

Introducing the e-newspaper – Audience Preferences and Demands

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Abstract

This paper adds to the overall understanding of new media adoption in general and the promotion of the e-newspaper in particular by empirically studying the preferences and demands of the potential users. The e-newspaper is a newspaper published on e-paper technology. The findings in this paper is based on the results from two studies, i.e. an online questionnaire with 3626 respondents and an evaluation in real life settings with 10 families over a two week period. Our initial hypothesis was that: *users confronted with a vision of new technology and services are more positive to adopt than users with actual use experience of technology and services in an early stage of development with inherent technology problems*. The research question of the paper is: *How does use experience influence perceptions of preferences and demands for the e-newspaper?* The findings showed that the hypothesis proved to be false, the test persons that have an actual use experience of the e-newspaper, despite the shortcomings in the device and service, were more positive to adopt than the respondents that have experienced concept movies and prototypes with more advanced functionality and interface.

Keywords: new media adoption; user experience; e-newspaper

1 Introduction

New mobile devices are constantly being introduced to the market offering new opportunities for publishing mobile media content and services. It is very difficult however, for content providers to predict m-commerce markets due to the uncertainties related to adoption of new mobile technology and services [1]. Moreover, this situation is new not only to content providers, it is also new to the audience. The rapid introduction of mobile technology and new services has led to a situation where users are constantly trying out new appliances and new services. This in turn changes use patterns as well as creates new preferences and demands, which leads to uncertainty about what people want [1].

Mobile service adoption has been studied by many scholars, e.g. drivers for adoption and intentions to adopt mobile services [2], factors influencing adoption [3, 4], adoption patterns [5-7], and attitudes towards using mobile services [8]. Much of this research has been focused on the adoption of mobile devices as such, as without adoption of devices there is not any prospect for successful m-commerce [9]. On the other hand, we argue that without attractive mobile content and services there is no incitement for m-commerce. This is indicated by the fact that in spite of the high penetration of mobile phones, which in Sweden and Italy were as high as 110% in 2006 [10], m-commerce has not taken off as hoped for [11, 12].

In the DigiNews and UbiMedia projects we have studied the potential of a new innovation for the media sector, i.e. the e-newspaper published on e-paper technology. As the e-newspaper introduction concerns both a new device as well as new content, it makes it an interesting case to study from an adoption point of view. As argued by Sarker and Wells [9], there is a need to understand adoption from the perspective of the consumers themselves. We have studied the potential willingness to adopt a future e-newspaper by presenting an online questionnaire resulting in 3626 respondents. However, it is very uncertain to trust what people think they want before having an actual experience of a product or service, we therefore also performed a user evaluation of an actual e-newspaper over a two week period with 10 families.

The research question in this paper is: *How does use experience influence perceptions of preferences and demands for the e-newspaper?* The aim is to contribute to the understanding of new media adoption as well as to contribute to the newspaper organizations preparations for launching the e-newspaper. This challenge will be

studied using the e-newspaper case described below and by testing the following hypothesis: *users confronted with a vision of new technology and services are more positive to adopt than users with actual use experience of technology and services in an early stage of development with inherent technology problems.*

The structure of this paper is as follows. In section 2 the e-newspaper case is presented followed by a description of the research method in section 3. The theoretical framework is presented in section 4. In section 5 the findings are presented and section 6 discuss the findings and conclude the paper.

2 The e-newspaper Case

This research has been conducted within two projects, i.e. DigiNews (ITEA 03015) and UbiMedia (Designing Ubiquitous Media Services through Action Research). The research started within the DigiNews project, which was a two year project including partners from Belgium, Spain, Netherlands, France and Sweden and consisted of several major technology firms, media houses and universities. The overall goal was to explore research and development issues for the future e-newspaper, i.e. a newspaper published on e-paper technology. After the DigiNews project ended in mid-year 2006, the research continued within the UbiMedia project, which is a Swedish project with partners from 9 Swedish newspaper, the Swedish Newspaper Publishers' Association and Stampen. This two-year project targets the challenge of designing ubiquitous media services for a multitude of devices and contexts to be consumed anytime and anywhere.

Electronic paper (e-paper) is the common term for several different technologies that can be used to produce screens with a number of specific characteristics. The e-paper is reflecting, giving the same reader experience as paper (such as high contrast, good color representation and the possibility to read in sunlight). The e-paper is thin, flexible and non-sensitive. In addition, it does not require high battery performance – ultimately, the screen image is stable and fix even when there is no electrical voltage applied.

The e-newspaper is predicted to combine the readability and overview from the printed newspaper with the possibilities of online media such as constant updates, interactivity and video [13], and is even predicted to replace the printed edition in the long run [14]. The potential replacement of the printed newspaper with the e-newspaper would dramatically reduce production and distribution costs for the newspaper companies.

The introduction of the e-newspaper has already begun, during 2006 two experiments with e-newspapers in real life settings has been performed, the first with the financial paper De TIJD in Belgium [15] and the second with Sundsvalls Tidning in Sweden which is one of the studies presented in this paper. In China the Yantai Daily Media Group started to publish an e-newspaper in October 2006. In all these examples the device iRex iLiad (Figure 1) was used, which is one of the two available “reading devices” on the market today, using e-paper technology.



Figure 1: iRex iLiad [16]

iRex Technologies BV, a spin-off from Royal Philips Electronics, launched the iLiad, a first generation electronic reader product in April 2006. The iLiad includes an 8.1 inch screen with 16 levels of grey and 160 dpi resolution, Wi-Fi, USB ports and MP3 capabilities [16]. Using a special marker, readers can comment on articles and scribble their notes on the screen.

The other device on the market is the Sony Reader (Figure 2), which was launched during the fall of 2006 on the U.S. market. The Sony Reader has a 6-inch screen, weight is less than 9 ounces and one can do 7.500 page views for each charge by an AC adapter. It can hold up to 80 eBooks at the same time, and allows PDFs, personal documents, newsfeeds, blogs and JPEGs. Sony offers books for the device on a new web site called Sony Connects [17].



Figure 2: Sony Reader [18]

Just to show how big this industry is expected to be, we give an example of analysts from IDTechEx who forecast plastic electronics will be a \$30 billion industry by 2015, and could reach as much as \$250 billion by 2025 [19].

3 Research Method

In the DigiNews and UbiMedia projects, described above, we have conducted several studies concerning audience preferences and demands of the future e-newspaper. In this paper we report from two of these studies, i.e. a survey with 3626 respondents and an evaluation of an early version of an e-newspaper with 10 families over a two week period.

The Survey

The survey was done through a web-based questionnaire. We presented the questionnaires at the news sites of the three Swedish newspapers that we have collaborated with in developing e-newspaper prototypes within the DigiNews project, i.e. Aftonbladet, Göteborgs-Posten and Sundsvalls Tidning (Table 1). Aftonbladet is a tabloid with the most visited news site in Sweden, Göteborgs-Posten is a local morning paper covering Göteborg (the second largest city in Sweden) and its surroundings, and Sundsvalls Tidning is a local morning paper in the north of Sweden.

<i>Newspaper</i>	<i>URL</i>	<i>Unique visitors/day</i>	<i>No. of respondents</i>
Aftonbladet	aftonbladet.se	1.200.000	3757
Göteborgsposten	gp.se	41.500	135
Sundsvalls Tidning	st.nu	14.500	447

Table 1: Newspapers hosts for questionnaires and number of respondents

The questionnaire was divided in four parts concerning background data, business models for electronic news, preferences for future electronic news and use of mobile media services. In total, 127 questions were asked and 4339 respondents answered the questionnaire. The respondents that had given an age under 15, those who did not complete or answered the questions included in this study contradictorily were excluded from the data set, resulting in a dataset containing 3626 respondents. In this paper we report from the background questions and questions regarding preferences for future electronic news.

We choose to use online questionnaires because that allowed us to show concept videos and prototypes for the respondents to obtain an understanding of the e-newspaper concept. Moreover, Buchanan and Smith [20] have argued that web samples can be as representative as or more representative than traditionally collected samples because of the heterogeneity of the online population. Although, admittedly there are inherent problems in controlling whom responds to online questionnaires. Control for cases with multiple submissions from the same IP number was handled in the data collection. Since the e-newspaper concept was not known to all potential respondents we provided them with the possibility to read more about e-paper technology on a separate page which consisted of a simplistic picture of the concept as well as links for further reading.

Further, we provided three concept videos of future e-newspaper scenarios in conjunction to the questionnaire for the respondents to watch. The movies envisioned the benefit of the e-newspaper for three different personas: the business women, the student and the senior citizen. Close ups on the designed user interface together with examples of functions showed the future e-newspaper in detail. The scenarios were based on the assumed preferences of the three personas and showed how a future e-newspaper could support their media consumption in different contexts. Watching these videos provided the respondents with an idea of what functionality the future e-newspaper could provide.

During the DigiNews project different prototypes (Figure 3) were developed for PC:s and tablet PC:s to be able to test conceptual ideas. These prototypes were developed together with newspaper designers and used contents from the newspaper partners. The prototypes also served as a way to explain how a future e-newspaper may look like and where presented with the introduction to the questionnaire. The respondents could download and test the prototypes on their own computer before they answered the questions.



Figure 3: Interactive e-newspaper prototype

The questions about preferences for a future e-newspaper regarded the e-paper device as well as the content and services. Some of the questions were statements with a 7-grade Lickert scale and others were multiple choice questions. The responses to the questionnaire were analyzed using SPSS v14.0. The analysis focused on calculation of mean scores and standard deviations for each statement and on frequencies and percentages for multiple choice questions. The goal was to generate an overview of what that was comparable to the results from the e-newspaper test persons.

The Evaluation

The evaluation was conducted with 10 families who tested an early version of an e-newspaper (Figure 4) published on the iRex iLiad in real-life settings over a two week period in the autumn of 2006. The e-newspaper of Sundsvalls Tidning was published twice daily, at 6 pm and 1 am, and was downloadable via Internet. The respondents were foremost selected to represent different types of households such as singles, couples, families with children, and senior citizens, to secure different use patterns, but we also tried to get differences in gender, ages, occupation and education. In two of the families both adults participated in the evaluation resulting in a total of 12 respondents (but only one of the extra family members answered the questionnaire – giving a total of 11 respondents to that part of the evaluation).

The two-week evaluation started with a meeting in Sundsvall, where the respondents were introduced to the device, and got a questionnaire about their media and reading habits. After two weeks of e-newspaper use, the respondents were visited in their homes for an interview about their experiences and preferences of the e-newspaper. A semi-structured interview approach [21], with an interview guide was used. These interviews were recorded and transcribed. Finally, they received a questionnaire consisting of 14 questions, partly matching the questions in the survey above.



Figure 4: E-newspaper prototype

However, as the e-paper technology in the iRex iLiad is in an early stage of development, there are some limitations compared to the e-newspaper prototypes described above. For example, the iLiad only presents 16 grayscale and have several limitations in the navigation system regulated by the device.

4 Theoretical Framework

One of the major topics in m-commerce research is user's adoption of mobile devices and services. Most of this research has been related to mobile telephony and services in 3G networks using theoretical frameworks like Innovation and Diffusion Theory [22] and Technology Acceptance Model [23]. Roger's [22] Innovation and Diffusion Theory explains among other things the Innovation-Decision Process, which contains five stages. In the second stage, the persuasion stage, the general perception of the innovation is developed which is explained by the perceived attributes, relative advantage, compatibility, complexity, observability and trialability. The later two are related to how users can experience the new technology before adoption which is the topic of this paper [3]. Rogers [22] define *observability* as the degree to which the result brought by the technology and the

technology itself is visible before adopting the technology and *trialability* as the degree to which a technology can be experimented with before adoption.

There are several studies addressing use experience and exposure in adoption processes. Sarker and Wells [9], for example, took an approach grounded in users actual practice and designed a framework for studying key issues related to mobile device use and adoption, including aspects of mobility. This framework is built as an input-process-output model. The inputs are user characteristics, communication/task characteristics, technology characteristics, modality of mobility, and surrounding context. The process consists of *exploration and experimentation* as one sub process and *assessment of experience* as another. Output refers to actual adoption behaviors, such as continuity of use over time. As this framework is based on study of motivations and circumstances surrounding individual's adoption and use of mobile devices, some of the issues described in the framework are related to communicational tasks such as voice communication, SMS, e-mail not applicable in this study.

In another study, the role of exposure to the adoption process was studied [3]. *Exposure* is defined as the degree to which an individual has acquired or exchanged information about the technology and its usage. The suggested model included exposure in form of *trial, communication, and observation*. The findings in this study suggest that the level of exposure of a new technology has an effect on the user's attitude towards that technology and thereby strengthens or weakens the user's intention to adopt. Trial and communication proved to be more effective than observation. The conclusion drawn is that exposure is likely to facilitate adoption of m-commerce.

In this study we are addressing adoption of a new technology together with its content. This was also the case in a study concerning adoption of services in mobile phones it was found that mobile services are adopted according to several patterns despite having the same technology base [5]. Allowing user to try the services rather than the technology was the focus in these tests. There are also studies indicating that *use situation and mobility* has a significant effect on intention to use a mobile service since user perceive services differently in different situations [24].

A summary of this literature review on factors influencing intention to use relevant for this study, i.e. related to use experience, are presented in Table 2.

<i>Factor</i>	<i>Reference</i>
Observability and trialability	Rogers (1995)
Exploration, experimentation and assessment of experience	Sarker and Wells (2003)
Exposure (trial, communication, and observation)	Khalifa and Cheng (2002)
Trial of service (not technology)	Carlsson, <i>et al.</i> (2005)
Use situation and mobility	Mallat <i>et al.</i> (2006)

Table 2: Summary of factors related to use experience

In this study we have let respondents experience the e-newspaper in two different ways. In the first study the respondents could observe visions of future e-newspaper usage in different situations watching concept videos. Further the respondents could try and experiment with e-newspaper prototypes. However, they were not exposed to the actual e-paper technology. In the second study, users tried the e-newspaper prototypes implemented in an e-paper device with its constraints in their everyday situations such as at home, commuting to work, at work etc. They were allowed to experiment with the e-newspaper prototypes for two weeks. In the following we describe and compare how these differences have affected the audience preferences and demands in the two studies.

5 Findings

In section we first present the background data to the respondents from the survey (Table 3) and the test persons in the evaluation. Thereafter we compare the results on preferences and opinions regarding the e-newspaper from the two studies. The test persons in the evaluation were 3 women and 9 men with the average age of 39,7. Their educational level was: elementary (3), grammar (5), and university level (5). 9 of the test persons work full time, 2 were students, and 1 a senior citizen. 9 of them subscribe to printed newspapers and all 12 read online news. Finally, 5 regularly use mobile services.

Demographic data		<i>All</i>	<i>Men</i>	<i>Women</i>	
<i>No of</i>		3626	2216	1410	
<i>%</i>		100	61,1	38,9	
<i>Mid age</i>		37,1	37,9	35,7	
Background data in percentage of total data set					
<i>Occupation</i>	Full time	55	<i>Income</i>	Low	30,0
	Part time	7,7		Medium	41,9
	Unemployed	5,8		High	28,1
	Senior citizen	6,3	<i>Education</i>	Elementary	9,1
	Student	19,0		Grammar	45,5
	Sick leave	3,6		University	44,0
	Other	2,6		Other	1,5
	<i>Newspaper subscriber</i>	<i>Read online news</i>	<i>Possession of mobile phone</i>	<i>Use mobile services</i>	
Yes	48,8	99,4	97,5	53,8	
No	51,2	0,6	2,5	46,2	

Table 3: Demographic and background data of the questionnaire respondents

The first topic for comparison regards the reason for considering exchanging the traditional printed newspaper with an e-newspaper. This question was asked in both studies and the respondents were given statements that they answered on a 7-grade Likert scale. The mean scored from both studies are presented in Table 4. *Availability anywhere* and *Added value such as new services* are the most important reasons for both groups. The least important reason in the survey was *Environmental reasons* and in the evaluation *Time savings*. Notable is that all reasons were rated higher by the test persons apart from *Time saving*. Some of the test persons mentioned that the e-paper device should not only contain their morning paper but also support all their reading, as illustrated by one of the test persons: “*I want to read everything on this device...it has to be good enough for that to make up for the inconvenience of downloading and updating. It has to be as good as what I have today.*”

<i>What reasons are critical if you sometime in the future would exchange your traditional printed newspaper to an e-newspaper?</i>	<i>Survey</i>		<i>Test persons</i>
	<i>Mean</i>	<i>Std dev</i>	<i>Mean</i>
Environmental reasons	3,6	2,59	4,8
Cost savings	4,0	2,64	5,6
Time savings	3,9	2,76	3,9
Availability anywhere	4,8	2,69	6,3
Satisfaction with new technology	4,0	2,64	6,1
Added value such as new services	4,2	2,60	6,0

Table 4: Reasons for exchanging traditional newspaper

The second question asked in both studies concerned what added services that the respondents regarded as interesting to include in an e-newspaper (Table 5). Both studies show that *Archive*, i.e. the possibility of saving newspapers from previous days, is the most interesting added service followed by *Personalization* and *Community information*. *Personal information* was regarded as the least interesting in both studies. Interestingly, the test persons scored all added services to be more interesting than the respondents in the survey. During the interviews the test persons gave additional input to preferred added services, e.g. the possibility of cutting out and save items from the printed edition was seen as an aspect that needed to be transferred to the e-newspaper. Some also mentioned the possibility of e-commerce as an attractive add-on. Other aspects mentioned were environmental, e.g. not cutting down trees and less decontamination due to less distribution by vehicles, and as one of the test persons said: “*I do not know how much time it would take to get used to it, but I think it is better than recycling old newspapers*”.

<i>Apart from reading the news, what added services do you think should be included in the e-newspaper?</i>	<i>Survey</i>		<i>Test persons</i>
	<i>Mean</i>	<i>Std dev</i>	<i>Mean</i>
Personalization	4,4	2,65	5,3
Community information	4,4	2,64	5
Personal information	2,9	2,40	3,4
General information	3,7	2,51	4,6
Archive	5,1	2,62	6,2
E-commerce	3,5	2,50	3,6
Entertainment	4,0	2,58	4,5

Table 5: Added services preferences

Next, the respondents were asked about the acceptable cost level compared to the printed newspaper (Table 6). In general, the test persons from the evaluation are more inclined to pay the same price or higher than the respondents from the survey. Some of the test persons mentioned that the e-newspaper had to be cheaper than the printed edition due to the saved printing costs for the publishers. Others mentioned that the price had to be lower than the printed edition, due to less content in the e-newspaper.

<i>What cost level is acceptable for you to change to an e-newspaper?</i>	<i>Survey</i>		<i>Test persons</i>	
	<i>No</i>	<i>%</i>	<i>No</i>	<i>%</i>
Cheaper than the traditional printed newspaper	2119	58,4	5	45,4
Same price	371	10,2	4	36,4
Can be more expensive if there is added value	281	7,7	2	18,2
Price is unessential	171	4,7	0	0
Missing	684	18,9	0	0
Total	3626	100	11	100

Table 6: Acceptable cost level

Thereafter the respondents were asked how they think the e-paper device should be financed (Table 7). The most preferred model in both studies is inclusion in subscription.

<i>How do you think the e-paper device should be financed/ paid for?</i>	<i>Survey</i>		<i>Test persons</i>	
	<i>No</i>	<i>%</i>	<i>No</i>	<i>%</i>
Hire-purchase	281	7,7	2	18,2
Buy the device	711	19,6	1	9,1
Included in subscription	1708	47,1	8	72,7
Other	592	16,3	0	0
Missing	334	9,2	0	0
Total	3626	100	11	100

Table 7: Finance of device

Further, they were asked about their willingness to exchange the traditional newspaper with the e-newspaper in the future (Table 8). Surprisingly, all test persons answered yes compared to two thirds of the respondents from the survey.

<i>Would you consider to, some time in the future, exchange your traditional printed newspaper for the e-newspaper?</i>	<i>Survey</i>		<i>Test persons</i>	
	<i>No</i>	<i>%</i>	<i>No</i>	<i>%</i>
Yes	2431	67,1	11	100
No	1070	29,5	0	0
Missing	125	3,4	0	0
Total	3626	100	11	100

Table 8: Willingness to exchange the traditional newspaper

Moreover, they were asked within which time frame they would be ready to read their newspaper on e-paper (Table 9). In both studies there were surprisingly many that were prepared to exchange today or within five years. However, 25% of the respondents in the survey did not answer this question indicating that it was difficult to decide.

<i>Within which time frame are you ready to read your newspaper on e-paper?</i>	<i>Survey</i>		<i>Test persons</i>	
	<i>No</i>	<i>%</i>	<i>No</i>	<i>%</i>
Today	1521	41,9	6	54,5
Within 5 years	683	18,8	5	45,5
Within 10 years	209	5,8	0	0
Within 20 years	88	2,4	0	0
Never	223	6,2	0	0
Missing	902	24,8	0	0
Total	3626	100	11	100

Table 9: Time frame

Finally, the survey respondents were asked about the factors that influenced their decision to read their newspaper on e-paper (Table 10). *Stable technology* and *Easy to find content* were the factors that scored the highest. The least influencing factor was *Observability of use*. The test persons were asked similar questions in the interviews.

<i>How important are the following factors for you choosing to read your newspaper on e-paper?</i>	<i>Survey</i>	
	<i>Mean</i>	<i>Std dev</i>
The appearance of the device	4,0	2,72
Continuous updates of news	4,8	2,80
Added functions such as chat	3,1	2,46
Easy to use and handle	4,6	2,81
Stable technology	4,9	2,81
Observability of use	1,9	1,87
Environment friendly	3,8	2,72
That it is the latest technology	3,0	2,41
Easy to find content	4,9	2,82

Table 10: Influencing factors

One of the major concerns of the test persons was the navigation of the e-newspaper that was very constrained by the device. Almost everyone mentioned that the navigation needed to be improved if they should consider exchanging the printed edition with the e-newspaper. The other most mentioned issue that needed to be addressed was the refresh rate of the display, i.e. it needed to update faster in order to create a pleasant reading experience. Some but not all test persons regarded color as essential for exchanging the e-newspaper. One of the test persons expressed: “*Color would be fun, but it is nothing that I prioritize as essential, I would exchange it even if it is not in color*”. News updates during the day was also found important by several of the respondents.

6 Discussion and Conclusion

In this paper we have addressed the research question: *How does use experience influence perceptions of preferences and demands for the e-newspaper?* We did so by testing the hypothesis that users confronted with a vision of new technology and services are more positive to adopt than users with actual use experience of technology and services in an early stage of development with inherent technology problems. This hypothesis proved to be false, in this case it was the other way around. In spite of the e-paper device technical constraints and the early prototypes, the test persons in the evaluation were more positive to the e-newspaper. On the one hand, the respondents in the survey were not able to experience the actual e-paper technology, they could only read about it and watch concept videos of the future e-newspaper vision and interact with e-newspaper prototypes to get an understanding of the concept. On the other hand, the test persons in the evaluation who experienced the e-paper technology first hand, also experienced the bugs and limitations in this early stage of technology. The e-newspaper prototypes available for online experience in the survey were all in color and had well functioned navigation systems and interaction possibilities whereas the Sundsvalls Tidning in the evaluation was presented in 16 grey scales and had limited navigation options and interaction possibilities due to limitations with the technology. When we set out to test the hypothesis we believed that the respondents in the survey that were confronted with a vision of a multimedia e-newspaper in color with added services would be more positive. Even so, there are similar patterns in preferences and opinions in both studies. The relations between reasons and importance of different added services were very alike, indicating the relevance of the results in both studies. We can conclude that our findings are in line with previous research, i.e. that experiencing technology and services in different ways and in different situations have impact on intentions to use. Even though the respondents in the second study were exposed to technical and navigational difficulties they were very positive towards adopting the e-newspaper. We believe that trying the e-newspaper during two week in their everyday setting as well as being able to experiment with the services in the actual e-paper technology have contributed to this positive attitude.

By empirically testing potential adoption of the e-newspaper with two different approaches, we have contributed to the overall understanding of new media adoption in general and the promotion of the e-newspaper in particular. To summarize the findings according to newspaper organizations preparations for launching the e-newspaper, the following can be derived: The e-newspaper need to contain archive functions. Providing added value by personalization and by offering community information would increase the potential adoption. If the newspaper organizations offer added value according to the audience preferences, they could expect the same willingness to pay as for the printed edition. However, before launching the e-newspaper, the navigation has to be improved as well as the refresh rate of the display. As most respondents preferred to have the device financed by inclusion in the subscription, this could be considered as the initial alternative. Finally, as almost half of the respondents stated that they were ready to start reading the e-newspaper already today, it is time for the newspapers to start preparing for the e-newspaper introduction.

Further research includes a major e-newspaper test in real life settings with 5 Swedish newspapers and 50 families at different locations in Sweden. This test will build on the results from the studies presented in this paper and will include more added value and more services.

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