Mobile Publishing in Print Media Companies and its Effects on Publishing Processes and Information Systems

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LIST OF ABBREVIATIONS

B2B	Business to Business
B2C	Business to Consumer
CMS	Content Management System
CSD	Ciruit Switched Data
DIN	Deutsches Institut für Normung
DTP	Desktop Publishing
FTP	File Transfer Protocol
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HSCSD	High Speed Ciruit Switched Data
IrDA	Infrared
IT	Information Technology
Kbps	Kilo Bits Per Second
KU	University of Kansas
LAN	Local Area Network
MB	Megabyte
MMS	Multimedia Message Service
MP3	MPEG Audio Layer 3
MPEG	Moving Picture Experts Group
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
SMIL	Synchronized Multimedia Integration Language
SMS	Short Message Service
UMTS	Universal Mobile Telecommunications System
USA	United States of America
USB	Universal Serial Bus
VGA	Video Graphics Array
VHM	Vorarlberger Medienhaus
VOL	Vorarlberg Online
WAP	Wireless Application Protocol
WML	Wireless Markup Language

XHTML	eXtensible HyperText Markup Language
XML	eXtensible Markup Language
XSL	eXtensible Stylesheet Language
XSLT	eXtensible Stylesheet Language Transformation

1 INTRODUCTION TO THE TOPIC

Through the explosive spread of broadband and wireless communication technologies the world becomes increasingly connected. People enjoy continuous access to an overwhelming variety of information and are simultaneously using different channels for gathering information. Especially great development potential is being anticipated for mobile devices, which allow location and time independent information access. In this context, the relevance of multi-channel-publishing is increasing in importance. Newspaper and magazine publishers as well as their advertising partners have started to discover the opportunities and potentials of mobile publishing [Zied01]. They also have started to realize that the continuing proliferation of media channels through expanding technology is going to reshape not only the content and advertising market but especially the publishing processes and publishing IT systems in entirely new ways.

1.1 Current problems of the print media industry

The computer revolution started the replacement of analogue production methods by their digital counterparts [RoRi03, 5]. Text, audio, still, and moving pictures became digital media objects, which can be collected, bundled, and distributed in an all-digital process, inducing major changes in the existing publishing processes [RoRi03, 6]. Correspondingly, the most noticeable alteration of the media for the end consumer was the destruction of all distribution barriers through the introduction of the Internet and the opportunity to act as a content distributor themselves (e.g. KaZaA) [RoRi03, 9].

In addition to the transformation from an analogue to an all-digital publishing process including digital content distribution, the challenges with which print media publishers are struggling today are much greater. The most prominent problems shall be elaborated in the following chapters.

1.1.1 Declining readership

The success of a print medium is measured by the size of its readership, which in turn is quantified by its circulation; if it is a free-circulation publication, the papers or magazines distributed serve as performance indicator [PiBr97, 33]. Overall, this figure is decreasing on an international

basis [Eber02, 51]. Declining readership occurs in all age and demographic groups, however especially the group of young, future newspaper readers is declining [Edmo04].

The magazine market does not show great promise either. With over 1,900 titles, the German magazine publishers operate in a saturated market fighting for a stagnating, if not diminishing audience [Medi03].

The issue of declining readership requires publishers to develop future-oriented concepts, targeting not only their traditionally senior customers but also the young generation of readers. The increasing content demand in a mobile context indicates that mobile content distribution might be one option to battle this issue.

1.1.2 Declining advertising revenues

Advertising sales are the primary revenue contribution to newspapers. In the USA over 80% and in Germany more than 60% of newspaper publisher's revenues originate from advertising sales [PiBr97, 5-7]. The revenue situation is similar in the magazine market.

The most prominent decision criteria for advertising customers are the size and characteristics of the target audience. The first of which is mainly expressed in penetration measures such as circulation per 1.000 readers PiBr97, 84], the latter is defined by demographics such as age, income, and interests.

In addition to the target audience, the print medium's reputation, the options for displaying advertisements, the day of the week, and the general business climate impact the ad placement decision of advertising customers [PiBr97, 39].

Especially through the emergence of new publication channels the attractiveness of print media as an advertising channel decreased. After television and radio the current threat emerged with the growing acceptance of the Internet, which represents a major competitor especially for classified ads. Backing up this issue, the portion of revenues from classified job offers compared to a newspaper's total revenues declined from 19% in 2000 to 8% in 2003 [Edmo04]. But not only classified job offers, also automobiles and real estate classifieds were shifted to the Internet.

In the magazine industry, the situation is less threatening. Advertising customers view magazines as a vehicle for delivering the image of youth and high purchasing power, a highly desired image for labeling goods and services [Pejm04]. Thus, the advertising revenues in the sector of pop culture/entertainment magazines remained on a high level during the last three years. The situation looks different in other magazine genres. Business magazines in particular faced a significant decrease during the period of economic difficulties in 2001/2002. The following chart illustrates the ad situation in the magazine industry.

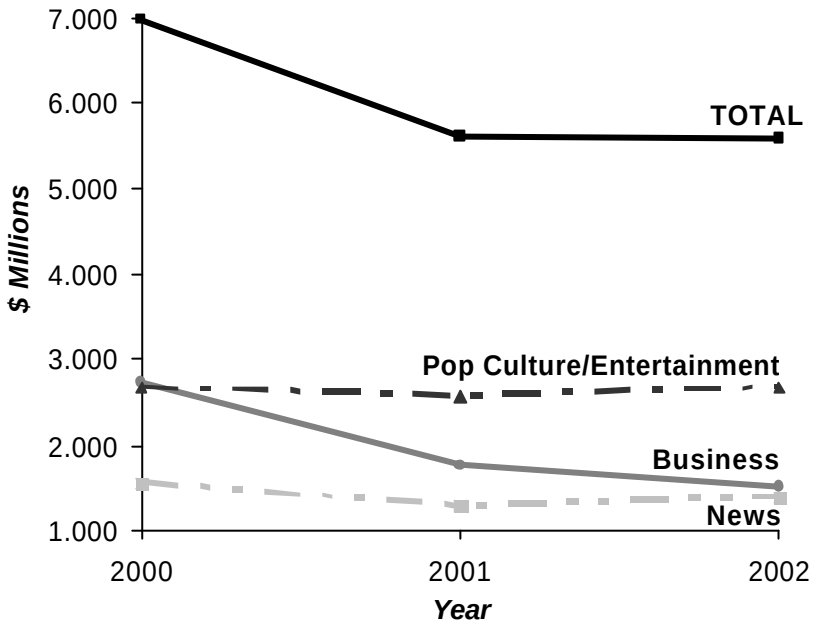

Fig. 1.1.3/1 Magazine ad dollars by selected genres [Pejm04]

The situation of the German print media market is the same: daily newspapers lost more than 300 million in advertising income between 2000 and 2002; general magazines struggle with around 430 million less in advertising income in 2002 compared to 2000 [Medi03].

Through the negative development of advertising income of print media publishers, it becomes necessary to develop new sources of revenue, either in the print medium itself or through complementary offers using new publication channels.

1.1.3 Increased cost pressure

Operating in a mature industry, newspaper and magazine publishers have to cope with increased cost pressure. The trend of proliferating publication

channels affects not only the readership numbers and advertising revenues it also influences the cost situation of the print media publishers.

With the time and money budget for media consumption being almost constant and an increasing number of publication channels, the audience reached with one content output unit is decreasing. Combining this with a dramatic fix cost degression in the publishing industry, enormous cost pressure becomes obvious.

The cost pressure is even increased through constantly increasing costs for content and a raised amount of editorial work through amplified technology (e.g. updating internet content) [Edmo04].

Correspondingly, in order to counter the cost pressure, print media publishers are forced to find innovative ways to efficiently produce and especially reuse their content.

1.2 Comparative media analyses

The emergence of new publication channels is one of the major reasons for the problems of print media publishers elaborated in the previous chapters. The following paragraphs serve to give an understanding of the specific strengths and weaknesses of the most recently evolved publication channels.

The scheme in figure 1.1.4/1 outlines a comparison between the media print, Internet, and mobile platforms along the criteria usability, information characteristics, target group, and media perception.

Compared to the Internet and mobile platforms, print media struggle with a reduced timeliness, an antiquated image, limited research options, limited display of multi-media content, and no personalization options.

However, when it comes to usability, in-depth coverage, and quality signaling through brand strengths print media publishers are clearly ahead of their competitors from the new publication channels. Especially, the ease of use provides the print media with significant competitive advantages: it requires no technical equipment and is always ready to read, it requires no technical expertise to read the content, and it is associated with leisure rather than work.

Through those comparative advantages print media publishers defended their position in the media market. With an almost 40% share of the world

media market, print media are about as important as the audiovisual media [Eber02, 9]. Newspapers remain the primary medium for audiences and advertisers for in-depth news, features, and commercial information [PiBr97, 2]. Magazines are very strong in serving the needs of niche markets as well as the need for profound analyses, background information, and opinions [Pejm04]. Now, the opportunity remains to transfer these strengths together with the powerful print media brands to the mobile environment and thus profit from the quality signaling and the trust customers place upon those media.

Criteria	**Print** (newspapers and magazines)	**Internet**	**Mobile platforms** (mobile phone, PDA)
Usability			
Portability (size, weight, power source)	• Big, foldable medium • No power required	• Limited in size, weight, power & Internet access	• Small size and weight and sufficient power
Ease of use (previous knowledge, readability)	• No special skills • High readability	• Well-known medium • Limited readability	• Small displays • Limited input options
Research options	• Limited research through indexes	• Extremely good, through excellent search engines	• Search engines can be employed • Limited display
Information characteristics			
Up-to-dateness (publishing speed)	• Two publications daily at the maximum	• Instant updates possible	• Instant updates receivable location independently
Content structure	• Only linear text	• Interconnected information through hyperlinks	• Interconnected information • Limited display
Content formats (text, picture, audio, video)	• Only text and pictures (mostly, black & white)	• All four content formats can be displayed well	• All formats can be displayed in limited quality
Possible story lengths	• All story lengths are possible	• All story lengths are possible	• Story lengths limited due to display ergonomics
Personalized information	• No personalization possible	• All levels of personalization possible	• All levels of personalization possible
Interactivity	• Limited interactivity	• Highly interactive • Very suitable for many transactions	• Highly interactive • Suitable for simple transactions
Target group			
Possible size	• Possibly 100%	• Possibly 52,6% of the German population over 14 [Iuhk04]	• Possibly 77% of the German population [Telt03]
Demographics	• Senior target group with higher income	• Especially age group of 14-29 year olds; educated [Iuhk04]	• Especially young people
Media perception			
Image	• Antiquated image • Less up-to-date • Highly informative	• Young, highly up-to-date, cautious about quality	• Very hip & young • Technically less mature
Brand strength	• High brand strenghs signals quality	• Special Internet brands advance • Cross-media better	• Special mobile brands weaker • Cross-media okay

Excellent Good Satisfactory Poor Very poor

Fig. 1.1.4/1 Comparative media analyses

1.3 Goal and structure of the thesis

Building upon the assumption, that print media publishers need to engage in mobile publishing in order to defend their competitive advantage, the goal of this thesis is to examine the necessary publishing processes and information technology needed to exploit the full potential of mobile publishing.

Based on this goal, a case study-based research design was selected. This design was preferred over a large number analysis of print media publishers, for which the sufficient quantity of participants is lacking due to the newness of this subject.

Starting with the explanation of traditionally deployed publishing processes and information systems in newspaper and magazine publishing, the thesis will cover the goals of mobile publishing followed by a chapter on the organizational and technical preconditions for mobile publishing, especially concentrating on the requirements for mobile end devices, content management systems (CMS), and XML. Three case studies from an internationally diverse background exemplify the current status of mobile publishing processes and information systems in use and their suitability for reaching the general goal of mobile publishing in print media companies. The thesis will be completed with a summarizing conclusion and a future outlook.

1.4 Definition of the print media industry

Media companies are companies whose main purpose is to create, bundle, and supply content in accordance with their economic, editorial, and artistic goals by utilizing mass media [ScHe02, 9] and [ScHe02, 17-18]. As a subset of these mass media, newspapers, magazines, and books form the print media. They feature text and pictures in a unidirectional communication. Furthermore, print media products are characterized by being consumable without special technical equipment, as opposed to, for example television, where a television set is needed in order to be entitled to the consumption of a television program. Other branches of the mass media are data networks, storage media, television, and radio [ScHe02, 10].

This thesis will focus on the print media in particular on the sub-sector of newspaper and magazine publishers, because of their great similarities in their business model and organizational structure.

Newspapers

Newspapers can be differentiated from other print media along a variety of dimensions such as format, content, and circulation patterns. The main characteristics of newspapers encompass the following:

- The production process deploys a printing press.
- The newspaper format features oversized pages, which are not coupled and thus a loose collection of newsprint.
- The publication contains mostly news, but also advertisements.
- The regular appearance of the publication is at short intervals.
- The circulation mostly concentrates on specific geographic areas.
- Target group of the newspaper is the general public [PiBr97, 8].

Famous examples for (inter)national daily newspapers are “The New York Times” or “Frankfurter Allgemeine Zeitung”. Those well reputed newspapers indicate that the newspaper market is characterized by strong brands.

Magazines

Contrary to newspapers, magazines deal with less timely information. They focus on providing background information and thus offering a platform for political, social as well as cultural discussions [JoPr00, 4]. Additionally, magazines put a stronger emphasis on design as well as artistic writing and imaging. The main characteristics of magazines encompass the following:

- The production process deploys a printing press.
- The magazine format features briefcase-sized pages, which are tightly bound.
- The content contains profound coverage, opinion, interpretation of timeless information, and advertisements [JoPr00, 13].
- The publication frequency may range anywhere from a one-time issue to weekly appearance.
- The circulation has a national reach and is not limited to a specific geographic area.
- The target audience is well-defined, often a niche audience distinguished by geographic location, interest in a specific topic or by demographics [Daly+97, 6].

Famous magazines are the “Time” magazine, the “Spiegel” or “Vogue”.

1.5 Definition of mobile publishing

The term mobile publishing is not yet ingrained in the scientific literature, which is why the constitutive definition used in this thesis emanates from defining publishing and e-publishing.

Defining publishing

Publishing means to make information accessible for the public arena, covering the tasks of content creation, content bundling, and content distribution [RoRi03, 19]. Thus the term publishing comprises the release of information through all possible channels: speeches as well as physical media such as paper, or electronic media like the Internet.

Defining e-publishing

E-publishing differs from traditional publishing, because all information from its creation to its consumption is digitalized, excluding all analogue media such as paper from the publishing process. Through abandoning analogue media, the update cycles are much shorter than in traditional publishing, the electronic publication media allow interactivity with the users and the display options for content are broadened with audio, video, and animated content [Eber02, 3].

Defining mobile publishing

Mobile publishing is a further containment of the e-publishing definition. It focuses on the use of mobile devices during two phases of the publishing process: content creation and content distribution.

Prof. Kleper focuses on mobile content creation and circumscribes mobile publishing as follows:

> "The publishing process has become portable, and, therefore, place independent. Laptop computers and other digital devices have freed digital publishers from the need to work directly in a physical location within the editorial, creative or productive environment." [Klep01 p. XXXII]

Contrary to Kleper, Bernd Zimmermann follows a consumer-oriented approach. He defines mobile publishing as the production of all informative, communicative or transaction-oriented applications, which a consumer can use on its mobile end device [Zimm03].

The integration of the two previous definitions serves as the underlying definition of this thesis:

> Mobile publishing is a special form of e-publishing, which aims at supporting all content creation and content distribution tasks with mobile end devices.

Concluding, mobile publishing differs from traditional and e-publishing primarily with respect to a different content carrying medium – the mobile end device. Thus we deal with a mainly hardware-driven definition, which could be broadened through including the context, in which the user resides or the services, which are running on the mobile end device. Both additional concepts are valuable for future reference; however lack relevance for this process-related and technology-focused thesis.

2 ORGANIZATIONAL AND TECHNICAL STATUS OF PRINT MEDIA COMPANIES

2.1 Process organization of print media companies

The overall purpose of print media companies is to create editorial content (news and features), to bundle, manifold, and finally sell and distribute the copies to the readers [PiBr97, 3]. Parallel to the focus on editorial content is the necessity to engage in advertising content, which is usually provided by advertising agencies, however needs to be incorporated into the final media product. Hence, print media companies simultaneously operate in two distinct markets, which is on the one hand the sale of copies of the print media product to the readership and on the other hand the offering of access to the readers to interested advertising companies. The performance in one process affects its performance in the other, and is often referred to as the circulation spiral phenomenon [PiBr97, 89].

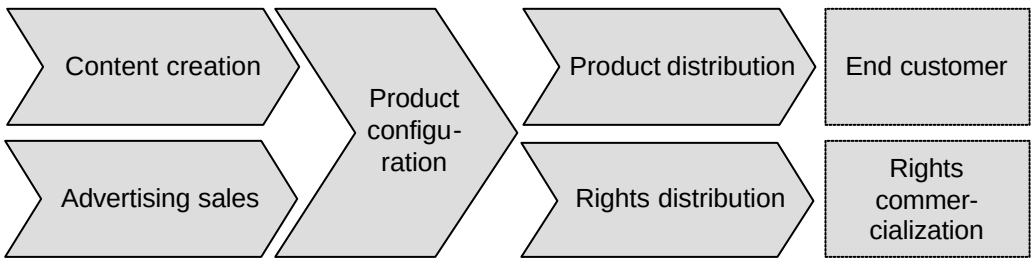

Fig. 2.1/1 *The generic value creation chain in the media industry* [Tzou03, 43]

Because of information products' short life cycle, the print media creation process is a constantly deadline-driven process, which is divided in the following phases: Project start, content creation and acquisition, verification,

approval, and bundling, design and layout, archival storage, production preparation and printing, distribution as well as billing and after sales service, which shall be explained in the following paragraphs.

Project start

The first step towards content creation and acquisition is the development of an editorial philosophy and content plan. Originally, the content plan described the major content components of the print media product. However today, the content plan should take additional distribution channels with their specific strengths into consideration.

The combination of a visionary editorial philosophy and a detailed content plan is the foundation for deciding on content purchase as well as initiating and allocating content assignments to the appropriate working groups.

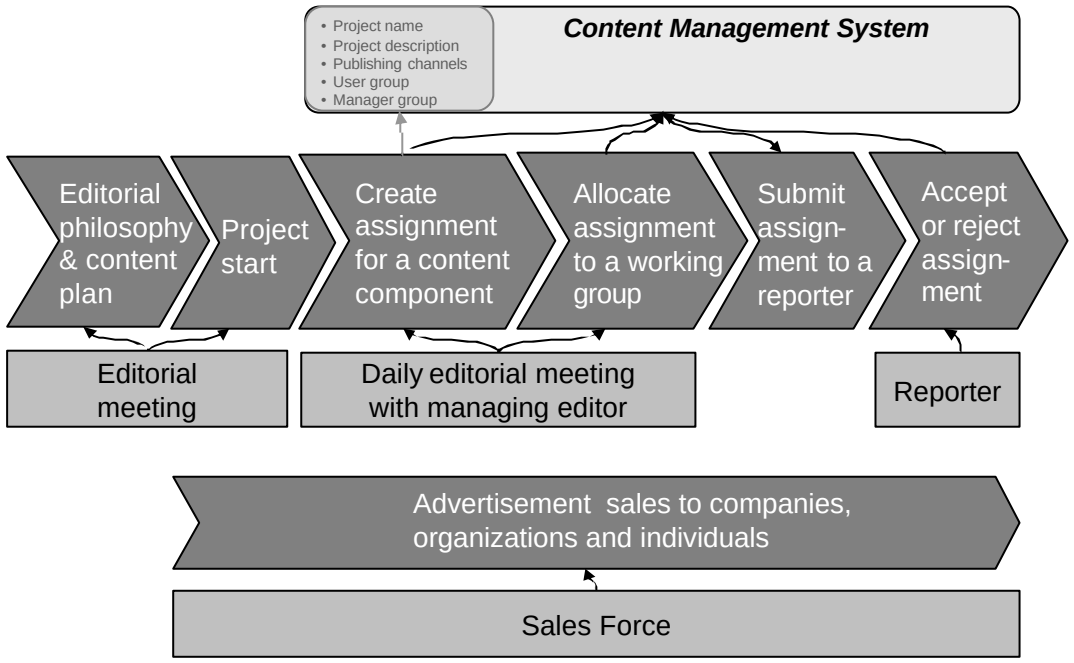

Fig. 2.1/2 The Publishing Process – Project start

Content creation and acquisition

Nonadvertising content is either originally created by the editorial staff or purchased material from individuals or content syndicates [PiBr97, 75]. In most cases the latter content type focuses on nonlocal interest matters and represents the majority of a newspaper's editorial content [PiBr97, 77]. Famous news services and syndicates which deliver such services are Deutsche Presse Agentur (DPA), Reuters, and Associated Press (AP).

Getty Images Editorial and Magnum Photos are international photo agencies, which offer watermarked photo previews on their website with the option to download a non-watermarked copy after agreeing on a license fee [Magn04].

The content created by the editorial staff is typically assigned to working groups days in advance, in the case of breaking news within minutes.

Advertising content comes from both local and (multi)national institutions. Depending on the advertising customer, the content is usually provided by an advertising agency and sometimes created by the ad production personnel of the newspaper itself [PiBr97, 83].

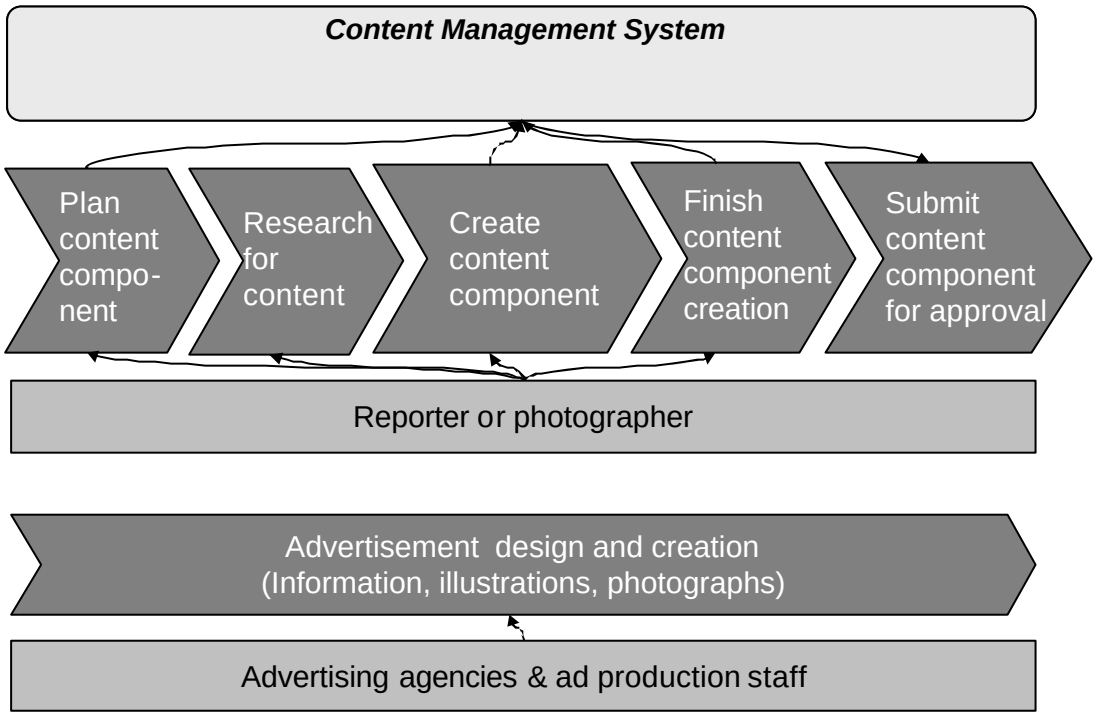

Fig. 2.1/3 The Publishing Process – Content creation

Verification, approval, and bundling

After finishing the content creation phase an authorized employee verifies the content component, finally approves and passes it on to the editorial meeting. Together with the managing editor, the editorial meeting decides on the final bundle of all editorial and advertising content components, determines the exact size of the print media product, initiates the final grammar, style and fact check, and forwards the content bundle to the production preparation.

Archival storage

In none of the sources used to investigate the publishing process in print media companies, archival storage of content components was mentioned as

part of the publishing process. However its importance as a basis for content reuse makes it imperative to view archival storage as an essential process step.

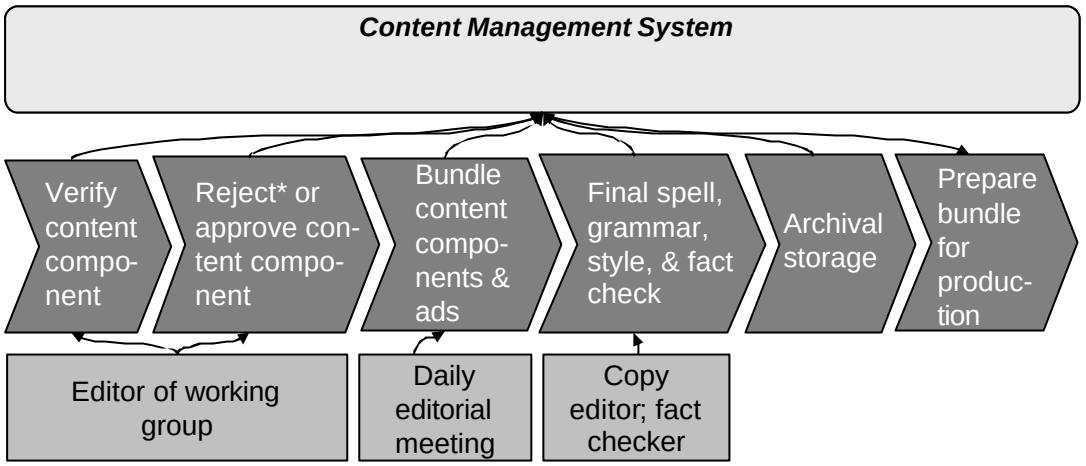

Fig. 2.1/4 The Publishing Process – Content verification, approval, and Bundling

Design and layout

The design and layout process starts with thumbnail planning, which reserves fixed positions for specific editorial content types like news or sports and advertising content types like full page ads or classifieds [Daly+97, 217]. During this process it is highly important that the consistency in content placement is being maintained for the readers to quickly find the desired information and to identify with the medium.

Layout contains the assembly of type, graphics, and photographs into the actual page layout and the production of proofs. Based on the proofs, proof reading and copy editing are completed by checking the placement of editorial and advertising material as well as the typographic accuracy [Daly+97, 218].

Production preparation and printing

In order to be able to start the production preparation, the digital input needs to be transferred to the printer. Today, floppy disks and removable cartridge drives are replaced by data telecommunication, especially E-mail and FTP, allowing print media companies to leverage their potential of becoming global by allowing regional and local printing to happen.

Once the file has arrived at the printing plant, it needs to be checked for errors, and finally prepared for its transition to the press plates. The

platemaking itself is a computer-supported process, especially in order to ensure accuracy and constant quality control [Daly+97, 223]. After completion of these tasks, a last proof is being printed and finally approved by the publisher, so that the press run can start. Depending on the humidity, temperature, and dirt the “runnability” of the paper can vary, resulting in deviations from the intended outcome [Daly+97, 227].

The finish of the press run is the starting point of the bindery process, which includes all necessary steps in order to transform the raw output into folded, trimmed, and sometimes bound print media products [Daly+97, 231].

Distribution

After leaving the printing process, the print media products can be distributed either via subscription, single copy sale or a mixture of both. In this step of the life cycle, the print media product crosses the border between being internally known and externally published. For copies sold via subscription, the print media product is labeled with the appropriate address of the reader, sorted according to zip-codes, and trucked to the closest post office. Single copy distribution is much more complicated, since the number of copies sold at each newsstand is constantly varying. In order to maximize revenues of single copy sale, sales data from the previous issue determine the current issue’s scope of supply for each newsstand [Daly+97, 231-233].

Billing and after sales service

Print media publishers need to take care of the billing of three major customer groups: newsstand customers, from whom the newsstand owner collects the money and passes it on to the publisher, subscription customers, who are usually billed on a monthly or even quarterly interval, and advertising customers, whose bills are typically prepared in accordance with their individual contract. The billing of the readers only applies for paid circulation. Shoppers, which are delivered to the readers without charge, will not be subject to that process step.

In times of declining readership after sales service is extremely important for print media publishers to continue being competitive. Tasks like call center operation, complaint handling as well as the collection of reader feedback and forwarding it to the appropriate departments need to be fulfilled by knowledgeable and courteous sales personnel.

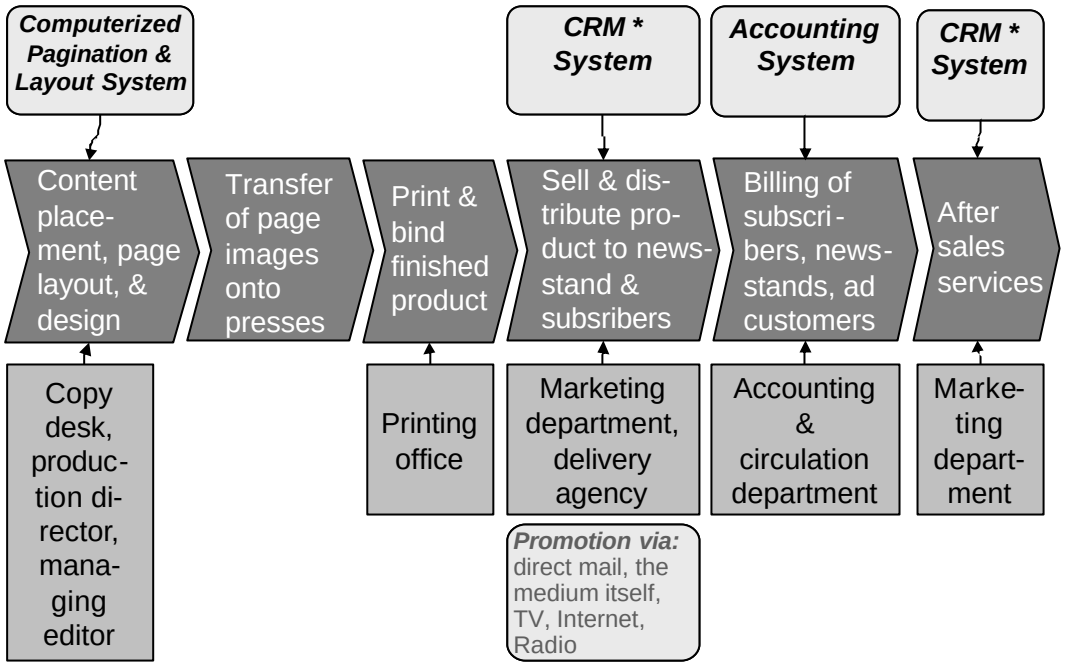

Fig. 2.1/5 The Publishing Process – Production, distribution, billing, and after sales service

Altogether newspaper and magazine publishers share the same sequence of publishing process steps; however the duration of each step is varying consistent with the type of print medium published.

2.2 Technology supporting the publishing process

Unlike from an organizational point of view, a technical approach reveals nearly no dissimilarities between editorial and advertising pages. Both stem from the same creation and production tools, they are printed the same way using the same equipment, and they make use of similar distribution systems [Daly+97, 214]. The subsequent chapter focuses on the description of the information technology supporting the print media publishing process.

Recent history of technology supporting the publishing process

Already in 1963 John Diebold, a management consultant, proclaimed that computers would be used throughout the whole production process including writing and editing as well as the layout and storage of articles [PiBr97, 112]. However it was not until 1970, when the *Detroit News* set up the first newsroom computer terminals for editorial work, which marked the start of the introduction of desktop, or computer-assisted, publishing in USA print media companies [PiBr97, 113]. The term desktop publishing refers to the use of input devices such as personal computers, scanners, as well as image-capturing devices, application software, networks, and output

equipment to accomplish the various tasks of prepress in a print media publishing environment [Daly+97, 174].

As the capabilities of storing digitalized fonts, photographs, and graphics as well as displaying them grew, the use of personal computers spread out and for the time being culminated in all publishing departments being networked by the mid 1990ies. Parallel to that development, sophisticated software emerged, which still supports the publishing process. The most prominent examples are sophisticated word processing tools and graphic image manipulation software, such as Adobe Photoshop. Page layout software like PageMaker or QuarkXPress facilitate the placement of type and design elements on the later printed page. Page description language (PDL) such as PostScript device-independently standardizes the communication between desktop computers and a wide collection of publishing equipment. Finally, the computer-to-plate technique eliminates film and negatives in the publishing process [Daly+97, 168] and [JoPr00, 71]. Consequently, most prepress operations were integrated on the desktop. Altogether, these software components, in conjunction with a reorganized process organization, immensely sped up the publishing process.

In 1994 nine out of ten design, editorial, and production departments used desktop publishing systems in their operations in order to realize an all-digital production up to the printing press [Daly+97, 172]. Consequently, the move towards electronic publication on the Internet or on mobile devices is not as disruptive from a production as from a consumer point of view.

Technology clusters analogue to the publishing process

In accordance with the publishing process, the technology needed to produce and deliver print media to the readers, three major groups of tools can be identified.

First is the group of tools that is employed during the collection, editing, and formatting the content. Traditionally pen & paper, a camera as well as computer equipment including sufficient hardware and the appropriate software tools are employed here.

The second category of technology is needed for getting the information to the audience: newsprint and ink, printing press, as well as insertion equipment represent the most critical tools. However the need for delivery

trucks and personnel must not be forgotten for being able to complete this phase.

The third cluster of technology is there to enable the reader to interpret the received information. Since today's newspapers and magazines are delivered on the medium paper, the only precondition for being able to recognize the content on the paper is light. Thus, to the point, for a consumer to interpret the print medium's content, no technical equipment is needed.

3 OBJECTIVES OF MOBILE PUBLISHING

In order to generate goals of mobile publishing, it is imperative to keep in mind the general goals of a print media company, which can be clustered into economic, journalistic, and political goals [ScHe02, 17-18]. With most print media publishers being privately owned, their focus lies clearly on economic goals, which in turn cannot be satisfyingly reached, when journalistic and possibly political objectives are neglected.

For developing the objectives of mobile publishing it is important to understand, that the mobile device is a new medium for the creation and distribution of content, which has not been previously used in the publishing process.

The following elaboration of mobile publishing goals pinpoints major objectives in a prioritized sequence, separating economic from journalistic goals.

3.1 Economic objectives

Increased Revenue

In order to increase revenues through mobile publishing, publishers have to operate on the markets for both, business and private customers. Whereas private entities can only be considered for editorial content sales, business partners can increase the publisher's revenue as customers for editorial content syndication or through additional advertisement booking. Especially from advertisement customers a premium price can be charged, because mobile publishing bears the opportunity to accurately match the ad content with the customer's preferences and thus markedly increase the advertising effect.

The private customer's willingness to pay can be enhanced through specially tailored information. Based on identified reader interests, habits, and preferences, age-specific, as well as activity, task, decision, and location-specific content offerings can be marketed and consequently contribute to the revenue situation of the publisher.

Cost Reduction

Cost reduction is certainly a goal in employing mobile devices. However, it should be considered that investments in constantly changing hardware and software are necessary.

The major cost saving opportunity in a mobile context certainly is the avoidance of high variable costs for printing and distributing the physical product. Distributing content on a mobile device completely eliminates the costs of printing and binding and alters the amount of distribution costs.

The second cost saving opportunity is the avoidance of converting analog into digital information. Through computerization like Computer Assisted Reporting (CAR) in conjunction with the new era of laptops and mobile phones reporters can easily connect to their offices, including the direct access to the printing process [Herb00, 9].

In that sense, mobile publishing is supposed to support a create once, publish everywhere workflow, enabling newsroom staff to quickly tailor content components according to the publication medium, without having to face numerous conversion efforts.

Retaining and attracting customers

Through the offering of mobile editions of a newspaper or magazine, publishers do not want to substitute their analogue medium. Customer retention is the key word. Thus, publishers aim at running targeted advertising campaigns for their own print medium in order to maintain or extend their current circulation. However more than that, they want to extend the reach of the print medium's brand and content offerings. Especially for retaining existing customers and for attracting new customer segments like young people, the mobile publication channel bears the opportunity of offering even more customer oriented content through more color, pictures, graphics, illustrations, and shorter stories. But not only the push-oriented content distribution, also the mobile channel's opportunity for interactivity and

the creation of communities serve to establish loyal customers. Thus, the combination of targeted advertising campaigns, extended content offerings, interactivity, and the thereby induced image gain are the foundation of retaining and attracting customers for both, the traditional and the mobile medium.

3.2 Journalistic objectives

As already mentioned above, the journalistic goals need to be harmonized with the economic goals in order to effectively support the economic well-being of the publisher.

New content types

The most prominent goal of employing mobile publishing is entering a new league of content types. The new functionalities of mobile devices support the creation and distribution of multi-media content. Consequently, mobile publishing enriches the traditionally text and still picture centered print publications with audio and video content.

Although not practiced on a large scale yet, user generated content is supposed to enrich the publication with new types of content. Votings on community relevant topics and topic-sorted blogs are only two examples, of new types of content added through user integration.

A precondition for an effective and efficient usage of user generated content is a good integration of the readers and sufficient incentives for a reader to participate in content creation.

Interactivity

Interactivity is a collective term for the interplay of action and response between a human being and a computer program. Through the usage of mobile devices, the users are supposed to be enabled to request specified information and receive it instantaneously over the same channel. On the one hand, the interactivity is supposed to enable the publisher to find out more about the reader’s desires, on the other hand the reader can be tied to the medium through fulfilling the need for targeted information.

An additional aspect of interactivity is the easy publication of content in the so-called blogs. This concept can be enlarged to include moblogs, where mobile devices serve as an inputting device for content to be listed.

Altogether, the support of interactivity is a convenient vehicle for improving the journalistic quality of the publication.

Publication Speed

In the pre-digital age, it could take hours if not days for a photo or an article script to arrive at the newsroom. Today, the utilization of digital cameras in conjunction with mobile phones and laptops allow a photo to be transmitted to the newsroom within minutes or even seconds [Herb00, 1]. Accordingly, the closing deadline of each issue can be prolonged, which leads to a higher percentage of up-to-date content in the print medium. The immediate and unproblematic transmission of the content is considered to be a major goal of mobile device usage in the content creation process.

Another goal of mobile device usage is to realize timesavings by eliminating the need to transfer information from analog media such as paper or a voice message into digital content. Still and moving pictures together with audio files and text messages are digitally created on the mobile device and hence can be directly transferred into the editorial systems of the print media company, saving time and human resources in the newsroom.

Analogue to time-savings during content creation, publishers seek to leverage the competitive advantage of the distribution to mobile devices compared to the “once-an-hour-news” on television and radio or even the “once-a-day-publication” of newspapers by being time-independent from program schedules or by eliminating the delays caused by the postal mail system.

Communication Support

The employment of mobile devices aims at facilitating the communication and enhancing the flow of information between reporters, newsroom editors, and readers. The mobile device allows instant either oral or written communication which not only brings information more quickly to the newsroom but also offers a fast feedback channel from the newsroom to on-site reporters leaving more options to direct reporters and photographers.

Image advantage

The employment of state-of-the-art mobile equipment and the promotion of its usage are supposed to contribute to a considerable image advantage of

the publisher, which is not only recognized by media specialists but also by the readers of the print medium and its electronic publications.

Credibility

In order to prove the newspaper's or magazine's devotion to in-depth investigation and the creation of meaningful content, mobile publishing aims at a substantially increased credibility through signaling personal on-site presence and brand image transfer to mobile editions complementing the printed publication.

4 PRECONDITIONS FOR MOBILE PUBLISHING

The ultimate goal is to efficiently leverage mobile devices in the content creation and content distribution process for fulfilling the economic and journalistic goals of mobile publishing. In order to do so, a series of organizational and technological changes needs to be considered. The most relevant alterations shall be explained in the following two chapters.

4.1 Organizational setup

Content creation supported by mobile devices together with distributing content on mobile devices changes the organization of newspaper and magazine publishers to differing extents.

In order to analyze the changes systematically, the process organization elaborated in chapter 2.1 serves as a foundation for the following analysis.

Process organization for mobile content creation

The changes of the process organization during content creation are at medium level. Freelance writers, contributing editors, on-site reporters, and photographers enjoy more freedom, because the mobile equipment enables them to accomplish their work at an independent location. Through the employment of mobile technology, the all-digital workflow is possible for the first time, eliminating ineffective process steps like copying handwritten information to the CMS. Thus mobile publishing enables publishing organizations to save time for the process steps themselves and the transition in between single tasks; the fundamental sequence of the process steps remains unchanged.

What changes is how often the process sequence is performed. Through the instant, location and time independent connection to the corporate publishing systems, the publishing process becomes a reiterative process. The information content of a single content module diminishes, whereas the sum of all content modules increases. Instead of the one-time-all-information-publishing method, a many-time-information-evolvement-publishing technique is employed.

Thus, it is important to provide the employees with sufficient training on the functionalities of the new technology and the opportunities of the new publishing method.

Process organization for mobile content distribution

Examining the procedural changes induced by mobile publishing in the content distribution phase, fundamental alterations arise. Most noticeably is the redundancy of all functions after prepress including the physical distribution of the end product through the employment of a mobile platform instead of paper as publication medium. However mobile content distribution affects the previous process steps as well. Through alterations in the usage context and the particularities of some mobile devices (see 4.2.1) parts of the content must be specifically created for the mobile usage, initiating a completely new publishing process with new creating, bundling as well as controlling resources.

4.2 Technical setup

The following three chapters explain the fundamental technology needed to support mobile publishing. Whereas the first chapter concentrates on the specifications of the mobile equipment, the second and third chapters focus on the technology, in particular a CMS and XML, which are needed in order to efficiently work with content from a mobile device and to format the content for the distribution to a mobile device.

4.2.1 Mobile equipment

In order to label a device as mobile, it needs to fulfill certain requirements. Most important for location independent usage are a small size, a low weight, sufficient battery life as well as the assurance of an all-time access opportunity to a wireless network such as GSM, GPRS, or UMTS. The most

prominent mobile device is the classical mobile phone, however new generation smart phones as well as PDAs (Personal Digital Assistant), laptop computers, tablet PCs, and, especially for future reference, e-paper need to be considered as a medium for mobile publishing. All of these mobile devices fulfill the above mentioned, basic requirements, which is why their suitability for mobile content creation and mobile content distribution shall be examined along the criteria connectivity, size and weight, input devices as well as output devices.

Whereas during content creation especially the input options play an important role, the content distribution relies on the provision of certain output devices.

Mobile Phone

Connectivity

A mobile phone is a telecommunication medium, which wirelessly connects to a relatively close transmitter. The coverage area of each transmitter is called a cell and can reach anywhere from 100 meters to 20 kilometers [Izmf03]. Besides the connection to ubiquitous wireless networks such as GSM together with CSD, HSCSD, and GPRS as well as lately even UMTS and Wireless LAN most of cellular phones support a short-range data transfer via IrDA (infrared) or Bluetooth. Thus they are capable of providing a modem for a laptop to access the Internet via a wireless connection.

Size and weight

Although the cellular phone's size ranges from 117x59x27 millimeter of a Sony Ericsson P800 to 87x47x24 millimeter of the Panasonic X70, the weight ranges from about 160 grams to about 75 grams, and battery life varies between 150 and 400 hours, these specifications make all cellular phones highly portable [Mans04, 114-117].

Input options

The main input device of a typical mobile phone is a keyboard featuring around 20 keys for controlling the menu, entering numbers, and via a specific mechanism also to input letters. The latest models of mobile phones are also equipped with a VGA camera and a microphone to record pictures as well as video and audio content [Speh04]. The quality of these cameras is constantly

increasing, already reaching one million megapixels, however not comparable with the current portable digital cameras.

Because of its limited input options, the mobile phone is of questionable usage for content creation. However its strengths lie in its multiple connection options, which are of high relevance for mobile publishing, when transferring created content to the corporate content repositories.

Output options

The primary output device of a cellular phone is its display. The new mobile phone generation offers a comparably high readability through displays much bigger in size (208x320 rather than 128x128 pixels) and colorfulness (up to 250.000 rather than 65.000 colors). Through appropriate software such as .html- and WAP-browsers or MPEG-players, all visual content can be watched on these displays. Audio content can be either perceived through integrated speakers or by plugging in headphones [Mans04, 114-117].

Thus, the output options of the mobile phone are very much suitable for multi-media content. However, the cellular phone's display capabilities as well as its processing power and battery life need to be considered when creating content for this medium. Consequently services complying with these limitations were created. Most prominent examples are

- SMS (short message service, which allows the user to send and/or receive short text messages)
- MMS (multi-media messaging service, which extends SMS to feature longer texts, pictures, audio, video or any combination of the latter, complying with the specified size limits)
- WAP (wireless application protocol, which was developed to transfer optimized Internet content to cellular phones)

PDA

Connectivity

With its roots as an address database, the PDA's strengths lie in the provision of software tools for information processing on the go. In the beginning data transfer was only possible via removable storage devices or through synchronization via docking station. Now, some PDAs are equipped with interfaces to connect to wireless networks. Thus they become capable of profiting from the advantages of mobile publishing.

Size and weight

The size and weight of PDAs is clearly bigger, than a mobile phone, however still small enough to fit in a trouser pocket.

Input options

Concerning input devices, the standard PDA differs from a cellular phone with respect to the input options. The keyboard has been replaced with a touchscreen, which, combined with an automatic handwriting recognition, highly improves the data entry. However, current PDAs lack integrated digital cameras and microphones, eliminating the option to record audios, videos or still pictures.

Concluding, the PDA has its strengths in personal information processing and the entry of textual data, for which it is well equipped through the touchscreen. For multi-media content creation, however, it is not well suited.

Output options

The output devices of the PDA are nearly identical to the mobile phone's. Major difference is again the display, which, through the lacking keyboard, is much bigger compared to the cellular phone. Thus the usability for the user is much more comfortable. Other than the display, typical output devices of PDAs include speakers and a headphone outlet.

Thus, the output options of the PDA, especially the larger display make a PDA very much recommendable for receiving multi-media content on the go.

Laptop

Connectivity

In order to use a laptop in a mobile environment, it needs to be hooked up to a ubiquitous wireless network. Two options are available: On the one hand, the laptop can be equipped with a GPRS or UMTS PC card using the laptop's PCMCIA interface [Speh04]. On the other hand the laptop can be hooked up with a mobile phone or PDA via Bluetooth or IrDA and thus use the mobile phone or PDA as a GPRS or UMTS modem. Whereas the first option is much more elegant, the high purchase price of these PC cards and the widely spread mobile phones make this solution rare in reality [Wirt04a, 94-97].

In order to broaden the opportunities for data exchange, Bluetooth and IrDA are complemented by additional interfaces such as USB, which enables an easy connection to digital cameras, removable storage devices or printers.

Size and weight

As the name suggests, laptops are portable computers small enough to work with on your lap. This implies the laptop's size and weight specifications: Their circumference measures around 35x25x5 centimeter – only slightly more than the standard paper size DIN A4. The weight ranges somewhere between 2.5 and 4.5 kilograms – notably heavier than paper and thus limiting permanent carrying [Wirt04a, 94-97].

Input options

The standard input devices of a laptop are a keyboard, a mouse, and a microphone. Opposed to mobile phones a laptop's keyboard represents the full alphabet, all numbers, and many controlling keys. Thus it is a highly suitable input device for creating textual data. The mouse is a movable input device, which allows the user to select and position displayed objects on the computer, facilitating the creation of graphic objects.

Through the microphone, the laptop is capable of recording audio content. However through its storage and processing capabilities, the strengths of the computer are clearly in creating textual and graphical content as well as in the modifying multi-media content.

Output options

The main output device is the laptop's display. Being considerably bigger than its counterpart in mobile phones or PDAs, the display stands out as much more comfortable to read. Disregarding its size, weight, and battery life, the conjunction of the high resolution display and built-in speakers or headphone outlets makes the laptop the topmost recommendable device for enjoying multi-media content.

Tablet PCs

Similar to mobile phones and PDAs, the only distinction criteria between a laptop and a tablet PC is its display – a touchscreen, which allows the user to write and draw on, resulting in a substitution of the keyboard as an input device. Because of this new input mechanism combined with handwriting recognition software, the tablet PC has a high usability in a truly mobile

environment. Especially when it comes to data entry the light weight tablet PCs can be a perfect substitute for a pad of notepaper [Wirt04, 28]. Furthermore through a computing power comparable with regular laptops, USB keyboard connection, and various possibilities for data transfer, they can replace laptops and even desktop PC used in the daily work of a reporter [Rink03, 131].

E-paper

Connectivity

The current version of e-paper is not designed for an instant and constant access to a wireless network. It rather uses a wired connection to a PC, which previously has downloaded all requested information, which strongly limits the device to fully leverage the potentials of mobile publishing [Xero04].

Size and weight

In the future, e-paper will have the alterable size and the low weight of traditional paper: This is possible, because, e-paper is made out of a thin plastic film, in which small beads (toner particles) are randomly distributed. Each toner particle consists of one light and one dark hemisphere, which show one of these hemispheres to the reader depending on the applied electrical charge. Because of its construction, e-paper can be reused more than a thousand times. Additionally, neither background lighting nor constant recharging of the e-paper is necessary [Xero04].

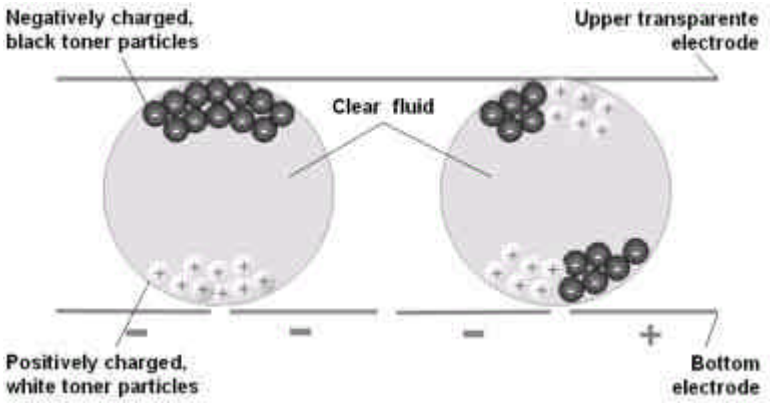

Fig. 4.2.1/1 eInk's Technology [Eink02]

Input options

E-paper is a pure display medium featuring no possibility to input data. Thus it cannot be employed to support the content creation process.

Output options

Because of its high contrasts and a viewing angle of nearly 180 degrees e-paper provides readability similar to paper. Its low power consumption caused by its image stable memory effect results in a considerably extended battery life as well as the opportunity to use much smaller batteries. Consequently costs as well as weight of the e-paper can be noticeably reduced. By replacing glass with ultra thin and light-weight plastic films, e-paper's appearance and portability come very close to traditional paper. However e-paper's display capabilities are limited to black and white text or still pictures [Eink02]. Consequently, it can serve as a substitute medium for paper in magazines and newspapers, but it is not yet suitable for multi-media mobile publishing.

4.2.2 Content management systems

Content management comprises the systematic sourcing, creation, editing, administration, processing, publishing, and re-usage of content [RoRi03, 15]. With regard to a continuously growing volume of information and content together with widely implemented all-digital publishing workflows it becomes obvious, that those tasks need to be supported by adequate hard- and software. The subsequent paragraphs highlight the description of the general functions of the most important content management application software components.

Most of the currently employed CMS are individually configured and adapted versions of commercially widely offered content management solutions, which are either fully integrated content management solutions or modular products. The latter products are considered to be best-of-breed, since they are assembled from individually optimized software pieces made to work closely with one another [RoRi03, 104].

Basically, content management solutions feature a threefold structure, which encompasses an editorial system, a content repository, and a publishing system, all to be described in the following.

Editorial System

The editorial system supports the editorial work, which comprise the tasks of planning, research, creation, and design of the editorial content. Additionally,

the editorial system supports the editors with coordination and controlling mechanisms [Tzou03, 90].

Current CMS offer limited capabilities of editing mechanism. They rather supply editing tools through integrating proprietary systems [Tzou03, 90]. Examples of integrated solutions could be Desktop Publishing Systems like QuarkXPress, but also graphic manipulation software such as Adobe Photoshop or text editors, even as simple as Microsoft Word.

Following the idea of coordination, the entire publishing procedure is managed by a collection of administration tools, such as digital rights management functionalities or user administration tools in order to enable personalized access to the CMS. Beyond that, the workflow functionality helps to master the flow of the publishing process. It allows defining single process steps, their sequence and the transition between the process steps. Furthermore responsibilities, deadlines, and roles for fulfilling the editorial tasks can be assigned. Sophisticated CMS provide much more flexibility through the ability of prioritizing projects, appointing substitutes, managing time-sensitive projects through calendar integration, offering multiple notification options such as email, SMS or fax, and most importantly for a flexible workflow management, those systems allow mapping exceptions.

In the context of controlling, some CMS are well suited for quality assurance. They allow defining approvals before content publication, they handle errors, and they map the dual control principle [Zsch99]. Moreover, some CMS offer not only reporting features, but also accounting, billing, and payment functionalities, which are supposed to support the processing of B2B or B2C purchase transactions in the Internet [ScHe02, 111].

Content repository

The content repository handles the physical storage of the content [ScHe02, 111]. With its basic function of entry reading, entry writing, deletion of existing entries, and entry changing the content repository is very similar to a data memory [RoRi03, 113].

Through separating content and layout, the simple storage is being augmented by media neutrality, which is imperative for efficient cross-media publishing of text, audio as well as still and moving pictures [Tzou03, 91].

Thus, the heart of the repository usually contains a multi-media database capable of storing (semi-) structured multi-media content components as well as their metadata.[1] The multi-media capability of these databases paired with the simultaneous storage of metadata are the foundation for efficient mobile publishing with a high content reusage rate.

The quality of a multi-media data base is mainly determined by the number of formats it supports. Thus, the compatibility with pictures formatted in .bmp, .gif, .jpeg, .psd, .tiff, .png, the error free handling of sound files such as .mp3, .wav, and .midi as well as video and animated files in the format of .mpeg, .mov, and .avi is essential to a broad usage environment of multi-media databases [Trin04, 163]. Furthermore, the support of animations and text files in all its numerous formats paired with database information are critical to the successful usage of the CMS.

A second important quality criterion is metadata handling. It is extremely important for a multi-media database to be capable of copying, moving, and erasing metadata together with the content component it belongs to [Trin04, 156]. Usually, the manufacturer of the CMS pre-defines a set of meta information, which is automatically collected by the system. Title, editor, date of last changes, and status are typical representatives of this meta information cluster. The second cluster refers to user-defined attributes, which comprise a great variety of functions [RoRi03, 121]. In the publishing industry the metadata format used to label pictures is called IPTC (International Press Telecommunications Council) and should be supported by the databases incorporated in the CMS [Trin04, 157].

For the archival storage and an easy retrieval later on, the content components should be equipped with key words and descriptions of the content they carry. Furthermore it is recommended to categorize the content, because this enables a topic based search on top of a one dimensional key word search. The search can be facilitated by the database being capable of generating thumbnails as a preview of the content components desired [Trin04, 163].

Manipulation tools can be incorporated into databases, however because of the specific manipulation needs in the print media industry it is better to

[1] Alternatively to a database, the multi-media content can be stored in a file system.

permit an easy data export into manipulation tools such as word processors or graphic manipulation software.

The content repository should also possess an adequate access control mechanism, which is necessary especially for security reasons. Registered users should be required to login thereafter the CMS examines the user's access rights. The following authorization determines which interactions between the user and the system are permitted. Especially in integrated media companies, where the departments of print, Internet, and mobile publishing use one common repository a simple distinction between reading and writing rights might not be sufficient.

Other important features of a content repository are protocol functions for recording content changes, professional data backups, a roll back functionality, a check-in check-out mechanism as well as the administration of different document versions, which shall not be described in further detail in this thesis.[2]

Publishing System

The major functionality of the publishing system is to prepare the content for display according to the target medium's specification.

One of the strengths of CMS is to connect the target medium specific layout to the underlying content using an appropriate pre-defined set of rules. Thus the publishing system enables the publication of the same content component on different target media in possibly multiple languages [RoRi03, 133].

Following the traditional print media workflow, the content selection has already been completed during previous process steps. However in digital publications this task can be performed by the publishing system through the integration of personalization tools. This is especially important in mobile publishing, where each and every user is identifiable by and addressable through a unique phone number, giving personalization a significant raise in importance.

Finally, through the rule-based assembly of content and layout the first copy of the final product is created, which is different for each target medium and

[2] A detailed description of the listed functionalities can be found in [RoRi03, 122-136].

serves as a foundation for the reproduction and distribution of the final product [Tzou03, 92].

Publishing digital on multiple media requires publishing systems to be capable of administrating publication periods, which can vary depending on the target media's publication purpose.

Through constantly proliferating media channels, a publishing system can provide a key success factor for a media company by offering the capability to swiftly adapt to the constantly changing media formats and to the shifting information needs of their customers [DaWa03; 10].

General Requirements

When considering employing a CMS for supporting the publishing workflow, it is not only important to cover all relevant criteria for seamless editing, storing, and publishing. It is also essential to find a system, which works platform independent, which uses open standards, which is simple to integrate into the existing IT environment, and which provides an extensibility and scalability for future reference.

In an organization using mobile publishing in the content creation process, it is essential for the integration of mobile reporters, external editors, and freelancers to be able to use the CMS location independently. Typically, this is realized through web-based user interfaces, which require the identification of the user through a user name and an appropriate password in order to protect the work environment of the publisher. Additionally, WAP interfaces as well as SMS and MMS gateways should enable the access to the CMS.

4.2.3 Media neutral data management and XML

The media industry increasingly realizes the growing importance of media neutral data. Media neutral data offer the advantage of being much more flexible than proprietary data. Being the foundation for publishing on multiple target media, media neutral data not only fulfills the requirements for multi-platform-publishing, they also represent an effective protection of investments in digital content components [RoRi03, 266].

The data format usually selected for media neutral data handling is XML. The following paragraphs describe XML as well as its advantages and disadvantages in cross-media publishing.

XML

XML stands for eXtensible Markup Language, which along with HTML (Hypertext Markup Language) derives from SGML (Standard Generalized Markup Language). In its function as a markup language it serves as a vehicle to structure and label content components. Document Type Definitions (DTD) describe the hierarchical structure of XML documents, which in turn store data according to these structures. This characteristic of XML is especially helpful for mobile publishing, because it ensures a consistent structure of very small content components, which can be stored according to their logical context and even more importantly, the content components can be platform independent as well as consistently exchanged between different information systems.[3] Thus, XML is a basic technology for the automated content exchange and thus fundamental for mobile publishing [Kamp01].

Particularities of an XML document

XML documents can be described as a group of documents, which comply with the XML grammar [RoRi03, 41]. More specifically, XML represents two parts of the general threefold document structure - content, structure, and layout.

Firstly, XML carries the raw information contained in the document, which is given as plain text and secondly, it serves as a vessel to convey the document's logical structure, giving elements such as headlines, pictures or body text and the relationship between those structural elements [RoRi03, 45-48]. The structure of a document is an important vehicle to reveal the document's purpose and meaning [RoRi03, 61]. However, the structure of a given document is usually not automatically apparent; leading to the requirement of qualified personnel to scan the information contained in the document and to put it into a clearly defined structure [RoRi03, 60].

To define a fixed structure of an XML document, a DTD can be employed, forcing the XML document to adhere to this pre-defined structure (e.g. "paragraphs may only occur inside chapters, not outside of them" or "level-2 headlines may only occur below level-1 headlines") [Kamp01].

[3] Publishing on mobile end devices demands a decomposition of content in comparably small components. However, the determination of the correct size of the content components is rather difficult, because technically there are no limitations towards the smallest possible module size' [Andi+03, S.6]. The size should be determined in a way that they can still be economically reused for other publications such as the print edition of a magazine.

The layout in particular is not handled by XML but by other languages such as XSL (eXtensible Stylesheet Language), which describe the shape or design of the document, i.e. features like font, font size, colors, and page position [RoRi03, 249-258].

Sticking to the threefold structure of documents, two important features of the XML standard shall be mentioned again at this point: XSL stylesheet and the Document Type Definition, which lead to a document having its content clearly separated from its structure and layout. Both are very important, because the display of XML documents in current browsers is very limited, leading to the fact that XML documents need to be converted to HTML before being displayed in a browser [Zsch00]. XSL is providing a set of mechanisms for transforming XML documents into HTML.

More generally, the XSLT style sheet describes how an XML document can be consistently transformed into any arbitrary file [RoRi03, 186]. This characteristic of XML / XSLT is especially important in the publishing industry, where transformation tasks are on the daily agenda. WML (Wireless Markup Language) shall serve as an example. WML is a language to display information on small cellular phone displays, which is similar to HTML, however working without many of HTML's layout details. Via XSLT information can be rendered according to the specification of the mobile hardware, giving publisher's the opportunity to reuse content components without major variable transformation expenses. Concluding, the combination of the XML and XSL standards efficiently supports the publisher's task of multi-platform-publishing out of one single content source [RoRi03, 265-267].

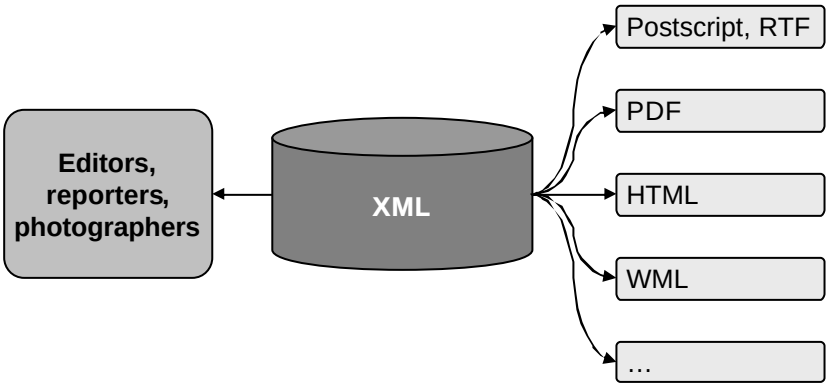

Fig. 4.2.3/1 XML as the center piece of multi-platform-publishing

Advantages of XML

The most prominent advantage of XML is the possibility to separate content and structure from its layout. Consequently it is a media neutral standard, which allows the publication of its content components on any arbitrary output medium, e.g. paper, Internet or mobile device [RoRi03, 249-258]. The combination of XML's media neutrality and the functionalities of XSL provide the opportunity to automatically prepare and convert content components according to the specific requirements of each publishing channel as well as rule-based distribution of formatted content [RoRi03, 266]. In the mobile environment, where many of the users are identifiable through their target phone number, the latter feature is the basis for fast and efficient content distribution according to each customer's desires.

Next to being media neutral, XML is also a platform neutral standard, which makes it perfectly suitable for automated transport and exchange of content [Kamp01]. This characteristic of XML is increasingly gaining relevance for publisher's who are engaged in content syndication.

XML is an open standard, which profits from its extensibility. Users can define tags and attributes for structuring and labeling their data according to their own needs, thus offering the opportunity to structure even highly complex documents [RoRi03, 189]. Since XML was created as a text markup language, the suspicion could arise, that it is not suitable for storing neither audio nor still or moving pictures. However XML is perfectly suitable for referencing such data with regard to file names, sequences, etc. [RoRi03, 228].

XML is also well suited for the retrieval of content components. Due to its platform independent tag structure and its possibility to enrich documents with meta information, it facilitates the retrieval of content components and thus is essential for content reusage [RoRi03, 188].

All together XML not only facilitates the media-specific content distribution it can also be a tool for archival storage and retrieval of multi-media content.

Disadvantages of XML

The first major drawback of XML is that its introduction requires a very intensive preparation. DTDs must be defined, necessary meta data requirements and stylesheets must be developed – altogether complex tasks,

which assume the existence of knowledge in the adequate programming languages and a profound discussion of the tradeoff between flexibility and maximum structural rigidity [RoRi03, 198-204].

The second disadvantage lies in the constant requirement to label all content components, which makes the application of XML very complex and time-consuming [RoRi03, 60].

Nowadays, many media companies use standard databases such as MySQL to store their content. However, due to the text-based structure of an XML document it remains a complex task to store/retrieve XML data to/from a relational database in an effective way [RoRi03, 288-293].

Concluding, the usage of XML promises great success especially for the cross-media publication of high-volume or complex information, which features a relatively homogeneous structure. However the scarcity of qualified personnel with knowledge in the adequate programming languages is a limiting factor to the introduction of the media neutral standard XML.

5 PRACTICAL IMPLEMENTATION OF MOBILE PUBLISHING

After interviewing three companies engaged in mobile publishing, it is clear that mobile publishing in print media companies has not yet reached its full potential. The implementation of mobile devices throughout the whole value chain, including both content creation and content distribution, has taken place in neither Germany nor the United States of America.

Up until now newspaper and magazine publishers focused on leveraging mobile devices and services either in creation or distribution of their content.

On the one hand, the case studies of Vorarlberger Medienhaus and gogol-medien exemplify the publishing processes and information systems currently employed to successfully create content with mobile devices.

On the other hand, the Kansas-based World Company serves as an example of how print media companies are currently set up to distribute content on a mobile device.

In order to create a better awareness of what kind of companies are already today employing mobile publishing methods, the introductory sections of each case study will be reserved for establishing a general understanding of

the companies by explaining their core business and giving an idea of the company's size.

5.1 Content creation: Case study Vorarlberg Online

All information contained in the following sections stems from various interviews with Mag. Dr. Jochen Hofer, editor-in-chief of Vorarlberg Online (VOL).

VOL belongs to the electronic media business division of the Vorarlberger Medienhaus, whose core business focuses on newspapers and printing. Accordingly, the product portfolio of the Vorarlberger Medienhaus comprises two daily newspapers, one weekly newspaper/shopper, several websites, and one radio station with a content focus on the state of Vorarlberg, Austria.

Their flagship product is the "Vorarlberger Nachrichten", which unites around 218,000 readers with a circulation of 72,000 newspapers, thus reaching around 75% of the population of the state of Vorarlberg. The second newspaper produced in the Vorarlberger Medienhaus, "NEUE Vorarlberger Tageszeitung", reaches 67,000 readers with a circulation of 12,500 newspapers, covering 24% of Vorarlberg.

The weekly newspaper/shopper "Wann & Wo" is published twice a week at no charge. Accordingly, the audience is the largest: 210,000 readers are attained with a circulation of 130,000 newspapers, equaling 90% of Vorarlberg's population.

The most prominent electronic medium of the Vorarlberger Medienhaus is VOL, a website launched in 1995 which now attracts 129,000 users, 100,000 of which are intensive users, who surf the website on a daily basis or at least several times a week.

"Antenne Vorarlberg" is a local radio station that started its service in 1998 and now serves about 40,000 listeners.

The content for the three different media types (print, online, and radio) is produced by roughly 400 permanent employees and about 1,000 freelancers, who work in order to create and deliver meaningful content to the local audience in the state of Vorarlberg.

The start of mobile phone usage in the content creation process of VOL was triggered by the incident of a Russian passenger plane and a cargo aircraft

crashing over Lake Constance in July 2002. Because of bad Internet connections, it took hours for on-site pictures to be delivered to the newsroom, even though the scene of the accident was less than 100 kilometers away from the newsroom. Since then, every reporter is equipped with a mobile phone containing a built-in camera for taking still and moving pictures.

The following two chapters concentrate on VOL and its content creation process of local online news supported by the usage of mobile devices as well as on the information systems used during this content creation phase. National and international news offered on VOL are created by and bought from press agencies, primarily from the Austria Presse Agentur (APA) or the Deutsche Presse Agentur (DPA), and thus are of no relevance to this thesis.

5.1.1 Description of the editorial processes

The publishing process at VOL is divided into four major phases of “project start”, “content creation”, “content verification, approval, and bundling”, and “content publication”, which shall be described in the following paragraphs. The four publishing steps are sequential; however they reiterate whenever new information components enter the newsroom. Hence, the publication characteristics change from a one time all-embracing article to small information units, which accumulate as time goes by and together form the whole content of the incident.

Project start

The process starts with an incident happening in the state of Vorarlberg. All information created in relation to that incident will eventually arrive at the newsroom of VOL at the so-called newsdesk. The newsdesk is a public email folder accessible by all employees of the Vorarlberger Medienhaus. It serves not only as the central news aggregation tool but also as a source for in-depth news coverage.

There are two methods by which breaking local news can arrive at the newsdesk: Either editors of Vorarlberger Nachrichten directly enter news as they write their stories for the newspaper or public press releases from the police or companies are automatically sent to the newsdesk via email.

Together with the breaking news in the newsdesk, predictable events need to be assigned to reporters for in-depth coverage, which is either automatically

assumed by working groups through their topic-specific organization structure or done by the editor-in-chief. Whereas the assignment of expected incidents is handled by email a week in advance, the reporting of unexpected items is usually assigned by telephone.

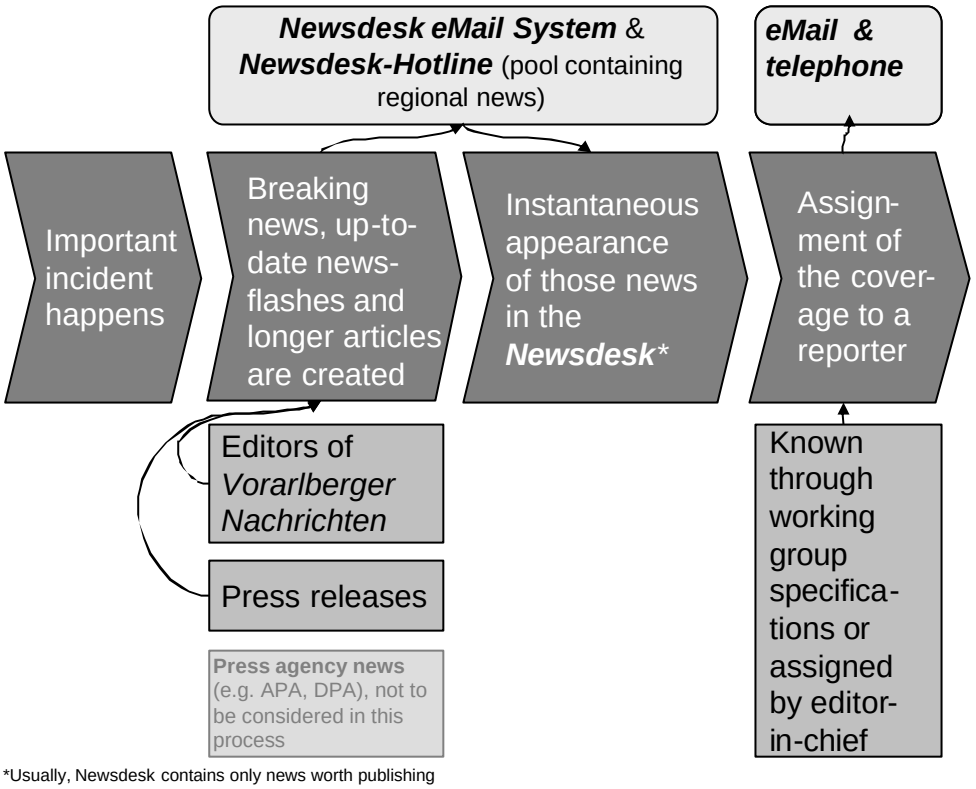

Fig. 5.1/1 The Publishing Process at VOL – Project start

Content creation

The content creation process starts out differently with than without mobile phone support: At first on-site reporters are supposed to take a picture of the scene with their mobile phones and send them via MMS directly to the newsdesk. The MMS contains only the pictures, however no description of the content of the pictures. This process step would not have to be performed, if mobile phones were not used.

As usual, before the reporters continue the research, they call the newsdesk hotline in order to provide initial information to the editors in the newsroom. By not attaching this background information to the pictures in the MMS, the full potential of the MMS is not being leveraged. Furthermore, because of the poor quality of the pictures taken with the current generation of mobile phones, they can only be published online and do not meet the quality requirements for the newspaper's print edition.

After learning more information about the incident, on-site reporters use their laptops to write short newscasts and send them to the newsdesk via email. If necessary, they hook up the laptop to the mobile phone and use the mobile phone's built-in modem to send the information via a GPRS connection to the newsdesk.

Now, the responsible editor prepares the initial information for publication and immediately brings it online long before the on-site reporters return. Thus the use of mobile phones remarkably speeds up the publishing process, with initial stories being published much faster than through the traditional process.

Parallel to the first news publication, on-site reporters and photographers gather information for an in-depth coverage. Together with detailed background information, they create high-resolution pictures as well as video and audio documenting the issue. Returning to the newsroom, they immediately transfer those multi-media content components to the Digicol DC4 Archive System, an immensely important step for future content reusage.

At this point it shall be stressed again, that the publishing process at VOL, especially the content creation, bundling, and publication, is highly reiterative. The sequential description of the process serves to guarantee the comparability with other publishing processes in this thesis as well as to support an easy understanding for the reader.

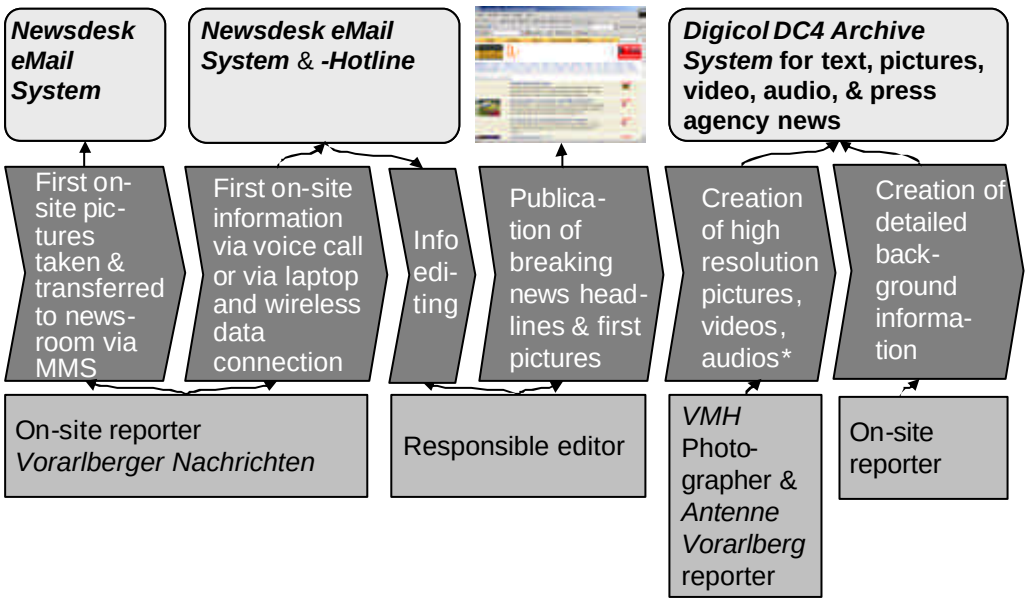

Fig. 5.1/2 The Publishing Process at VOL – Content creation

Content verification, approval, and bundling

Once all text, picture, audio, and video content components have been created, the target medium's editor-in-chief verifies, approves or rejects the content component for further use. In the latter case the reporters need to include the editor-in-chief's feedback and resubmit it to him. In all the other cases, the content components are put together to the final product: pictures are being selected, supporting audios and videos are chosen, and finally the responsible editor customizes the content components according to the target medium. For the online medium, the web CMS "Sense/Net" supports this process step.

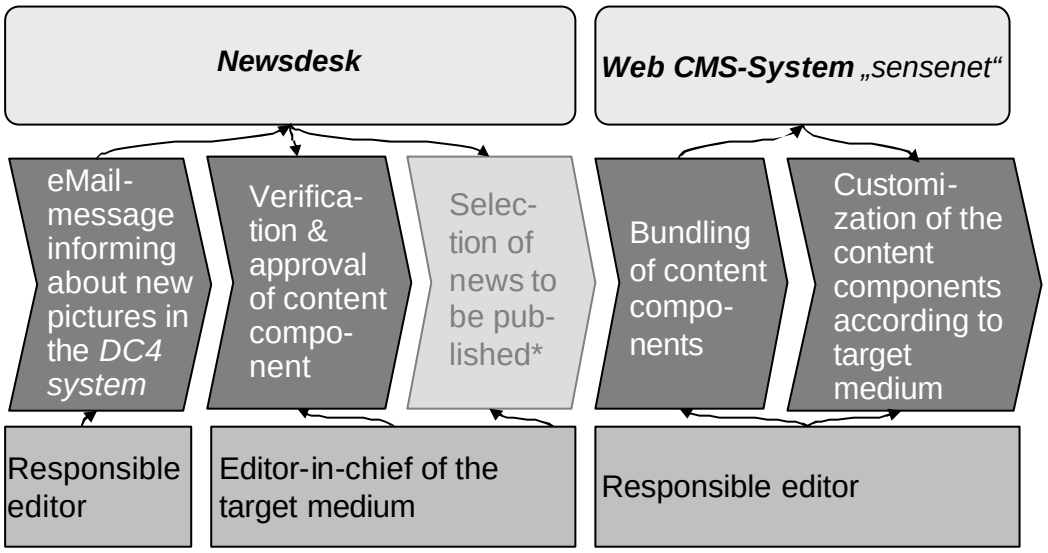

Fig. 5.1/3 The Publishing Process at VOL – Content verification, approval, and bundling

Content publication

The content publication phase at VOL unites the phases of design and layout, as well as the phase of distribution that were introduced in chapter 2.1. Because of the characteristics of the online medium Internet, the phases of physically preparing the production as well as printing are of no relevance to this process.

Each target medium's strengths determine its design and layout and thus the later presentation to the readers, with the online news being the only medium offering multi-media content in the forms of text, still pictures, audio, and moving pictures. The online medium is also the only medium of the Vorarlberger Medienhaus that offers a direct feedback channel for the readers, who in turn make strong use of it by participating in various blogs,

chat rooms, and evaluation methods provided by VOL. Especially in the lifestyle sector, such as movie recommendations or restaurant suggestions, this user-generated content is being incorporated in offline publications such as the “Vorarlberger Nachrichten” or “Antenne Vorarlberg”, leading to cross-media publishing practices.

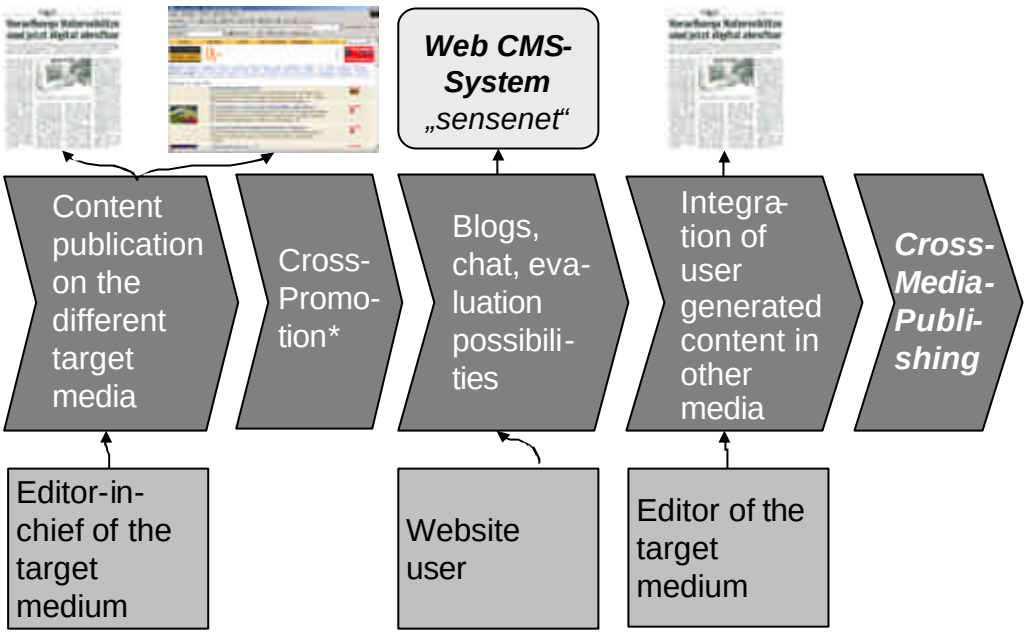

Fig. 5.1/4 The Publishing Process at VOL – Content publication

With operations in radio, newspaper, and online publishing, the Vorarlberger Medienhaus pursues successful cross-media promotion. The example of a fire in a farmhouse illustrates how Vorarlberger Medienhaus realizes this strategy. The information of the fire is published in the media newspaper and Internet, whereas each concentrates on its specific strengths. The Vorarlberger Nachrichten, the flagship newspaper, publishes one meaningful picture accompanied by a rather long coverage of the incident. The Internet on the other hand concentrates on the publication of almost 20 pictures, which document the incident and allow the written information to be very short. Both media refer to one another for more textual or visual information.[4]

Billing and after sales service

Because the usage of the information content on VOL is free, users are not billed. It is however necessary to bill the advertising customers, who reach a large portion of Vorarlberg’s population with their ads on VOL. Usually, the

[4] Illustrative pictures for this cross-media promotion can be found in the appendix *(Fig. Appendix/1, Appendix/2, and Appendix/3).*

billing of this customer segment is conducted according to their individual contracts.

Content syndication for its users can be viewed as a special after sales service of VOL. Although the Vorarlberger Medienhaus is not actively pursuing content syndication, private entities are increasingly making use of the newly emerged opportunity to buy pictures from the Vorarlberger Medienhaus. Each individual transaction is triggered by interested buyers, who approach and pay the Vorarlberger Medienhaus, which in turn delivers the requested pictures. This process is not automated yet.

Summarizing, the major difference in VOL's process compared to the traditional process lies in the additional process step of taking pictures with the mobile phone and sending it to the newsdesk, thus enabling an instant multi-media coverage of any incident. Without the mobile phones, the first news publication would still be done, however without the pictures. Furthermore the transferal of digitized information can be conveniently handled on the spot, rather than relying on fixed-line Internet access. Also, the mobile phone as a two-way communication medium enables fast feedback from the editors in the newsroom resulting in targeted research and picture-taking initiatives.

STRENGTHS OF THE PROCESS	***ROOM FOR IMPROVEMENT***
• ***Publication speed*** of multi-media information is highly increased, giving the reader the opportunity the see pictures even in the first message published	• ***Using the full capabilities of MMS*** by substituting phone calls with text messages included in the MMS, thus shifting to a truly all-digital publishing process as well as saving time and labor
• ***Demonstrating credibility*** by showing that the *Vorarlberger Medienhaus* has its own on-site reporters	• ***Poor MMS-picture quality*** reduces the reusage options for content components created with the mobile device
• ***Fast Feedback to the reporters*** is guaranteed through the employment of all-time connected mobile devices	

Tab. 5.1.1/1 Strengths and weaknesses of the publishing process at VOL

5.1.2 Description of the mobile equipment and the employed information systems

The four technological components for greatest importance employed during the publishing process of VOL are the mobile phone Nokia 6600, the newsdesk, the web CMS Sense/Net, and the archival system Digicol DC4, which is used throughout the Vorarlberger Medienhaus.

Mobile equipment

Mobile phone Nokia 6600[5]

With the Nokia 6600, Vorarlberger Medienhaus is using a state-of-the-art smart phone, which is well suited for the tasks on-site reporters want to perform with it. Most important, it is equipped with a built-in digital camera with double digital zoom. Its resolution for still pictures is as great as 640x480 pixels. Moving pictures can be recorded either at a resolution of 176x144 or 128x96 pixels, with the option to also record audio. Essential for the usage of on-site reporters is the availability of sufficient memory together with an efficient administration tool for multi-media content. The Nokia 6600 solves this issue by offering 6 MB internal memory with the option to extend it with removable multi-media cards of up to 128 MB. It also provides a media gallery tool, which supports convenient access to and administration of pictures, video, and audio captured with this mobile phone. For data transfer, on-site reporters can use up to 40.2 Kbps in GPRS networks and up to 43.2 Kbps in HSCSD networks. For data synchronization or, more important, for usage as a GPRS modem, the Nokia 6600 provides wireless connectivity via Bluetooth so that a laptop can be easily hooked up to the mobile phone [Noki04].

Altogether, the Nokia 6600 helps the Vorarlberger Medienhaus to achieve its reputation of using cutting-edge technology. However, with the start of the third generation mobile phone network in Austria in the second quarter 2003, the opportunity remains to incorporate high-speed data transfer and end devices with digital camera resolutions of over one million megapixels.

[5] A picture of the employed mobile phone Nokia 6600 can be found in the appendix *(Fig. Appendix/4).*

Information systems

Publication process support – Newsdesk

The newsdesk is the central information tool in the newsroom of VOL. It is implemented as an email folder, publicly accessible by all editorial staff. All relevant breaking news, up-to-date newsflashes, and longer articles are collected in this folder in order to provide a common platform throughout the publication process. Its close interrelation with the email communication makes it very easy to share information without causing media breaks, thus saving time and conversion expenses.

The simple setup as an email folder saves implementation and maintenance costs and fits the needs of VOL, which can, because of its size, efficiently coordinate and distribute work without implementing expensive workflow solutions.

Archival Storage – Digicol DC4 asset management system

DC4 is a multi-media capable archive, workflow, and editorial system that is based on Internet technology. In the Vorarlberger Medienhaus this system is mainly used for archival purposes, as VOL stores its still picture, audio, and video content components in the DC4 system.

With archival storage being its main purpose, The DC4 system supports the administration, archival storage, and data inquiry in multiple formats such as video, .mp3 audio, and .pdf-pages, as well as in numerous text documents. In order to perform these tasks, the DC4 offers an automatic indexing feature. Complex heuristic, statistical, semantic, and linguistic methods support a high accuracy of this automated process. Based on the automatic keyword attribution and optional manual content categorization, search engines are deployed. They permit extensive search opportunities ranging from full-text search over semantic clouds to image retrieval functions. Thus the DC4 system provides the foundation for fast and easy content component retrieval and consequently enables a high content reuse quota, which is necessary for time and cost saving cross-media publishing as performed at the Vorarlberger Medienhaus [Digi04].

Content Publication - Web CMS Sense/Net

With the Sense/Net Portal Engine, VOL is using an off-the-shelf solution for publishing their web content. Through a precise role and policy model, the

system allows authorized users, usually the responsible reporters and the editor-in-chief, to publish created content in designated areas as well as create and change the navigation on the website.

For supporting the publication process, this CMS offers editorial preview, templates as well as review and approval functions, which allow a quick and easy publication of content to the Internet, by simultaneously guaranteeing adherance to the design and presentation guidelines of VOL. In contrast to the editorial preview and templates, the approval function is of limited use, since VOL's number of employees is small enough to coordinate and distribute work without electronic support.

Besides efficient content publication, user community management and the management of user generated content from the website of VOL are major strengths of the Sense/Net Portal Engine. It offers a voting portlet as well as weblog and newsletter plug-ins. The results captured with the voting machine module and the weblog are particularly important sources of reader feedback, which are published either on the website or in the offline medium Vorarlberger Nachrichten. Hence the idea of cross-media publishing can be carried out by employing the Sense/Net Portal Engine.

The system operates on a XML and XSLT basis, thus separating the business logics from the presentation tiers. A page generator produces webpages in any markup language by transforming the XML source using XSLT. Consequently, the presentation of content components can be varied according to different output media and devices. Being able to transform XML content into basic HTML, XHTML or WML, the system is well prepared for easily displaying the content on a mobile device [Sens03].

With VOL storing its content using an XML based content repository, a highly efficient usage of Sense/Net Portal Engine with its cross-media publishing capabilities can be realized.

STRENGTHS OF THE TECHNOLOGY	***ROOM FOR IMPROVEMENT***
• ***Publication speed*** of multi-media information is highly increased, giving the reader the opportunity the see pictures even in the first message published	• ***Using the full capabilities of MMS*** by substituting phone calls with text messages included in the MMS, thus saving time and labor
• By allowing a change of content appearance without any disruption of the underlying content, the ***publication cycles*** at VOL can be considerably fastened	• ***The integration of the single information systems*** can be enhanced, particularly through connecting the Newsdesk and the Web CMS Sense/Net as well as integrating the Digicol Archive System

Tab. 5.1.2/1 Strengths and weaknesses of the technical equipment at VOL

5.2 Content creation: Case study gogol-medien

Gogol-medien is a German startup company, which was founded in 1994. Through the creation and licensing of innovative information and communication technologies, gogol-medien offers new approaches for the classical publishing industry.

All information contained in the following chapters stems from various interviews with gogol-medien's CEO, Martin Huber and the confidential business plan.

Gogol-medien targets regional media markets, which are characterized by regional distinctions, small market sizes, and high heterogeneity – altogether reasons why high investments for print media publications seemed unattractive until now.

Its publishing solution JustClick® opens the opportunity to profitably enter those market niches. Gogol-medien itself proves the success of its solution as a publisher of various print media publications. The following chapters describe the editorial process and the information systems used to publish the free city magazine "gersthofer". In particular, the "gersthofer" print medium impersonates the lead or dominant medium supplemented by an Internet presence and mobile content offerings.

5.2.1 Description of the editorial processes

The editorial process of the "gersthofer" revolutionizes the traditional task sequence of content creation, content bundling, and content distribution.

Through the application of information system driven journalism, content bundling is the first step after agreeing on the editorial philosophy. It is then followed by content creation and finally by content distribution.

The following paragraphs serve to give a detailed understanding of that new process sequence.

Project start and content bundling

Similar to many print media publications, the first step of the publishing process is the determination of the editorial philosophy. Target groups, general orientation of the magazine, and a rough estimate of the breakdown between editorial and advertising pages are discussed.

Now, a detailed magazine content plan is agreed upon. Contrary to traditional content plans, the editorial meeting comprehensively prepares the final product: exact formats are determined, the number of pictures is predefined, and even the final placement of each content component is decided. Thus the bundling of the product is fixed before the content is created, leading to a new journalism paradigm, in which the format determines the content and its placement in the final product rather than the events being the determinate.

In the next step, the content components need to be assigned for creation. This can either happen through the start of an internal workflow modeled in the CMS or through the public call for participation in content creation in the print medium or on the website of the “gersthofer”.

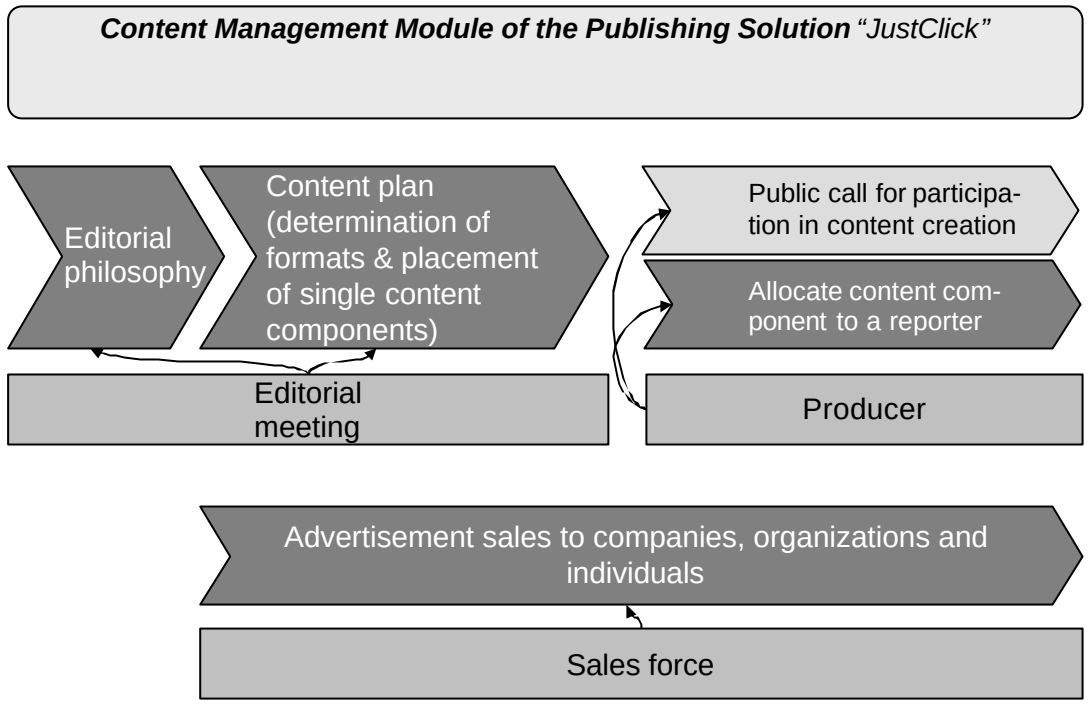

Fig. 5.2.1/1 The Publishing Process at gogol-medien – Project start and content bundling

Content creation

Before starting the content creation either the responsible reporter or the readers/users of the "gersthofer" plan their content component. Due to the binding format decisions of the magazine content plan, the content creators enjoy very limited freedom for creating a specific content component. After planning the content component, it is necessary to research and finally to create the content. The majority of the content is created directly in the content management module of the JustClick® publishing solution, which is accessible via a standard web interface.

This is where the mobile aspect comes into play. The combination of portable digital cameras and laptops allows reporters and, in designated cases also readers/users, to create content on the spot. However only through the usage of mobile phones or GPRS PC cards does the instant transferal and further processing of the newly created content become possible. But not only the reporters profit from the ability to immediately access the CMS: the direct access is also key to an instant supply of information without any additional conversion efforts. In addition to the web access, a MMS as well as a SMS gateway offer direct access to the CMS. Because of the current limitations in characters and size as well as a lack of convenient input devices, SMS and MMS are mainly used by readers/users, who create content of limited complexity.

After finishing the content creation, it is submitted as a complete component and thus ready to enter the next phase of the publishing process.

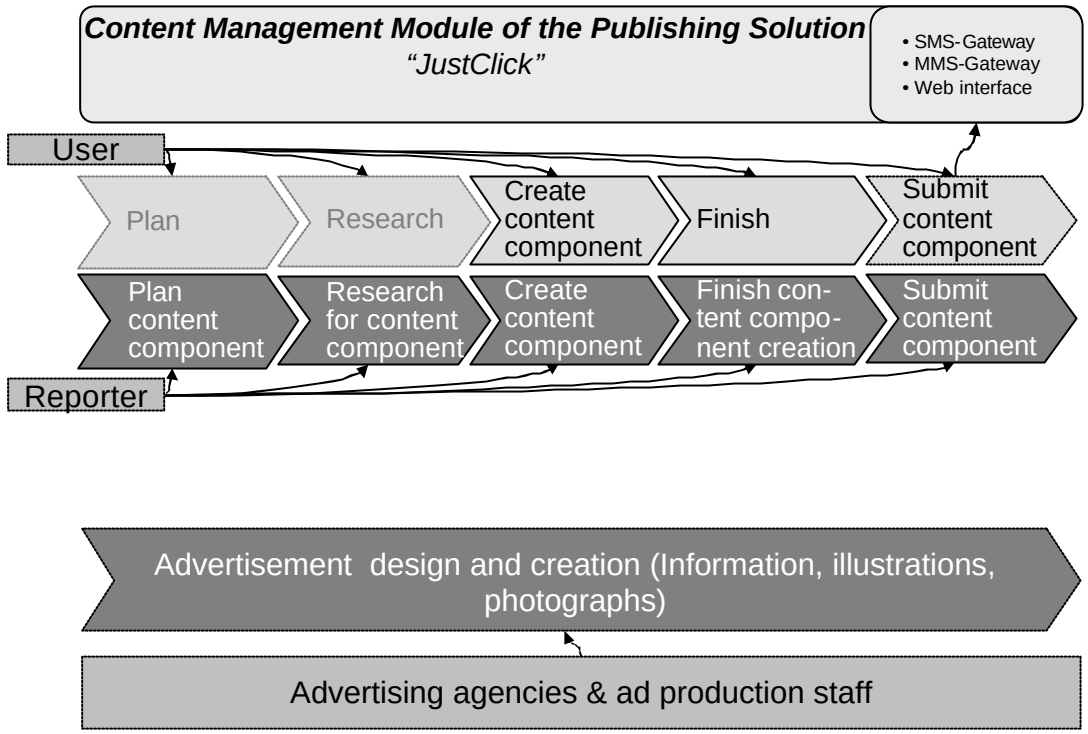

Fig. 5.2.1/2 The Publishing Process at gogol-medien – Content creation

Content approval and production preparation

Whereas the content approval in traditional print media publications is a major step in the publishing process, the journalistic standards for regional print publications offered free of charge are lower, allowing to save time and costs for additional approval steps.

The JustClick® solution is designed to publish the content immediately after receiving it from the reporters or readers/users. However, if desired, the content can undergo collaborative processing methods, described as follows.

The producer publishes a readily created content component to a selected audience, which is defined as the users of the online edition of the "gersthofer". Through the combination of the publication of various format-identical content components and a call for participation in electing the best content component, the "gersthofer" collects reader preferences and publishes the content accordingly in its printed edition.

Completing the content creation and collaborative approval, the content bundle is prepared for production, followed by the layout, and the final transferal onto the printing presses. Together these tasks are handled by the desktop publishing system Adobe InDesign®, which is seamlessly integrated

into the content management module of JustClick® and thus controlled via the web interface of JustClick®.

Archival storage is no explicit process step at “gersthofer”. It is rather a constantly accompanying task, which is automatically fulfilled by the publishing solution JustClick®.

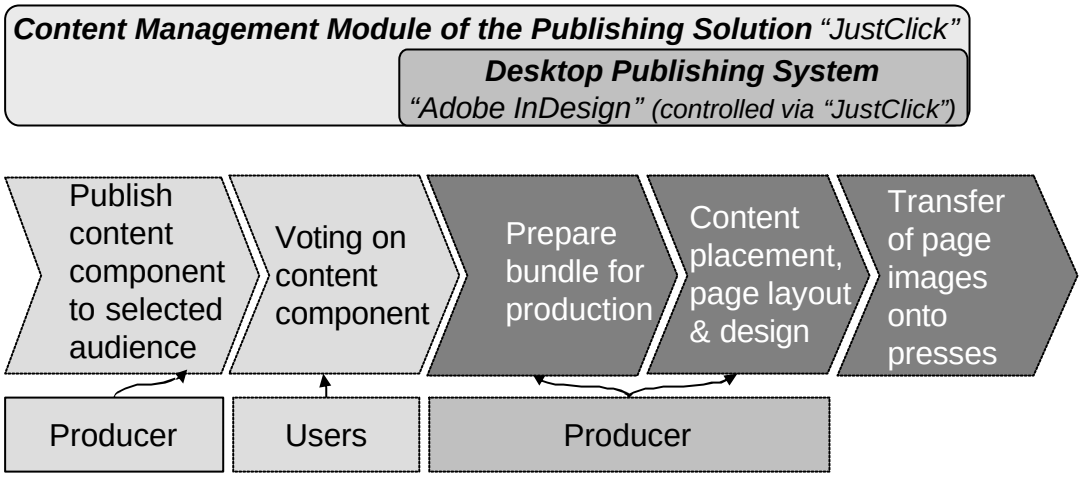

Fig. 5.2.1/3 The Publishing Process at gogol-medien – Content approval and production preparation

Content publication

The content publication of the “gersthofer” follows the traditional process. After printing the magazine, the finished product is bound and finally distributed to centralized display locations, where the readers can pick up their copy free of charge.

As usual, the content publication also comprises the task of billing readers and advertisement customers, which in the case of the free magazine “gersthofer” only applies to advertisement customers. The tasks of administrating the customer history as well as generating customer specific bills are handled by the advertisement module of JustClick®.

After sales services are handled by the marketing department, which uses the customer relationship and the advertisement module to satisfy the needs of its customers. Especially interesting is the option for advertising customers to upload and alter their advertisements through a web interface offered by JustClick®.

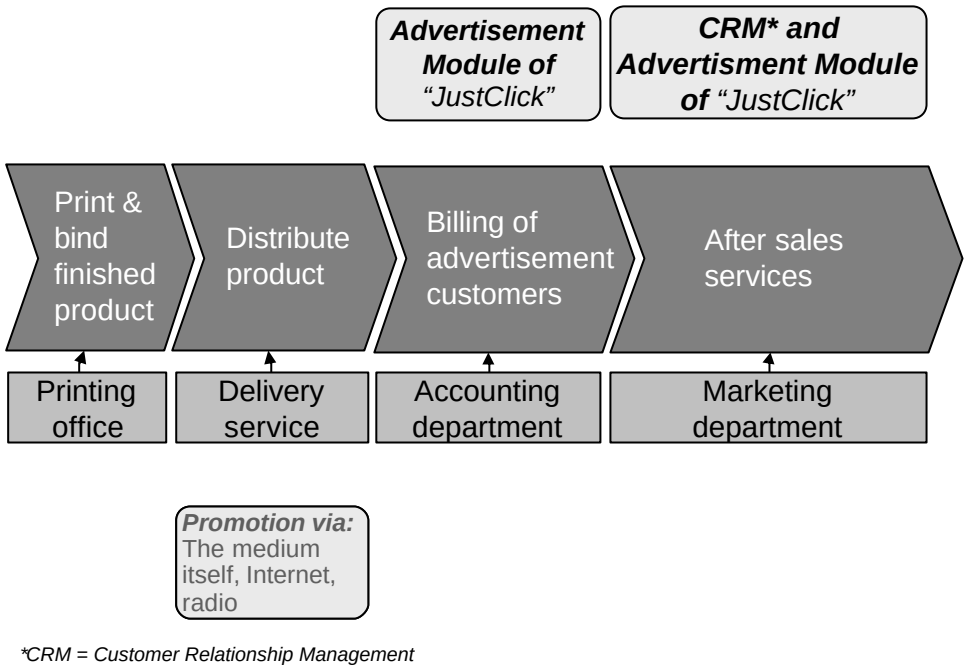

Fig. 5.2.1/4 The Publishing Process at gogol-medien – Content publication

Summarizing, the major difference in the gogol-medien's editorial process compared to the traditional process lies in the alteration of the process sequence. The information system driven journalism allows defining a content bundle before the single content components are created. Thus, the predefined content format serves as the basis for the efficient usage of mobile equipment.

STRENGTHS OF THE PROCESS	***ROOM FOR IMPROVEMENT***
• **All-embracing, seamless modeling of publishing process** through JustClick®	• ***Quality assurance*** must be enhanced
• ***Information system driven journalism*** leads to high proximity to customers and increased efficiency through frontloading and less costly ex post modifications	• ***Functionalities associated with advertisement creation and alteration must be extended***
• ***Reader/user integration*** and **collaborative processing techniques** save resources for content creation and content bundling	• ***Further improvement of supporting mechanisms during content creation*** such as automatic spell and grammar check or additional word processing tools

Tab. 5.2.1/1 Strengths and weaknesses of the publishing process at gogol-medien

5.2.2 Description of the mobile equipment and the employed information systems

The most relevant technological support during the publishing process of the “gersthofer” stems from the mobile equipment in particular a laptop, a digital camera, a mobile phone, and a GPRS PC card, as well as from the publishing solution JustClick® and from the desktop publishing application Adobe InDesign®.

Mobile equipment

Working together with many freelance writers but especially through the user integration, the mobile equipment employed to create the content cannot be regulated.

For content creators, the laptop computer, a small mobile personal computer, is certainly the most prominent vehicle to create content. With its built-in keyboard and mouse as input devices, a fairly big flat screen and built-in speakers as output devices, and various interfaces for connecting to external appliances, the laptop computer is suitable for either a mobile work environment or for working from home.

Digital cameras complement the functionalities of the laptop by offering superior quality in photo shooting. The pictures can be transferred from the camera to the laptop computer instantaneously using a variety of interfaces: USB, FireWire or built-in memory card readers are the most prominent transferal options.

In order to access the CMS and to transmit the created content to this system, a variety of options are feasible. In the context of this thesis, the transmission over ubiquitous wireless networks is most interesting. Currently, the most relevant ubiquitous network is the GSM network, which can be accessed with a laptop either through a GPRS PC card or with the mobile phone as a GPRS modem. Both access options are used to access the CMS and to transfer data during the content creation process at the “gersthofer”.

Information systems

Publishing solution – JustClick®

JustClick®, the publishing solution developed by gogol-medien, contains four software modules, which support the complete publishing process including the advertisement handling. All four modules, CMS, management reporting

tool, customer relationship management, and advertisement module are accessible via a standard internet browser, providing universal access opportunities and eliminating costly client installations.

Examining the content management module, the general threefold structure is revealed. The editorial system supports the tasks planning, research, creation, and design of the content. Additional to the standard functions it provides gateways for receiving SMS and MMS in order to easily integrate user-generated content. The content repository is XML-based, complying with the requirement of media neutrality for cross-media publications. Accordingly, the publishing system supports content output on multiple media, most prominently print and web.

Delivering relevant business ratios on a weekly or even daily basis is the strength of the management reporting module. Complying with the user rights definition, the magazine publisher receives an overview of key performance measures such as marginal income, product and issue profitability, revenues or budget in order to precisely manage the publishing house.

The internal administration of the advertisement customers is handled by the customer relationship management module. Providing a detailed customer database, it not only supports marketing initiatives and serves as a reporting tool of the advertisement activities of each customer or customer segment but it also takes care of billing issues.

Contrary to the internal focus of the customer relationship module, the advertisement module serves to digitalize the communication between the "gersthofer" and its advertisement customers. On the one hand the web-accessible tool allows uploading new advertisement campaigns directly into JustClick® and on the other hand it offers advertising customers the opportunity to alter their campaigns directly in the system.

Desktop publishing software – Adobe InDesign®

With Adobe InDesign®, "gersthofer" uses an off-the-shelf desktop publishing solution to support the layout and design phase of the print edition. Adobe InDesign® offers extensive functionalities for fast and reliable assembly and output of pages.[6] Other key functions of Adobe InDesign® are its seamless XML integration for import and export as well as its support of script language

[6] The complete product description can be dowloaded from Adobe's corporate website: http://www.adobe.com/products/indesign/overview.html.

for open interfaces and the control of Adobe InDesign® via the JustClick® user interface.

The table below summarizes the key strengths and weaknesses of the information systems supporting the publishing process at “gersthofer”.

STRENGTHS OF THE TECHNOLOGY	***ROOM FOR IMPROVEMENT***
• ***No expensive installations***	• Limited support of ***audio and video files***
• ***No previous knowledge***	• ***Limited support and automation of MMS and MMS gateway*** (SMIL container is fairly complex)
• Off-the-shelf DTP solution guarantees ***interoperability***	• Refinement of ***usability and ergonomics***
• Open interfaces allow the ***control of the DTP system via the CMS user interface***	

Tab. 5.2.2/1 Strengths and weaknesses of the technical equipment at gogol-medien

5.3 Content distribution: Case study The World Company

The World Company is the leading news source in the community of Lawrence, Kansas USA. With around 600 employees, The World Company operates in the business segments newspaper, Internet, cable television, local telephone service as well as installation of hotspots throughout the Lawrence community. As a multi-media company, it is one of the most innovative and technologically advanced media companies in the United States [Tljw04]. They recently showed their innovativeness in fall 2001, when The World Company became one of the first media groups to combine its print, television, and Internet news-gathering into one newsroom. The innovativeness was again proved in May 2003, when The World Company won four “EPpy Awards” in the categories “Best Overall Newspaper Site”, “Best Internet News Service”, “Best Internet Sports Service”, and “Best Internet Entertainment Service” [Topl03].

The World Company’s flagship newspaper is the “Lawrence Journal World” with a daily circulation of 20,000 copies – a number that increases to 22,000 on Sundays. Their three major websites, Lawrence.com, LJWorld.com, and KUSports.com, respectively unite two, five, and thirteen million page views per months. The engagement in services for mobile phones is virtually

unique: LJWorld.com and Kusports.com offer a mobile edition of their website for .html-browser-equipped mobile phones and PDAs. The page views for this edition have not been counted yet. The event reminders, based on the calendars on Lawrence.com and the Kansas Legislature news on LJWorld.com, each provide SMS service to about 100 users per week. KUSports.com attracts the most users for SMS services: about 6,000 users sign up for SMS alerts on every single KU men's basketball game, with 2,500 to 3,000 of those subscribing to the quarterly update service and the remainder subscribing to halftime or post game SMS notifications. Bearing in mind that the USA is about 2 years behind the mobile telephony and its advanced standardization in Asia and Europe, the success of The World Company's engagement in this sector is remarkable. An extensive interview with Rob Curley, Director of New Media/Convergence of The World Company, serves as the foundation for the following two chapters, which describe the publishing processes and the supporting information technology at The World Company.

5.3.1 Description of the editorial processes

The publishing process for the publication on mobile devices is entirely different for SMS alerts and for the browser-based edition of LJWorld.com and KUSports.com.[7]

Because of poor mobile telephony standards, The World Company decided to start out with the browser-based version of its newspaper, which targets a small customer segment using .html-browser-equipped mobile devices.

This mobile edition is a thin version of a full-scale website, leaving out elaborate formatting and all pictures due to the low and costly bandwidth for transmitting the content and the limited display options of a mobile device. The textual content however is an exact copy of the full-scale website. Making use of XML's media neutrality and the functionalities of XSL, the only human intervention necessary for filling the mobile edition with content is a respective command in the CMS to publish a certain article in the mobile edition. Major difference to the print version is the change in the distribution

[7] The mobile edition of LJWorld.com can be reached under the URL: http://subtilis.ljworld.com. It features the detailed information sections „news", „sports", and „business". The mobile edition of KUSports.com can be reached under the URL: http://subtilis.kusports.com. It features the detailed information sections „men's basketball", „women's basketball", and „football".

process. One click in the CMS for appropriately publishing the content is enough to displace all traditional process steps from the production preparation, over printing, binding, and the physical distribution to billing of users and advertisement customers. Only after-sales services remains of relevance, especially for attracting new users with the explanation of the mobile service.

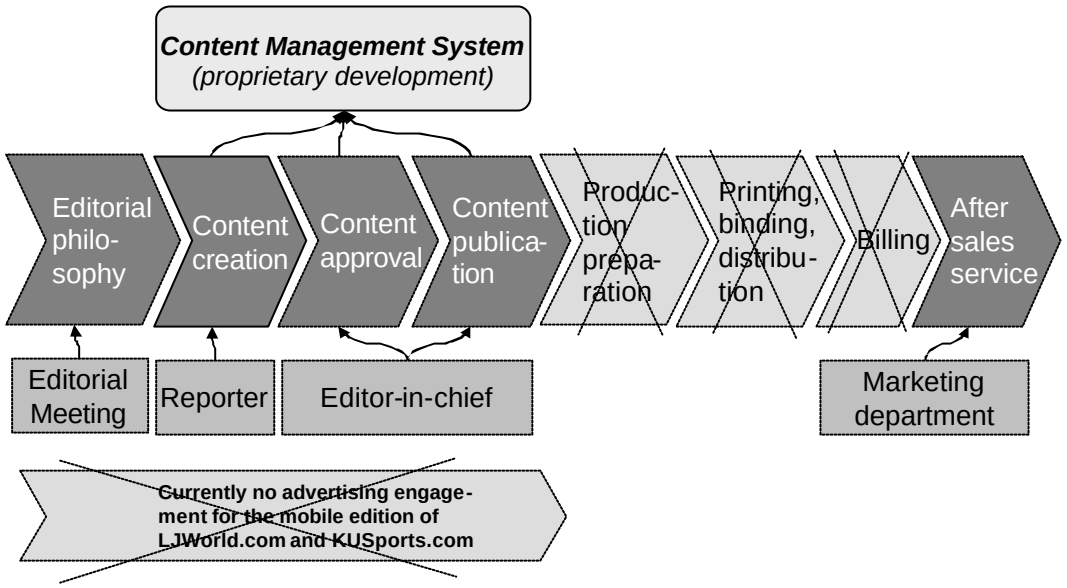

Fig. 5.3.1/1 The Publishing process for the mobile edition at The World Company

Possibly contrary to the reader's intuition, the production of SMS alerts requires much more effort than the publication of The World Company's mobile newspaper edition.

An exception is constituted by the event reminder on Lawrence.com, which automatically draws a pre-defined, all time identical introductory text as well as the name, date, time, and location of the event out of a database and packs it into a SMS. At the user-defined reminder time, the SMS is automatically sent to the requester's phone number, which marks the end of the publication process.

For legislature and sports updates the process is only partly automated. Comparable to the event reminder, interested readers/users can only use the LJWorld's or KUSport's website and no mobile end device to register for the desired service. They have to state their mobile phone number as well as their service provider, since the SMS sending is not standardized as it is in Europe or Asia. In the case of sports news, users also have to indicate the desired update frequency. All this information is automatically transferred to a

database, which also stores the mechanism to translate the combination of mobile phone number and service provider into an appropriate “SMS-address”.

The editorial process starts out with an important incident happening, such as a relevant court decision or a goal for the KU basketball team. This is when the editor on duty creates a new entry into a specified field of the database, which is configured to restrict the number of characters according to the SMS specification. After finishing entering the information, the editor presses the “send” button, which triggers the forwarding of the SMS alerts to the users with the matching preferences. Outside the basketball games, important news, such as the acquisition of new players, are being sent out to subscribers who requested a quarterly update. These news updates are created and forwarded employing the exact same process as described above.

Thus, the content for sports and legislature SMS alerts is created particularly for this publication purpose and not reused from or for any other publication channel.

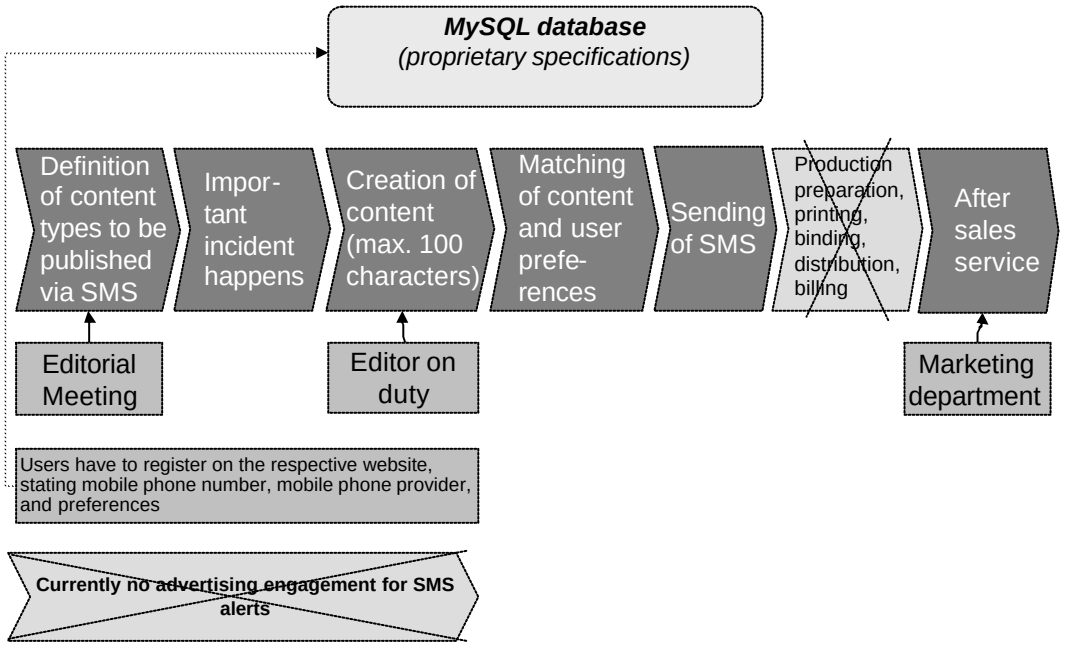

Fig. 5.3.1/2 The Publishing process for the SMS alert at The World Company

The following table summarizes the strengths and weaknesses of the currently employed publishing processes for offering content on the go.

STRENGTHS OF THE PROCESS	*ROOM FOR IMPROVEMENT*
• **Economization of process steps**, which were indispensable in traditional publishing	• **Manual entry of content** for two out of three SMS alerts
• **Core competences of** LJWorld.com's and KUSports.com's **editors are leveraged** through concentrating on content creation, since nearly no additional work for the mobile edition is required	• The **Reusage of content** for SMS alerts can be optimized
	• The **selection of content** provided for the mobile context should be reconsidered (Legislature news)
	• Strengths of the mobile device can be further exploited through **offering multi-media content**

Tab. 5.3.1/1 Strengths and weaknesses of the publishing process at The World Company

5.3.2 Description of the employed information systems

Two major information systems enable The World Company to publish their content on mobile devices.

First they developed a proprietary CMS, which was designed for supporting the publishing process of their websites. The system features the common threefold structure with an editorial system, an XML-based content repository, and a publishing system. Through the combination of XML's media neutrality and XSL's functionalities the same system can now be used to produce the mobile edition of LJWorld.com and KUSports.com. The only changes necessary were firstly to reprogram the user interface in order to add the new publication channel and secondly to adapt the XSL stylesheets in order to enable an automatic translation of the underlying XML file according to the specifications of the mobile edition.

The second support from information technology stems from the combination of a MySQL database and a proprietary database management system, which serve as a foundation for the publication of the SMS alerts. On the one hand this database serves to store all user-relevant data (using a web interface, the users enter their mobile phone number, their mobile phone provider, and their preferences directly into the database). On the other hand the editor on duty creates the SMS content, which is entered into a specified field of the database. After the content creation it is the database's duty to match the content with the user preferences and finally employ special

algorithms to translate the user-entered mobile numbers into the carrier-specific formats for proper SMS delivery.

The following table summarizes the core strengths and weaknesses of the employed technology.

STRENGTHS OF THE TECHNOLOGY	***ROOM FOR IMPROVEMENT***
• Proprietarily developed solutions allow the **maximum calibration of the systems** with the underlying processes	• Necessity to manually enter rather than automatically generate SMS texts reduces efficiency of the system
• **Perfectly automated publication of mobile edition** without any human interference saves time and resources. (**high content reusage rate**)	
• Despite provider specific SMS interfaces, the **forwarding of SMS is done automatically**	

Tab. 5.3.2/1 Strengths and weaknesses of the technical equipment at The World Company

6 EVALUATION OF CASE STUDIES

After the individual assessment of publishing processes and information systems of each case study in chapter five, chapter six is dedicated to reflection on how well the examined publishers' mobile publishing operations are suited to fulfill the general goals of mobile publishing.

The evaluation in the subsequent chapters is based on the elaboration of the mobile publishing objectives in chapter three and the practical examples in chapter five.

6.1 Evaluation of economic achievements

Increased revenues

The achievement level of the goal to increase revenues is highly heterogeneous. Where as gogol-medien does not receive any additional revenues through mobile content creation, VOL manages to increase its revenues through picture sales to private customers and through additional advertisement sales on their websites, where the content created with the mobile device is displayed.

Operating in the field of mobile content distribution, The World Company has a higher potential to increase its revenues. Currently, there are no additional revenues through its engagement in mobile publishing. However for the upcoming basketball season, the reception of scores and game statistics will be offered for a fee, or the user will have to accept advertisements in the SMS alert. At present, there are no plans to charge for the mobile edition, the legislature SMS notification, or the event reminder SMS. It is also not envisaged to include advertisements in any of the latter mobile services.

Cost Reduction

Whereas VOL used the advantages of mobile publishing to improve its revenue situation, gogol-medien has clear strengths in the field of cost reduction. The employed publishing processes, in combination with the mobile equipment and the web-accessible content management solution, allow for the elimination of all content conversion costs. On the contrary, VOL is not yet working with an all-digital publishing workflow; i.e. the pre-defined process step of calling the newsroom after sending the MMS picture requires human resources for receiving and entering information into the news gathering system. Thus, there are hardly any cost reductions at VOL.

Through the engagement in mobile content distribution, The World Company is able to realize considerable cost advantages by eliminating all printing costs and significantly reducing distribution costs for its mobile editions. Furthermore, the employment of an all-digital publication process leads to a minimal amount of additional costs, although many additional mobile content services are being offered.

Customer retention and attraction

Concerning the retention and attraction of customers, the picture varies.

Through their isolated operation in the field of mobile content creation, VOL and gogol-medien can only reach the goal of customer attraction and retention through the creation of customer-oriented content, which both do. Whereas VOL provides its users with highly desired immediate picture coverage of important incidents, gogol-medien lets their readers vote via SMS on which content they prefer.

Operating in the field of mobile content distribution, The World Company can use cross-promotion, brand extension, and customer-oriented content to

attract and retain customers. The concept of using the existing brand and media to attract users to the mobile publications is of great success.

The cross-promotion potentials are used one-sidedly, i.e. the mobile channel does not carry information promoting the print, online or television publications but vice versa they do. The current information systems do support cross-promotion, however the idea is not yet ingrained in the publishing processes.

The figure below shows how well the economic goals of mobile publishing are achieved.

Mobile Publishing Goals	Vorarlberg Online	gogol-medien	The World Company
Revenue increase			
Content sales to private customers	• Increasing usage of the opportunity to buy pictures	• No content sales to private customers	• Charge for sports SMS alerts beginning next season
Content sales to business partners	• Content sales within the VHM • No external sales	• No content sales to business partners	• Content sales only within The World Company
Additional advertisement booking	• New ad space on websites with mobile created content	• No additional ad booking	• New ad space in sports SMS alerts next season • No ad sold in mobile edition
Cost reduction			
Lower costs for printing & distribution	• No mobile content distribution	• All-digital workflow, but same costs to print & distribute	• No printing costs • Significantly lower distribution costs
No conversion between analogue & digital media	• Still conversion costs from voice to digital	• No conversion costs; all content is created digitally	• Content is digitally created in CMS or database field
Customers attraction & retention			
Cross-promotion	• No mobile content distribution	• No mobile content distribution	• No cross-promotion in either SMS alerts or mobile edition
Extension of print medium's brand	• No mobile content distribution	• No mobile content distribution	• Brand extension into additional mobile content offerings
Customer oriented content	• Mobile Publishing allows immediate picture coverage	• Users are asked to evaluate created content	• Users selected the type of content desired

Excellent Good Satisfactory Poor Very poor

Fig. 6.1/1 Evaluation of economic achievements

6.2 Evaluation of journalistic achievements

The diverse picture on how well the publishing processes and the employed information systems support the journalistic goal of mobile publishing is elaborated in the following chapters.

New content types

The most important criterion for new content types is the enhancement of the publication through multi-media content. At VOL and gogol-medien, multi-media content creation and processing is well supported through the mobile equipment of the on-site reporters, which provides the appropriate input mechanisms for text, picture, audio, and in the case of VOL even video content, and through the content management solutions, which serve to receive and process the created content.

At The World Company no multi-media content is being distributed to the customers due to the characteristics of SMS and the insufficient bandwidth to deliver multi-media content in a reasonable amount of time.

User-generated content, as a new type of content, can only be found at gogol-medien. Through an explicit call for user participation and the provision of SMS- and MMS-gateways, the user-generated content is seamlessly integrated into the publishing process at gogol-medien.

Interactivity

As described above, gogol-medien is the only case where interactivity with its users can be found.

The current publishing processes and most prominently the information systems at VOL and The World Company do not provide assistance for interactivity, in part due to poor interfaces for integrating user-generated content. For example, at present it is not possible for The World Company's users to order SMS alerts from a mobile device – instead the user has to use the medium Internet to do so. Also the mobile editions' only interaction possibility is the request for plain text articles via hyperlinks placed on a central navigation page.

Publication Speed

All content being digitally created is the foundation for a considerably sped-up publishing process at gogol-medien and The World Company. At gogol-medien, it is the combination of an instant and an unproblematic transmission via GPRS, which increases the publication speed noticeably. The World Company's major success in publication speed is the possibility to instantly publish content on a mobile device regardless of program schedules or delays in the mail system. Reasons for this success are the efficient

publishing processes, which require no additional work for the publication of the mobile edition and SMS calendar alerts, and the existence of a single database entry for the publication of the SMS notifications on sports and legislature. A further reason is the proprietary developed information system, which effectively support the editorial tasks and the reusage of content without further human interaction.

VOL has also accelerated its publishing process through the mobile equipment in use. Nevertheless, the partial usage of analogue media, such as voice telephony, reveals potential to eliminate media breaks and thus to further increase the publication speed.

Communication Support

The deployment of mobile end devices is essential for a successful communication between the involved parties. In the practical examples of VOL and gogol-medien, the mobile equipment is highly supportive of an enhanced information flow and fast feedback opportunities between editor, on-site reporters and, in the case of gogol-medien, even with users. At The World Company, communication support with its users is not encouraged.

Image advantage

Independent from the employed publication processes and information system lays the positive image effect of using state-of-the-art publishing equipment. Whereas VOL and The World Company aggressively promote this issue, there is room for improvement at gogol-medien.

Credibility

Through providing its readers with exclusive content from occurring incidents, VOL and gogol-medien achieve to raise their credibility through signaling on-site-presence. The World Company maintains its credibility though the transfer of the print medium's brand image to the mobile edition. However, the image transfer could be improved.

The figure below shows how well the journalistic goals of mobile publishing are achieved.

Mobile Publishing Goals	Vorarlberg Online	gogol-medien	The World Company
New content types			
Multi-media content	• Multimedia content possible, emphasis on text & pictures	• Multimedia content possible, emphasis on text & pictures	• No multi-media content
User-generated content	• No user-generated content	• User-generated and processed content	• No user-generated content
Interactivity	• Not improved through mobile publishing	• Interactivity through users as mobile content creators	• Mobile phone / PDA not used to interact with user
Publication speed			
Immediate & easy content transmission	• Immediate & easy transmission via MMS/GPRS	• Immediate & easy transmission via GPRS PC cards	• Easy transmission via SMS or .html to user's mobile phone
No conversion between analogue & digital media	• Still conversion costs from voice to digital	• No conversion costs; all content is created digitally	• Content is digitally created in CMS or database field
Communication Support	• Voice and data communication between newsroom & on-site reporters	• Mainly data communication between newsroom & on-site reporters	• Mobile phone / PDA not used to interact with user
Image advantage	• Aggressive promo-tion of innovative technology usage	• Promotion via guest lectures & one TV appearance	• Promotion as first-mover for SMS alerts
Credibility	• Exclusive pictures from mobile phone usage	• Exclusive content from on-site reporters & users	• Brand image transfer not pursued with force

Excellent Good Satisfactory Poor Very poor

Fig. 6.2/2 Evaluation of journalistic achievements

7 CONCLUSION AND FUTURE PROSPECTS

In the 300-year history of the print media industry, the technology used to produce print media has been remarkably stable [PiBr97, 63]. Many technological improvements helped to ease and speed up the printing, however none represented a dramatic change from previously employed printing equipment, which brought paper in contact with inked type [PiBr97, 65]. Through the emergence of the Internet and especially through the rapid spread of mobile end devices, the print media publishing business is encountering major changes in its publishing processes and information systems, as elaborated in this thesis. However, the internal issues are not the only change publishers have to face. They have to think about future trends for the mobile publication channel and which potentials beyond publishing can be leveraged in order to profitably operate in the market for mobile content and applications.

Future trends

In the near future, the print media industry will face many changes through the emergence of the mobile publication channel and consequently changing consumer behaviour. Soon, consumers will not only select the media format. They will increasingly take the usage situation into consideration when deciding on a medium. Thus, the challenge of content distribution on mobile end devices is to differentiate itself from other media by providing media and usage context adequate content and thus escape the burial in a plethora of information.

Key characteristics of mobile end devices are location and time independence as well as interactivity. This unique selling proposition can be leveraged by employing the new publication method of moblogs. The mobile counterpart of the successful blogs in the Internet represents an easy, automated way to post texts, pictures, audio, or video captured with a mobile phone to the Internet. Completely new segments of coverage arise. Formerly unprofitable coverage of micro local news will be economically feasible through an active user community posting texts, pictures, audio, and video about incidents happening.[8] Moblogs reflect the general movement from mass media towards individualized media, which together with interactive user communities and improved content help print media publishers to retain their customers.

However the engagement of print media pubishers in moblogs does not reveal great potential for additional revenues. In order to not repeat the lacking success of Internet business plans, further research should examine, which content and applications are economically advantageous. The business objective of print media publishers should be to get the consumer to pay for access to its information and / or to get advertisers to pay for access to the consumers [Elde96, 13].

The need to open up new sources of revenue usually involves a brand extension or at least a transfer of the print medium's image. The German BILD-Zeitung successfully uses its image of being very close to the general public through the engagement in commerce activities: the so-called "Volkskarte" (People Card) offers the average citizen numerous discounts, free services, and an information hotline for consulting concerning additional

[8] Successful moblogs can found at http://www.textamerica.com/moblogs.aspx.

savings. For BILD-Zeitung the revenues generated through this expansion into a related business field represent an enourmous contribution to financing the Internet presence bild.de [Bild04].

Assuming, that the publishing processes and information systems are capable of mobile publishing, the options for print media publishers to successfully engage in this field are manifold, as the two examples of moblogs and commerce activities show. However, next to the alignment of the internal processes and information systems, which were elaborated in detail in this thesis, print media publishers need to seriously study their customers' needs as well as all feasible economic scenarios associated with their mobile activities.

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9 APPENDIX

Als die Feuerwehr ankam, stand der Dachstuhl des landwirtschaftlichen Anwesens in Vollbrand. (Foto: E. Hagspiel)

Blitzschlag lässt Bauernhaus abbrennen

Bewohner in Sicherheit – 171 Feuerwehrmänner kämpfen gegen extreme Hitze

VON GEROLD RIEDMANN
E-MAIL: gerold.riedmann@vn.vol.at

Müselbach (VN) **Nachbarn beobachten, wie kurz vor 17 Uhr ein Blitz in den Bauernhof einschlägt. Das Wohnhaus samt Stallgebäude ist ausgebrannt.**

Dichter Regen über Müselbach. Gewitterwolken. Der Dachstuhl des Bauernhauses brennt lichterloh. „Als wir ankamen hat der Landwirt sich und seine Kühe, Kälber und Schafe schon in Sicherheit gebracht", sagt Feuerwehreinsatzleiter Herbert Bolter den „VN" an der Brandstelle.

Extreme Hitze

„Unsere Männer hatten mit extremer Hitze zu kämpfen – doch es ist uns gelungen, den angrenzenden Stadel zu halten, auch fast alle Maschinen konnten wir retten", sagt Einsatzleiter Bolter von der Feuerwehr Müselbach. Alle Wehren des Abschnitts Mittelwald sind im Einsatz – zusätzlich auch Lingenau und Langenegg.

Der allein stehende, 61-jährige Landwirt erlitt einen schweren Schock, wurde vom Roten Kreuz betreut. Er kommt nun in einem Notquartier unter.

Meteorologen bestätigen die Blitz-Beobachtungen. „Es waren über der Region einige schwere Gewitter", sagt Günter Scheibenreif von der ZAMG Bregenz auf „VN"-Anfrage. Die Bregenzerwaldbundesstraße war für zwei Stunden gesperrt.

Fig. Appendix/1 *Article about the farmhouse fire in the "Vorarlberger Nachrichten" with cross reference to more pictures at VOL* [Ried04]

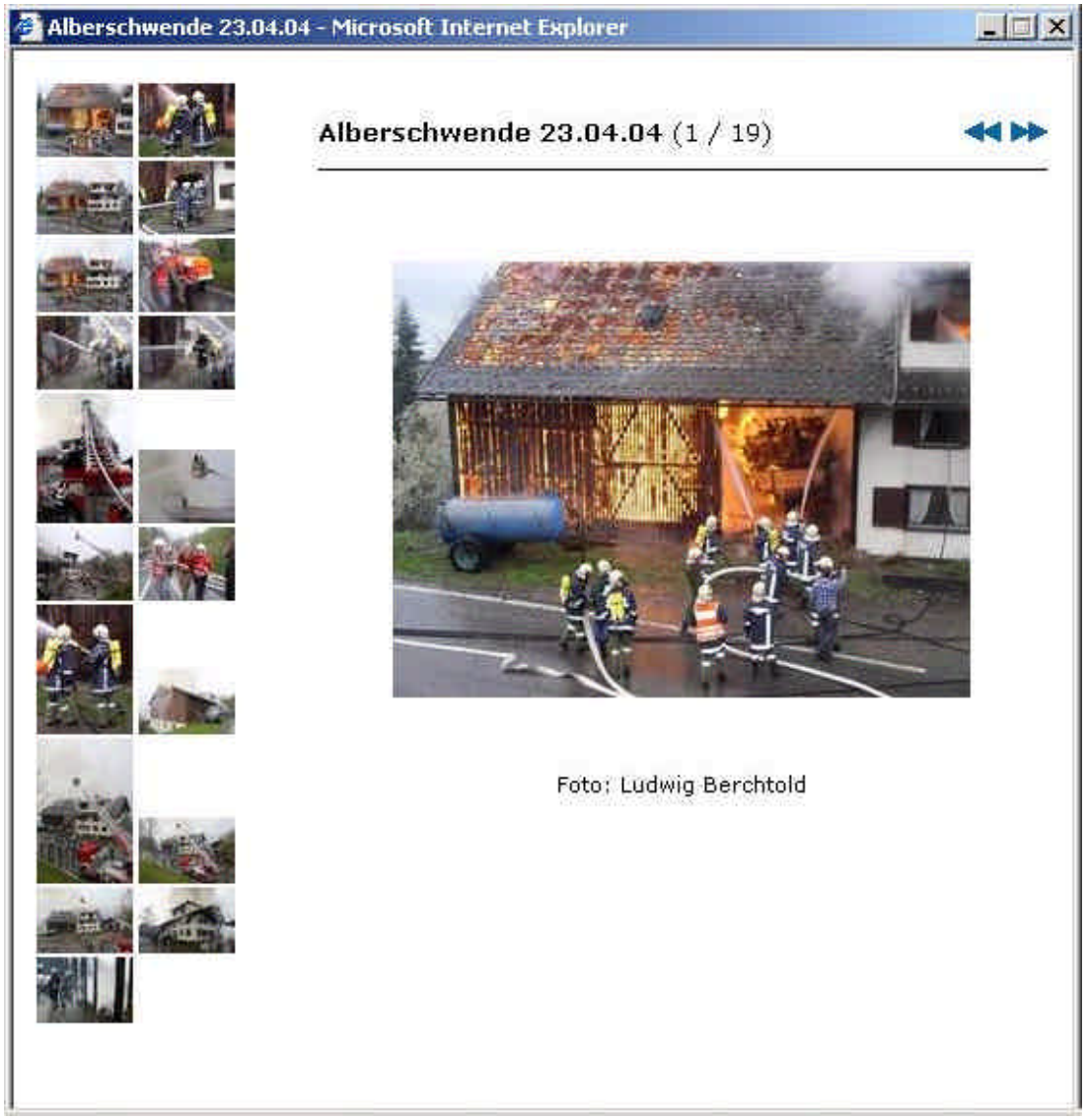

Fig. Apppendix/2 Picture collection of the farmhouse fire at www.VOL.at

Fig. Appendix/3 Newscast about the farmhouse fire at www.VOL.at

Fig. Appendix/4 Mobile phone Nokia 6600 [Noki04]

10 DECLARATION

Ehrenwörtliche Erklärung

Ich erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit selbständig angefertigt habe; die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde bisher keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

München, den 27. August 2004

(Antje Seider)