

# SOCIAL ENGAGEMENT AND CUSTOMER PROFITABILITY IN ONLINE CUSTOMER NETWORKS

*Research*

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## Abstract

*The rapid growth of the Internet has led to a revolution in the relationship between customers and companies. After the first experiences on social media platforms, companies started hosting their own online customer networks where formerly passive consuming customers are able to connect, share, and cooperate with each other and the company. This social engagement of customers is generally considered as an incredible value for the hosting company. However, while previous research regularly takes a positive relationship between users' social engagement and customer profitability in online customer networks for granted, there is still a lack of research rigorously analyzing this aspect in detail. Against this background, the aim of our paper is to provide an in-depth investigation of the relationship between users' social engagement and customer profitability in online customer networks using a unique dataset of a German direct banking institution. This leads to interesting results that do not support either existing statements in literature or best current practices. Indeed, in our case we do not generally observe significant higher social engagement for "buyers" compared with "non-buyers".*

*Keywords: Online Customer Network, Social Engagement, Customer Profitability, Social Network Analysis.*

## 1 Introduction

Within less than 20 years the world became a digital networked community, from 1% of the world population with access to the Internet in 1995 up to 40% in 2014 (Internet Live Stats, 2015). A large share of the people worldwide use online social networks for socialising, entertainment, information, and business (Ipsos, 2013; National Opinion Research Center et al., 2015). The rapid shift from analogue to digital society has major impact on the relationship between customers and companies, resulting amongst others, in the companies' increasing engagement in social media (Rishika et al., 2013). Growing interaction and networking of customers in the digital world have also fostered a rapid development towards firm-sponsored online customer networks (Belk and Tumbat, 2005; Algesheimer et al., 2010). An online customer network represents an online community of customers, whose members share similar social and commercial interests and are therefore likely to exhibit similar characteristics in terms of cognitive, emotional, or material resources (McAlexander et al., 2002). According to Manchanda et al. (2015), up to 50% of the top 100 global companies like *Disney*, *Procter & Gamble*,

or *Amazon* host their own online customer network. The *SAP Community Network*<sup>1</sup> where customers can maintain a personal profile, establish friendship ties, and interact and exchange with other customers via discussion groups or direct messages may serve as a popular example. Online customer networks are generally seen to create substantial value for all parties involved: for example information retrieval for participating customers, knowledge collaboration between customers, and customer retention for sponsoring companies (cf. e.g., Faraj et al., 2011; Wirtz et al., 2013). Therefore, it is not surprising that companies have a strong interest in establishing and developing online customer networks in order to take advantage of these benefits (Agarwal et al., 2008; Baldus et al., 2015).

Previous research already started to investigate the economic effects of online customer networks (cf. Algesheimer et al., 2010; Zhu et al., 2012; Manchanda et al., 2015). However, to this date, little is known in depth about the relationship between customers' social engagement and customer profitability in online customer networks. Indeed, so far it is not clear whether firm-sponsored online customer networks are economically beneficial and if so, what kind of members of these networks are particularly valuable for the company (cf. e.g., Goodwin, 2014). Against this background, the aim of our paper is to provide an in-depth investigation of the relationship between customers' social engagement and customer profitability in online customer networks using a dataset of a German direct banking institution's online customer network. The dataset contains unique information regarding the customers' social engagement and their financial data. Based on Social Network Analysis (cf. e.g., Scott, 2013), we derive interesting findings that do not support either existing statements in literature or best current practices. Indeed, we observe that "*buyers*" are not generally characterized by significant higher social engagement in the online customer network compared with "*non-buyers*".

The remainder of this paper is organized as follows: In Section 2, we briefly review the theoretical foundations and the related literature. In Section 3, we describe the research methodology and the dataset of the German direct banking institution which serves as a basis for our work. In Section 4, we present our findings derived based on Social Network Analysis. In Section 5, we discuss implications for theory and practice, critically reflect on limitations, and provide directions for further research. Finally, we conclude with a brief summary of our results.

## 2 Theoretical Background

### 2.1 Social engagement in online customer networks

The impact of social media on the customer-firm relationship has led to an increasing importance of online customer networks (Manchanda et al., 2015). An online customer network is a specialised, non-geographically bound platform for users who share the same interests in a company's products and services and who want to interact with each other and with the company (Muniz and O'Guinn, 2001; McAlexander et al., 2002; Porter, 2004). With firm-sponsored online customer networks (Kannan et al., 2000; Porter and Donthu, 2008), firms aim to strive economic benefits (Balasubramanian and Mahajan, 2001). Actually, it is assumed that firm-sponsored online customer networks will become increasingly important for companies (cf. e.g., Lee, 2014; Goodwin, 2014). According to Wirtz et al. (2013), customers have an intrinsic motivation to participate actively in online customer networks. This motivation is due to the reputation associated with the company (e.g., Algesheimer et al., 2005; Hughes and Ahearne, 2010), social benefits, such as support from other members (e.g., Muniz and O'Guinn, 2001; Mathwick et al., 2008; Dholakia et al., 2009), and mere functional drivers like the reduction of uncertainty (e.g., Weiss et al., 2008; Adjei et al., 2010), a better information quality (e.g., Muniz and O'Guinn, 2001; Porter and Donthu, 2008), or monetary incentives (e.g., Garnefeld et al.,

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<sup>1</sup> <http://scn.sap.com>

2012). In general, online customer networks help customers to interact with likeminded who share the same interest and passion in a specific brand, service, or product (McAlexander et al., 2002).

Research on social engagement of customers is a fairly young field of science (van Doorn et al., 2010) and grew in parallel with the increasing emergence of online customer networks (cf. e.g., Libai, 2011; Sashi, 2012). Nonetheless, social engagement of customers is regarded as a key element of online customer networks (e.g., Brodie et al., 2013). According to Coulter et al. (2012), it includes, but is not limited to, discussions, relationship building, commenting, knowledge acquisition, and opinion forming, hence the sum of all human communication and interaction through online customer networks and other social media (van Doorn et al., 2010). Among the basic aspects of social engagement are the level of customer participation and interaction within the network (cf. e.g., Algesheimer et al., 2005; Bagozzi and Dholakia, 2006; Casaló et al., 2010), the quality of relationships as expressed by satisfaction and personal gain (cf. e.g., Adjei et al., 2010; Casaló et al., 2010), the degree of identification with the online customer network (cf. e.g., Algesheimer et al., 2010; Casaló et al., 2010), and the quality of communication (cf. Adjei et al., 2010). In literature, another differentiation of social engagement is between the dimensions valence, i.e. if customers' social engagement has positive or negative consequences for the company (e.g., Brady et al., 2006), modality and form of the expressed social engagement, the temporal and geographic scope of social engagement, the potential impact, and the customers' plans and goals (van Doorn et al., 2010). Therefore, social engagement is regarded as the company's possibility to establish enduring and emotional relationships towards their customers (cf. e.g., Sashi, 2012). Brodie et al. (2011) further differentiate between affective, cognitive, and behavioural engagement. Affective engagement covers the emotions experienced in an online customer network. Cognitive engagement describes the level of attention and absorption focused on an online customer network. Behavioural engagement, mainly occurring in discussion groups, includes to share experiences, ideas, and other content (cf. Vivek et al., 2014), to learn from other network participants (cf. Dholakia et al., 2004; Zaglia, 2013), and to recommend products, services, or network content to other users (e.g., Schau et al., 2009). In summary, in an online customer network social engagement of customers can strengthen the bond between customers and company and increase customer loyalty towards the company (cf. e.g., McAlexander et al., 2002; Kumar et al., 2010; Dessart et al., 2015).

## 2.2 Social engagement and customer profitability in online customer networks

A dedicated social engagement of customers in a company's online customer network is widely seen as strategically important in order to establish a competitive advantage and as a foundation for future business success (Brodie et al., 2013). Companies furthermore expect a stronger bond and an increase in customer loyalty (cf. e.g., Hagel and Armstrong, 1997; Bagozzi and Dholakia, 2006; Fournier and Lee, 2009). This, in turn, enhances the ability to understand customers (cf. e.g., Williams and Cothrel, 2000), increases the esteem of the existing portfolio (cf. e.g., McAlexander et al., 2002), and improves the adoption rate for new products and services (cf. e.g., McAlexander et al., 2002; Thompson and Sinha, 2008). Regarding these benefits, it seems likely that social engagement in online customer networks is a primary driver of growth in sales and profitability (Voyles, 2007).

As social engagement may impact customer profitability, recent studies have started to examine different aspects regarding the link between social engagement in online customer networks and financial benefits. Among the first studies are Algesheimer et al. (2005), who built up a conceptual model regarding the influence on customers' intentions and behaviours in the context of an online customer network of a European car club. Their survey revealed a link between network membership and increased purchase intentions among customers. Although there was no direct link between social engagement and customer profitability, the research was the basis for a subsequent field study conducted by Algesheimer et al. (2010). This study examine the online customer network of *eBay* Germany, regarding the impact of customers' network participation on their buying and selling behaviour. Even though there was neither an in-depth analysis of the network participation nor of customer characteris-

tics, the study revealed effects of the online customer network on the bidding and selling behaviour of *eBay*'s customers. Because these effects were both positive and negative for the sponsoring internet auctioneer, Zhu et al. (2012) complemented the existing research on *eBay* with information of the lending platform *Prosper.com* to focus on customers' risk-seeking tendencies regarding their financial decisions. The study concluded that both active online customer network participation as well as establishing strong friendship ties within the network increase the willingness to take financial risks.

In order to better understand the impact of social engagement on customers purchase intentions, researchers focused on customers participating on a company's online social network platform (Kim and Ko, 2012; Goh et al., 2013). The results of the survey among luxury brand customers by Kim and Ko (2012) indicate a positive influence of social media activities on customers purchase intentions and therefore increasing future profits for the company. Goh et al. (2013) focused on the impact of social media content, both from customers and marketers, on customers' purchase expenditures. Therefore, the authors manually matched content data from an Asian retailer's *Facebook* fan page with consumer transaction data and came to the conclusion that social media content affects consumer purchase behaviour and leads to an increase in purchase expenditures. Rather than focusing on the content, Rishika et al. (2013) examined the effect of customers' level of participation on a wine retailer's social media fan page to investigate the impact on the customer lifetime value. The authors' main findings refer to an increase in customer profitability after the launch of a social media fan page for a treatment group as well as the fact that customers with high social media participation are more profitable than customers that do not participate strongly. Although the economic impact of social media participation of customers is examined, the study limits its definition of social engagement to the visit frequency of the company's social media sites and the observed economic effects are only seen from the perspective of an entire group of customers. Neither the social engagement of customers, nor the respective individual value proposition is examined in detail.

Recently, Manchanda et al. (2015) conducted a first comprehensive study with a long term examination of the economic effects of online customer network membership and participation. They analysed the impact of a newly launched online customer network on its members' purchase behaviour. Customer data was compared before and after the launch of the online customer network and tested in comparison with a non-participating control group. Manchanda et al. (2015) found a significant increase in customer expenditures attributable to customers joining the company's online customer network. The study based on data from a multi-channel entertainment and informational media retailer also reveals that both quantity and quality of interaction between customers of an online customer network have a positive economic impact for the operating company.

### 2.3 Research gap and theoretical contribution

Meanwhile, there is a well-established research stream on online customer networks. However, to this date, there is still a lack of knowledge with respect to a deep understanding of the relationship between users' social engagement in these networks and customer profitability. Indeed, only quite a few studies started to examine the financial implications of customers' participation in online customer networks. Some of these studies, due to reasons of data availability, lack a direct linkage of customers' social engagement data and corresponding financial data. Hence, the findings are either based on indirect deduction of potential online customer network influence on customer profitability by investigating customer intentions and behaviours (Algesheimer et al., 2005), survey based estimations of customer lifetime values (Kim and Ko, 2012), or complex (indirect) linking of data from general social media fan page visitors and financial data (Goh et al., 2013; Rishika et al., 2013). Other studies examine customers' buying and selling (Algesheimer et al., 2010) or financial risk behaviour (Zhu et al., 2012) in the context of online auction and lending platforms but do not focus on customer profitability. Finally, many researchers analyse data from third-party social media platforms (Kim and Ko, 2012; Goh et al., 2013; Rishika et al., 2013) and therefore lack the focus on online customer networks in the proper sense. In sum, to the best of our knowledge to date the study by Manchanda et al. (2015) is the only

one, which analyses direct financial effects of a membership in an online customer network. Although this study is limited to participants in an offline and online loyalty program and lacks the focus on individual customers' network characteristics (e.g. customers' centrality and integration in the network), we regard this research as complementary to the findings of our work.

Our findings are based on the analysis of a unique dataset of the online customer network of a German direct banking institution. The dataset contains information regarding customers' social engagement in the online customer network and customers' financial transactions. Therefore, unlike previous studies, we are able to analyse the relationship between users' social engagement and customer profitability in the online customer network by directly linking both customers' social and financial transaction activities. Hence, we do not have to rely on auxiliary constructs or estimated values. Further, we are able to characterize the company's customers with respect to their social engagement and profitability. In sum, our contribution to the existing body of knowledge in the research stream on online customer networks is twofold: our research provides (1) first insights regarding the interplay between social engagement and customer profitability based on a unique data set from an online customer network which also allows (2) a characterization of profitable and non-profitable customers with respect to their social engagement in the online customer network.

### **3 Research Method**

#### **3.1 Setting**

To examine the relationship between social engagement and customer profitability in online customer networks, we have chosen the online customer network of a German direct banking institution. Founded in 2009, the direct banking institution offers a wide range of traditional as well as innovative financial products and financial services such as crowd investing or social payment and hosts one of the most active and innovative financial online customer networks in Germany. By providing an online customer network for its users to share, cooperate, and collaborate, the philosophy of the banking institution with around 100 employees is clearly built on the social engagement principles of Web 2.0 (cf. e.g., Constantinides and Fountain, 2008). Therefore, the online customer network is the key element of the direct banking institution's business activities and serves as a major differentiating factor over established traditional financial banking institutions which are often associated with non-transparency and information asymmetry (cf. e.g., Begemann, 2015).

The online customer network's more than 300,000 registered users can express their social engagement in various ways. Besides maintaining contacts and exchanging private messages via personal profile pages, they can also access and share evaluations about financial products and financial advisers. The agile core of the online customer network is, however, users' social engagement in numerous public discussion groups debating about various financial topics. Users who signed up for a membership in a discussion group can write, read, and like posts. The banking institution uses the discussion groups as main point of contact with their customers. In exchange with the banking institution customers are for example able to co-determine interest rates for loans or to recommend new banking products and banking services. For every user, a publicly visible and continuously updated community measure is generated representing the individual user's social engagement within the online customer network.

In sum, about one third of the registered users of the online customer network are at the same time customers of the banking institution, purchasing the banking institution's financial products and using its financial services via an online banking platform directly connected with the online customer network. Regarding our research focus, the online customer network is therefore ideally suited to examine the relationship between social engagement and customer profitability.

### 3.2 Data collection and preparation

To analyse the relationship between social engagement in the online customer network and customer profitability, the direct banking institution provided us with a dataset ranging from June 2014 to October 2015 consisting of two parts. The first part, which is used to represent customer profitability, refers to the customers' revenues regarding a recently launched bank capital bond. This financial product was on the one hand chosen because of the lively discussions it caused in the direct banking institution's online customer network around its initial launch. On the other hand, the characteristics of the product seem eminently suitable to examine the relationship between social engagement and customer profitability. The bank capital bond is available and of potential interest for every customer but it is at the same time not a daily used financial product, like for example a giro transfer. Therefore, it is neither restricted to a specific clientele nor used by the broad mass of customers without further thinking about its usage. Customers who purchase this financial product want to be informed about this product and one important source of information is the opinion and advice of other users in the online customer network. During the observation period 89 customers made 182 financial transactions of the bank capital bond resulting in a total revenue of 425,424 EUR.

The second part of the dataset includes data regarding the social engagement of an observation group consisting of 2,083 individual users of the online customer network. These users were selected due to their membership in discussion groups dealing with the newly launched financial product under consideration or related topics. For reasons of confidentiality, all personal details have been removed prior to the transfer of the dataset.

### 3.3 Data analysis and measures

Our paper aims to investigate the relationship between social engagement and customer profitability in the online customer network. In this context, to quantify each individual user's profitability, we calculated his or her total revenues regarding the financial product considered for the observation period. According to their customer profitability, we further distinguish three categories in the following: *top 1% buyers* (21 users), i.e. the 1% users with the highest customer profitability (i.e. with the highest total revenues); *buyers* (89 users also including the 21 *top 1% buyers*), i.e. all users with positive customer profitability (i.e. with positive total revenues); and *non-buyers* (1,994 users), i.e. all users who have not purchased the financial product under consideration within the observation period.

To quantify each individual user's social engagement in the online customer network, in a first step we determined his or her *number of group memberships*, his or her *number of written group posts*, and his or her *duration of network membership*. In a second step and to enable more in-depth analyses of each user's social engagement in terms of writing and reading group posts within the online customer network's discussion groups, we made use of the fact that the online customer network can be represented as a graph with a set of nodes and a set of directed and weighted edges (ties) linking pairs of nodes (Barrat et al., 2004; Wasserman and Faust, 2009). The respective graph contains 2,083 nodes, representing the users of the online customer network, and 240,900 directed and weighted edges, representing the presence and frequency of social interaction between a pair of users. Thereby, it is important to note that group posts reach all other users who are member of the respective group (i.e. 1:n communication). To analyse the graph representing users' participation in the online customer network's discussion groups and particularly to determine each individual user's respective structural position in the network, we applied Social Network Analysis. Social Network Analysis has been intensively used in IS research to study the structure of networks and the relationships between its members (cf. e.g., Scott, 2013; Kane et al., 2014). In this context, there exist several measures to quantify the centrality of a node and to identify important nodes within a network (Bonacich, 1987; Wasserman and Faust, 2009). The most common centrality measures are *closeness centrality*, *betweenness centrality*, *degree centrality* (Freeman, 1979), and *eigenvector centrality* (Bonacich, 1972). *Closeness centrality* can be regarded as a measure of how long it will take information to spread from one user to the other users

within the online customer network. This means, users with high *closeness centrality* can spread information more quickly (Newman, 2005). *Betweenness centrality* indicates the number of shortest paths from all nodes to all others that pass through a certain node. Hence, users on many shortest paths between other users have higher *betweenness centrality* and therefore higher influence on the flow of information (Brandes, 2001). *Degree centrality* is defined as the number of ties a node has. In a directed network such as the examined online customer network of the direct banking institution *degree centrality* is divided into two separated measures. *In-degree centrality* indicates the number of edges directed to a node and can be interpreted as the popularity of the user while *out-degree centrality* describes the node's number of edges directed to other nodes and indicates the user's gregariousness (Opsahl et al., 2010). *Eigenvector centrality* assigns relative scores to all nodes in the network on basis of their connection to other high scoring nodes. A user in the online customer network with high *eigenvector centrality* is therefore more important than a user with a low value (Bonacich, 1972). For our analyses, we used the *igraph*<sup>2</sup> package for *R* to calculate *closeness centrality*, *betweenness centrality*, *eigenvector centrality*, and *in-* and *out-degree centrality* for each node of the online customer network. In order to interpret the results, the users were ranked depending on their centrality scores for each measure and categorized into four social engagement categories of equal size  $S_{25}$ ,  $S_{50}$ ,  $S_{75}$ , and "Rest" using the respective quartiles. Hence, for example segments  $S_{25}$  and "Rest" refer to the 25% of all users showing the highest and the lowest centrality scores, respectively.

## 4 Findings

### 4.1 Relationship between social engagement and customer profitability in the online customer network

To test if *buyers* (89 users) have significant higher social engagement compared with *non-buyers* (1,994 users), we perform a left-tailed two-sample t-test for unequal sample sizes and unequal variances for the social engagement measures *number of group memberships*, *number of written group posts*, and *duration of network membership* as well as for *closeness centrality*, *betweenness centrality*, *eigenvector centrality*, and *in-* and *out-degree centrality* (cf. Table 1).

Measures	Buyers (mean)	Non-buyers (mean)	t-stat
Number of Group Memberships	3.40	2.00	-3.43**
Number of Written Group Posts	2.31	2.05	-0.24
Duration of Network Membership [days]	554.78	481.94	-1.29*
Closeness Centrality [%]	19.25	18.93	-0.52
Betweenness Centrality [%]	0.03	0.02	-0.90
Eigenvector Centrality [%]	6.31	10.25	1.56
In-degree Centrality [%]	1.60	2.30	1.36
Out-degree Centrality [%]	0.03	0.05	0.80

\*  $p < 0.1$ , \*\*  $p < 0.01$

Table 1. Results of the left-tailed two-sample t-test for unequal sample sizes and unequal variances for buyers and non-buyers regarding social engagement measures.

<sup>2</sup> <http://igraph.org/r/>

The results in Table 1 reveal a significant higher *number of group memberships* ( $t$ -stat = -3.43125,  $p$ -value = 0.00031) among *buyers* compared with *non-buyers*. Likewise, *buyers* have a significant longer *duration of network membership* ( $t$ -stat = -1.29264,  $p$ -value = 0.09814) than *non-buyers*. However, the *number of written group posts* of *buyers* is not significantly higher compared with *non-buyers*. Surprisingly, with regard to the centrality measures we do not observe significant higher social engagement values for *buyers* compared with *non-buyers*. On the contrary, when testing vice versa if *non-buyers* have significant higher social engagement compared with *buyers* (i.e. right-tailed two-sample  $t$ -test), the centrality measures *eigenvector centrality* ( $t$ -stat = 1.56089,  $p$ -value = 0.05935) and *in-degree centrality* ( $t$ -stat = 1.36130,  $p$ -value = 0.08678) are significant ( $p > 0.1$ ). Actually, these results do not support either existing findings in research about social engagement of users and their economic value in online customer networks or best current practices.

## 4.2 Results of the online customer network analysis

To get deeper insights regarding the interplay between social engagement and customer profitability in the online customer network, on the one hand we used the three categories distinguishing the users according to their customer profitability, i.e. *top 1% buyers*, *buyers*, and *non-buyers*. On the other hand, we differentiated the four quartile-based categories distinguishing the users according to their social engagement measures, i.e.  $S_{25}$ ,  $S_{50}$ ,  $S_{75}$  and “Rest”. For each customer profitability category (*top 1% buyers*, *buyers*, and *non-buyers*) we calculated the percentage of the respective users belonging to the different quartile-based social engagement categories ( $S_{25}$ ,  $S_{50}$ ,  $S_{75}$  and “Rest”). Thereby, we first focus on the social engagement measures *number of group memberships*, *number of written group posts*, and *duration of network membership* (cf. Table 2).

Customer Profitability	Number of Group Memberships				Number of Written Group Posts				Duration of Network Membership [days]			
	$S_{25}$	$S_{50}$	$S_{75}$	Rest	$S_{25}$	$S_{50}$	$S_{75}$	Rest	$S_{25}$	$S_{50}$	$S_{75}$	Rest
<b>Top 1% Buyers</b>	38%	29%	24%	9%	24%	14%	29%	33%	43%	43%	0%	14%
<b>Buyers</b>	40%	28%	24%	8%	22%	22%	26%	29%	30%	26%	16%	28%
<b>Non-buyers</b>	24%	25%	25%	26%	25%	25%	25%	25%	25%	25%	25%	25%

Table 2. Users classified according to their customer profitability and their overlap with the social engagement categories for number of group memberships, number of written group posts, and duration of network membership.

Table 2 highlights that *buyers* have a higher *number of group memberships* than *non-buyers*. 68% of the *buyers* are among the first two social engagement categories  $S_{25}$  (40%) and  $S_{50}$  (28%) compared with only 49% of the *non-buyers*. Only 8% of the *buyers* belong to the category “Rest” containing the users with the fewest group memberships. For the measure *duration of network membership* also comparatively more *buyers* than *non-buyers* can be found in the top category  $S_{25}$ : 30% of all *buyers* and even 43% of the *top 1% buyers* are among the top 25% users with respect to the duration of network membership. In contrast, only 25% of the *non-buyers* belong to this top category. On the contrary, the results for the *number of written group posts* differ considerably. For this social engagement measure *non-buyers* are characterized by higher overlaps with the respective top social engagement categories  $S_{25}$  and  $S_{50}$ . Indeed, only 38% of the *top 1% buyers* belong to the first two categories while this is the case for 50% of the *non-buyers*.

In a second step, we focus on users’ individual structural positions in the online customer network represented by the centrality scores for *closeness centrality*, *betweenness centrality*, *eigenvector centrality*, as well as *in-* and *out-degree centrality* (cf. Table 3 and Table 4).



Customer Profitability	Closeness Centrality				Betweenness Centrality				Eigenvector Centrality			
	S <sub>25</sub>	S <sub>50</sub>	S <sub>75</sub>	Rest	S <sub>25</sub>	S <sub>50</sub>	S <sub>75</sub>	Rest	S <sub>25</sub>	S <sub>50</sub>	S <sub>75</sub>	Rest
<b>Top 1% Buyers</b>	14%	29%	43%	14%	24%	10%	48%	19%	29%	43%	19%	10%
<b>Buyers</b>	11%	31%	34%	24%	34%	9%	35%	22%	26%	36%	25%	13%
<b>Non-buyers</b>	26%	25%	25%	25%	25%	26%	25%	25%	25%	24%	25%	26%

Table 3. Users classified according to their customer profitability and their overlap with the social engagement categories for closeness centrality, betweenness centrality, and eigenvector centrality.

Customer Profitability	In-degree Centrality				Out-degree Centrality			
	S <sub>25</sub>	S <sub>50</sub>	S <sub>75</sub>	Rest	S <sub>25</sub>	S <sub>50</sub>	S <sub>75</sub>	Rest
<b>Top 1% Buyers</b>	29%	43%	19%	10%	14%	19%	38%	29%
<b>Buyers</b>	27%	35%	27%	11%	11%	31%	30%	27%
<b>Non-buyers</b>	25%	25%	25%	26%	26%	25%	25%	25%

Table 4. Users classified according to their customer profitability and their overlap with the social engagement categories for in- and out-degree centrality.

Our prior analyses and statistical tests based on these measures do not show significant higher social engagement of *buyers* compared with *non-buyers*. Even though, the descriptive findings in Table 3 and Table 4 illustrate interesting differences in the relative allocation with respect to the social engagement categories ( $S_{25}$ ,  $S_{50}$ ,  $S_{75}$  and “Rest”) for *top 1% buyers*, *buyers*, and *non-buyers*, respectively.

A closer look at the top category  $S_{25}$  for *closeness centrality* reveals that *buyers* are much less often characterized by very high centrality scores compared with *non-buyers*. Indeed, only 11% of the *buyers* and 14% of the *top 1% buyers* belong to the top category while this is the case for 26% of the *non-buyers*. *Closeness centrality* is based on a user’s shortest paths to all other users in the online customer network. The normalized version used in this research inverts the sum of the lengths of the shortest paths to all other users so that larger values represent higher centrality (cf. Freeman, 1979). Hence, it can be concluded that *buyers* do not receive information more quickly within the online customer network than *non-buyers*. Focusing on *betweenness centrality* only 34% of the *top 1% buyers* and 43% of the *buyers*, but 51% of the *non-buyers* belong to the first two social engagement categories ( $S_{25}$  and  $S_{50}$ ). According to Freeman (1979), users characterized by a high *betweenness centrality* are acting as gatekeepers, hence important distributors of information, between disparate regions of the online customer network. For *out-degree centrality* *buyers* are less often represented in the first quartile  $S_{25}$  (11%) compared with *non-buyers* (26%) as well. In general, the centrality measure *out-degree centrality* indicates a user’s ties to other users in the network (cf. Freeman, 1979). For our weighted graph representing users’ participation in the online customer network, it more concretely reflects the total number of interactions between a pair of users initiated by the respective user under consideration.

In contrast, for *eigenvector centrality* and *in-degree centrality* a broad majority of the (highly) profitable customers are among the first two social engagement categories  $S_{25}$  and  $S_{50}$ . Indeed, for *eigenvector centrality* 72% of the *top 1% buyers* and 62% of the *buyers* belong to these categories, but only 49% of the *non-buyers*. For *in-degree centrality*, we observe very similar results: 72% of the *top 1% buyers* and 62% of the *buyers* belong to the two top categories, but only 50% of the *non-buyers*. Related to *out-degree centrality*, *in-degree centrality* represents the total number of a user’s interactions initiated by one of his or her neighbours in the network (cf. Freeman, 1979). *Eigenvector centrality* is

a recursive version of the degree centrality measure. Here, a user is regarded as central when he or she interacts with other central users (cf. Bonacich, 1972).

## 5 Discussion, Limitations, and Future Research

### 5.1 Discussion and implications for theory and practice

This study has investigated in-depth the relationship between customers' social engagement and customer profitability in online customer networks using a dataset of a German direct banking institution. The dataset contains unique information regarding the customers' social engagement and their financial data. Our study contributes to theory and practice in various ways.

First of all, we do not generally observe significant higher social engagement for “*buyers*” compared with “*non-buyers*” in the investigated online customer network. This insight does not support existing statements in literature where a positive relationship between customer profitability and social engagement is predominantly argued (cf. e.g., Manchanda et al., 2015; Kim and Ko, 2012; Goh et al., 2013; Rishika et al., 2013; Zhu et al., 2012). In contrast to our findings Manchanda et al. (2015), for example, found a 19% increase in revenue triggered by online customer network membership and social engagement based on a long term investigation of economic effects of membership and participation in an online customer network. However, although rare, not all previous research observed mere positive effects of social engagement in online customer networks on customer profitability. Algesheimer et al. (2010), for instance, recognized also negative effects on the bidding and selling behaviour, for example a decline in the amount of money spent per month, due to customers' social engagement in the online customer network of *eBay* Germany. With respect to practice, our findings do not support some prevalent assumptions about the benefits of online customer networks. As a current practice, many companies generally encourage and accelerate a strong participation of users in the company's online customer network. With regard to the examined banking institution for example, users with high level of social engagement are financially rewarded regardless their customer profitability. However, the mere and undifferentiated encouraging of users' social engagement in online customer networks does not seem to be a sufficient practice in view of our results. As a practical implication companies have instead to critically reflect on how to manage online customer networks regarding economic benefits in general and how to manage users' social engagement in particular.

Second, further analysing the characterization of profitable and non-profitable customers (i.e. *top 1% buyers*, *buyers*, and *non-buyers*) with respect to their social engagement in the online customer network, we were able to derive three insights: on the one hand, we found that *buyers* have a higher *number of group memberships* and *duration of network membership* than *non-buyers*. On the other hand, for the measures *number of written group posts*, *closeness centrality*, *betweenness centrality*, *eigenvector centrality* and *in- and out-degree centrality*, we found no significant higher social engagement of *buyers* compared with *non-buyers*. A high value for *closeness centrality* can indicate the possibility to quickly spread information between users in the online customer network (Newman, 2005) while a high value for *betweenness centrality* can represent a user's high influence on the flow of information (Brandes, 2001). Based on our results it may thus be concluded that *buyers* do not seem to be able to spread information more quickly (indicated by *closeness centrality*) and also do not significantly more often control the flow of information (indicated by *betweenness centrality*) than *non-buyers*. In addition, referring to *in- and out-degree centrality*, it turns out that *buyers* have no significant higher probability to interact with other users compared with *non-buyers* (Opsahl et al., 2010). *Buyers* have therefore neither a higher popularity (indicated by *out-degree centrality*) nor are they more gregariousness (indicated by *in-degree centrality*) than *non-buyers*. Further, the analysis of the centrality measures reveals even surprising contrary findings. For two centrality measures (*in-degree centrality* and *eigenvector centrality*) that describe users' individual structural positions in the online customer network, we observed higher social engagement of *non-buyers* compared with *buyers*.

According to the findings and as the basis for further practical applications in the context of the present online customer network of the direct banking institution, we can characterize *buyers* as generally mature members (*duration of network membership*) of the online customer network with a high curiosity about the online customer network's variety of discussion groups (*number of group memberships*). However, *buyers* are not characterized by a significant higher *number of written group posts* compared with *non-buyers*. Indeed, this social engagement measure indicates that *buyers* do not participate more in discussion groups compared with *non-buyers* even though they are members in more groups and have on average a longer lasting online customer network membership. Our further analyses with centrality measures commonly used in IS research (e.g., Kane et al., 2014) support this observation.

## 5.2 Limitations and future research directions

Although our research provides first insights about the relationship between customer profitability and social engagement in online customer networks, there are several limitations which can serve as starting points for future research.

First, we only considered the online customer network of one single company which provided us with the relevant data needed to conduct our research. Nevertheless, the online customer network of the direct banking institution is among the most innovative online customer networks for financial products and financial services in Germany. Furthermore, it offers typical functionalities for socialising and information sharing (i.e. maintaining a personal profile, establishing of friend ties, and participating in discussion groups) which are regarded as elementary for online customer networks (cf. e.g., Muniz and O'Guinn, 2001; McAlexander et al., 2002). Combined with the users' ability to conduct financial transactions via the associated direct banking platform, the online customer network provides an ideal setting to investigate the relationship between customer profitability and users' social engagement. Therefore, we assume that the results obtained therefrom also hold for other companies. Nevertheless, to increase the generalizability of our results for heterogeneous online customer networks, future research should investigate further online customer networks.

Second, we focused on one single financial product of the direct banking institution. Naturally, including revenue figures generated from a wider range of financial products and financial services would mean to investigate more users. We believe that the newly launched financial product is suitable as a starting point for our research due to the lively exchange of ideas in the discussion groups about the financial product. In order to investigate differences between various product groups regarding the relationship between customer profitability and users' social engagement, it is necessary for future research to include a wider range of financial products and financial services.

Third, the evaluation of social engagement in the online customer network focuses on memberships and posts in discussion groups. Obviously, discussion groups do not completely reflect the social engagement of users in the online customer network. However, the participation of users in the various discussion groups is by far the most frequently used feature of the online customer network. All of the 2,083 users under observation are members of one or more of the analysed discussion groups and more than 53% of the users are author of at least one group post. Nevertheless, in order to capture the whole range of users' social engagement it is necessary for future research to extend the investigation also to less-used functionalities like the establishing of friendship ties or private messages.

Fourth, we did not conduct an in-depth content analysis how the valence of the written group posts affects users of the online customer network. Therefore, we did not consider, for example potential negative group posts about the financial product under observation (cf. Kumar et al., 2010), and did not reject off-topic group posts, for example about other financial products or financial services of the banking institution. However, the discussion groups for our research were selected according to their relevance for the newly launched financial product. We assume therefore that a high number of the respective group posts in the observation period refer to the financial product under observation. Nevertheless, future research should include a content analysis of group posts in order to better understand the content part of the online customer network.

Finally, not all aspects of the social connections and communication were considered in our social network analysis. Nonetheless, we applied the most common centrality measures and were able to investigate users' centrality in the online customer network (e.g., Kane et al., 2014). For future research, we suggest a more detailed analysis of the structural characteristics of *buyers* (e.g., an analysis of interrelationships between top classified users). Also further characteristics such as demographic information (e.g., sex, age, and place of living) could be integrated in order to get a more comprehensive picture about the relationship between customer profitability and users' social engagement in online customer networks.

## 6 Conclusion

This research investigates the relationship between customer profitability and users' social engagement in online customer networks. A dedicated social engagement of customers in a company's online customer network is widely seen as strategically important in order to establish a competitive advantage and as a foundation for future business success (Brodie et al., 2013). Therefore, it is not surprising that companies have a strong interest in establishing and developing online customer networks in order to take advantage of these benefits (Agarwal et al., 2008; Baldus et al., 2015). However, to this date, little is known in depth about the relationship between customers' social engagement and customer profitability in online customer networks. Thus, the aim of our paper is to provide novel insights about the relationship between customers' social engagement and customer profitability in online customer networks using a dataset of a German direct banking institution's online customer network. The dataset contains unique information regarding the customers' social engagement and their financial data. To quantify each individual user's profitability, we calculated his or her total revenues regarding the financial product considered for the observation period. According to their customer profitability, we further distinguished customers into the three categories *top 1% buyers*, *buyers*, and *non-buyers*. To quantify each individual user's social engagement in the online customer network, we determined his or her *number of group memberships*, his or her *number of written group posts*, his or her *duration of network membership* as well as common centrality measures such as *closeness centrality*, *betweenness centrality*, *degree centrality* (Freeman, 1979), and *eigenvector centrality* (Bonacich, 1972). Based on Social Network Analysis (cf. e.g., Scott, 2013), we derive interesting findings that do not support either existing statements in literature or best current practices: First, we found that in the context of the investigated direct banking institution's online customer network "*buyers*" are not generally characterized by significant higher social engagement compared with "*non-buyers*". This insight is not in line with existing statements in literature where a positive relationship between customer profitability and social engagement is predominantly argued (cf. e.g., Manchanda et al., 2015; Kim and Ko, 2012; Goh et al., 2013; Rishika et al., 2013; Zhu et al., 2012).

Second, when analysing the characterization of *top 1% buyers*, *buyers*, and *non-buyers* with respect to their social engagement in the online customer network, we found that *buyers* have a higher *number of group memberships* and *duration of network membership* than *non-buyers*. In contrast to existing statements in literature, the analysis of the residual social engagement measures, especially the centrality measures commonly used for social network analysis in IS such as *closeness centrality*, *betweenness centrality*, *eigenvector centrality* and *in- and out-degree centrality* (cf. Bonacich, 1972; Freeman, 1979), reveal that there is no significant higher social engagement of *buyers* compared with *non-buyers*. Finally, for the centrality measures *in-degree centrality* and *eigenvector centrality* the analyses even show that *non-buyers* have a significant higher social engagement than *buyers*.

Overall, the results are unexpected. Following our results, companies have to critically reflect on how to manage online customer networks regarding economic benefits in general and how to manage users' social engagement in particular. With our results, we hope to contribute to a better understanding of the relationship between customer profitability and social engagement in online customer networks. We hope that our present findings will stimulate further discussion and research on that interesting topic and support practitioners to better understand and use online customer networks.

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