet is these days considered to be a major source of such information for customers (Kaplan & al, 2010). Another source of information and influence for customers are the people around them (Evans & al, 1992; Childers & Rao, 1992; Phelps & al, 2004). Many researchers consider Word-of-mouth (WOM) referrals as one of the most important source of information for customers concerning their pending purchases (e.g. Bansal & al, 2000; Richins 1983; Herr & al, 1991). Though traditionally WOM has been defined as oral communication between two parties (Arndt, 1967) the high adaptation of the internet has started a partial migration of WOM from oral conversation to a new arena, the internet. The internet can be defined

as a tool for interpersonal communication (Riegner, 2007) and is therefore well suited to host WOM communication.

The recent increase in popularity of social networking sites has changed the way consumers use the internet (Kaplan & al, 2010). A major part of online time is spent on social networking sites and consumers have started to think of the online world as a social space (Donath & Boyd, 2004). Jansen & al (2009) described these social communication services as a potentially new form of WOM though researchers are not uniform about whether traditional communication theories are appropriate for describing online WOM (Brown & al, 2007). In light of previous research showing that consumers are influenced by opinions posted online (Dellarocas, 2006) and acknowledging the popularity of social networking sites it is a reasonable assumption that a large share of influential online WOM is now dispensed through social networking sites. Results by Duan & al (2008), showing that consumers appear to trust online WOM even when the other party is outside of their immediate social circle, support this claim as well.

Social networks offer a basis for gathering knowledge and content endorsed by other users (Mislove & al, 2007) and social networking sites seem to be the perfect online arena for finding and dispensing of such knowledge. Though social networking sites are operating around users corporate entities have found their place within these networks as well. Relatively little research has been conducted on the consumer behavior on social networking sites and potential implications of said behavior. The little research that has been conducted on consumers within the context of social networking sites has focused on identifying influential users (Trusov & al, 2010) and understanding why these users decide to share content (Ho & Dempsey, 2010) or the validity of social links as an indicator for social interaction (Wilson & al, 2004).

This study aims to develop a framework describing how social influence factors affect consumer's cognitive decision making process. This study focuses in particular on how the popular adaptation of the social networking site Facebook changed consumers' perception of value through changes in social influence. The aim is to answer the following research question: *How does a customer's perception of group consensus affect their behavior?* The study first analyzes offline purchasing behavior and the social influence factors that affect a customer's decision making process. This is followed by an analysis of similar behavior in an online context. Results are

then compared to better understand how these two contexts affect a customer's purchasing behavior. More exactly the study aims to answer the question: *How the adaptation of Facebook changed group norms and affected purchasing behavior?* Further on the study asks *how behavioral data collected on Facebook can be used to predict purchasing behavior.*

Ticket sales of high-school targeted youth events were used as research data. Sales data was collected from 53 high-schools over a period of 4 years with a total of 21 204 purchased tickets. The popular adaptation of Facebook took place roughly in the middle of the chosen time period. This allowed for a before and after comparison of the scale of the group that affects a customer's perception of group consensus in relation to the adaptation of Facebook. In addition data of indicated purchase intentions was collected on Facebook. The correlation between these indications of purchase intentions and realized purchases enabled the creation of a forecasting model to be used for forecasting future purchasing behavior.

Previous research has already shown a strong link between demonstrated intentions and actual purchases (Jamieson & Bass, 1989) as well as the potential effect of social influence (Granovetter, 1973) on a purchasing decision. The main contribution of this study is to research how this paradigm has changed through the popular adaptation of the social networking site Facebook.

The article continues as follows. First the theoretical background is discussed with a focus on online word-of-mouth, social influence and social networking sites. Second, the article addresses the research methodology used and the data collection. Third, the analysis of the data and related results are presented. Finally the article is concluded by discussing managerial implications and presenting an outline for future research.

## THEORY, RESEARCH MODEL AND HYPOTHESES

### ONLINE WORD-OF-MOUTH

Word-of-mouth as a term was first coined in the 50's by Katz & Lazarsfeld (1955, as cited in e.g. Trusov & al, 2009; Godes & Mayzlin, 2004; Cheung & al, 2008) and has been characterized as oral communication regarding a brand, product or service between two persons, the receiver and the communicator (Arndt, 1967). Compared to other advertising media the communicator is to be perceived as non-commercial by the receiver (Brown & Reingen, 1987). Early research showed that positive WOM increased the probability of purchase (Arndt, 1967) and was four times more effective than personal selling and seven times more effective than print advertisement (Katz, 1955).

Researchers generally agree that word-of-mouth communication can be spread online (e.g. Trusov, 2009; Kaplan, 2010; Chevalier, 2006; Brown & al, 2007; Gupta & Harris, 2010). While some researchers use the umbrella term WOM for both offline and online word-of-mouth others prefer terms such as electronic word-of-mouth or eWOM (e.g. Hennig-Thurau & Walsh, 2004; Lee & Lee, 2009), online WOM (e.g. Riegner, 2007) or interactive WOM (e.g. Phelps & al, 2004). For clarity reasons the terms word-of-mouth and WOM are used in this study for traditional oral WOM while electronic word-of-mouth, eWOM and online WOM are used synonymously when describing word-of-mouth occurring on the internet and especially on social networking sites. Set aside the different arena the key difference between traditional WOM and online WOM is the potential scale. Cheung & al (2008) defined electronic word-of-mouth as any positive or negative statement made by an actual, potential or former customer about a service or product to a multitude of people and institutions on the internet. While traditional WOM is most commonly shared to a single person or small group the definition of online WOM incorporates the idea of mass-transmitting the message. Trusov & al (2009) found that WOM referrals had a strong impact on customer acquisition and had a much higher elasticity on the long-term compared to traditional forms of advertisement meaning that customers gained through WOM were more likely to bring in referrals compared to customers gained through other mediums. From a marketers point of view this emphasizes the importance of online WOM as a single customer's reach has increased exponentially. Dellarocas & al (2010) research focused on identifying patterns within online WOM

contributions in the movie industry. Their study found a U-shaped relationship between the likelihood of a user dispensing online WOM and the popularity of the product meaning that users had a preference to contribute on the most popular movies as well as on rather unknown pieces.

In the early days of online word-of-mouth research focus was mainly on Usenet newsgroups bulletin boards (Godes & Mayzlin, 2004). More recent studies have focused on websites dedicated to user feedback (Hennig-Thurau & al, 2004; Steffes & Burgee, 2009; Bailey, 2010) or feedback systems integrated in online stores (Chevalier & Mayzlin, 2006) and the most recent trend has been to look at online WOM through interactions within social networking sites (Trusov, 2010). The field of online word-of-mouth within the context of social networking sites is new and relatively little research on the area has been published at the moment. The rapidly increasing popularity (Hitwise, 2012) of social networking sites makes online WOM in this context an especially interesting topic for research. The less anonymous nature of the social networking site Facebook makes it especially interesting as research has shown that self-presentation varies between different online settings (Zhao & al, 2008).

## SOCIAL INFLUENCE

Social influence as a concept is broader than the term word-of-mouth. While word-of-mouth requires active communication between two parties to transfer the message social influence can occur passively (Godes & al, 2005). Passive social influence occurs when insight or opinions are not expressed directly but observed or perceived. Research by Nancarrow & al (2001) found that style leaders influenced others simply through their behavior without need for active WOM. In a similar fashion group norms influence individual decision making

Onnela & Reed-Tsochas (2009) conducted a study on spontaneous emergence of social influence in online systems. The results showed a threshold, which when crossed induced a highly correlative adoption behavior amongst users. This phenomenon is closely related to the viral effect of news, videos and images on the internet. The key question from a marketer's point of view is how these spontaneous emergences are born. Obviously the content has to be appealing to the potential users spreading the viral message, but similar to products even the best content needs to be launched properly to be able to spread like wildfire.



## SOCIAL NETWORKING SITES

Social networking sites (SNS) provide a private online space for consumers and the tools required for consumers to interact with each other online (Ahn & al, 2007). These sites are typically operated by individual corporations (Mislove & al, 2007). The rise of social networking sites in the recent years has awakened the interest of many researchers (Lewis & al; 2008) but even with the amount of research in the area constantly growing there is currently no consensus or model generally accepted by researchers describing the structure or behavioral patterns of users within social networks. Mislove & al (2007) have contributed to the field by identifying the structure of social networking sites confirming the power-law and scale free properties within social networking sites. Scale-free networks are a class of power-law networks. Power-laws describe skewed distributions (Faloutsos & al, 1999) and can be used to estimate node connections (Li & al, 2005). Mislove & al's (2007) approach using scale-free metrics suggests that there exists a tightly-connected core of users that are connected to each other. Trusov & al (2009) researched the effects of WOM within social networks and later on continued with the aim of being able to identify influential users, the high-degree nodes, on social networking sites (2010) using a regression model. Though it would be unarguably of high value to be able to determine the most influential users the reliability of the model is questionable as the amount of activity was the only variable used in ranking the influence of users. A study conducted by Cha & al (2010) identified three measures of influence on the social networking site Twitter: indegree, retweets and mentions. The results of their paper are not aligned with the model presented by Trusov & al (2010) as popular users with a high degree of nodes are according to the study not necessarily influential in terms of retweets and mentions. Research on word-of-mouth has shown that the reliability of the messages is one of the core variables attributing to the influence of WOM messages (Buttle, 1998). Users within social networks have been known to collect connections as a symbol of status (Donath & Boyd, 2004) and research by Wilson & al (2009) showed that users often don't have any interaction at all with up to 50 % of their Facebook friends. Therefore the approach to value quantity over quality when identifying influence would require more research to be validated.

## RESEARCH MODEL AND HYPOTHESES

Social influence has been actively researched since the 1970's (Granovetter, 1973) and WOM since the early 1950s. WOM can be considered to be a component and part of social influence theories. As WOM was expanded to include online WOM, the research focused mainly on actively dispensed WOM (e.g. Kaplan, 2010; Hennig-Thurau & Walsh, 2004, Riegner, 2007). Little effort has been put into researching the passive social influence that is experienced in an online environment. In this article passive social influence is defined as interpersonal influence that occurs without the active sharing of opinions but through observations and perception. An example of this passive influence is when a user observes the behavior of other through social networking sites.

While previous research on behavior within social networks has either focused on identifying single influential users (Trusov & al, 2010) and the effect of their activity within social networking sites (Jansen & al, 2009), there have been very few studies examining collective group behavior within social networking sites. Dholakia & al (2004) created a basic framework for the evaluation of social influence within small virtual communities. In this research the model was simplified, focusing only on the key variables used for measuring the social influence of group norms to the participation behavior of the analyzed population. The original model was created based on interaction research using user based variable as antecedents and group variables as factors affecting the outcome. The antecedents for the model were based on offline behavior and studies have shown that the personal motivations behind online and offline behavior are similar (McKenna & Bargh, 1999).

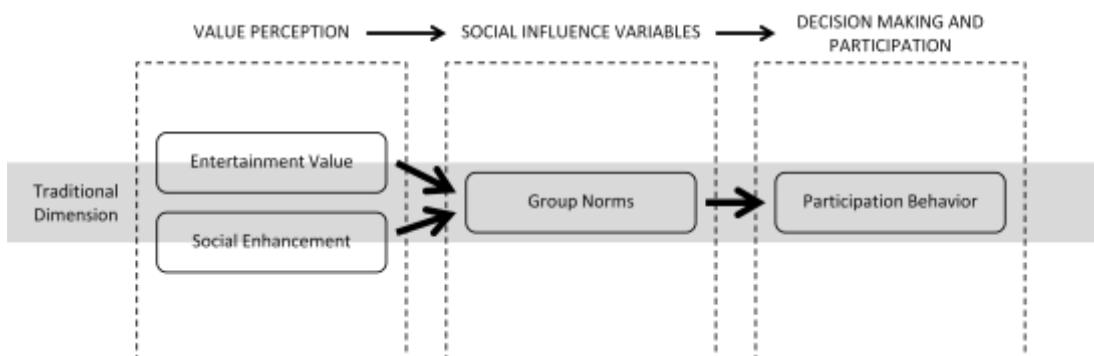


Figure 1. Simplified social influence model based on Dholakia & al (2004).

The model created by Dholakia & al (2004) was used as a basis for the framework presented in this study. Further on an additional dimension was added to the model to illustrate the impact of the adaptation on Facebook on the process from value perception through social influence to decision making.

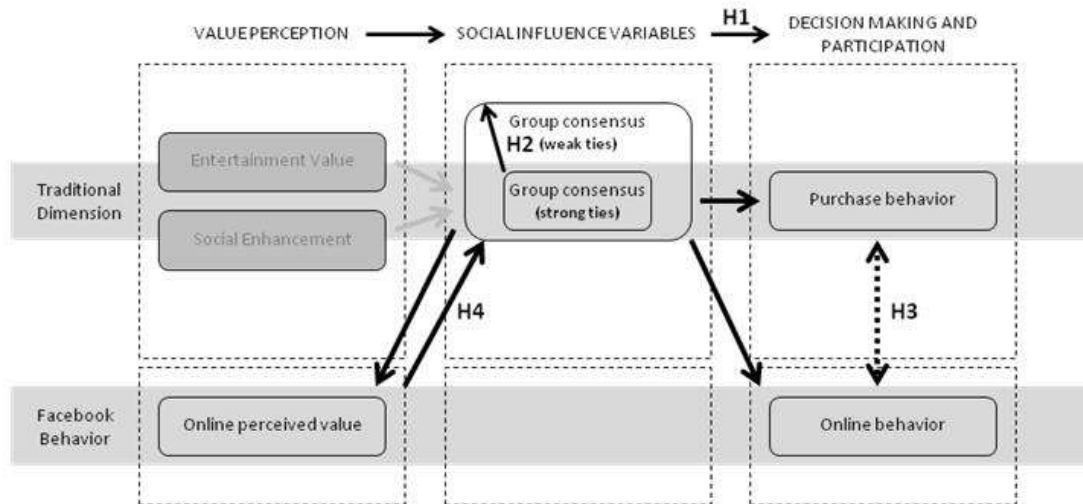


Figure 2. Framework for social influence when perceived value is affected by social networking sites

Dholakia & al (2004) showed that social enhancement is a key variable in the decision making process of a consumer. Not only do explicitly expressed attitudes of group members affect individual decision making (Christian & al, 2012) but findings by Christian & al (2012) suggest that a consumer’s understanding of a group’s social intention affects the consumer’s individual decision making as well. This is supported by findings of Bagozzi & Lee (2002) that showed group norms as an influencer of subjective norms. Louis & al (2007) came to a similar conclusion that group norms can be used to predict a individuals intentions. Based on these findings it is anticipated that:

*H1: Social influence and group norms impact decision making process*

This study’s key contribution is researching the effects that the adaptation of Facebook had on consumer behavior, in this case the purchasing decision. Research has shown that the mere knowledge of other peoples preferences can affect decision making (Robins al, 2001). Further on the people affection decision making don’t even have to be in the consumer’s immediate social network (Duana & al, 2008). Face-to-face interaction occurs mainly between a consumer and his strong ties.

Facebook friends represent, at a minimum level, a dyadic relationship (Lewis & al, 2008; Mayer & Puller, 2007) and therefore include a greater number of weak ties. Donath & Boyd (2004) hypothesized that the use of social networking sites could substantially increase the amount of weak ties one could form and maintain. As a result of this the exposure of consumers to interaction with their weak ties outside their immediate social network has increased and it is therefore expected that:

*H2: The adaptation of Facebook changed the scale of the group that affects purchasing behavior*

An early study by Jamieson & Bass (1989) was one of the first to show a clear correlation between the stated intentions and trial purchases of new products. Though the correlation between purchasing intentions identified in survey studies as well as questionnaires and actual purchasing behavior has been researched, very little focus has been given to purchasing implications made within social networking sites. Dellarocas & al (2007) studied the relation between online product reviews and product sales proving a strong correlation. This study tests whether or not a similar correlation exists between the behavior on social networking sites and real-life purchasing behavior and therefore the following is proposed:

*H3: Purchasing implications stated on Facebook correlate with actual purchasing behavior*

Research has shown that online WOM is dispensed and received on product review websites (Bailey, 2010). While Facebook is mainly used for sharing information (Bailey, 2001) and relatively few users use it to actively search for product reviews the mere interaction with other users can cause the rise of group norms (Postmes & al, 2000). Further on research has shown that Facebook users claim their identities rather implicitly than explicitly and stress group identities over individual ones (Zhao & al, 2008) likely due to the non-anonymous environment of Facebook. Based on previous research and literature following is expected:

*H4: The perceived group consensus on Facebook affects perceived value of product*

In the context of events this means that when a user uses Facebook to share his or her intention of attending an event the key purpose is to share ones preferences and likings. If the hypothesis proves right it shows that other users use the collective

information of other users participating or not participating in an event on Facebook to form an idea of the group consensus regarding actual participation of the event in the real world.

## RESEARCH METHODOLOGY

### SELECTION OF EMPIRICAL SETTING

The study looks at the research question in the event management industry's context. The event industry was chosen for several reasons. Previous research indicates that major part of the perceived value of nightclub events consists of the ability to socialize with friends and people alike (Skinner & al, 2005). As cognitive knowledge of key attributes is likely to affect a consumer decision making (Wertenbroch, 2000) and information on the participation of people with similar interests can be considered as cognitive knowledge (Reingle & al, 2007) events are a suitable area for research of the impact of social influence. Furthermore Facebook has an integrated event-platform allowing its users to create events within the networking site and tell their friends about their plans by attending, maybe attending or not attending a certain event. This feature has provided an opportunity to observe user behavior online. Combined with access to detailed event sales data through a period of 5 years this presents an opportunity to research the impact in customer purchasing behavior that the adoption of Facebook caused while eliminating the method bias (Podsakoff & al, 2003) that would be likely in a study based on questionnaires or interviews.

### DATA COLLECTION AND VALIDITY

Data of event participation was collected from archives and databases of an event management firm. Data included detailed sales reports of the firm's and its competitor's. Data of behavior on Facebook was collected manually from the related event pages on Facebook. The target segment chosen for this study was high school students in their graduating year in the cities of Helsinki, Espoo and Vantaa (Finland). The collected data includes all events that were specifically targeted at this segment and were of larger scale with a minimum size of 300 students participating. For each event that was observed for this study the following data was collected: The amount of pre tickets sold, the sales point of these ticket sales, the total amount of tickets sold and the purchasing implication stated by users on Facebook (attending, maybe attending, not attending).

All data used in this article is based on recorded actions of users and realized sales. Though it is possible that certain purchasing intentions stated online have occurred by accident or a user might have later on changed his or her mind the data is still valid and reliable for calculating correlations between the stated implications and related purchasing behavior. Further on it should be acknowledged that the data does not include specific information whether or not the users stating implications of attending or not attending an event on Facebook are the same users later on conducting the purchase of a ticket.

#### MEASURES AND METHODOLOGY

To measure social influence the sales data was segmented according to each high school. The assumption being that the daily interaction and a relatively small class sizes (average 126) the students can be considered each other's strong ties. The relative sales against segment size were then analyzed to see if group norms appeared and students within each segment influenced each other's decision making process concerning the ticket purchases.

In this article the popular adaptation of Facebook within the studied population is assumed to have occurred in between late 2009 and early 2010. In the dataset used less than 10 % of the studied population was reached through events published on Facebook in May 2009 while the same number in May 2010 was over 90%. For the purpose of this study the popular adaptation of Facebook amongst the studied population is assumed to have occurred within this period of time. Further potential errors caused by the incorrect estimation of the exact moment are eliminated by ignoring events during this phase of time when comparing changes in behavioral patterns before and after the popular adaptation of Facebook. Sales data of events prior to the adaptation of Facebook and after were compared to see if behavioral patterns had changed. Behavior within each high school was compared to the collective behavior of the whole studied population the assumption being that the adaptation of Facebook enabled students to be influenced by a larger group than before.

Facebook enables users and corporate entities to create events. These events can be solely online events or related to offline events. In this case the studied event management firm studied created Facebook events related to upcoming offline events. These Facebook events of analyzed events clearly stated that participation

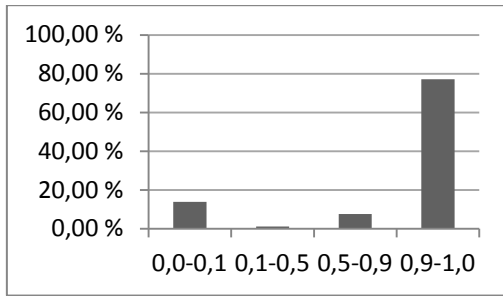
required the purchase of a ticket. Therefore the action of attending an event by users is considered a stated implication of purchase in this study. These stated purchasing intentions are public and visible to everyone on Facebook who views the related Facebook event. In this study the perceived group consensus as observed by a user on Facebook refers to assessment of an event that the user makes based on the purchasing intentions displayed by other users. These stated purchasing intentions were compared to test the correlation between these two behaviors.

## ANALYSIS AND RESULTS

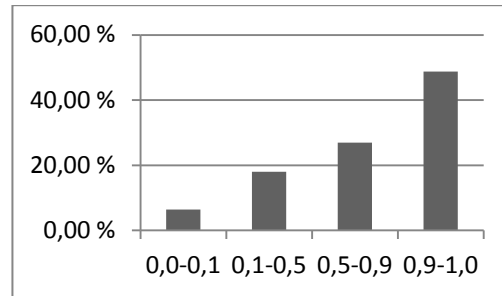
### RESEARCH DATA

The collected sales data was split into 53 segments based on the high school the sales occurred at. Sales ( $R-s$ ) within segments were then compared to the allocated capacity ( $Q$ ) for each segment to get a relative sales ratio. The allocated capacities were calculated using the total population of each segment ( $P$ ). This was done to reduce errors caused by different population sizes of segments and the varying capacities of different venues. These ratios were calculated for all available segments and compared to corresponding numbers from comparable events from previous years. In this analysis these different years are referred to as different instances ( $i$ ) of a comparable event ( $e$ ). To reliably compare different instances not only do the studied events have to be similar in terms of timing, concept, price, target audience and marketing efforts applied but also the competing events within close proximity have to be reasonably comparable. In the available data only eight events met these criteria and qualified for a longitudinal data analysis over four years.

To evaluate performance the relative ticket sales ( $\frac{R-s}{Q}$ ) of each segment were split into two categories based on the sales ratio – sales below 0,5 and sales above 0,5. Within these two categories two extremes, sold out and sold none, were further on separated to their own categories. To account for outliers it was decided to extend the ranges of these extremes to 0,0-0,1 and 0,9-1,0 respectively.



Graph 1.  $e\{1-2\}, i\{1-2\}$



Graph 2.  $e\{1-2\}, i\{3-4\}$

All eight qualified events with a total of 5917 sold tickets were categorized by the relative ticket sales into the previously mentioned four categories. The graphs (1-2) show the distribution amongst these categories. Instances 1 and 2 occurred after the popular adaptation of Facebook and instances 3 and 4 prior to it. The graphs show a change in the distribution pattern of the relative sales ratios. This suggests a change in the way purchasing decisions are made within the population.

In addition to categorizing sales within segments according to the relative sales ratio and analyzing the changes in distribution patterns the data was processed through a standard deviation model depicted below to examine variations within segments.

$$\sigma_x = \sqrt{\frac{\sum \left( \frac{R-s}{Q} - \frac{\sum R-s}{Qn} \right)^2}{n-1}}$$

Function 1. standard deviation model on data range  $e_1, i\{1-4\}$

The data output from the standard deviation model showed a clear change in the variation of sales within segments ( $e_1 i_1 = 1.02E-5$ ;  $e_1 i_2 = 0,021$ ;  $e_1 i_3 = 0,042$ ,  $e_1 i_4 = 0,066$ ). Looking at the behavior within segments in the data output from events prior to the adaptation of Facebook ( $e_1 i_3, e_1 i_4$ ) the higher variation suggests that customers within different segments behave differently. More curiously the same segment was observed behaving differently in different instances and events. Further on the variation between segments drops drastically after the popular adaptation of Facebook.

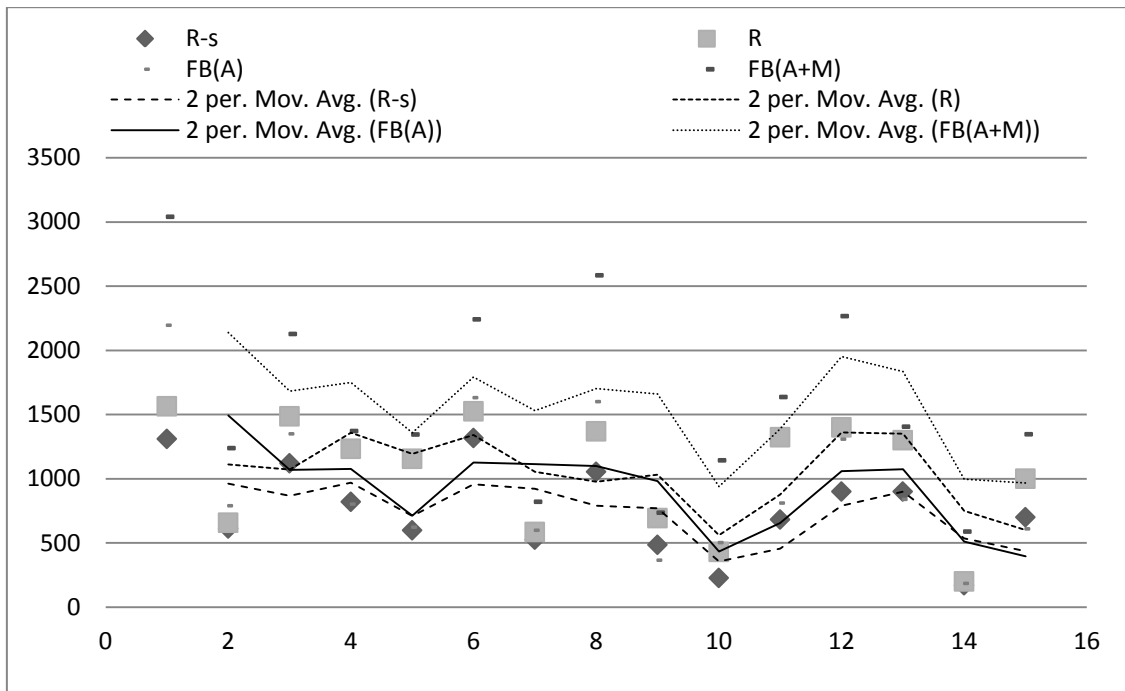


e	i	n	!=0	Avg. R-s	Avg. (R-s) / P	$\sigma_x$	Var ( $\sigma_x^2$ )
1	1	53	27	0,99938	0,36956	0,003207501	1,02881E-05
1	2	53	22	0,94802	0,44442	0,14747657	0,021749339
1	3	53	23	0,86558	0,25312	0,205655433	0,042294157
1	4	53	27	0,80043	0,39764	0,257440507	0,066275615

Table 1. Data output on model (see function 1), data range=  $e_1, i\{1 - 4\}$

Both, the change in relative sales distribution of segments as well as the high variance between segments are in alignment with *H1*. Though these results support the concept that group norms and social influence impact the purchasing behavior other reasons can't be ruled out.

The large drop in variation after the popular adaptation of Facebook suggests a change in the decision making process. This study argues that the change of variation is caused by the extended knowledge of other consumers' opinion of events. Facebook facilitated the sharing of purchasing intentions with a large audience and provided consumers with the knowledge of how their weak ties intentions. It is widely acknowledged that consumers use information found online to help their decision making process (e.g. Trusov, 2009; Brown & al, 2007; Hennig-Thurau & al, 2004) and therefore this study argues that the change in variation found in the longitudinal analysis performed supports *H2*. Though previous research had shown that Facebook is primarily used to interact with existing offline relationships (Ellison & al, 2007) the data suggests that the perceived public opinion, even of those users not previously familiar to a user, can act as social proof enforcing the belief of group consensus. This is in alignment with findings of Robins & al (2001) and Duan & al (2008) proving that the mere knowledge of other people's opinions can affect perceived value.



Graph 6. Correlation of R/R-s and FB(A) as well as FB(A+M), s=same day sales

The above graph 6 illustrates the correlation between realized ticket purchases ( $R$ ) and ticket sales excluding same day sales ( $R-s$ ), where  $s$ =same day sales, and intentions of ticket purchases as indicated by users on Facebook.  $FB(A)$  shows users that indicated they are *Attending* on Facebook while  $FB(M+A)$  depicts users who indicated they are either *Attending* or *Maybe attending* on Facebook.  $R-s$  is used to illustrate pre-purchases excluding same day spontaneous purchases occurring at the last moment. Results show a clear correlation between purchasing intentions indicated on Facebook and the actually purchasing behavior (correlation coefficient,  $FB(A)$ ,  $R-s$ : 0,9166), supporting  $H3$ . Further on the strong correlation enables the forecasting of actual purchasing behavior using intentions recorded from Facebook. To achieve even more accurate results indirect indications on purchasing intentions on Facebook,  $FB(M)$ , were included in the forecasting model. The factor  $\gamma$   $\{0 < \gamma < 1\}$  is used to account for the partial nature of these indications. The factor varies within context and was chosen using linear optimization methods to provide the highest possible correlation for the chosen dataset. Using the data the following forecasting model was created.

$$\frac{FS}{TC} = \frac{FB(A) + \gamma FB(M)}{TC} \{FS < TC\}$$

*Function 2. Forecasted sales (FS) per capacity based on scaled FB-measures.*

The  $\gamma$  –adjusted model provided an even higher correlation between  $R$ -s and  $FB(A) + \gamma FB(M)$ , correlation coefficient 0,9399. This correlation is based on the forecasting model and relying on the context-based factor  $\gamma$  and can therefore not be generalized on all results and is merely intended to show that even higher levels of accuracy can be achieved using a more sophisticated model. A partial explanation for the increased correlation comes from the restraint of  $\{FS < TC\}$  affecting 26,7 % of the measured instances. Therefore it should be acknowledged that the forecasting model is context based and the accuracy will likely decrease when sales capacity is not capped by the limited offering or capacity.

Though it is unlikely that Facebook users actively calculate ratios such as  $FS/TC$  to help their decision making the data indicates that on some, possibly unconscious, level users evaluate the value of events based on the participation behavior of other users. When comparing two ratios, the forecasted sales per capacity ( $FS/TC$ ) and the total realized sales per capacity ( $R/TC$ ) a clear discrepancy is found. With high  $FS/TC$  ratios ( $>0,7$ ) the  $FS/TC$  and  $R/TC$  ratios are relatively close to each other (average difference of 8,8 percentage points). In comparison when the  $FS/TC$  ratio is below 0,7 the average difference between the  $FS/TC$  and  $R/TC$  ratios increases to 30,2 percentage points. These results support *H4* suggesting that the group consensus on Facebook does in fact have an effect on a consumer’s valuation of an event or product. Further on the findings suggest that a user might re-evaluate prior decisions once a group consensus is clearer. This discrepancy is in alignment with *H3* and further on shows support for *H1* implying that potential customers use the information they gather on Facebook to form a basic idea of the group consensus whether or not an event is popular and worth participating.

## DISCUSSION

This study contributes to the research on online word-of-mouth and social networking sites by offering insight into the factors that affect a customer's purchasing behavior within the context of social networking sites. The longitudinal analysis performed shows a change in purchasing behavior before and after the popular adaptation of Facebook. These results suggest that while prior to Facebook consumers were mainly predisposed to the intentions of their strong ties (Steffes & Burgee, 2009) Facebook exposed consumers to the intentions of their weak ties as well. This change in the extent of ties a consumer is predisposed to seems to affect the purchasing decision making process of consumers.

Further this article explored the correlation between purchasing intentions stated online and actual purchasing behavior. The results support the underlying hypotheses showing that just like online reviews affect purchasing behavior (Dellarocas, 2007) purchasing intentions expressed on social networking sites correlate with actual purchases. This finding confirms that the theory first presented by Jamieson & Bass (1989) applies also in a social networking sites context.

Findings also show that the wide adaptation of Facebook and other social networking sites has changed the range of weak-ties and therefore changed the scale of a group that effectively affects the decision making of consumers. Further on the results show that a perceived group consensus on Facebook affects positively the value of an event. This finding has similarities with the findings of Lee & al (2012) that showed that online WOM lowers the threshold for others to contribute WOM.

Previous research (Trusov & al, 2010) has focused on identifying influential users on social networking sites. The findings of this article suggest that users value the opinions of other regular users with no high influential status as long as there are enough of them. Popular WEB 2.0 sites such as blogs with large reader bases revolve around the author and therefore make the author more influential than the average user. Social networking sites such as Facebook on the other hand have empowered the average user to have an opinion as well and share it with a large group of users. Similar to a study by Postmes & al (2000) showing that online interaction can create group norms the results of this study suggest that these individual interactions and

opinions of regular users have a high impact on purchasing behavior of consumers as long as the group of users behind the opinion is large enough.

Just as the study by Dellarocas & al (2010) showed that users were more likely to provide online WOM for niche or hit products this article showed that consumers value the opinion of other users higher when the opinion is shared by a large enough group of other users.

An interesting notion is that 71.8 % of realized pre-date purchases were conducted as offline transactions. Previous research has looked into the correlation of online purchase intentions and online purchases (San Martín, H. & Herrero, 2012) and the impact of eWOM on purchasing intentions (Lee & Lee, 2009), but research on the correlation between indications of purchases on social networking sites and related actual purchases in an offline environment has not been published before. While the traditional notion for online advertising has been to only promote products that a consumer can instantly buy online the results suggest that engaging users in an online environment can be used not only to support offline sales but to even predict future offline sales.

## MANAGERIAL IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

As previous research has shown firms often fail to fully engage their customers (Culnan & al, 2010). Further on creating a successful presence in social media and on social networking sites can be extremely difficult (Kaplan & al, 2010). The results of this study show that a customer's perception of a Facebook event depends on how other customer's have reacted to the event. This results in a situation where a high participation rate results in more participation and vice versa low participation doesn't encourage new users to participate either. Understanding that popularity within Facebook events and communities works similar to an avalanche highlights the importance of the beginning of a Facebook campaign.

The results suggest that at the very beginning when a Facebook event is established users make their decisions on participating based on their own judgment as very little information on decisions made by other users is available at this stage. The results hint that a user might later on change his or her opinion of a Facebook event if a critical mass of other users doesn't attend themselves. This means that the likelihood

of users acting on their Facebook stated purchasing intentions decreases dramatically if the relative amount of other users displaying similar intentions is low.

The findings are in alignment with previous research suggesting that there is a tipping point in social influence (Onnela & Reed-Tsochas, 2009). This knowledge encourages management to create a clear strategy for kick starting their Facebook and viral campaigns on other similar social networking sites. Encouragements such as competitions, prizes and rewards can help early users overcome the higher threshold for participation. These encouragements can be one tool to help build the initial base of users required to start a viral avalanche. When calculating the cost per early user one therefore needs to remember that the return on these early customers can be exponentially higher than the value of the user itself because of the influence effect. The importance of the initial user base is in alignment with a previous study showing that early online WOM acts as a catalyst for more online WOM (Lee & al, 2012). An interesting topic for future research would be researching this tipping point more exactly.

This paper has contributed some interesting findings to the field of online WOM and social networking sites but is not without limitations. Due to limitations of the data it can't be proven that the users showing purchasing intentions on Facebook are the very same consumers that later on actually go on to purchase the product. Results merely indicate a very strong correlation between these two. Future research could close this gap by following each individual and showing that it is in fact the same individuals that show purchasing intentions on Facebook that make the actual purchases later on.

Second the study analyzes a very limited target segment of young adults with a similar educational background. Results are therefore not necessarily directly transferable to other populations.

Further on the forecasting model created in this study highly relies on the scale-factor ( $\gamma$ ). This factor is context-related and will likely vary from firm to firm within the same industry and target audience and even more so among different industries. Therefore the forecasting models scale-factor needs to be properly calibrated before it can be expected to provide accurate results for a digital marketing campaign.

Future research could test the validity of the presented forecasting model in different industries and amongst different target segments.

The dataset used in the study contained information on the progress of stated indications of purchasing intentions from the moment the event was published on Facebook right till the event occurred. Future research could focus on the timing of these stated purchasing intentions. Preliminary results of this article hint that the slope of the accrual of these stated intentions within the first hours and days after being published on Facebook could be used to predict with relative accuracy the popularity of the product. While the forecasting model presented in the current article allows the prediction of purchasing behavior right before the event this would enable the forecasting of the purchasing behavior at a very early point in time similar to the predictions Szabo & Huberman's (2010) model is able to predict the lifetime popularity of certain user created content submissions even within the first hours after being published.

## CONCLUSIONS

The findings of this paper provide insight to the effects that the popular adaptation of the social networking site Facebook has had on the consumer decision making process. The study focused on understanding the impact of online group consensus and peer pressure on purchasing behavior. Proving the correlation between consumers past behavior on Facebook and the related purchasing behavior provided the opportunity to use this correlation to create a forecasting model. The behavior on Facebook occurred in the event industry mainly prior to the purchasing behavior. This discrepancy in time in combination with the knowledge of the correlation enables one to forecast the purchasing behavior with a high accuracy. Despite its limitations this model can be used as a starting point for the assessment of viral marketing campaigns. Further on the model can be used to estimate the total demand in situations where actual sales were limited due to lack of supply or other artificial restraints.

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