

Between the Profiles: Another such Bias. Technology Acceptance Studies on Social Network Services

Katsiaryna S. Baran^(✉) and Wolfgang G. Stock

Department of Information Science, Heinrich Heine University Düsseldorf,
Düsseldorf, Germany
Katsiaryna.Baran@hhu.de

Abstract. Unfortunately, social science surveys are often confronted with biases. Due to network effects, on network markets, e.g. on markets of Social Network Services (as Facebook), only one company, the “standard,” dominates a local (or even the global) market. Common models of evaluation and acceptance of information systems (as variants of the Technology Acceptance Model, TAM) capture systems’ quality on dimensions of perceived ease of use, perceived usefulness, trust, and fun. In an empirical investigation on different user groups, we found that the users were not able to present unbiased quality estimations of “their” standard system and other, non-standard systems. They were captured in their standard, leading to the conception of the “standard-dependent user blindness” (SDUB). So users’ quality statements on information systems on network markets are a highly vulnerable area of surveys.

Keywords: Technology acceptance model (TAM) · Social network service (SNS) · Survey · Bias · Standard-dependent user blindness (SDUB) · Facebook · Vkontakte

1 Introduction

To capture user experience with information systems and to perform qualitative and quantitative measurement and evaluation tasks, social sciences as well as computer science (including HCI research) often make use of surveys [14, 19]. All known common models of technology acceptance and information system evaluation bank on user statements. The Technology Acceptance Model (TAM) [5] and its successors, e.g. TAM 2 [21], the Unified Theory of Acceptance and Use of Technology (UTAUT) [22], the Model of Adoption of Technology in Households (MATH) [4], TAM 3 [20], the DeLone and McLean model [6, 7], the Jennex and Olfman model [10] or the Information Service Evaluation Model (ISE) [16] try to measure information systems’ quality on dimensions such as perceived ease of use, perceived usefulness, trust, and fun. All those dimensions are constructs. Are the constructs valid? Studies based on the TAM model family always work with user surveys. Are the surveys valid and reliable?

During the course over the last years, Social Network Services (SNSs) became very popular all over the world [2]. The diffusion of services on information markets such

like Facebook or Vkontakte is a typical phenomenon of network economics following the principle of “success breeds success”. The more users an information service is able to attract the more the value of the service will increase. More valuable services will attract further users. If an information service passes the critical mass of users, network effects will start [11]. When such a critical mass of users is achieved, we typically observe a steep increase in users and usage [17]. Each user that enters the network imposes a positive externality since she or he increases the value of the system. This leads to positive feedback loops for direct network effects (more users—more valuable service—any more users) and indirect network effects (more complementary products—more valuable service—any more complementary products) and in the end to one standard in a certain region [13, 17]. The value of being a member of a SNS does not depend in the main on the objective characteristics of an SNS but on the number of other people that are using the same SNS (“to keep in touch with old and current friends” [8]). The important feature is that “users are suppliers of content as well as consumers of content” [8]. The presence of network effects implies that positive feedback effects are working for the largest network; the strong becomes stronger and the weak becomes weaker. This, in turn, implies—in terms of the Swedish pop group ABBA—that “the winner takes it all, the loser standing small” [1]. Due to these network effects, we are able to identify exactly one SNS player, which became standard on a national information market.

In Germany, we could observe a struggle between studiVZ, a German SNS, and Facebook; and the winner was and is: Facebook [2]. In Russia, there was a struggle between Odnoklassniki (which was the first mover) and Vkontakte, while Facebook never played a major role. The winner in Russia is Vkontakte [12, 18]. So both SNSs, Facebook and Vkontakte, are not first movers in Germany (it was studiVZ) and in Russia (here it was Odnoklassniki), but they became the standard on the SNSs’ national market. Facebook achieved a critical mass of German users and is able to keep its dominant position as well as Vkontakte did it in Russia [23].

Here, our research question arises: Under such conditions, are users able to give an unbiased view on the information quality dimensions of “their” standard SNS and (perhaps even better) other SNSs, which is needed for studies based on TAM and related models? The “classical” view of TAM-like studies is the analysis of the influences of indicators of perceived information system quality (as ease of use, usefulness, trust, and fun) on the acceptance of the information systems. In Fig. 1, this is the direction from the left-hand side of the model to the right-hand side. In our research, we also change the direction and ask for the influences of the acceptance indicators (in our studies [3], we work with the four dimensions of adoption, use, impact, and diffusion) on the perceived quality indicators. Our research problem lies in the direction from the right to the left in Fig. 1. How does the user’s acceptance of one single information system influence her or his perception of the ease of use, the usefulness, the trust, and the fun of this system? Under the conditions of a standard (as in SNS markets), how does the user’s acceptance of the standard influence the quality perceptions of the standard system and of further non-standard information systems? Hence, in this work we propose the following hypothesis:

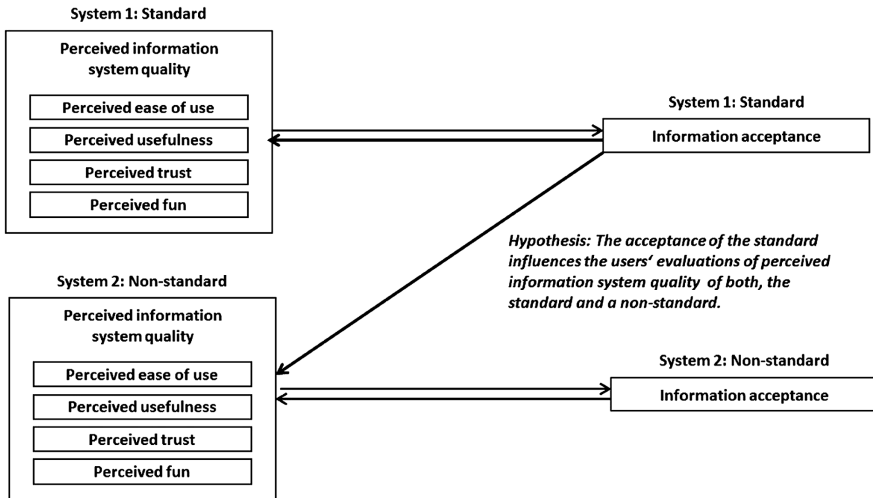


Fig. 1. Research model

The user perceptions of the quality of a SNS are strongly influenced by the standard SNS. The “winner-takes-it-all” situation makes its users “blind” to give an unbiased quality perception of “their” (standard) SNS and of other (perhaps even better) SNSs.

2 Research Method

Facebook achieved a critical mass of German users and is able to keep its dominant position in Germany as well as Vkontakte did it in Russia. We tested our hypothesis on two case studies, namely Vkontakte and Facebook. The target respondents of this study were current SNS users in Moscow, Russia, and Düsseldorf, Germany. Empirical data for this study was collected by a questionnaire in February and March 2014. Our test persons were Russian students from Lomonosov Moscow State University ($N = 54$) and German students from Heinrich Heine University Düsseldorf ($N = 27$). The surveys took place at both universities. We conducted the study among those user groups, because both social network sites, Facebook and Vkontakte, are initially targeting at students but later welcoming everyone [18]. A total of 81 test persons finished the questionnaire. Among these SNS users, 61.1 % were female and 38.9 % were male. Most of the test persons were between 18 and 28 years old. A large proportion of Russian participants has a Vkontakte account and use Vkontakte frequently; all Russian students have also a Facebook account, but most of them do not use it actively. German students have a Facebook account and use it very actively, but they did not have a Vkontakte account. So our test persons were instructed to create it for this study and used it actively about one month. All test persons were familiar with both SNSs.

The questionnaire included 50 items. On a scale between 1 (not at all) and 10 (highly applying), every test person had to estimate the importance of an indicator for his or her SNS behavior for both services, Facebook and Vkontakte. Our test persons

were asked on adoption, use, impact and diffusion as well as on their quality perceptions for both SNSs, the standard and the non-standard. Typical questions for the dimension of information system quality were: “Is the design of SNS clear and easy to use?,” “Could you quickly orient yourself on the website?,” “Is Vkontakte/Facebook easy to use?” and “Do you find that Vkontakte/Facebook enriches your life?” etc. Besides the language (Russian versus German) all questions were identical. The standard/non-standard distinction is oppositional. What in Germany is the standard (namely Facebook), is a non-standard in Russia. And what in Russia is the standard (namely Vkontakte), is a non-standard in Germany.

3 Quality Perceptions of the Standard and the Non-standard SNSs: The Standard Dependent User Blindness (SDUB)

We will present the results of our two case studies, for Vkontakte as standard (Russia) and non-standard (Germany) (Fig. 2) and for Facebook as standard (Germany) and non-standard (Russia) (Fig. 3). For all indicators of information systems’ quality our Russian and German participants chose their favorite SNS—Russian users favor Vkontakte over Facebook and German users favor Facebook over Vkontakte. Almost all values are twice as high for the standard. Keep in mind that there were identical questions and identical systems to evaluate! The only difference is in the user group with its specific standard. Additionally, the differences between the standard SNS and the non-standard SNS are statistically very significant for nearly all indicators apart from usefulness of the Russian standard (Vkontakte).

For perceived ease of use, the difference between the evaluation of the standard and the non-standard users is 1.31 points (**) for the case study of Vkontakte and even 2.96

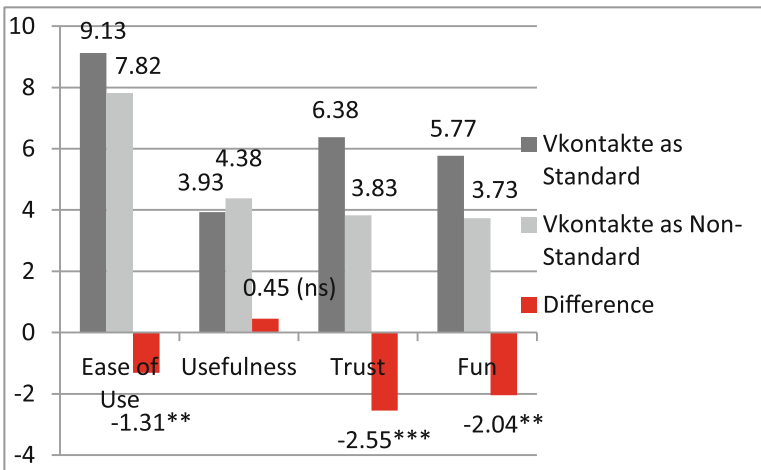


Fig. 2. Quality perceptions for standard and non-standard SNSs. Case study 1: Vkontakte ns: not significant; **: p < 0.01; ***: p < 0.001

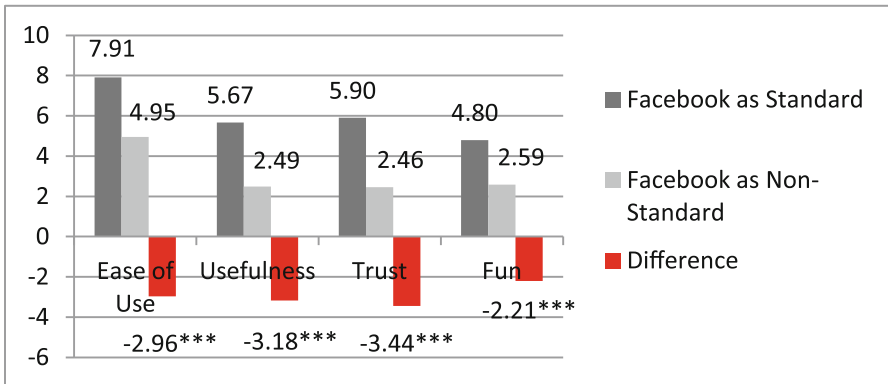


Fig. 3. Quality perceptions for standard and non-standard SNSs. Case study 2: Facebook

points (***) for the other case study of Facebook. The standard is more easy to use for its common users.

The case study of Vkontakte does not lead to statistically significant differences for the TAM dimension of usefulness. But the Facebook case study shows a great difference of 3.18 points (***). For Facebook standard users this SNS is more than twice as useful as for non-standard users (5.67 points in contrast to 2.49 points).

Perceived trust shows extreme differences for both case studies. The difference for case study 1 (Vkontakte) is 2.55 points (***), while the difference for the Facebook case study is 3.44 points (***). The standard's users do trust "their" SNS and trust to a much lesser extend other SNSs.

For perceived fun both case studies exhibit great differences between the standard and non-standard users. The Vkontakte study amounts to a difference of 2.04 points (***) and the Facebook case to a difference of 2.21 points (***). All users have much more fun with "their" standard than with a non-standard SNS.

It is obvious that identical questions on the same SNSs lead to completely different answers in dependence of the affinity of the users' standard SNS. Our research hypothesis could be clearly confirmed. The users were not able to give an unbiased quality perception on SNSs. We will call this bias on SNS markets the "standard-dependent user blindness" (SDUB) [3]. This bias seems not to be a known bias (such as the similar bias of social desirability [9]), but a new method bias [15].

4 Conclusion

Considering the wide distribution of TAM-like studies in the social sciences, computer science and information systems research as well as the great importance of SNSs nowadays, the results of our study on the conditions of the system quality perceptions are extremely interesting and also new. This study discovered that users perceive the quality of a SNS dependent on their standard SNS in favor of their standard system and in disadvantage of the non-standard information systems. The "winner-takes-it-all"

situation makes its users “blind” to give an unbiased quality perception of “their” (standard) SNS and of other SNSs. SNS quality estimations by users are obviously highly vulnerable areas of surveys.

If such an effect applies on other markets of the network economy, we always must expect the biased user perceptions, the standard-dependent user-blindness (SDUB), in all social and computer science studies concerning social media insofar it relies on TAM-like user surveys. On network markets, describing information systems quality by user statements is highly biased, because the users are caught up in their standard system.

References

1. Anderson, B., Ulvaeus, B.: The winner takes it all/ABBA. Polar Music (1980)
2. Baran, K.S., Fietkiewicz, K.J., Stock, W.G.: Monopolies on social network services (SNS) markets and competition law. In: F. Pehar, C. Schlögl (Eds.), *Re:inventing Information Science in the Networked Society*. Proceedings of the 14th International Symposium of Information Science, Hülsbusch, Boizenburg, Germany (2015)
3. Baran, K.S., Stock, W.G.: Interdependencies between acceptance and quality perceptions of social network services: the standard-dependent user blindness. In: *Proceedings of the 9th International Multi-Conference on Society, Cybernetics and Informatics (IMSCI 2015)*, 12–15 July 2015, Orlando (2015)
4. Brown, S.A., Venkatesh, V.: Model of adoption of technology in households: a baseline model test and extension incorporating household life cycle. *MIS Q.* **29**(3), 399–426 (2005)
5. Davis, F.D.: Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **13**(3), 319–340 (1989)
6. DeLone, W.H., McLean, E.R.: Information systems success. the quest for the dependent variable. *Inf. Syst. Res.* **3**(1), 60–95 (1992)
7. DeLone, W.H., McLean, E.R.: The DeLone and McLean model of information systems success. a ten-year update. *J. Manage. Inf. Syst.* **19**(4), 9–30 (2003)
8. Fjell, K., Foros, Ø., Steen, F.: *The Economics of Social Networks: The Winner Takes it All?* Institute for Research in Economics and Business Administration (SNF Working Paper; 42/10), Bergen, Norway (2010)
9. Furnham, A.: Response bias, social desirability and dissimulation. *Personality Individ. Differ.* **7**(3), 385–400 (1986)
10. Jennex, M.E., Olfman, L.: A model of knowledge management success. *Int. J. Knowl. Manage.* **2**(3), 51–68 (2006)
11. Katz, M.L., Shapiro, C.: Systems competition and network effects. *J. Econ. Perspect.* **8**(2), 93–115 (1994)
12. Khveshchanka, S., Suter, L.: Vergleichende Analyse von profilbasierten sozialen Netzwerken aus Russland (Vkontakte), Deutschland (StudiVZ) und den USA (Facebook). *Inf. Wiss. Prax.* **61**(2), 71–76 (2010)
13. Linde, F., Stock, W.G.: *Information Markets A Strategic Guideline for the I-Commerce*. De Gruyter Saur, Berlin, New York (2011)
14. Müller, H., Sedley, A., Ferrall-Nunge, E.: Survey research in HCI. In: Olsen, J., Kellogg, W. (eds.) *Ways of Knowing in HCI Research*, pp. 229–266. Springer, New York (2014)

15. Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P.: Sources of method bias in social science research and recommendations on how to control it. *Annu. Rev. Psychol.* **63**, 539–569 (2012)
16. Schumann, L., Stock, W.G.: The Information Service Evaluation (ISE) model. *Webology*, 11(1), Article 115 (2014)
17. Shapiro, C., Varian, H.R.: *Information Rules: A Strategic Guide to the Network Economy*. Harvard Business School, Cambridge (1998)
18. Sikorska, O.: Facebook vs. Vkontakte: Kampf der Titanen auf dem russischen Markt (2013). <http://allFacebook.de>
19. Stern, M.J., Bilgen, I., Dillman, D.A.: The state of survey methodology: challenges, dilemmas, and new frontiers in the era of the tailored design. *Field Methods* **26**(3), 284–301 (2014)
20. Venkatesh, V., Bala, H.: Technology acceptance model 3 and a research agenda on interventions. *Decis. Sci.* **39**(2), 273–315 (2008)
21. Venkatesh, V., Davis, F.D.: A theoretical extension of the technology acceptance model: four longitudinal field studies. *Manage. Sci.* **46**(2), 186–204 (2000)
22. Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D.: User acceptance of information technology: toward a unified view. *MIS Q.* **27**(3), 425–478 (2003)
23. Winkels, M.: *The Global Social Network Landscape: A Country-by-Country Guide to Social Network Usage*. eMarketer, New York (2013)