

SUPERDISTRIBUTION OF PROFESSIONAL AND USER-GENERATED CONTENT - THE USER'S PERSPECTIVE

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Abstract. Superdistribution is a user-centric approach for the mass-market dissemination of media contents like music, videos, or slide shows. It is based on the idea that consumers can directly and legally exchange content among each other, and adopts the principles of viral marketing as well as multi-level networking. Superdistribution has many facets and may be applied for a broad range of business scenarios. The music industry, for example, which is still suffering from illegal file sharing, has recently identified it as an alternative marketing and distribution channel and initiated activities for making Digital Rights Management (DRM) ready for Superdistribution. However, Superdistribution is not limited to protected content, but can also be applied for the dissemination of user-generated and unprotected content. This paper investigates the user's perspective on this new approach. It presents the results of three user studies, which have been conducted with different prototypes and test cases. Furthermore, the paper points out limitations of Superdistribution and identifies further research needs.

1. Introduction

Digital content like music, video, text, games, or software are traditionally distributed from provider to user, with or without a merchant as intermediary. Superdistribution as a multi-level networking approach, where digital contents are distributed by the consumers, for example via email, peer-to-peer platforms, Bluetooth, memory sticks, or other distribution channels, is

an alternative approach that is focused in this paper. It differs from the classical, partly illegal file sharing by including mechanisms for keeping control about the usage of protected content and its clearing, or by granting incentives to the consumers that have forwarded content to their friends, relatives, or colleagues. Superdistribution is not limited to be used for professional content - it can also be applied to distribute user-generated content (UGC). Therefore, it is in line with the ideas of the Web 2.0 paradigm, which represents a general re-alignment of the "plain old Web" with its clearly assigned roles of providers and consumers towards features like user-centricity, democratization, and openness.

As the concept of Superdistribution is widely described in theory (Mori and Kawahara, 1990; Gehrke and Anding, 2002), our research focus lies in the user acceptance and usability aspects of this new approach, both of which have been examined in two exploratory user studies.

The remaining paper consists of four sections. Hereafter we will give a short summary of the theories and concepts that underlie this paper. Chapter 3 describes the methodology and results of three user studies. Subsequently limitations and further research needs are discussed and at last a conclusion is given.

2. Background

The concept of Superdistribution as originally defined by Mori and Kawahara (Mori and Kawahara, 1990) allows for decentral exchange of content combined with a usage based charge mechanism and a defense mechanism against interference to assure proper operation. The basic idea is to distribute content over the Internet's infrastructure in a decentral way and to monitor its usage for charging the user accordingly.

Alongside with the technical implementation, possibilities of the Superdistribution concept research was conducted in the field of revenue sharing business models in peer-to-peer file sharing systems (Gehrke and Anding, 2002). The revenue sharing component leads to the extension of the technical peer-to-peer model by an economic peer-to-peer concept. The commission-based distribution remunerates users who redistribute the protected content to spread it like a viral infection. The authors argue that such business models supersede illegal free file sharing systems as the owners of music are compensated for their expenditures. Furthermore, the possibility to attain revenues constitutes a gambling factor according to the authors with the security not to act illegally as they would do using traditional file sharing systems.

One of the first to apply these two concepts to music was the *Potato System* (Nützel and Grimm, 2003). The system remunerates those users with

a defined commission who actively redistribute content within the system. By now, the idea of Superdistribution is also implemented in several other Internet services, e.g. *www.passalong.com* or *www.musicgremlin.com* but none of them has reached mass-market status yet. Thus, the user's adoption behavior needs to be analyzed from eligible theoretical and empirical perspective to discover reasons for this reluctant development.

Empirical research was already conducted to investigate the effects of splitting ratios when splitting revenues among the members of a supply chain (Quiring et. al., 2007). Results indicate that users' download behavior does not strictly relate to increasing revenue share. It is concluded that users foremost seem to acknowledge the possibility to participate actively in this business model and do not act as profit maximizing actors.

As Superdistribution offerings available today are combined with digital rights management (DRM) systems, which limit the content's usage to a defined extend of operations, DRM is also relevant in this context. Research has come to the conclusion that the DRM-induced limitation of content-usage significantly reduces customer's willingness to pay (Dufft et. al, 2005). This is the reason why several music labels are offering DRM-free music downloads by now. As this effect may override the positive incentives of Superdistribution, we analyze alternatives for DRM in Superdistribution offerings.

3. Methodology and results

For our exploratory research questions, we settled for a qualitative research strategy applying triangulation. This greatly reduces uncertainty of qualitative results by confirming one proposition by two or more independent measurement processes (Wimmer and Dominick, 2006). In this context we supplemented observational data from two exploratory experiments with data gathered by interviews and questionnaires. The overall research design is summarized in Figure 1.

During the whole study a qualitative research strategy was used. Thereby the participants' perspectives come to the fore. Furthermore the object area of OMA DRM V2.0¹ and Superdistribution can be investigated to gain a better understanding (Hopf 1979, 16).

¹ OMA DRM V2.0 is a Digital Rights Management System developed by the Open Mobile alliance that includes Superdistribution.

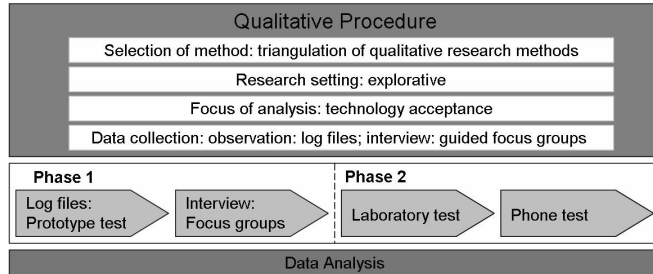


Figure 1. Research design.

3.1 RESEARCH PHASE 1 – OMA DRM V2.0 PROTOTYPE

In order to precisely test the attitudes towards OMA DRM V2.0 we settled for an operational prototype and subsequent focus group interviews.

The use cases implemented include downloading files from a test platform by mobile phones or laptops, sharing files with friends and their devices or sharing files with one's own devices. The prototype consisted of a central server hosting 400 music files protected with OMA DRM V2.0 and the accounting mechanisms to track the chosen way of distribution and register the Domain Sharing partnerships where the legitimate owner of a music file grants selected people access to his proprietary content repository.

A field test setup was chosen to give room to extensive trials and to better approximate the participants' music consumption habits in order to increase validity (Ahrens, Hess, Pfister and Freese, 2008). To enable a natural handling of the prototype, people were recruited in their natural circle of friends (networks). After the test each group took part in a focus group.

The results show that the concept of Superdistribution was not judged positively by the participants. Being used to the possibility to satisfy the demand for music via illegal file sharing systems, the participants didn't ascribe high importance to the fact that Superdistribution enables legal file sharing. The analysis of statements of the recorded focus group interviews showed the following results: Both Superdistribution and Domain Sharing were perceived as restricting by the participants. The attitude towards Domain Sharing was more positive than towards Superdistribution across all groups. Our results suggest that a less restricting DRM technology such as OMA DRM V2.0 by itself is not regarded to be a superior technology by users. They reacted very strongly to limitations of use, which is consistent with earlier research findings described above.

3.2 RESEARCH PHASE 2 – LABORATORY TEST AND PHONE TEST

The focus group analysis in Phase 1 provided insight into participants' reported Superdistribution behavior, their rather negative finding of Superdistribution and their animosity towards limitations due to DRM. The presented form of DRM, the test in a network of befriended people, and a possible different association with music could have caused bad acceptance. To avoid this and to get a better comprehension of people's preferences concerning Superdistribution, the explorative research was continued in two further tests to observe acceptance and handling of different technical solutions, and to find out a possible alternative.

Currently, the most promising technical solution for our purposes is the multimedia format *Adobe Flash*. The first reason is that it supports any type of media, such as text, slideshows, videos, games and more. Secondly, it is possible to add functionality, such as reporting activity to a server, which then can be stored in a database. The latter is necessary for analyzing how different types of content are distributed. In particular it needs to be registered how many people viewed the content and how they rated it.

3.2.1 *Laboratory Test*

To analyze people's behavior due to different technical solutions a laboratory test was conducted. Therefore 30 people were invited to the lab in consecutive sessions, where they opened a specific content from their mailbox in different ways. Either the content was attached to the email as Flash file, html file or the email contained a URL. By closely watching participants' actions while trying to handle the different formats, problems and their origins could be identified easily. To foster this, the participants were asked to use the "Think Aloud Method" (van Someren, 1994). That way we could better understand potential problems or preferences for one or the other format. In the end participants were asked to fill out a questionnaire to find out about their attitude towards the different formats as well as their motivation and behavior when actually forwarding content.

The laboratory test showed that the link was clearly easier to handle than the html or Flash file. While all participants were able to view the content using the URL, only 68.8% were able to open the HTML attachment and only 46.9% could open the .swf file. The average time used to open the .swf file was significantly higher (34.8 sec) than for the html (21.4 sec) or the URL (9.28 sec). Although these numbers represent the first-time usage rather than the every-day usage, because most users had never done a task like this before, the results demonstrate the difficulties the Flash format brings about. Even the average time of those participants, who had worked with Flash before, is significantly higher (17.7 sec).

The main usability problem was that – as Flash is usually embedded in websites – the file extension .swf is largely unknown. Also, it is not possible to simply double-click the file, because today’s operating systems do not associate the extension .swf with Internet browsers, even if the plug-in is installed. Another problem with locally playing Flash content was the connection to the server. When a .swf file tries to report activity to an unknown server a security warning is given and by default the activity is stopped. This does not happen if the Flash file is stored on the same server, which registers activity.

To understand the motivation for distributing content, five possible motivational factors were examined: Altruism, reputation, entertainment, community idea, and opinion leadership. The results show that the one main reason is altruism. While the other motives showed no evidence at all, participants declared to forward attachments in emails to “let others take part” and “provide a benefit for others”.

Another barrier could be that people generally need to install some type of software before using Superdistribution. Therefore the general willingness to install plug-ins was examined. Regarding this, participants stated they were mainly motivated to do so when the content seemed important to them (mean 4.4 with a standard deviation of 0.980)². Whether the content is sent by a close friend or not has only little impact (mean 3.6 with a standard deviation of 1.305).

To validate these results another test was designed, which aimed at observing the actual behavior due to forwarded content in combination of a certain format.

3.2.2 Phone Test

To make sure the statements given in the questionnaire correlate to the actual behavior of the participants, a phone test was arranged, where participants were directly asked about their behavior. Prior to the phone interview the research team sent emails to 17 acquaintances. The email contained a URL, which lead to the same content used in the laboratory test. As humor is the most common received content category³ (Phelps, Lewis, Mobilio, Perry and Raman, 2004) we presumed positive results. A few days later, participants were interviewed during an unexpected phone call. The questions asked in the phone interview were similar to the ones used in the laboratory test: First, the usability issues were discussed, and second, their motivation for forwarding this content. This way of questioning allowed us to get

² on a 5-point-scale from 1 = “not at all” to 5= “very much”

³ Phelps et al. found out that «jokes» are with 48.8% the most frequent content send by forwarded emails (2004, p. 341).

information about the actual behavior rather than the assumed behavior. However, there was the possibility of social desirability (see Chapter 4 “Discussion”).

Three quarters of the participants stated that they had opened the received link (13 out of 17). Again altruism is the main reason for forwarding attachments to others (mean 4.5 with a standard deviation of 1.033). The dimensions community idea, entertainment, opinion leadership, and reputation turned out to be irrelevant (means from 2.9 to 1.8).

Altogether three key results were gained from the laboratory and phone test. First, opening of Flash files locally leads to usability problems as the file extension is widely unknown and not automatically opened with the right application. Second, people are willing to install plug-ins only if the content is perceived as important or was sent by friends. Finally, the main reason for forwarding is altruism.

4. Discussion

As with all exploratory research, this study has its limitations. First, qualitative exploratory research does not – due to small numbers of participants – provide representative results. Having more participants would enhance generalizability. Nonetheless, we got tendencies and trends usable in further research.

Furthermore, the study could not test DRM in all its aspects. However, the key results can deduce a use of DRM as follows: it should be invisible and easy to install and it could work well when “cool” content is sent from friend to friend. In this case most people would install it without thinking too much about it.

Another problem is the aspect of social desirability. Especially in the phone test it is possible that participants chose answers they thought to be appropriate even if other answers would be more correct (Bortz and Döring, 2002).

5. Conclusion

From theoretical perspective, Superdistribution seems to be a promising approach as an innovative, intuitive mean of content distribution. As the services available today have not (yet) reached mass-market stage, the user acceptance and usability may be improvable - an aspect which is addressed in this paper. As our explorative results show, Superdistribution enabled by OMA DRM V2.0 and Domain Sharing are perceived as restriction and not as superior technology. As concrete implementation of Superdistribution, we

analyzed *Adobe Flash* as it is able to contain various media formats and additional functions. However, our results show that although *Flash* is installed on a broad base of clients, there are still serious usability problems as *Flash* files are not automatically opened with the right application. Concerning user motivation, we found out that altruism is the main motivation for Superdistribution, and superdistributed content reaches the highest rate of reception if it is perceived as important and sent by friends. Hence, in the future alternative approaches to distribute this kind of content need to be thought up and tested at large scale.

References

- Ahrens, S., Hess, T., Pfister, T. and Freese, B.: 2008, Critical Assumptions in Superdistribution based Business Models – Empirical evidence from the user perspective, *Proceedings of the 41th Annual Hawaii International Conference on System Sciences (HICSS 2008)*, Hawaii.
- Bortz, J. and Döring, N.: 2002, *Forschungsmethoden- und Evaluation für Human- und Sozialwissenschaftler* (3rd edition), Springer-Verlag, Berlin, Heidelberg, New York.
- Dufft, N., Stiehler, A., Vogeley, D. and Wichmann, T.: 2005, *Digital Music Usage and DRM-Results from an European Consumer Survey*, Indicare Project.
- Gehrke, N. and Anding, M.: 2002, A Peer-to-Peer Business Model for the Music Industry, in J. L. Monteiro, P. M. Swatman and L. V. Tavares (eds.), *Towards the knowledge society – eCommerce, eBusiness and eGovernment*, Kluwer Academic Publishers, Boston, pp. 243-257.
- Hopf, C.: 1979, Soziologie und qualitative Sozialforschung, in C. Hopf and E. Weingarten (eds.), *Qualitative Sozialforschung* (2nd edition), Stuttgart: Klett-Cotta, pp. 11-37.
- Mori, R. and Kawahara, M.: 2000, *Superdistribution – The Concept and the Architecture*, the transactions of the IEICE E 73, 7.
- Nützel, J. and Grimm, R.: 2003, *Potato System and signed Media Formats – an Alternative Approach to Online Music Business*, Wedelmusic 2003 conference, Leeds, United Kingdom.
- Phelps, E. P., Lewis, R., Mobilio, L., Perry, D. and Raman, N.: 2004, Viral marketing or Electronic Word-of-Mouth Advertising: Examining Consumer Responses and Motivations to Pass Along Email, *Journal of Advertising Research*, **44**(4), pp. 333-348.
- Quiring, O., von Walter, B. and Atterer, R.: 2007, Money from Peer to Peer - an Experiment on File Sharing Behavior under Different Economic Conditions, in *Proceedings of the 57th Annual Conference of the International Communication Association*, San Francisco, USA.
- van Someren, W.M., Barnard, F.Y. and Sandberg, A.C.J.: 1994, *The Think Aloud Method: A practical guide to modelling cognitive processes*, Academic Press Limited, London.
- Webb, E.J., Campbell, D.T., Schwartz, R.D., Sechrest, L. and Grove, J.B.: 1981, *Nonreactive measures in the social sciences*, Houghton Mifflin, Boston.
- Wimmer, R.D. and Dominick, J.R.: 2006, *Mass Media Research*, Thomson, Belmont.