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Carina Ihlström and Maria Åkesson

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Carina Ihlström Eriksson and Maria Åkesson
Halmstad University, Sweden
{carina.ihlstrom_eriksson;maria.akesson}@hh.se

Abstract

The aim of this paper is to further explore new issues on advertising in ubiquitous information environments by theoretically and empirically discussing challenges of ubiquitous advertising. We have performed 15 interviews and 9 workshops with publishers and advertisers from the media industry. Our findings confirm previous research but also point out several additional challenging issues. We contribute to theory and practice by suggesting additional challenges for ubiquitous advertising regarding: 1) dynamic data exploitation, 2) real-time advertising adjustment (and channeling) to user behavior and preferences, 3) context adaptation and 4) user-advertiser relations.

1. Introduction

Constant development and introduction of new mobile technology, converging IT and media as well as integrated global infrastructures are trends that have led to a ubiquitous information environment. Ubiquitous information environment is a term describing services offered in a multitude of devices delivered in integrated infrastructures in mass scale [1]. This development has led to the emergence of new opportunities in m-business [2] but also to disruptive implications for value networks in traditional media [3].

The media industry is an example of an industry experiencing these disruptive effects [4]. Publishers of today are organized as media houses publishing in multiple channels such as print, online, telecom and broadcasting, i.e. in a ubiquitous media environment. Moreover, they publish news around the clock available anywhere and anytime. Thus, media houses of today have parallel value networks in different publishing channels, as the potential value propositions to users and advertisers differ between channels.

Now, the media houses are on the doorstep of yet another mobile media innovation, the e-newspaper, i.e. a newspaper service published on e-paper technology, which has the potential of becoming very interesting for publishing. E-paper technology is reflecting, giving the same reading experience as on paper (such as high contrast and the possibility to read in sunlight), and is thin, flexible and non-sensitive. The resolution is 160 dpi, which is the same resolution as on printed newspapers, compared to the 72 dpi of a LCD screen. The electronically made print also enables e-paper the same viewing angles as printed material since it is a reflecting display technology in contrast to projecting technologies such as LCD screens. Another advantage of the technology is the low power consumption; power is only needed when the display is updated. These properties makes e-paper technology especially suitable for content traditionally offered in print such as newspapers, books, magazines, making it an interesting addition to the existing channels. The e-reader (the e-paper device) is also uniquely identifiable, which contributes to target advertising, as individuals can be targeted based on their subscription information connected to a specific e-reader.

Today there exist several e-readers on the market, e.g. Sony Reader, iRex iLiad, Bookeen Cybook, STAReBOOK and most recently the Amazon Kindle. Several international newspapers such as New York Times, Wall Street Journal and Le Monde are currently available as text versions with limited use of pictures, in some of these devices. However, the value chain in this context is in favor of the manufacturers, i.e. they own the distribution and customer base. Manufacturers like Plastic Logic, Polymer Vision and Bridgestone announces flexible, bendable and color e-paper to enter the market this or next year.

The ongoing trend of digitalization is of vital strategic importance for the media houses since they lately have experienced decreased circulation and advertisement revenues for their printed editions [5], thereby being forced to find complementing revenue sources. The potential replacement of the printed newspaper with the e-newspaper would dramatically reduce production and distribution costs for the media houses, making it an interesting prospect for the industry. However, for this to happen they need to take control of the value chain and not leave it in the hands

of the manufacturers. As of today the media houses have a unique relationship with their advertisers and they need to find a way to attract them to this new channel as well.

Online advertising has grown over the years and is currently becoming an important part of the media house strategy. For example, online advertising has grown from 3 MSEK in 2006 to 4 MSEK in 2007, i.e. a growth of 35.6% [6].

Furthermore, advertising in mobile channels is becoming more interesting, mainly due to the penetration rate and growing amount of active mobile data users. For example, the amount of MMS sent in Sweden during the first half year of 2007 was 42 million, compared to 27 million sent during the same period the previous year, i.e. a 55 % increase [7]. Other reasons for increased interest given by scholars like Bulander *et al.* [8], Haghirian *et al.* [9] and Bauer *et al.* [10] are: personalization, ubiquity, interactivity, localization and multimedia.

However, earlier research in m-business is heavily skewed towards consumer issues [2], where several authors have focused on m-advertising, e.g. Bauer *et al.* [10]; Tsang *et al.* [11], and Gidófalvi *et al.* [12].

In this paper we focus on publishers and advertisers view of advertising in ubiquitous media environments in general and in the e-newspaper in particular. The advertiser view has earlier been studied by e.g. Drossos and Giaglis [13], who surveyed advertising experts about mobile channel-specific attributes of advertising, mainly focusing Short Message Service (SMS).

We are addressing the following research question: *What are the challenges of advertising in a ubiquitous media environment?*

The aim of this paper is to further explore new issues on advertising in ubiquitous information environments by theoretically and empirically discussing challenges of ubiquitous advertising.

2. Theoretical background

Advertising in ubiquitous media environments creates new opportunities to reach individuals and thereby increasing the relevance of the message. This opportunity also creates challenges to balance the interests of the consumers with the interests of the advertisers.

Ranganathan and Campbell [14] conceptually discuss several challenges in pervasive computing environments. In this paper we do not differ between the terms pervasive and ubiquitous environments. Advertising in such environments enables targeting of consumers, timing of delivery of ads in suitable ways. Ranganathan and Campbell [14] outline seven issues to address for advertising in such environments:

1. Reaching the right people with the right ads
2. Delivering ads at the right time
3. Delivering ads in the best way
4. Serendipitous advertising
5. Providing a means for users to follow up on the ad
6. Collecting advertising revenue
7. Privacy and Security

The *first challenge* is to match consumer needs with advertiser offerings, i.e. that the right people can be targeted by indicating their preferences, requesting or prioritizing ads, which also have been pointed out by Salo and Tähtinen [15]. In short, this is about discovering consumer's intent, and to avoid advertising that consumers might find irrelevant or irritating [16], i.e. to match the message with the user so it is accurate and relevant. One important issue for relevant ads in this setting is the proximity of the mobile consumer [12], i.e. to make use of location based advertising [11]. Tailoring ads is one way of getting closer to users [17]. Leppänieni *et al.* [18] point out that to obtain true marketing effectiveness one needs to *"reach the right people with relevant content when it matters most to them"* (p.96).

The *second challenge* is about *when* to deliver ads at the consumer's convenience. Based on context information, the best possible time to deliver an ad can be determined. Such context information may be based on location, time of day, the company of the consumer, the consumers schedule etc. Context awareness is an important part of m-advertising [15; 17]. Reaching an individual with an ad that correspond to the individuals media goal, i.e. what the individual is trying to achieve, increases the individuals interest in the ad [15], i.e. delivering the ad at the time when they are interested. The frequency of ads is also of importance [9], i.e. to deliver ads at the right time, it is important not to over expose.

The *third challenge* regards *how* to deliver the ad in the best possible way given the available channels as well as the best device at hand. The best is to reach the consumer so that they can react on the ad, still not too annoying for the consumer. It is important that there is a fit between the message in an ad and the consumer's individual goals [15]. Another important aspect is the technical issues [17; 19], i.e. transmission, screen size, keyboard functions *etc* that all influence how the ad is perceived and interacted with. Furthermore, the channel influences the perceived usefulness of the ad

[16], receiving a discount offer in the mobile phone when situated in the store is much more helpful than receiving the same offer on your computer.

The *fourth challenge* deals with how to catch the interest of people even though the ad may not meet specific user needs. The purpose is that the surprising effect might lead to a purchase or to an interest for more information. In ubiquitous environments, serendipitous ads could fit well with peripheral displays that people walk by or in elevators *etc*. Adapting message content [9] and catching content of ads [17] help create serendipitous ads in ubiquitous information environments.

The *fifth challenge* relates to the consumers possibility to react on an ad to get more information or to buy the product or service, but also to indicate that they do not wish to receive any more ads from that company. There needs to be a good interface for consumers to follow up on an ad, e.g. to request for more information, for personal contact or even for buying the product at hand, independently of how or when they were reached by the ad. Interactivity is part of a successful m-advertising model [15]. This includes being able to react negatively on an ad.

The *sixth challenge* is about what models that are suitable for collecting advertising revenue, for example by number of clicks in an interactive environment or number of times an ad is shown. In this environment, traditional criteria as fixed space and time slots are challenged. The authors [14] picture several criteria for advertising fees e.g. consumer request, estimation of interest, serendipity, kind of media and format. Consumer's willingness and when and where they want to be reachable for advertising content can be other alternatives [17].

Finally, the *seventh challenge* is about how to balance the need for personal information and privacy as well as security issues. The advertising model described is pushing ads to the consumer and therefore privacy is very critical issue. Information about how and when an individual was reached should not be revealed to the advertiser from the pervasive service provider. Further consumers should be able to decide if and how much advertising they are willing to receive. Scharl *et al*. [19] emphasize the tradeoff between personalization and privacy, and according to Vatanparasat [20], privacy is one of the three components together with purpose and performance, which are affecting consumer behavior concerning ads. As m-advertising targets individuals, it is perceived as personal, and could be apprehended as an intrusion of privacy [15], thereby highlighting the importance of consumer attitudes [9]. It is therefore recommended that a service provider collect consumers permissions [15; 17], which is required by law in some countries [19].

In their visioning Ranganathan and Campbell [14] suggest solutions that may overcome these challenges. They discuss how a pervasive service provider, i.e. a service provider reaching a variety of locations (e.g. homes, offices, parks, cities) in a variety of ways (e.g. computers, billboards, TV, mobile phones), containing commerce, payment services, advertising services etc.

For overcoming these challenges a middleware solution is discussed, with capability to transform different data formats to be suitable on the device it is going to be presented on. If this is supported, new types of ads can be developed making use of several interfaces and formats (e.g. sound, video, touch panels etc.).

3. Method

This research took place within two different projects. The first was the DigiNews project (ITEA 03015), a two-year collaborative research project, including several major technology firms, media houses and universities across Europe, which ended mid-year 2006. The overall goal of the project was to explore research and development issues for an electronic newspaper of the future. 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 newspapers, the Swedish Newspaper Publishers´ Association and Stampen (a parent company for several newspapers, printing houses and distribution companies). 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.

In these two projects we have among other things studied the importance of advertising, and in this paper we focus on the views from publishers and advertisers regarding advertising challenges.

We have performed 13 interviews and four workshops with publisher representatives. In addition, we have performed two interviews and five workshops with advertisers.

All publisher respondents had key functions within each media house, e.g. editor-in-chiefs, managers, or designers. These interviews covered topics related to the scope of the project, such as organization, technology, business models, advertising, new services and design, however the reporting in this paper is limited to advertising issues for ubiquitous media environments in general and in the e-newspaper channel in particular. The advertisers selected for

interviews were obtained by recommendations from other advertisers during the workshops described below, and the aim of these two interviews was to get a clearer view of the advertising market, strategies, and their view of the e-newspaper potential.

The 13 interviews with publishers were about 60-90 minutes long and followed a semi-structured interview guide, aiming at consistency between the sites and interviewees. While allowing individual perspectives to emerge, the interview guide provided a systematic way of delimiting topics discussed in the interview [21]. The first interview with an advertiser was one hour long, whereas the second was three hours long. Both interviews were conducted as a conversation with only a few themes regarding advertising in digital media and in e-newspaper to be covered in depth. All interviews were recorded and later transcribed by a professional audio typist.

Three initial workshops with newspaper representatives were performed within the DigiNews project, in which one of the focuses was advertising in the e-newspaper channel. At these workshops six, five and three representatives were presents.

The advertisers selected for the workshops represented three different segments of the industry, i.e. local retailers, national retailers and well-known brands as well as representatives from media bureaus. To make sure that all there segments of advertisers were heard in this discussion, we chose to make a separate workshop with each of them, due to their different needs and demands that would have effect on the e-newspaper channel. The following two workshops included representatives from media bureaus and one of these also had representatives from well-known brands. The first four workshops had four representatives each while the last only had two representatives, from two different media bureaus.

All workshops started by a presentation of the scope of the project at hand, followed by a discussion building on themes, such as digital advertising in general, added value with and demands on the e-paper, size, day-parting, contextual advertising, personalization, interactivity etc. In all workshops the e-newspaper concept was discussed.

The last workshop was performed with newspaper representatives. Seven representatives from six media houses participated at this workshop in which we focused especially on the challenges with advertising in ubiquitous environments.

All workshops but one lasted about three hours (the last one only lasted two hours) and were led by one of the authors of this paper. At each workshop another member of the research group was present to take notes and to make sure that no important subject was overseen. The workshops were all recorded and later transcribed by a professional audio typist.

There is an imbalance between the amount of respondents between publishing and advertising regarding the interviews performed. In table 1 we present an overview of the amount of respondents in each activity. Although the amount of respondents that represents the advertisers was fewer, the amount of time spent on the advertising topic was more in total in this category, making this a fairly comparable sample.

Table 1. No. of respondents

	No. of interviews	No. of workshops	Total no. of respondents
Publishers	13	4	34
Advertisers	2	5	20

The transcriptions from the interviews and workshops were carefully reviewed by the authors, who corrected branch specific names and concepts.

One of the authors started the initial clustering by sorting out all available input from the transcriptions into the seven challenges described by Ranganathan and Campbell [14]. A special form was used with each challenge and corresponding key concepts identified from theory, i.e. a provisional start list [22]. Thereafter both authors individually analyzed each challenge separately before taking a joint discussion in order to reach consensus about relevant issues regarding each challenge. In the following chapter we present our findings according to these challenges.

4. Findings

In this section we present the findings in relation to each of the seven challenges by Ranganathan and Campbell [14]. We start by presenting the general findings and continue with e-newspaper specific findings under each sub-heading.

4.1. Reaching the right people with the right ads

The most central aspect related to this challenge is consumer's interest. Reaching the right people with the right ads is about consumer analysis; it is about knowing who is interested of what, also including demographical and geographical aspects. Targeting is the term most used to describe what can be achieved in a ubiquitous media environment. Knowledge about consumers is the key for targeting. One part of this challenge is to get closer to peoples sphere of interest as illustrated by this quote:

"One exiting thing nowadays is to look at communities. It's like a view into a dollhouse. It's almost like buying rink publicity in an ice hockey game. We are trying to get inside the bubble of people, into their sphere of interest." (Advertiser)

Another central aspect discussed in relation to this challenge is advertising based on consumer behavior. The respondents give the search-based advertising as an example of a successful model. This model reaches people when they are searching for something on for example Google, reaching people with what they are interested in when they are looking for it, as illustrated in the following:

"That is why the search advertising is working very well. With Google ads, you hit the one who is searching. That is targeting on users own terms." (Publisher)

The publishers in this study discuss the search based model to be a critical challenge for them. The reason given is that this model requires large traffic volumes, larger than they have. Coordinating solutions within the industry is an approach that they think may help, as can be seen in this quote:

"The search model requires huge volumes. Not even Aftonbladet.se has volumes enough for this. Maybe this could be a possibility if we can coordinate our efforts between the newspapers. In the future we will see more behavioral advertising. What you do decides what ads you get." (Publisher)

Situation-based advertising is another aspect of this challenge. The respondents discuss this to be an important model that can be further developed in ubiquitous media environments. Targeting on a situation, like when you are looking for a house to buy is a well working model. Everybody wanting to buy or sell a house is interested. The mass-market model is not selective enough since it also reaches people that are not interested and thereby get annoyed as illustrated with the following quote:

"The most irritating advertisements are those that are not targeted, i.e. mass marketing and spam. Of course, it's not fun to receive ads from Via and Pampers if you aren't interested." (Advertiser)

The advertisers want to "shoot with an air gun instead of a shotgun" to avoid this irritation and thereby being rejected. The challenge for publishers is thereby to find sustainable models for selection in ubiquitous media environments.

Regarding the e-newspaper, the personalization possibilities due to the unique ID of the devices create an increased interest from the advertisers, e.g. to only reach all readers that live in a certain area, own their houses or have small children. This opportunity relies on the willingness of the readers to share personal information and preferences to the media houses along with their subscription details for the e-newspaper. Connecting this information with a specific e-reader creates opportunities for targeted advertising to individuals.

4.2. Delivering ads at the right time

This challenge is all about timing. While the first challenge was about who is interested – this is about when they are interested. As expressed by one of the publishers:

"That is the Google model – when the user is there – when they are searching for something – and not when we think they want it. That is to say it is on the users conditions – that is really timing!"

Ads also need to be relevant to the consumer context. For example, if an information service with integrated ads is used, the ads need to be relevant to the content, e.g. in a service about food and cooking, ads can be about food, kitchen utilities, kitchens, dining furniture, but not about drilling machines.

Relevance is also about timing, not only time of day but also about holidays and vacation times, i.e. seasoning. One of the publishers has put together a special calendar for their advertisers to give their advertisers new ideas about timing. The calendar shows everything from Christmas to Ramadan, mother's day to world peace day etc. This calendar could of course be used in all channels.

Time of day is of course also relevant, e.g. ads about lunch menus are not very interesting after 2 pm. One of the representatives from the media bureau said: *"It is important to choose time of day, it can be the same offer but needs to change the rhetoric".*

The publishers find day-parting interesting but think that it is difficult to get the advertisers to see that:

"You could for example imagine that an ad would change its appearance during the day. That one customer has bought the space for the morning hours and another for the evening hours etc. – we should be able to use "prime-time" like in the TV-model, in print it is the way it is". (Publisher)

The advertisers found it essential to reach the right reader at the right moment and in the right mood. One advertiser that represents cosmetics and perfumes argued the importance of reaching their target group, i.e. women of a particular age group and with specific interests, at the right time and in the right mood, advertising in magazines:

"It's like a reward to yourself when the children have gone to bed and are sleeping, the highlight of the day. Then you have a more emotional communication and an editorial environment that fits into cosmetics.

It's a completely different environment for reading when you read the morning paper at breakfast or evening paper on the way home from work.". (Advertiser)

The representatives from the media bureaus also stressed the importance of reaching the target group depending on their needs, *"time of day, position, during commute etc".*

Regarding the e-newspaper the publishers agree that contextual ads, e.g. to have brands like Nike on the sports section, should be supported. It should also be possible to have surround session like in the New York Times where you always have ads according to your profile following you throughout the whole e-newspaper.

4.3. Delivering ads in the best way

The publishers think that this is a problematic challenge, it is about the message and its impact provided by the media. They have just learned how to work with the web and are fumbling carefully with other channels. As one publisher said:

"We are very bad at using the strengths from each channel the best way and combine them for best effect. We should be able to use the fact that we have many channels as a huge advantage. But we do not do that today."
According to the media bureaus there has been a shift in advertising from dominance in one media into spread the message to several channels. It is important to optimize advertising effectiveness by choosing the right among many channels. There is also a shift from focusing on demography to values and interests of the audience.

In the best of worlds, from a publisher view, one would start with the advertiser consumer needs and customize a solution that meet this need in the best way, using all possible channels. However, the publishers think that the average advertiser customer is not ready for this, illustrated by the following quotation:

"The small local advertisers want the same space and ad week after week. It is very difficult to communicate new or alternative ideas to them, especially ads in new channels let alone with multiple channels." (Publisher)

Nonetheless, even though the publishers offer packages they find it very difficult to customize, which requires resources that they do not have. There are several reasons for this, e.g.

a) finding someone who can coordinate and make sure the customer only get one invoice. If a customer wants a multi-channel ad campaign it is important that

they only meet with one salesman and not different persons for each channel.

b) modifying advertising systems that are specialized for the printed newspaper. According to the publishers there is a huge challenge in integrating systems to make them work smoothly.

c) changing they way how people in the organization think. *"This is crucial and we have experienced very good investments in systems failing because we did not manage to get people to rethink. If we cannot make people think in new ways system finesse will do no good."* (Publisher)

The advertisers agree that the choice of channels depends on the type of message that is sent.

"There are no specific placements that are best, what is best depends on the message we are about to send. We try to get a way from the product thinking and more and more go towards talking about customer benefit" (Advertiser)

Even though consumers may want to avoid ads, the multi-channel approach works in the favor of the advertisers. One of the advertisers expressed:

"Nobody can avoid advertising. Then we only say: how are we going to reach this customer in another way? The company will talk to the consumers anyway. We will have to find other ways. Sure, we can try to sort and control as a consumer, but Pampers will not give up on parents of small children just because they have rejected advertising."

According to the advertisers advertisements can be divided into three headlines: exposure, relationship and transaction. In regards to the e-newspaper it is exposure that applies, according to the publishers:

"It is exposure that applies, and then the advertisement can tell where I can get more information."

Another possibility with the e-newspaper is to let the consumers buy specific newspaper parts, e.g. the sport section, and thereby bundling advertisement with this section. In addition, subscribing to ads of special interests was discussed as an opportunity with the e-newspaper because of the unique ID of the device.

4.4. Serendipitous advertising

The publishers regard serendipitous advertising to be a kind of push advertising such as the commercial model from TV or radio. This type of advertising is described as surprising and sinking unconsciously into people's minds. The challenge is to balance so it does not annoy or irritate people, to interrupt without being disturbing. As one of the publishers said:

"The key is to interrupt in a way that catches curiosity."

This type of advertising is difficult to attach to a search or behavior based advertising model according to the publishers, as people do actively choose NOT to se ads and commercials.

"It is a delicate balance between advertising and disturbance, between surprise and irritate. If people are irritated they think SPAM – that does not work." (Publisher)

On the other hand, this type of advertisement has the potential to engage consumers:

"There is much of the commercial information that in some way engages us. In that there is aha experience, which makes us respond" (Advertiser)

The advertisers work hard to find ways of serendipitous advertising for attracting audience. As one of the advertisers expressed:

"The extension is to use our own website to create a relationship. Customer databases, conduct a dialog, find out more, etc, and then the initial contact is just a way to catch people." (Advertiser)

Some ideas about the e-newspaper regarded this type of advertisement:

"Perhaps an advertisement can be a motion snippet between two articles? But not in the middle of an article, it should not disturb the reading experience". (Publisher)

Some discussions among the publishers regarded how to provide serendipitous advertising in different channels, e.g. to find ways to surprise their readers based on more substantially more knowledge about their preferences and needs. The media houses feel confident that their readers would be willing to provide them with this kind of information given the added value that could be provided back to the readers.

4.5. Providing a means for users to follow up on the ad

The publishers regard feedback and interactivity as important and that they are getting better at that:

"Before, it used to be an ad in the printed newspaper and a phone number. Today, big advertisers have a branding ad in the newspaper and a reference to their own web site that may be very advanced and offers a lot more than we can help them with."

Chat sessions with experts, was given as an example of how to manage this challenges with smaller advertisers. It often attracts many people, not only those with questions, there were also many just viewing.

The publishers agreed that the mobile phone is very good for this purpose as it is much more direct. But

they worried about the competition of the mobile operators:

"We have to consider how not to be by passed, how do we make sure that there is a value in going through us when advertising?"

The representatives from the media bureaus discuss the value for the advertisers related to feedback: *"It is important to know who have noticed the ad and to know as much as possible about this person, what they felt and what they did when they watched the ad. It is interesting to look at the flows. Time could also be relevant".* Furthermore, they argued that engaging the consumers in a dialog with the advertisers is a benefit.

The e-newspaper creates a new arena for advertisements. For example, as suggested by publishers it would be possible to create a special "room" for the advertiser. By clicking on an ad you arrive to the advertiser room where additional information could be published, e.g. a product catalogue. In this way the reader does not leave the e-newspaper as they might do if the click on a banner on the web. This is thought of as a new way of business:

"One could also commercialize electronic paper in the way that the advertiser could have more information space and pay us more for that. My vision is that one should be able to click on a piece of clothing and be able to see it in all available colors." (Publisher)

According to the advertisers, the e-newspaper could provide a way of "legal lying", e.g. presenting only a mobile phone in the ad, encouraging the reader to click on it, and when clicking the reader is presented with the legal details that usually are presented in a very small size.

Initially there will be no return channel in the e-reader, i.e. only push advertising is possible. But if the reader provides the media house with relevant information about preferences relevant for advertising, it will be an indirect pull strategy.

Games or other interactivity could also be used to attract readers, which is illustrated in the following quotation:

"The ads will change due to interactive possibilities, to get direct feedback. There will be more targeted advertisements. One will know so much more about one's subscribers." (Advertiser)

4.6. Collecting advertising revenues

There must be different revenue models for different channels according to the publishers. In paper size and placement decide the price. On the web there are a few different models like size and placement, number of clicks, period of time etc. In mobile

channels they are still experimenting in a trial and error phase. They find it very challenging to stitch this together over multiple channels. It is of importance to measure how many that sees an ad, how many that is interested in an ad and how many that act on it, as this is valuable information in collecting advertising revenues:

"We really need to develop our methods for how to measure to produce targeting and tracing information. We really need to develop such techniques for the future. This is really a huge challenge and maybe the most important one because then we can communicate what we are selling to the advertisers." (Publisher)

More direct targeting of individuals will probably increase the revenues:

"I think we will charge considerably more from the advertisers. They can get more information into their advertisements and eventually even get in a motion picture. Then you can use customer databases and direct more and get more out of the advertisement for those who really want it. You can use all 18-year old in Mjölby, who shop at JC. They don't need to buy jeans advertisement to a 97-year old. They just pay for the effect. Today they shoot with a shot-gun" (Publicist)

According to the media bureau representatives there is a special value chain in personalization. They believe that it is possible to find new attractive payment solutions for the advertisers which in turn increase advertising revenues for the media houses if you could target individuals instead of larger groups.

Most advertisers and publishers agree on the importance targeting and of being able to show reach in order to generate advertising revenues. By taking advantages of the unique ID of the e-paper device and by incorporating measurement possibilities in the e-paper device, both publishers and advertisers could benefit.

4.7. Privacy and Security

There are legislations concerning advertising which vary in different countries, but the media firms have this competence. According to the publishers privacy is much more important in the mobile channel since the devices are personal. With the printed paper a mass-audience is reached as well as online. The mobile phone is not a mass-medium, it is personal.

"You can compare it to your mailbox. It is personal and for example a SMS is sent to your individual number. But now browsing with the mobile is becoming a habit and then it is not as personal. In the browser you are in a public space." (Publisher)

Both advertisers and publishers agree that this issue needs to be addressed. Regarding the possibility of personalized ads in the e-newspaper the following quotations illustrate that it has to be on the terms of the user:

"Yes, if I have given my permission. But I don't want them to know that I'm in New York." (Advertiser – regarding offering of last minute tickets based on location)

The publishers discuss that consumers may want to block advertising and consider if this should be allowed in the e-newspaper for a higher fee.

5. Discussion and conclusions

In this paper we aimed at further exploring new issues on advertising in ubiquitous information environments by theoretically and empirically discussing challenges of ubiquitous advertising.

We have done that by (1) matching relevant concepts from related research to the challenges addressed by Ranganathan and Campbell [14], (2) empirically validating these challenges in the context of the media industry and (3) suggesting four additional issues to consider for succeeding with ubiquitous advertising. By this we contribute both to theory and practice within the media industry.

Through the literature review of relevant recent studies we have related concepts in order to enrich the understanding of each challenge. In table 2 below, we summarize our findings and present an overview of advertising challenges in ubiquitous media environments.

As shown in table 2, there exists research addressing the challenges of ubiquitous advertising, although not very extensive. However, most of the concepts have been derived from consumer studies. By empirically illustrating these challenges from a publisher and advertiser view, we have added to this literature. Some of the empirical topics are similar to the theoretical concepts, although in our findings there are some additional aspects that were emphasized.

First, the challenge of analyzing consumer behavior and preferences was stressed as a prerequisite for targeted advertising. Both advertisers and publishers need to know more about the consumers and how to make use of this information. *Second*, in addition to context information related to the individual consumer the empirical findings show that timing is also about cultural context such as different holidays. Day-parting and seasoning are two ways of adapting advertising to handle this. *Third*, the respondents underlined the importance of selecting channel or combinations of

channels based on the potential impact of the advertising message. *Fourth*, to succeed with serendipitous advertising it is essential to find a balance between interrupting and disturbing as the tolerance among consumers may be effected. *Fifth*, the publishers see the potential of taking an intermediary role, providing an interface between advertisers and consumers, thereby creating the means for feedback and interactivity. *Sixth*, the respondents stress the importance of discussing tracing related to each channel and finding ways to integrate parallel models for revenue collection. *Finally*, it was noted that the choice of channel influence privacy issues, or vice versa.

The respondents remarked that some media are more personal while others are more public. It is important not to intrude the personal sphere.

Grounded in the empirical evidence, we argue that all seven challenges by Ranganathan and Campbell [14] are relevant in the media industry. As shown by the findings these challenges are important to address when it comes ubiquitous media environments, especially when adding a new channel such as the e-newspaper. We believe that the e-newspaper will add to the existing ubiquitous media environment by creating new possibilities for both content and advertising. The unique qualities of the display and device provide an interesting complement to existing channels.

Adding to the challenges of advertising in ubiquitous media environments, we suggest the following issues to be considered for succeeding with ubiquitous advertising, balancing consumer and advertiser values:

1. **Dynamic data exploitation:** How to develop models to produce and make use of consumer information dynamically over time in a ubiquitous media environment?
2. **Real-time advertising adjustment** (and channeling) to user behavior and preferences: How to adjust advertising to consumer preferences, i.e. advertising on consumer terms?
3. **Context adaptation:** In what ways can advertising be integrated with services/content adjusted to context?
4. **User-advertiser relations:** How to create an arena for building relations between consumers and advertisers as well as between advertisers?

By matching relevant theoretical concepts to the seven challenges [14], empirically testing them and by suggesting additional important issues we have explored and summarized the challenges of advertising in a ubiquitous media environment. Future research should address the valuation of both the seven challenges [14] from a consumer perspective, as well as the additional ubiquitous advertising considerations, from all stakeholder perspectives.

Table 2. An overview of advertising challenges in ubiquitous media environments

Challenges described by Ragnanathan and Campbell (2002)	Suggested solutions by Ranganathan and Campbell (2002)	Related concepts from other studies	Empirically derived main topics	Empirically derived models
Reaching the right people with the right ads	Platform for transformation of formats Discover user intent (based on interest and behavior)	Targeting (Salo & Tähtinen, 2005) Tailoring (Komulainen *et al.*, 2006) Location based advertising (Tsang *et al.*, 2004)	Targeting - consumer analysis - who is interested in what	Demographic Geographic Behavioral (search) Situational
Delivering ads at the right time	When users are free enough to act on an ad (based on context information)	Fit with individual media goals (Salo & Tähtinen, 2005) Context awareness (Salo & Tähtinen, 2005; Komulainen *et al.*, 2006) Message exposure (Haghirian *et al.*, 2005)	Relevance when the users want it Contextuality Rhetoric	Day-parting Seasoning
Delivering ads in the right way	Where the user is going (based on context information)	Technical issues (Komulainen *et al.*, 2006) Channels (Merisavo *et al.*, 2007)	Message Impact Contextuality	Bundling Customization
Serendipitous advertising	In the users sourrounding (large periferal displays, sound in the elevator etc)	Message content (Haghirian *et al.*, 2005) Ad catch (Komulainen *et al.*, 2006)	Balance	Interrupt but not disturb Push (scale from print to commercials)
Providing a means for	With any device, any	Interactivity	Feedback and	*Traditional*, such as SMS,

users to follow up on the ad	where at any time	(Salo & Tähtinen, 2005)	interactivity	URL, chat, phone number *New*, such as subscription, and direct sales Follow up flows
Collecting advertising revenues	Develop new criteria for advertising fees e.g. user request, guesses of interest, serendipity, kind of media and format	Reachability (Komulainen *et al*., 2006) Willing receivers (Komulainen *et al*., 2006)	Tracing	*Traditional*, such as size, place, click rate, period of time *New*, based on user behavior
Privacy and Security	User discretion User control	Personal (Salo & Tähtinen, 2005) Permission (Salo & Tähtinen, 2005; Komulainen *et al*., 2006) Attitudes (Haghirian *et al.*, 2005)	Personal vs. Public sphere	Personalization on user terms Allowing blocking based on payment

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