Social Network Services: Competition and Privacy

Claus-Georg Nolte, Jonas Schwarz, Christian Zimmermann

University of Freiburg, Institute of Computer Science and Social Studies,
Department of Telematics, Freiburg, Germany
{nolte, schwarz, zimmermann}@ig.uni-freiburg.de

Abstract. Social Network Services (SNS) business models highly depend on the gathering and analyzation of user data to obtain an advantage in competition for advertising clients. Nevertheless, an extensive collection and analysis of this data poses a threat to users' privacy. Based on an economic perspective it seems rational for Social Network Operators (SNO) to ignore the users' desire for privacy. However, privacy-friendly services might have the potential to earn users' trust, leading to an increased revelation of personal data. Addressing these issues, we examine the existing privacy problem in SNS in the context of competition between SNO to investigate whether competition tend to enhance user privacy or whether it is the root of its violation. Therefore, this paper investigates the interconnectedness of the market structure and privacy problems in SNS. After analyzing the users' and the advertisers' side of SNS, their competitiveness and its influence on user privacy are examined.

Keywords: Privacy, Social Network Services, Competition, Multi-Sided Platforms, Two-Sided Markets

1 Introduction

At least since Facebook was published in 2004, social network services (SNS) have constantly been on the rise and consume evermore of our daily online time and, thereby, of our personal data. Moreover, since the beginning of the smartphone age SNS have even been following us from our desktops to every place we go. They demand us to share every bit of our lives with our friends within the network and, thus, with the network itself. Consequently, Harvard Law professor Jonathan Zittrain deduced in 2008 that this technology threatens "to push everyone towards treating each public encounter as if it were a press conference" [1]. This thirst for user data can be explained with the business model of SNS which heavily depends on gathering and analyzing user data to deliver targeted advertisements [2]. This extensive collection and analysis of user data poses a severe threat to users' privacy. Hence, Margo Seltzer, professor in computer systems at Harvard University, sets it straight at the Davos Forum in 2015 stating that "privacy as we knew it in the past is no longer feasible" [3].

Disclosed data itself is necessary for SNS businesses to improve their targeting of advertisements and thereby obtain an advantage in competition for business customers,

13th International Conference on Wirtschaftsinformatik,
February 12-15, 2017, St. Gallen, Switzerland

Nolte, C.-G.; Schwarz, J.; Zimmermann, C. (2017): Social Network Services: Competition and Privacy, in Leimeister, J.M.; Brenner, W. (Hrsg.): Proceedings der 13. Internationalen Tagung Wirtschaftsinformatik (WI 2017), St. Gallen, S. 822-836

which demand for precisely targeted advertising. Hence, users' demand for privacy-friendliness only becomes important insofar as it is helps providers to gain trust and to get users to reveal even more personal data [4]. Thus, it seems not an irrational ignorance of users' desire for privacy by the providers but a rational choice in an economic competition not to prioritize this desire.

The paper takes an economic perspective on the present privacy problem in SNS to investigate whether competition between providers tends to enhance user privacy or whether it is the root of its violation. For this purpose we investigate privacy in those business focusing on the market structure, thereby taking into account that SNS constitute multi-sided platforms (MSP) [5]. Analyzing the users' and the advertisers' side of SNS, we compare their competitiveness and its influence on user privacy. Therefore, we build upon insights from theoretical literature concerning MSP, behavioral research papers about SNS and privacy, as well as market evidence.

In the following we will first state the essential definitions for our investigation in section 1.1 and further give a brief overview of the related literature in section 2. Thereafter, we start with the analysis of the influence of SNS competition on user privacy, firstly by examining the characteristics of the goods which are up for rivalry on the different market sides in the SNS environment, and secondly, by investigating those goods and competitions in detail considering appropriate findings from scientific literature (see section 3.1). Thirdly, we will analyze their impact on user privacy in section 3.2 and following. Finally, we will discuss our results, match them with empirical evidence (see section 4) and give a summary of our paper in the conclusion.

1.1 Essential Definitions

As mentioned above, we aim at investigating the interrelation of the market structure in social networks services (SNS) and user privacy. Hence, there is a need to clarify the term and interpretation of SNS. According to the updated definition of Kane et al. [6], which builds upon the earlier characterization of Ellison [7], SNS contain the following features: "users (1) have a unique user profile that is constructed by the users, by members of their network, and by the platform; (2) access digital content through, and protect it from, various search mechanisms provided by the platform; (3) can articulate a list of other users with whom they share a relational connection; and (4) view and traverse their connections and those made by others on the platform" [6]. In the following we use this definition as a basis to describe and understand SNS. However, we add the restraint that the main revenue source of the SNS should be advertising to ensure the multi-sided platform character of our investigation object. Hence, the scope of our analysis contains SNS such as Facebook, Google+ and Twitter.

Moreover, we define the term of Social Network Operators (SNO) as companies, which "provide the underlying basic services and infrastructures, needed by users to interact with each other" [8]. In the case of Facebook, the website facebook.com constitutes the SNS while the company Facebook Inc. is the SNO.

Further, the term multi-sided platform, also known as two-sided platform or market, requires a clear definition, too. Therefore, we draw on the work of Staykova and Damsgaard [5]. According to their research, MSP (1) enable direct interaction between

two or more participants affiliated to them; (2) are containing homing and switching costs for those participants; and (3) include direct and indirect network effects [5] (see Fig. 1). In our setting, homing costs are the costs in money, effort, time and other aspects of entering and using an MSP. Moreover, switching costs are similar onetime costs that occur if participants switch from one platform to another. Additionally, network effects occur when the value of the platform or its product for one participant is influenced by the total number of participants (of the same or another side). Those effects can be both positive or negative and are seen as a key aspect of MSP [9].

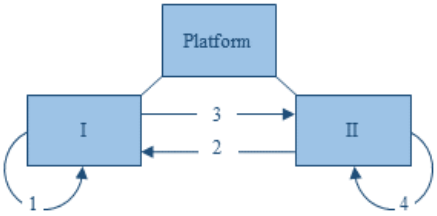

Figure 1. MSP model, including platform participants (I&II), same-side network effects (1&4), and cross-side network effects (2&3) [5].

The privacy definition used in this paper builds upon Westin's definition of privacy. Hereby, he defines it as "the claim of individuals, groups or institutions to determine for themselves when, how, and to what extent information about them is communicated to others" [10]. For him, "this, also, involves when such information will be obtained and what uses will be made of it by others" [11]. In the context of SNS, we consider privacy as the capability of SNS users to control their personal data and its collection, aggregation, analysis and possible transfer by the SNO and third parties, as well as users' ability to optimize the amount of data disclosure and its security against misuse with respect to their preferences.

The legal definition for personal data is provided by the EU data protection directive as "any information relating to an identified or identifiable natural person".[1] However, for our case a broader classification is useful. Drawing from Nolte, we define personal data as "any data revealed by user action, starting from simple likes, to direct personal information, and even analysis of users click and browse behavior" [12]. This diversification is necessary to capture that by the aggregation and combination of meta- and behavioral data, inferences can be drawn. Those can constitute sensitive information for users and sometimes even personal data in the definition of European data protection law [13]. Given this definition, it is obvious that the data-centric business model described above constitutes a severe threat to users' privacy.

[1] EU Data Protection Directive (95/46/EC), 1995.

2 Related Literature

User privacy in SNS is a widely examined and discussed issue. Basically, the topic can be divided into two main research streams: Behavioral and user-focused research as well as provider-focused research. The former offers the seemingly contradictive result that users on the one hand care for privacy and try to preserve it with privacy-seeking behavior [14], but on the other hand do not act privacy-aware and seemingly carelessly disclose personal data when using Internet services [15]. Those findings led to the definition of the so-called "privacy paradox" [16]. Furthermore, provider-focused research has shown that privacy is not a major market factor in the competition for user attraction although users estimate it of high importance for them [17, 18].

However, the question wherefrom this dynamism arises which drives SNS providers to claim more and more user data and thereby restrict user privacy is still open to research. Different forces interact which each other and the participants in an SNS. Most of those forces have direct or indirect influences on privacy [19]. One popular assumption is that users' demand for privacy is of minor priority for SNS providers because users are not willing to pay for it [20] and the monetary income is generated by advertisement customers [2]. However, recent successful mail services show that a minority of users is willing to spend small monetary amounts for increased communication privacy.[2] Other companies in the Internet search business even display the possibility to succeed without demanding any money for a privacy respecting service [21]. Nevertheless, this willingness to pay for privacy either in a monetary way or in terms of switching costs seems of no significance for SNS [15, 22, 23].

Further, the more general question of competition in MSP has been addressed from different angles. The economics of two-sided markets have most notably been explored by Rochet and Tirole [24]. Further research into MSP market structures has been conducted by Armstrong [25], Evans and Schmalensee [26] and others [5, 27]. While these highly recognized works provide deep insights into the economics of MSP, they do not cover privacy issues. A variety of publications address the questions of competition and monopolistic tendencies in online MSP, while focusing on the search engine market and Google's market position in particular [28, 29] or on SNS and Internet services in general [30]. However, the potential interrelation of the privacy problems in SNS and the market structure are not in the focus of current research.

3 Economic Analysis

In the following section we introduce and clarify the MSP business of SNS. Further, the traded goods in an SNS environment are examined from different angles to determine their competitive character. Afterwards, we consider their influences on user privacy for both sides of the SNS/MSP entity, namely the users' and the advertisers' side. For simplicity other SNS participants, like application developers, are bypassed.

[2] Mailbox.org, Posteo.de and others.

As argued above, SNS in general constitute an MSP, generating revenue by brokerage of targeted advertising to its users for business partners [2, 31, 32]. A closer view on the market structure reveals strong direct same-side network effects between its users, because each additional user makes the SNS more attractive to others [33, 34]. Moreover, there are indirect cross-side network effects between users and advertisers. Each additional user makes the network more valuable for advertising clients. This is due, firstly, to a broader audience for targeted advertisement and, secondly, to a higher amount of user data, which elicits the possibility of drawing inferences and thereby creates more precise profiles [5]. On the other side, users are at least accepting personalized advertisements as a price to use SNS free of monetary charge [32]. However, there are no positive network effects between the advertisers, rather the opposite can be assumed. While advertisers profit from additional SNS users and often perform side-advertisement by promoting their SNS company profiles (e.g. advertising the company's Facebook-page or Twitter-account), they are rivals to other advertisers within the same network for the limited space of targeted advertisements (see Fig. 2).

3.1 Features of Social Network Service Goods

As already stated, advertising companies are in rivalry for the limited space for targeted advertisements. More precisely, currently leading SNS auction targeted advertisement for specific audiences or keywords in a real-time bidding system between interested advertisers. The space for advertisement in the network is limited and advertising clients can exclude each other through a higher bid for the same keyword or target group, thus, the good of advertisement is exclusive and a rival good. Furthermore, a SNO can decide to exclude some advertisers from its service. Hence, advertisement in SNS is a classic private good (see Table 1). Thus, one has to assume that there exists a strong rivalry between similar advertisers. Classifying this insights into a feature of goods table shows that the service of providing targeted advertisement within SNS is to be considered a private good [35].

Categorizing the SNS users-side is more complicated. First of all, we have to distinguish between two different goods: the plain SNS membership and the actual usage of the network. The first requires usually only a valid email address and roughly two minutes for filling out the application form and confirming one's mail address. The second comprises the aforementioned homing costs, time and effort to understand the SNS' practice as well as adding user created content. Both add up to the aforementioned switching costs (c.f. section 1.1). We already argued that users experience same-side network effects from other users. Hence, profile creating and SNS usage is non-rival. Creating a profile and actively participating in an SNS prevents no one else from joining or using it.[3] In addition, the question to be answered is whether those user-sided goods are excludable or not which makes the difference between a public good and a club good. At first glance, it seems intuitively to argue that those goods are public because no one seems to be able to exclude someone else from the usage. However, people from Turkey trying to access Facebook during the military coup in July 2016 or generally

[3] Except for server overload which is not discussed here for simplicity.

trying to use it in China or North Korea will disagree. Countries as well as SNO have technical instruments to restrict SNS access or directly ban specific users.[4] Hence, the SNS registration and usage is non-rival but excludable for users' side whereby it complies with the characteristics of a club good (see Table 1).

Table 1. Feature of Goods Classification for SNS

	excludable	**non-excludable**
rival	*"private good"* targeted advertisement	*"common good"*
non-rival	*"club good"* SNS registration & usage	*"public good"*

3.2 The Social Network Operator Viewpoint

The last angle missing is the SNO perspective. First, the providers compete among themselves for advertising clients. All SNS are offering roughly the same product on this market side: targeted advertisement. It applies here that neither can money spent by an advertiser in one network be spent twice, nor can advertisement space be assigned multiple times. Accordingly, one can assume that the SNS advertisement market side is in strong competition because several providers supply a comparable private good to a high quantity of advertisement-willing companies (see Fig. 2).

Second, user registration and membership seems non-rival from an SNO perspective because users can easily set up multiple accounts in different SNS. Moreover, a provider is not able to prohibit its members from registering at other networks nor to hinder other services to open their registration for them. Yet, users can decide to refuse a certain SNS. However, competition undoubtedly exists for attracting users between SNO, since the quantity of accounts is a signal to attract advertisers.

Third and most interesting from an SNO perspective is the time users spend in the network. It seems to be a highly valuable good for providers, because it increases the possible quantity of advertisements shown to users and probably the amount of data disclosed by them [14]. Further, users' time and attention is limited and can only be spent once to an SNS. A strong competition for users' time between SNS and also other services can thus be presumed [36]. As a result, users are not only paying for an SNS with revealed personal data but also with their time and attention (see Fig. 2).

[4] Technical workarounds for users are neglectable for our analysis.

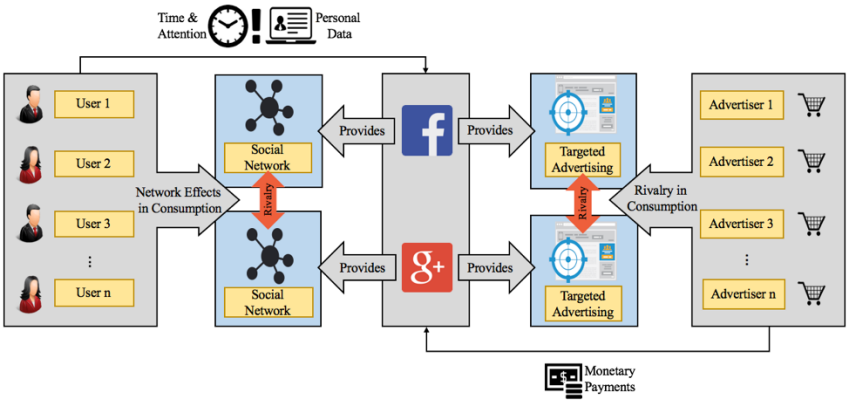

Figure 2. The market structure of SNS

3.3 Competition on Users' Side

Analyzing the SNS' competition on the users' side of the market structure, we firstly identified two relevant factors: trust and enjoyment [33, 34]. On the one side, as described before, the SNO wants to receive users' time and therewith their attention for advertisements and their disclosed personal data for improved targeting of those advertisements [37]. On the other side, users want to enjoy an SNS and demand it trustworthy [4, 33, 34], while enjoyment also includes strong same-side network effects, i.e. finding the own friends within the same SNS [34].

Targeting the trust factor first, literature shows that increasing trust in their SNS can be achieved for SNO by implementing privacy controls [33, 38]. This is not only relevant because improved trust increases the SNS usage but also the quantity of disclosed data and the acceptance of advertising [39, 40]. Hence, trustworthiness is beneficial for SNS to bind users to the service as well as to receive more user-generated content and reliable user data. Undoubtedly the implementation of privacy controls has a positive influence on user privacy in SNS [19]. However, findings suggest a design conflict between privacy and usability and, thus, enjoyment [18].

Talking about the enjoyment of an SNS, it seems to be the most crucial factor in SNO competition. Firstly, because it attracts users to join a network and, thus, self-evidently increases positive same-side network effects between the users as well as positive cross-side network effects from the users' side to the advertisers'. Secondly, enjoyment tempts users to spend more time with the network, leading again to positive influence on advertisers. Additionally, more time spent in an SNS also increases the quantity of user-generated content because content creators value a platform more if they have a larger audience [41]. Further, a higher amount of content again attracts more advertisers because it enhances the providers' targeting ability for advertisement. To conclude, we find plenty of motives for providers to compete with enjoyment for user registrations and user time. SNO are facing this competition by increasing their own platform stickiness. Literature results show that there exist mainly two ways of doing so which add to another: increasing the content of the platform and implementing

more features and functionalities to it [5, 36]. While the latter seems at first glance privacy neutral for users, changing the platform appearance to entice users to enter more data clearly is a threat to their privacy [14]. However, additional platform features also contain the potential to harm user privacy when they educe additional personal data from users or even leak those data from the platform to third parties if the SNO decides to open her network to external application developers.

3.4 Competition on Advertisers' Side

As already stated, SNO compete for selling targeted advertising to corresponding customers (c.f. section 3.2). To attract those advertisers, we identified four factors as most relevant: the quantity of users, the accuracy in user targeting to serve the advertisements, the time users spend in the network and the price to advertise to the targeted user group. In their evolution, the majority of SNS followed the same path: first starting one-sided and attracting users, and after hitting a critical mass, implementing advertisement and thereby evolving into a two-sided platform [5]. Later, most SNS also included external application developers and other services (e.g. identity management) and, thus, transformed into an MSP. However, we already covered the privacy impacts of competition for user registration in the previous section.

Besides the pure quantity of users, the average time a user spends in the network appears to be the crucial factor in the competition for advertisers [36]. Its theoretical competition and privacy impacts on users' side were already shown above. However, another option for tying users closer and longer to a network seems to enhance the SNS content [6, 42]. This can either happen by tempting users to post more data or by including external content creators and their content directly into the network (e.g. news sites or celebrities). A further method is simply to acquire competitors and include their services into the own SNS. We already showed the possible privacy threats of tempting users to reveal more data above. The method of including further content form external content creators is basically privacy neutral, except for users' active reaction on this content (e.g. likes and comments). However, implementing bought-up competitors and especially merging their existing user data and accounts with already existing in-network user data can be extremely privacy invasive. Merging that data and drawing inferences from the new database can reveal information which the user initially wanted to hide by audience-segmentation via using two separated services.

The third identified factor is the accuracy of user targeting. The most obvious way of improving this factor is to gather more user data, either directly from the users or from external sources, to analyze it with algorithms. The impacts of user data have already been discussed. However, one has to expect that the possibilities of enhancing targeting by user data somewhere hits a limit value where gathering more data does not result in any more improvements. Hence, another method to improve the targeting constitutes a direct inquiry of users either for their interest or indirectly by giving them the controls to correct their information and drawn inferences connected to their account [37]. The latter can be privacy enhancing for users if it is allowed for them to delete data or at least exclude certain information from the targeting mechanisms.

Finally, the cost-benefit-factor of advertising in an SNS depicts a crucial aspect, since the advertisement side is the monetary paying side. As every agent acting in an economic environment, advertisers seek for the most efficient way to spend their money and, thus, to target their audience. Besides the developers' achievement of a leading targeting algorithm and the already treated topic of feeding it with user data, SNO have another factor to influence the efficiency of their advertisement offer: economics of scale. Additionally to non-rivalry and excludability, user membership and activity in SNS have the characteristic of low marginal costs. The costs to provide the service to an additional user are, after establishing a working system, marginal for the SNO. The same holds true for the advertisers' side and the service of automated advertising space auctions. Hence, this leads to rising returns of scale which makes an SNS the more efficient the larger both sides are. Thus, the direct way to increase SNS attractiveness for advertisers is to gain more users joining and spending time in the SNS. This becomes even more efficient if those users originate from different target groups, because the SNS then represents all sections of society. This insight leads us directly back to section 3.3 and the discussed influences on privacy and competition.

3.5 The Trump Side of Competition

In the previous sections, we analyzed the two major sides of SNS regarding competition and their impacts on user privacy. Table 2 summarizes the different activities of SNO and their influences. However, it seems uncertain which side in competition outweighs the other and, thus, whose needs are favored by the SNO for economic reasons. If the users' side and therewith users' needs are preferred it is to be expected that the trust factor could lead to an improvement of users' data control options and, thus, to an enhanced user privacy. We expect the opposite if advertisers are the SNO-favored SNS side, due to the demand of evermore user data for better profiling.

Table 2. SNO activities and their influence on user privacy

SNO Activity	Influence on User Privacy
Implementing Privacy Controls	+
Give Users Control to Correct and Enhance the Information and Drawn Inferences Connected to their Account	+
Implement more Features and Functionalities	❍
Changing Platform Design to Entice User to Enter More Data	-
Merging their Existing User Data and Accounts with Already Existing In-Network User Data	-

Following the influential papers on MSP, the standard link from classical economics between the inverse relation of price over marginal cost and elasticity of demand does not hold true for MSP. In other words, the service on one side will be served by the provider even if this service and the price paid for it by the its participant alone is not profitable [26]. Hence, the loss from one side has to be outweighed by the profits from the other. To identify the provider's cash cow we have to find out on which side

multihoming is most prevalent [24, 25]. In other words, the side where the MSP participants use more than one platform simultaneously is expected to be overpriced, while the singlehoming side is expected to be subsidized [43].

4 Discussion

In this section we will match the theoretical analysis of competition and its influence on privacy in SNS with available market observations and empirical evidence. Subsequently, we discuss whether this evidence confirms our theoretical findings.

First, targeting the mentioned trust factor of section 3.3 we find that current developments indicate that SNS and other Internet services recognized the coherency between users' trust and user-generated content. Respectively, Facebook introduced new privacy controls in 2008 [44] and constantly improves them [45] while Google implemented its own user privacy controls lauded by specialized press [46]. However, another reason for this privacy trend in Internet services might be the upcoming reform of the EU Data Protection Directive which comes with rigid laws and harmful financial penalties in case of violations [47]. Hence, the future of this trend is sustainably influenced not only by user behavior but also by the corresponding law. Utterances of the European Commissioner let us assume that the end of the road of regulating Internet services concerning competition and user privacy hast not been yet reached [48].

As showed in sections 3.3 and 3.4, SNO compete against each other for users' time spent on their platform as well as for content. Therefore, they implement new features into their platforms or integrate taken-over services and external apps. Recent developments in Internet services and SNS make this competition visible. The acquisition of WhatsApp by Facebook, as well as the takeover of Instagram led to a domination of Facebook in the branches of mobile messaging and mobile photo sharing. Moreover, Facebook started partly merging Facebook and Instagram accounts and announced in the latest terms and conditions change of WhatsApp that phone numbers and contacts will be transferred to Facebook [49]. Both clearly contain the aforementioned privacy threats of merging different services accounts.

As a result, Facebook's recent introduction of instant articles can not only be interpreted as an attempt to enlarge the own content but also as an attack on Google and Twitter [50]. Furthermore, Facebook included the feature of selling tickets for events and recently announced the possibility to run crowd-funding campaigns and collect money directly inside the SNS [51]. This seems to be an attempt to use its already large user base and the resulting network-effects to include the markets for online ticket-sale and crowd-funding and, thereby, keep the users as long as possible in the Facebook environment. The same applies to implementation of an own browser within the Facebook app, a strategy also used by Twitter.

Moreover, companies like Google, Facebook and Twitter provide identity management features which enable users to log-in with their already existing SNS accounts to external services. What seems like a comfortable feature to make users' life of managing different online accounts easier, can also be interpreted as a way to gather more data from external services, track users beyond the own platform and enhance

both targeting and time for displaying advertisement. We already pointed out the privacy threat aspects of those strategies.

However, the most interesting question is which side, the users' or the advertisers', is subsidized and who is the "cash cow" (see section 3.5). Evidence from the magazine industry suggest that users are subsidized and advertisers are the main income source [52, 53]. The fact that users are not paying any monetary price for SNS and advertising is the main income source for SNO strongly supports this view [54]. Nevertheless, considering multihoming as the crucial factor, recent statistics suggest that it is on the rise on users' side with 52% of US users using two or more social media sites in 2014 [55]. However, the relevant factor of SNS competition on users' side is also the time spent in the network (see section 3.2). Facebook leads by far with 70% of its users using the platform daily before Instagram with 49% and Twitter with 36%, while the second also belongs to the Facebook environment. Moreover, "the engagement of Facebook users continues to grow, while daily use on other platforms shows little change" [55].

Because, we lack numbers for multihoming behavior on the advertisers' side we use the market distribution as an indicator. In 2014 Alphabets' share of the net digital advertising revenue was 31%. This revenue includes the income from targeted advertising on the Google search sites and also the advertisement revenue from services like YouTube, Google+ and AdWords. The leader is followed by Facebook with a market share of nearly 8% and the Chinese online search engine Baidu with close to 5% [56]. Despite these distinct numbers the development of the online advertisement market indicates that the competition between the targeted advertisement-offering SNO is rising. While Alphabet was able to keep its market share over the last three years, competitors are catching up. Facebook nearly doubled its market share from 2012 to 2014 from 4% to close to 8%. Besides, except for two, all other market participants beyond the 0,5% market share were able to claim slightly more percentages each year [56]. This development indicates not only that online targeted advertisement is becoming more popular but also let us presume that adverting clients tend to use more than one Internet services and, thus, show multihoming behavior.

The point that both sides of SNS seem to show multihoming behavior and that the users' side does not pay for their usage in terms of money makes it difficult to apply the insights of MSP markets and multihoming here. As mentioned afore, on the one hand one could claim that users are the subsidized side because they are enjoying SNS for free. However, on the other hand one could also argue that advertisers are being favored and thus subsidized because they are the crucial revenue source of SNO. Moreover, advertisement prices in SNS seem comparably low to those paid in print media and we expect the targeting to be more exact due to the revealed user data [54]. Hence, advertisers could be subsidized with better targeting for comparably lower prices while users could be overpriced in terms of private data elicit by the SNS and, thus, lower privacy. However, according to the lack of literature and data available we are not able to finally assess this case.

In summary, our investigation shows that competition between SNO does neither necessarily improve user privacy nor does it generally harm it. Competition in MSP like SNS is complex and our analysis shows that there are indeed various privacy harmful aspects. However, the competition for users could have privacy friendly

consequences, if the trust factor outweighs the privacy contrary implementation of additional features and overtaken services.

4.1 Limitations & Future Research

Our work is limited due to the available data about certain market aspects of SNS competitions. We found no data about multihoming behavior of advertisers regarding the purchase of targeted advertising in SNS. Additionally, there is no evidence whether newly integrated privacy controls by Facebook and Google are actively used and, thus, increase user privacy or if they are just having a trust-building and thereby possible privacy harming effect. Moreover, the comparably low costs of targeted advertisement in SNS can partly be explained by the strong economics of scale and the near-zero variable cost of running an SNS and displaying advertisement compared to print media. Hence, future research in this area should tackle and close this data gap.

Furthermore, considering our classification of SNS goods, club goods as the SNS membership and usage from user side also have the characteristic of low marginal costs. This leads to rising returns of scale, which makes club goods ideal for natural monopolies [35]. Considering the costs to set up an SNS by programming the service and establishing the computing power to serve a broad user base as well as the high costs of running such a server infrastructure as fixed costs, there exist monopoly tendencies for this market [57]. Future research could build upon our work to investigate those tendencies and their influence on privacy for the SNS market.

5 Conclusion

In this paper we investigated the challenge of user privacy in SNS from an economic perspective. The aim was to analyze if competition between networks tends to decrease or enhance user privacy. Therefore, we first clarified that SNS are multi-sided platforms with at least two sides: users on the one and advertising clients on the other side. Furthermore, we characterized the traded goods within SNS markets from the three viewpoints of users, advertisers and social network operators showing that SNS membership and usage are club goods from user perspective, while targeted advertisement is a private good from an advertiser and SNO viewpoint.

Moreover, SNO compete for advertisers on the one side. On the other side they compete for users' membership and more intensely for users' time. In order to attract the advertisers, providers have to maximize their targeting for advertisements and the time users spend within their platform. Hence, they have the incentive to gather as much personal data from users as possible and enhance their platform with additional content, features and services to bind users' attention and spend time in the SNS. All analyzed factors of competition in the SNS environment contain unilateral privacy threatening aspects. Except for the factor of user trust for an SNS, gained by implementing privacy controls as one aspect to get users to reveal more data. Furthermore, the fact that users do not pay in monetary terms for SNS usage but that advertising clients are the crucial revenue source for SNO suggests that users might be discriminated against and

overpriced in terms of personal data disclosure. However, the validation by the MSP theory where the multihoming side is overpriced and the singlehoming side is subsidized provides no sufficient results to verify or reject this assumption. In summary, this analysis shows that competition in the SNS environment does neither generally harm user privacy nor does it necessarily improve it. However, the latter seems less likely, unless the competition for users' trust outweighs all the other privacy divergent aspects. The case of competition in the Internet MSP is complex and current statistics provide not enough data to give a solid answer to the question whether advertisers or users are subsidized by the SNO. Nevertheless, the analysis of our research question shows that competition can be assumed to have a negative influence on user privacy at the present stage.

References

1. Zittrain, J.: The future of the internet - and how to stop it. Yale University Press (2008)
2. Beuscart, J.-S., Mellet, K.: Business Models of the web 2.0: Advertising or the Tale of Two Stories. Communications & Strategies, Special Issue (2008)
3. Seltzer, M.: The Surveillance State of Today. Davos, Swiss (2015)
4. Lawani, O., Aïmeur, E., Dalkir, K.: Improving Users' Trust Through Friendly Privacy Policies: An Empirical Study. International Conference on Risks and Security of Internet and Systems, 55–70 (2015)
5. Staykova, K.S., Damsgaard, J.: A Typology of Multi-Sided Platforms: The Core and the Periphery. In: European Conference on Information Systems, 23, pp. 1–16 (2015)
6. Kane, G.C., Alavi, M., Labianca, G.J., Borgatti, S.: What's different about Social Media Networks? A Framework and Research Agenda. MIS Quarterly, forthcoming (2012)
7. Ellison, N.B.: Social Network Sites: Definition, History, and Scholarship. Journal of Computer - Mediated Communication 13, 210–230 (2007)
8. Buchmann, J.: Internet Privacy. Springer (2012)
9. Shapiro, C., Varian, H.R., Becker, W.E.: Information Rules: A Strategic Guide to the Network Economy. Journal of Economic Education 30, 189–190 (1999)
10. Westin, A.F.: Privacy and Freedom. Atheneum, New York (1967)
11. Westin, A.F.: Social and Political Dimensions of Privacy. Journal of social issues 59, 431–453 (2003)
12. Nolte, C.-G.: Personal Data as Payment Method in SNS and Users' concerning Price Sensitivity - A Survey. In: Business Information Systems Workshops, pp. 273–282 (2015)
13. Schermer, B.W.: The limits of privacy in automated profiling and data mining. Computer Law & Security Review, 45–52 (2011)
14. Stutzman, F., Gross, R., Acquisti, A.: Silent listeners: The evolution of privacy and disclosure on facebook. Journal of privacy and confidentiality 4, 2 (2013)
15. Acquisti, A., Gross, R.: Imagined communities: Awareness, information sharing, and privacy on the Facebook. International workshop on privacy enhancing technologies, 36–58 (2006)
16. Norberg, P.A., Horne, D.R., Horne, D.A.: The privacy paradox: Personal information disclosure intentions versus behaviors. Journal of Consumer Affairs 41, 100–126 (2007)

17. Preibusch, S., Hoser, B., Gürses, S., Berendt, B.: Ubiquitous social networks–opportunities and challenges for privacy-aware user modelling. In: Workshop on Data Mining for User Modelling at UM (2007)
18. Zhang, C., Sun, J., Zhu, X., Fang, Y.: Privacy and security for online social networks: challenges and opportunities. IEEE Network 24, 13–18 (2010)
19. Nolte, C.-G., Brenig, C., Müller, G.: Coherences on Privacy in Social Network Services. A Qualitative System Dynamics Analysis. In: Privacy and Identity Management, 11, forthcoming. Springer, Karlstad, Sweden (2016)
20. Bauer, C., Korunovska, J., Spiekermann, S.: On the value of information-what Facebook users are willing to pay. Ecis 2012 proceedings (2012)
21. Rusthon, K.: DuckDuckGo: The privacy search ruffling Google's feathers, goo.gl/TSH8nj
22. Acquisti, A., John, L.K., Loewenstein, G.: What is privacy worth? The Journal of Legal Studies 42, 249–274 (2013)
23. Tucker, C.: Economics of Privacy and User-Generated Content. Emerging Trends in the Social and Behavioral Sciences: An Interdisciplinary, Searchable, and Linkable Resource (2015)
24. Rochet, J., Tirole, J.: Platform competition in two-sided markets. Journal of the European Economic Association 1, 990–1029 (2003)
25. Armstrong, M.: Competition in two-sided markets. The RAND Journal of Economics 37, 668–691 (2006)
26. Evans, D.S., Schmalensee, R.: Markets with Two-Sided Platforms. Issues in Competition Law and Policy (ABA Section of Antitrust Law) 1 (2008)
27. Hagiu, A., Wright, J.: Multi-sided platforms. International Journal of Industrial Organization 43, 162–174 (2015)
28. Bork, R.H., Sidak, J.G.: What Does the Chicago School Teach About Internet Search and the Antitrust Treatment of Google? Journal of Competition Law and Economics 8, 663–700 (2012)
29. Haucap, J., Kehder, C.: Suchmaschinen zwischen Wettbewerb und Monopol: Der Fall Google. In: Wettbewerb und Regulierung in Medien, Politik und Märkten, pp. 115–154. Nomos Verlagsgesellschaft mbH & Co. KG (2013)
30. Haucap, J., Heimeshoff, U.: Google, Facebook, Amazon, eBay: Is the Internet driving competition or market monopolization? International Economics and Economic Policy 11, 49–61 (2014)
31. Müller, G., Flender, C., Peters, M.: Vertrauensinfrastruktur und Privatheit als ökonomische Fragestellung. Internet Privacy, 143–188 (2012)
32. Knoll, J.: Advertising in social media: a review of empirical evidence. International Journal of Advertising 35, 266–300 (2016)
33. Krasnova, H., Spiekermann, S., Koroleva, K., Hildebrand, T.: Online social networks: why we disclose. Journal of Information Technology 25, 109–125 (2010)
34. Lin, K.-Y., Lu, H.-P.: Why people use social networking sites: An empirical study integrating network externalities and motivation theory. Computers in Human Behavior 27, 1152–1161 (2011)
35. Mankiw, N.G.: Principles of Microeconomics. South-Western Cengage Learning, Mason, Ohio (2012)

36. Kwon, H.E., Oh, W., Kim, T.-H.: One-Sided Competition in Two-Sided Social Platform Markets? An Organizational Ecology Perspective (2015)
37. Zimmermann, C., Nolte, C.-G.: Towards Balancing Privacy and Efficiency. A Principal-Agent Model of Data-Centric Business. International Workshop on Security and Trust Management, 89–104 (2015)
38. Torres, A.M.: Social networking and online privacy: Facebook users' perceptions. Irish Journal of Management (2012)
39. Barary Savadkoohi, F.: Personalized online promotions: long-term Impacts on customer behavior (2012)
40. Tucker, C.E.: Social networks, personalized advertising, and privacy controls. Journal of Marketing Research 51, 546–562 (2014)
41. Ahn, D.-Y., Duan, J.A., Mela, C.F.: An equilibrium model of user generated content. Available at SSRN 1957989 (2011)
42. Mital, M., Sarkar, S.: Multihoming behavior of users in social networking web sites: a theoretical model. Information Technology & People 24, 378–392 (2011)
43. Eisenmann, T., Parker, G., van Alstyne, M.W.: Strategies for two-sided markets. Harvard business review 84, 92 (2006)
44. Facebook introduces new privacy controls. The Irish Times (2008)
45. Gross, D.: Facebook privacy now defaults to friends only, goo.gl/hQZ9ur
46. Prigg, M.: One more reason to Google yourself: Search giant to add privacy information letting users see what it knows about them. Dailymail.com (2016)
47. van Eecke, P.: Technology firms and the European General Data Protection Regulation: How should they prepare?, http://goo.gl/hI7yQJ
48. Vestager, M.: Competition in a Big Data World. Munich, Germany (2016)
49. brt/dpa/AP: Datenschutz-Anpassung: WhatsApp gibt Telefonnummern an Facebook weiter, goo.gl/Pe0sW4
50. Sullivan, D.: Facebook Instant Articles: A Slippery Slope For Google To Do The Same, Hurting The Web?, goo.gl/ui0PZz
51. Constine, J.: Wait, Did Facebook Just Build A Kickstarter Competitor?, goo.gl/Eagrp7
52. Kaiser, U., Wright, J.: Price structure in two-sided markets: Evidence from the magazine industry. International Journal of Industrial Organization 24, 1–28 (2006)
53. Athey, S., Calvano, E., Gans, J.S.: The Impact of Consumer Multi-Homing on Advertising Markets and Media Competition (2012)
54. Olbrich, R., Holsing, C.: Facebook Ads. WIST 43, 557–560 (2014)
55. Duggan, M., Ellison, N.B., Lampe, C., Lenhart, A., Madden, M.: Social Media Update 2014 (2015)
56. eMarketer: Net digital advertising revenue share of major ad-selling online companies worldwide from 2012 to 2014 (2014)
57. DeLong, J.B., Summers, L.H.: The'new economy': background, historical perspective, questions, and speculations. Economic Review-Federal Reserve Bank of Kansas City 86, 29 (2001)