

The Challenge of E-paper Publishing

– From New Consumption to New Workflows

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Abstract: New publishing technologies, such as electronic paper (e-paper), bring new demands on newspaper publishers in the way they produce, publish and distribute their contents. E-paper as a new mobile publishing channel will not only be a technical challenge to the publishers, but will also change the consumption of news products. In this paper we take an outside-in perspective on the impact of this new channel, by taking a starting-point in possible new consumption. Based on three empirically founded scenarios of future consumption, we discuss what impact the e-paper publishing channel will have on distribution, systems of the media house, i.e. editorial, advertising and subscription, and on workflows.

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1. Introduction

The media companies of today are no longer isolated within a specific field of business, such as newspaper publishing, radio or television broadcasting, as they often were previously. There is an ongoing irreversible trend for news publishing companies to distribute their content in multiple publishing channels. As the multiple media publishing evolves, both media companies and forms of publication have a tendency to be more and more intimately linked (Jonsson *et al.*, 2002).

Going from a substrate-based publishing process, to a format-neutral media house, has not been a development without problems and obstacles (Huusko, 2001). For most media companies the entire business strategy and especially the editorial environment have been unforgiving subject to a number of market-driven changes, both organizational and technical. Clearly, the traditional newspaper publishing industry had initial difficulties in preparing content for multiple media channels, and there is still a lot to be done in terms of organization and ways to work.

In the traditional media-specific newspaper-publishing environment, production focus often lies on creating and aggregating news material suited for a single output channel and with a corresponding rule dictated by its physical limitations – thereby setting the agenda and publishing rhythm for the rest of the editorial process (Sabelström Möller, 2001). In a media-neutral editorial environment, the story itself lies in focus and any number of output channels can be selected for distribution, depending on what evolves in the news stream during the day.

With the introduction of electronic paper (e-paper) on the market, new possibilities, but also new challenges, are presented to the media companies. The potential replacement of the printed newspaper with the e-newspaper (i.e. a newspaper on e-paper) would dramatically reduce production and distribution costs for the media companies. The e-newspaper is predicted to be presented on a very thin and foldable device (i.e. the eReader), combining the readability and overview from the printed newspaper with the possibilities of digital media such as constant updates, interactivity, sound and video.

The internal workflows of the newspaper might not seem to change with yet another publishing channel (the e-paper) at a first glance. Still the focus of publishing has to be changed from an inside-out to an outside-in perspective. That is to say, that the way the reader chooses to consume future products, will have a great impact on the news publishing organization, the workflow and the content handling (Appelgren *et al.*, 2004).

The DigiNews project (ITEA 03015) aims at proposing an end-to-end solution for the future e-newspaper. We are researching what impact this new channel will have on publishing systems, workflows, distribution and consumption. In this paper we have chosen to focus on the outside-in perspective, i.e. from a future consumption view (including user visions of the e-newspaper design and the eReader device). With three empirically based scenarios (Ihlström *et al*, 2004) of future consumption as a base, we have analyzed what impact the introduction of the e-newspaper channel could have on distribution, publishing systems and workflows.

2. Method

In the initial stage of the DigiNews project we do not have access to the eReader since the technology is being developed at a very rapid speed, and the technical specifications are constantly altered. But as Lyytinen and Yoo (2002) point out, it is important for researchers to be actively involved during the development of the technology and not just after it has reached the market.

To envision future consumption of the e-newspaper we have used for example future workshop, scenario and mock-up techniques for gathering data. The use of day-in-the-life scenarios for envisioning future use and mock-ups of design are for example suggested by Go and Carrol (2004).

This paper takes its starting point in three empirically based scenarios of future consumption of the e-newspaper (Ihlström *et al*, 2004). The scenarios are based on the results from experiences of e-newspaper prototyping and questionnaires to newspaper designers. The scenarios were later validated through questionnaires to readers and through ten future workshops with newspaper employees and readers.

The scenarios reflect different time horizons and are also considering different levels of functionality discussed in the DigiNews project, i.e. from basic to extended services. Basic services regard creating a reading experience similar to that of the printed edition of a newspaper on the eReader, whereas extended services include interactivity, web browsing capabilities etc.

3. Background

In this section, we give a background to the situation underlying our discussion. We start by describing the current situation regarding distribution, systems and workflows in the media houses today. Thereafter we present the e-paper

technology followed by the three empirically based scenarios of new consumption.

3.1 The media houses today

Traditionally, newspaper companies have been occupied with publishing content one, or sometimes, two times a day in print. However, the world for publishers started to change a decade ago, with the introduction of the web. Today, the media landscape is even more flourishing with mobile channels, enhanced possibilities on the web etc. This change lead to new demands on the media companies in the way they work and rely to their customers (Ifra, 2004).

As the newsroom and the advertising departments of newspaper and other media companies become increasingly converged, the consumption in turn is shifting the other way around. The consumers tend to live and work more and more in multiple media. The consumption is diverged and the consumers surround themselves with a mix of print, broadcast, web and mobile channels readily shifting from one to another to satisfy their need of information (Newsplex, 2005).

Distribution

For most newspaper companies, the printed product is the main revenue base. Subscribed morning newspapers are delivered to the consumer using different kind of physical carries – either via car, bicycle or by foot. The delivery of the printed newspaper is dependent upon weather conditions and the health of the carrier. The distribution is time-consuming and expensive. Single copies are sold in newsstands and shops, and free newspapers are distributed where people are commuting, or as direct mail to the households.

For digital editions, both on the web and mobile services, distribution is not as time consuming and expensive. People surf the web using modems or high-speed Internet access via cable and broadband, via wireless networks in public areas, at home or at work. Mobile services have become increasingly interesting to the broad audience, and information is received and retrieved using mobile telephones and other mobile devices.

Systems

In this section we are discussing three different systems, i.e. editorial, advertising and subscription, present in the media houses today.

Editorial

The editorial systems of today are often based on XML structured databases to handle media-neutral information. However, many newspaper organizations use systems that were initially developed for the creation and publishing of material in the printed edition. For publishers using old editorial systems, often with

proprietary file formats and archives, the link to other subsystems, such as the publishing systems for the web, mobile services as well as TV and radio, is not transparent. This makes automated processes technically challenging (Sabelström Möller, 2001).

Advertising

Like editorial systems, the advertising systems of the newspapers might not always communicate with other subsystems within the media house. But for newer systems, there are build-in possibilities of sharing information with the modern editorial systems, and booking of advertisements can be made for multiple media with linking between different advertisements. The more channels the advertising department is to work with, the more different kinds of information the advertising system has to handle consequently.

Subscription

The traditional subscription-based newspaper does not need to have a complex subscription database or system to support it. Traditionally, the system should handle name, address and telephone number to the subscriber in combination with information on the length of the subscription, discounts etc. The subscription database or system is also linked to the invoicing system of the newspaper company. But with new digital channels allowing personalization of the published products, selling of digital single copies, such as PDF:s and the possibility of publishing editorial and advertising content to targeted groups, the subscription database transforms into a Customer Relation Management (CRM) database. This in turn has a great impact on the way information on the subscribers is handled and retrieved.

Workflows

The production workflow of a newspaper can be divided into two parts correlating to the dual organization structure of the newspaper – the editorial workflow and the advertising workflow (Stenberg, 1997). In both cases, the production workflow starts with the planning of the product and ends with distribution to the end-consumer (Appelgren *et al*, 2004). The structure of the workflow differs between different output channels, such as TV, radio, print and the web, due to different production and publishing techniques, narrative techniques and rhythm (Sabelström Möller, 2001).

In a non-interactive production process the workflow is usually linear, starting in the advertising department and ending in the distribution process. However, when giving the consumers the chance to interact with the product itself as a part of the editorial contribution, the production and the workflow becomes more of an iterative loop where editors could take into consideration the comments and reflections of the consumers (Appelgren *et al*, 2004).

One can describe two extremes of organizational production workflows, where one is the integrated multiple channel workflow, and the other the separated, where the printed and the electronic editions are produced in separate organizations. In the first case, all editions are regarded equal in a publisher's perspective, giving the possibility to publish news in the channel best suited at the moment. In the second case, the workflow is most often organized in line with the production of the printed edition since it is regarded as the primary. Other editions such as web, PDF:s and PDA:s are regarded secondary (Sabelström Möller, 2001).

3.2 The e-paper technology and device

Electronic paper (e-paper) is the common term for a multitude of different technologies that can be used to produce screens with a number of specific characteristics. In this paper we define e-paper as technologies consisting of bipolar pixels. Each pixel can change between two fixed stages (colors). 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.

As of today, there are two technologies for e-paper available on the market – electrophoreses and dipolar rotation. In this paper we will also describe a third upcoming e-paper technology, called electrowetting.

One commercial product representing the electrophoresis technology is E Ink of E Ink Corporation, USA, developed at Massachusetts Institute of Technology (MIT). Today, E Ink Corporation holds the patent of the E Ink technology and license the production of E Ink displays to a number of corporations, among them Philips (E Ink, 2005).

The principal components of electronic ink are millions of tiny microcapsules, about the diameter of a human hair. Each microcapsule contains positively charged white and negatively charged black particles. When a negative electric field is applied, the white particles move to the top of the microcapsule where they become visible to the user. This makes the surface appear white at that spot. At the same time, an opposite electric field pulls the black particles to the bottom of the microcapsules where they are hidden (Figure 1).

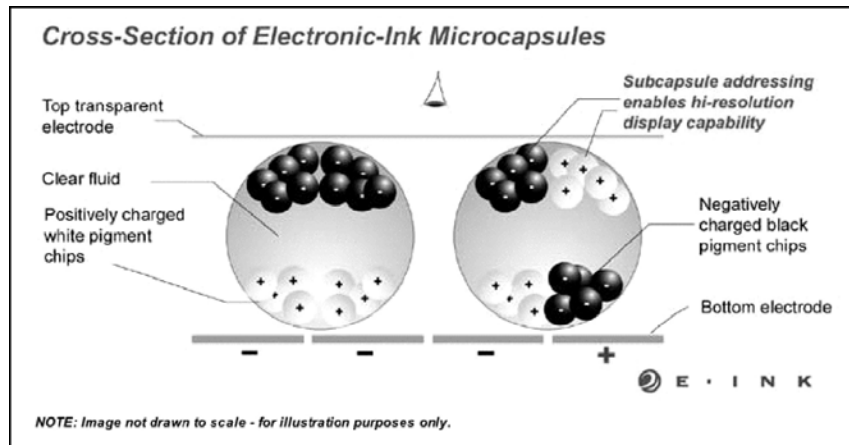


Figure 1. Sketch of the E Ink technology (E Ink, 2005)

In Figure 2, an example of a product based on E Ink technology, i.e. the Sony Librié, is presented.

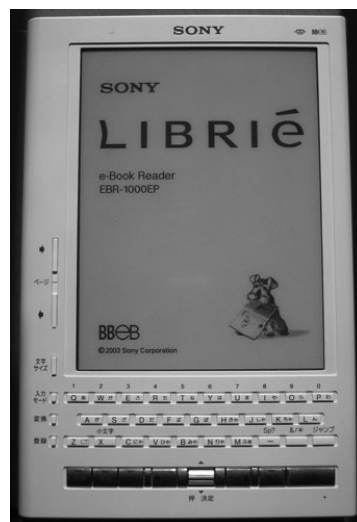


Figure 2. E Ink technology in the Sony Librié.

Electronic paper based on bichromal rotation was first invented by Nick Sheridan at Xerox, as early as in the 1970:ies (Gyricon, 2005). Today, the technology is used in SmartPaper by Gyricon LLC in the USA. SmartPaper consist of two sheets of thin plastic with millions of tiny bichromal beads embedded in between. Each bead is smaller than a grain of sand and has a

different color on each half. The hemispheres are charged differently – positive or negative.

Electrowetting (Figure 3) is an attractive technology for the rapid manipulation of liquids on a micrometer scale and it can be used to form the basis of a reflective display that is significantly faster than electrophoretic displays, so that video content can be displayed. For the electrowetting display, the focus is on the movement of confined water–oil interface. In equilibrium, a colored oil film lies naturally between the water and the electrode. When a voltage is applied between the substrate electrode and the water, an electrostatic term is added to the energy balance, and the stacked state is no longer energetically favorable (Hayes *et al*, 2003).

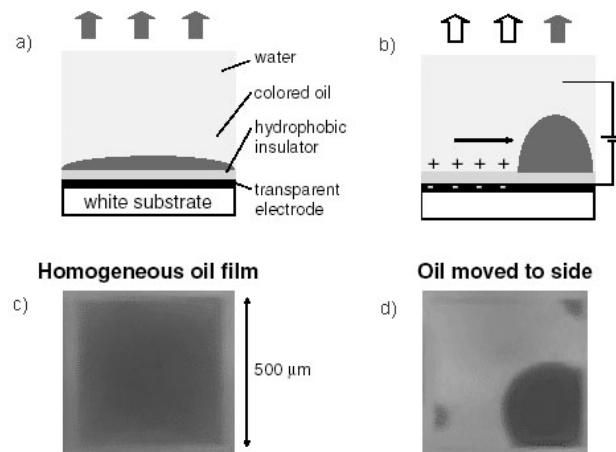


Figure 3. The electrowetting principle (Philips Research, 2005).

3.3 New consumption – three scenarios

In the following, three future consumption scenarios are presented. The first is based on personas representing senior citizens, the second representing business travelers, and the third representing young early adopters. The scenarios are also describing an increasing level of functionality.

Scenario 1 – senior citizens in sparsely populated areas

Mr and Mrs Andersson are having breakfast. Mrs Andersson comments on the e-newspaper being thick this morning, “It is 350 pages today” she says. They then discuss the top story on the new healthcare budget that they both are reading on their two eReaders. “Was there not another article on this topic, just a

few days ago?” Mr Andersson asks his wife. “Well, search for it then, I’m moving on to the local news” she answers. She turns the page and presses ‘the enlargement button’. “My eyesight is getting worse” she says. “I will search for ads from opticians to see if there are any special offers. See, here is one good offer for new glasses. I think I will make an appointment.” Mrs Andersson then presses the ‘contact me button’ in the ad. Next time the eReader is connected to the modem the request will be sent to the newspaper, and the contact information will be sent to the optician from the subscriber database. A few minutes later an SMS with suggestions of appointment times arrives to her mobile, and she immediately confirms the appointment.

Mrs Andersson has been thinking about dinner, but feels like she lacks the inspiration today. She looks in the fridge and then chooses the new cookbook that she has bought to her e-Reader. She fills in a few of the ingredients that were available and presses the ‘search button’. Immediately, she gets suggestions of six different recipes, and turns to her husband for advice.

Later in the day, after a nice dinner, Mr Andersson connects his e-Reader to the modem to check for updates on the healthcare budget discussion. He also checks for updates on information from the local pensioners’ association if there is a boule game scheduled for the weekend. Mr Andersson looks out the window and remembers when he had to walk a mile to get the newspaper every morning, sun shine, rain or snow. It is really amazing, he thinks, the e-newspaper. Really looks like a printed paper and yet delivered through the phone line and best of all it saves the beautiful forests of Sweden.

Scenario 2 – business travellers

At the airport in Stockholm, Mrs Nord is waiting for her flight to New York. “Beep, beep!” Her e-Reader is beeping since there are new updates on important business news that she has subscribed for. Mrs Nord picks the e-Reader up and reads the latest news on the Ericsson stocks. As she is a subscriber to the business edition of Dagens Nyheter, a major national morning newspaper, she also gets an automatic offer of an analysis of the economic development of the Ericsson stocks, which she accepts. While waiting for the information, she reads the ads on new mobile phones, pressing the buttons in the graphical user interface to shift ads, stops and looking at the new phone from Nokia, really liking the beautifully red color. After a few minutes the analysis is presented, including a summary of an article published in the Financial Times last week. She finds the summary interesting and orders the full article. Through her subscription the charge is made to her account on the Dagens Nyheter. As she is about to board the plane to New York she orders a single copy of today’s New York Times and the latest novel by Clancy to read on the plane, from the ordering menu to the right on the display. When sitting on the plane reading the Clancy novel, she reflects on the convenience of the e-Reader having two

connected displays, feeling like a book. She also likes the ability to use the buttons on the frame for turning pages.

Next morning in New York, she reads the new edition of Dagens Nyheter, and finds an article about several burglaries in her neighborhood in Stockholm. She phones her husband, asking him “Have you seen the article on page 7 about the burglaries? Maybe it is time to install that alarm that we have talked about. Could you please see to it today? Maybe you can phone the number on the ad to the right? It seems like a reasonable price to me.” Later, when passing the hotspot in the hotel lobby, she gets ads on last minute tickets for a Broadway musical. She follows the impulse to order one, feels like she could allow herself that luxury before returning home to the husband and kids, and looks the theatre up in the interactive map in her e-Reader.

Scenario 3 – young early adopters

Ola, a young urban IT manager, is on his way to his favorite coffee shop. While passing a hot spot his recently upgraded 8.2 x 11.6 inch foldable e-Reader is updated with the latest news. Ola is a subscriber to a personalized e-newspaper with the sports from Sports Illustrated, IT news from Computer Sweden, a national trade magazine, and the local news and advertisements from Sydsvenskan, the metropolitan morning newspaper of the region. Through the user profile in the subscription database he mainly gets ads on new mobile phone offers, on stereos, sports cars and whiskey. He is currently looking for a used rare super sports car, a Koenisegg CC8S, with a top speed of 240 mph and is subscribing to the notification service from Aftonbladet, the major evening newspaper. While sipping his coffee, reading the e-newspaper, a green light is indicating that there is a personal message for him. The newspaper service has located a car in Zurich and there will be an auction next Monday, attached to the message is a video clip of the car. Full of expectations, he clicks on the file and the sound of the engine roaring is heard in the whole coffee shop. Several heads are turned, he smiles and says: “There is nothing like the sound of a Koenisegg.”

He checks his calendar, which is embedded in the e-Reader, finds out that he will be able to attend the auction and switches to the online mode, searching for flight coupons to Zurich. He books the flight, and sends an e-mail to his fiancée and invites her to dinner this evening to celebrate. On his way to the restaurant, the e-Reader beeps and he receives an offer of “Midleton Very Rare” whiskey just as he passes the liquor store. He hesitates, but thinks that should I celebrate, I might as well do it properly, and walks into the store. Later that evening, sitting in front of the open fire, sipping his whiskey, the Persian cat happens to knock the glass over, and the whiskey pours out on the e-Reader, lying on the table. Ola sighs, a bit upset about the spilled expensive whiskey, and goes to rinse the e-Reader.

4. Analysis and discussion

For each scenario we here discuss the impact from a media house point of view. We start by shortly discussing the impact on future distribution and on eReader requirements, followed by our main focus on systems and workflows. In figure 4, this outside-in perspective, i.e. from new consumption to new workflows is illustrated.

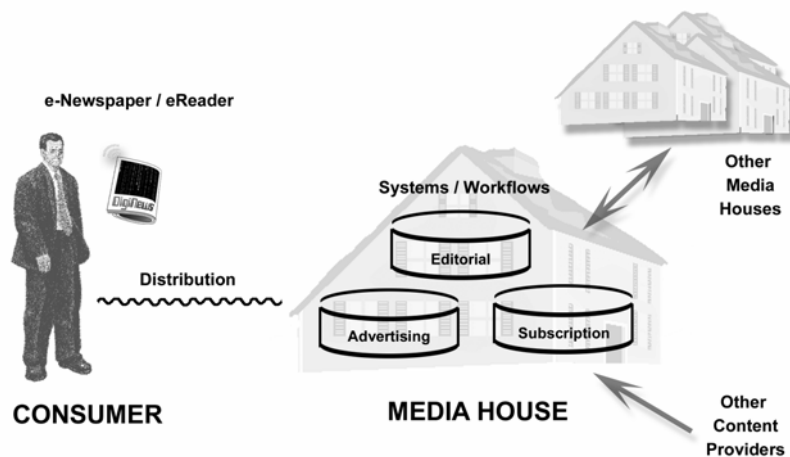


Figure 4. The outside-in perspective

Impact on the distribution

Scenario 1

In this scenario the readers have their e-newspaper delivered through the phone line with a modem. This illustrates the situation that might be representative for sparsely populated areas. The e-newspaper should be produced in standards that enable a small file size. In this case the infrastructure is enabling a return channel through the modem and telephone line.

Scenario 2

The second scenario requires an infrastructure that enables wireless delivery of the e-newspaper, wireless return channel, wireless connection to hotspots, global range and, finally, wireless dynamic positioning. Each e-reader must thereby be uniquely identified.

Scenario 3

In addition to the requirements on infrastructure described above scenario 3 requires wireless on-line connection to the Internet.

Impact on the eReader device

Scenario 1

The user must have an Internet connection and a modem. The e-reader device is required to enable storage capabilities, searching in stored information, to store information to be sent to the publisher when connected and to support a graphical user interface. In this case, touch screen capability is required to support the scenario. Enlargement of text and the possibility of entering text to search must also be supported. Further, the storage capacity must allow for additional content such as a cookbook.

Scenario 2

In this scenario the device has sound, capability to send information wirelessly, and capability to store a large amount of information. Further, the e-reader must have an input device, for the user to be able to search, to place orders etc. The e-reader must also be uniquely identifiable in order for the ordering and billing in the scenario to be possible.

Scenario 3

In addition to the capabilities described above this scenario requires for the e-reader device to have video capability, software to support browsing, e-mailing and such. Further the device must be very durable and possess computational capabilities.

Impact on systems

Scenario 1

One consequence of the smaller format of the e-newspaper is that the new product will contain many more pages compared to today's printed edition. New templates have to be supported by the system, based on the standards and formats required. Further, the editions are updated during the day, which in turn put new demands on the page composition and layout of the e-newspaper. Scenario 1 requires the editorial system to have an archive structure where articles are tagged and threaded. In addition, the system needs to be linked to other sources such as local societal organizations. Also, the system must support tagging of information and additional metadata in standard formats, in order to automate the publishing in multiple publishing channels to a large extent.

In the first scenario it is possible to search for advertisements and to get in contact with the advertiser. This gives that the advertising system and the subscription database must handle the connection between advertisements, subscribers and advertisers. There should also be support for receiving information from the subscriber, in this case about an advertisement, and to forward the information to the advertiser. In this case contact information is sent

to the advertiser to enable for him or her to send a text message to the subscriber's mobile phone with appointment suggestions. Systems supporting linking between advertisers and subscribers using for example text messaging already exist on the market today (Arena Partners, 2005).

The information in the subscription system must support distribution and billing, probably in combination with other sub systems. In this scenario the publisher mediates information between the subscriber and the advertiser. The subscriber system must be extended with reliable and accurate contact information compared to today. It should also be and connected to the advertising system to make this mediation possible.

With interactive advertising and content and the linking between a certain subscriber to the information and the offer from an advertiser, the subscription databases truly have to be built up with CRM capabilities.

Scenario 2

The editorial system, or a connected publishing system, must be able to send alerts when news updates are made in order to support scenario 2. In this scenario there are different editions of the e-newspaper and therefore the system must have the capability to handle various editions and their linking to certain profiles and updates. The editorial system must also allow linking to content from a third-party publisher, in this case the Financial Times. Further, the system could be required to store content to support services such as interactive maps, if this is a service that the publisher wishes to make available for its customers.

Automatic offers based on target groups, is a possibility that requires that the advertising system can handle metadata information for the different advertisements profiles. Further, the system should support for users to group advertisements, like in this case for new mobile phones. This scenario includes advertising based on positioning which means that position information should be stored as metadata in the advertisements in the advertising system. However, in the example from scenario 2, the user probably has to subscribe to a messaging service for advertisements from a local player in whatever country he or she visits.

In this scenario it is possible to subscribe for updates on certain news, such as business news. This means that each subscriber must be regarded as an individual reader and not as a household. The subscriber system must therefore change in structure and be extended to store profiling information for several individuals living at the same address. This also includes profiling information for advertisements.

It is also possible to buy digital copies of novels in this scenario. This kind of service might not be offered by the newspaper publisher, but if the publisher wishes to function as the mediator, the subscription system must be designed to support billing and different payment models.

Scenario 3

In scenario three, the system is required to handle constant updates. Content has to be presented according to profiles to support a personalized e-newspaper, which also requires a flexible layout and templates. In this case the personalization allows content from several newspaper publishers, which in turn requires that publishers share profile information between systems, that an aggregator of content is active, or that the eReader itself has built-in possibilities to assemble information from different sources and present them. In this scenario, publishing and presentation of content becomes more similar to web publishing than to print. Scenario 3 also includes multimedia content such as video clips and sound, which must be handled in the templates. The possibility for readers to solely subscribe to advertisements from one newspaper together with additional parts from other publishers forms a personalized e-newspaper, which requires cooperation and integration of systems between newspaper organizations or mediators.

In this scenario advertisements are targeted according to the reader profile. This requires the three systems to be interconnected. It is possible to subscribe to notification on advertisements, in this case for sales of a rare car. There are already today systems supporting these kinds of services, e.g. subscription to real-estate advertisements from the newspaper (Dagens Nyheter, 2005), but the system has to be adapted to mobile distribution of information.

Impact on the workflows

Scenario 1

Since updating of the content is ongoing during the day, the rhythm of the e-newspaper publishing will to a great extent agree with the continuously updated web publishing of today (Sabelström Möller, 2001). The vast amount of news to become edited and composed will lead to a greater need of layout driven production and automated flows in as large a scale as possible (Rosenqvist, 2000).

The way to work, and thereby the workflow, has to be adjusted to the new smaller format of the e-newspaper. Also, as the newspaper becomes electronic, new work tasks, such as linking articles to previously published material and inclusion of metadata for search will be added to the workflow. This will in turn lead to a demand for new skills and a different view on news production within the editorial department.

In order for the publisher to serve their customers (both the readers and the advertisers) the workflow in both the editorial and the advertising departments has to be adapted to the dynamics of interactivity. As Appelgren *et al* (2004) point out, the workflow is no longer to be considered linear, but a loop.

With scenario 1 as a base, the advertising department will have to work more intensely with interactive and rich media advertising, which put new requirements on the sales organization and the creators as well as the advertisement system. One example from the scenario is the possibility to make contextual searches for opticians among the advertisements in the e-newspaper. In order to make such a search fast and accurate, the proper metadata has to be added to each advertisement.

Scenario 2

The different services in scenario 2 are much related to technology and services outside of the newspaper publisher's core business. However, the possibility to subscribe to sections of the newspapers in combination with e.g. stock exchange information will imply that sections and even subsections are prepared as stand-alone products of the newspaper publisher.

Moreover, the possibility to get enhanced information from third-party sources (in this case the Financial Times) connected to the subscribed e-newspaper will affect the workflow and the tasks in the editorial department. Dedicated tasks for searching and linking additional information have to be implemented in the e-newspaper workflow.

The push-advertisements mentioned in the scenario will have to be tagged with information on location (coordinates) and a certain amount of metadata in order to be pushed at the right time to the right eReader passing a certain hotspot.

Scenario 3

In scenario 3 much of the same workflow for the editorial staff as in scenario 2 will apply. The news will be updated as they are on the web today and pushed to the e-newspaper matching the subscription profile of that particular news item. In order to get this personalized news feed to work, both the editorial system as well as the way of working and the workflows must support media-neutral and metadata-rich content production.

In this scenario the user can filter advertisements based on interest. This is a variation of the possibility to push advertisements to people in certain geographical areas, presented in scenario 2. In addition, this scenario presents the possibility to subscribe to classified advertisements and to download multiple media information on the advertisements. As mentioned before, the first kind of service is available from publishers already today, whereas multiple media advertising will require knowledge on the advertising department on how

to handle and mark-up audio and video in combination with text, still images and illustrations.

In table 1, main issues illustrated in the different scenarios and discussed above are summarized. The issues in scenarios 1 also count for scenario 2 etc, i.e. the issues are presented in an accumulative way.

Scenarios	1	2	3
eReader device	<i>Storage Searching Sending Touch screen Enlargement Text input</i>	<i>Extended storage capabilities Input device Unique identity</i>	<i>Video Computational capabilities Internet software Durable</i>
Distribution	<i>Modem (file size)</i>	<i>Wireless Return channel Hotspots Global range Positioning</i>	<i>Internet connection</i>
Systems Editorial	<i>Templates (tagging, updates etc) Archives Linking (to other information sources)</i>	<i>Alerts Editions (several) Mediation (standards) Support (interactive services)</i>	<i>Constant updates Dynamic templates (personalization) Multimedia</i>
Advertising	<i>Contact information Mediation (advertiser – reader)</i>	<i>Automation Targeting Tagging (all mobile phones) Positioning</i>	<i>Personalization Notification</i>
Subscription	<i>Extended subscriber information</i>	<i>Unique identity (of eReader + subscriber) Profiling Billing account</i>	<i>Alerting</i>
Workflows	<i>Rhythm Metadata</i>	<i>Sections as stand-alone products Linking to third-party information</i>	<i>Multimedia production</i>

Table 1. Summary of impacts

4. Conclusions

We have described how consumers and publishers vision new consumption if the e-newspaper was to be introduced. These visions include ideas of new services, content and interactive possibilities as well as perceptions of the e-newspaper design and the eReader device. Taking that as a starting point, our analysis and discussion gives an overview of the impact on requirements for the eReader device, the distribution, the different systems and the workflows. Even though it might not seem so at a first glance, the introduction of this new

publishing channel most certainly have an impact on all the above-mentioned elements, as described in table 1.

By taking an outside-in perspective and thereby discussing the impact on the media houses from a future consumption view, we can conclude that the workflows will be changed. The more advanced services offered and the higher consumer requirements, the more capacity and functionality are required by the eReader. This in turn set new demands on distribution coverage and availability to support mobile and interactive services.

For the media house, the e-newspaper will have the most impact on the various systems for producing, publishing and distributing content. In order to make it possible to publish personalized editions – both regarding editorial content and advertisements – and to charge consumers for the products, all systems involved must be fully integrated and exchange information transparently. With the introduction of the e-newspaper, the editorial and advertising workflows will immediately change. Not only because the new publishing channel requires a new way of composing pages, but also because the increasing amount of metadata attached to various content elements and information on the consumers needed result in new tasks in the daily work.

The e-newspaper and the eReader will certainly not only affect the media house internally, but also the relations between the different players on the market. In order to coordinate distribution, subscription etc, and for the media houses to continue having control of the distribution and the “ownership” of the customer, at least a national cooperation needs to be established. In order to handle these issues on a global level, roaming like mobile operators have today is a plausible solution.

The scenarios for new consumption described will of course have an influence on issues not discussed in this article. Digital rights management, standards, privacy and security issues are examples of issues that will be addressed in future work.

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