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JMM – The International Journal on Media Management

Editorial

Dear Reader

Welcome to a new issue of JMM – The International Journal on Media Management.

In this issue we have a distinguished group of authors, whose collected articles mainly cluster around the challenges arising from new digital media for the content industry. Through new services, technologies, and devices, innovative business models and products are required and the potentialities imbedded in the change have to be exploited.

Robert G. Picard leads off this issue with an analysis of business models of online content services, especially how they have changed through changes of technology and audience demand and how current business models resulted from these changes. In his article he explores the implications of these business models for multimedia and other content producers and possible prospects for the future.

In their article, Hsiang Iris Chyi and George Sylvie analyze the development of online newspapers and how they take advantage of the possibilities the online medium offers. Based on a survey with 14 online newspaper-practitioners they show that while most newspapers hope to complement print and

online products, these possibilities are not part of every newspaper's strategy. Most of them are testing several models of earning revenues to become an economically viable medium.

David Nicholas and Paul Huntington assess the use of newspaper website logfiles. The goal was to determine the most appropriate method for evaluating the use of these logfiles and to establish what types of analysis could be drawn. For this, the logfiles of The Times/The Sunday Times Web were examined. Based on these findings the study lays a foundation and identifies new classifications on which more detailed cross-classifications and modeling can be based.

Technology-driven innovations in the area of transport media and new devices pose a challenge for both media companies as well as their customers. The main questions for the media industry is how these new technologies can be exploited, e.g. through new content-oriented products or new services based on these technologies. Joachim Rawolle and Thomas Hess concern themselves with an analysis of attributes of digital contents and an assessment of different combinations of target devices and transport media. Based on this, they deliver a discussion of two emerging concepts.

The influence of corporate culture on the achievement of strategic aims in two leading international broadcasting companies – BBC and CNN – is investigated by Lucy Küng. The article aims to explore how cultural beliefs support the organizations strategic goal is assessed and to uncover senior managers' unconscious assumptions concerning organization mission, the competitive environment and acceptable strategic responses. The author concludes that culture can act as a restraint to strategic plans and that culture in general is a valuable strategic asset for media organizations.

This issue again concludes with our calendar of events. We hope you find our collection of articles interesting. We look forward to continuing to deliver strong, peer reviewed content to you and to develop our relationships with the (new) media community. You are always welcome to contribute your research or your feedback to the JMM and to take the opportunity to share your ideas with this community. Since we are a journal focused on the possibilities of new media, you will find all our content online under

www.mediajournal.org.

*Beat F. Schmid
Peter Glotz
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New Digital Media and Devices

An Analysis for the Media Industry

Joachim Rawolle and Thomas Hess, University of Göttingen, Germany

I. Introduction

Customers and media companies are confronted with technology-driven innovations in the area of transport media as well as new devices. Typical characteristics of these technologies are digital storage and transmission of content from a technical perspective and a higher degree of interactivity from the users' perspective (see Schreiber 1997, 19).

For the media industry the question arises, how these new technologies can be exploited. The traditional emphasis of the media business has been the creation, bundling and distribution of information and entertainment (see Schumann and Hess 2000, 1). Recently, new content-oriented products have emerged by serving existing contents to new target devices, (re-)using device-specific variants of existing contents or by creating original contents for exclusive usage on a determined target device. In the future, new services based on applications, communication or transactions become possible, which fundamentally amplify the scope of activities for the media industry.

The main goal of this paper is to analyse this area of interest in a systematic way. Section 2 starts with a short overview of major technological trends (for details, see Rawolle and Hess 2000). Section 3 works out attributes of digital contents that can be used to evaluate the given technologies. Based on these findings, different combinations of target device and transport media are assessed. Additionally, section 4 provides a deeper discussion of two major upcoming concepts, eBooks and mobile commerce.

2. New Media and Devices at a Glance

Based on a simplified version of the general communication model (see Shannon and Weaver 1949), we distinguish between transport media and end devices. Further, end devices are subdivided into stationary and mobile devices. Transport media technologies belong to one of two categories: online (i.e. network-based) and offline (i.e. portable storage) media (see fig. 1).

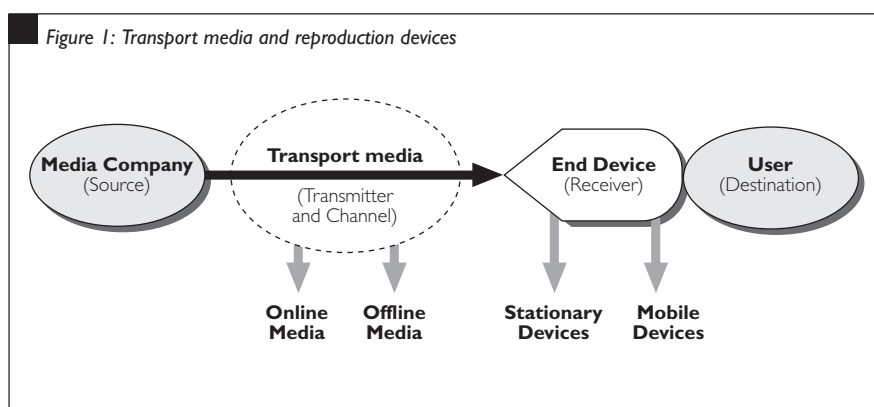
2.1. Transport Media

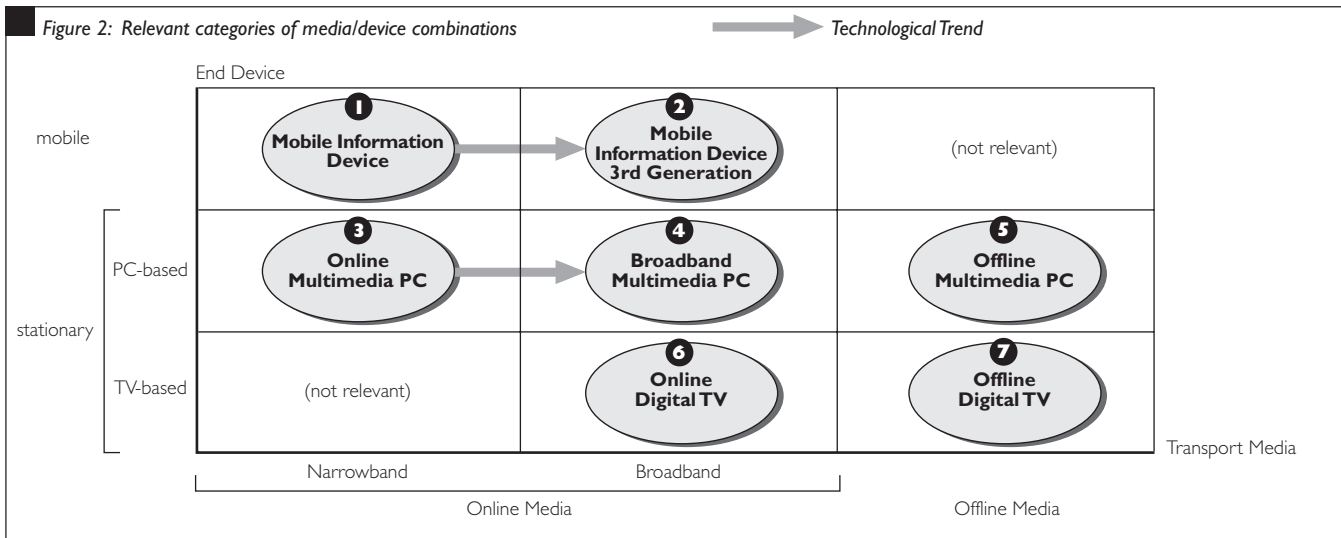
All kinds of public networks are usually based on a backbone-infrastructure and different access technologies ("last mile"). For the media industry, especially the Internet and TV-cable are relevant wired networks, because both can be used for the distribution of digital contents. The Internet offers a proven technology for duplex communications (although with low bandwidth at the moment), whereas TV-cable is capable of broadband transmission via Digital Video Broadcasting (DVB) but lacks an integrated feedback channel and is therefore best suited for broadcast-oriented distribution. However, new Internet access technologies like ADSL, powerline or wireless local loop will increase bandwidth for Internet users in the future. As well, the integration of feedback capabilities in TV-networks is being worked on.

As a second example of online media, wireless networks allow the transmission of contents without having a physical link. Traditionally, the media industry have used terrestrial broadcast or satellites, which are both constrained to simplex transmission from sender to receiver. In contrast, mobile communication technologies like the Global System for Mobile Communication (GSM) support two-way transmission of data and can be used for Internet access via Wireless Application Protocol (WAP), but provide significantly lower bandwidth at present. This is likely to change within the next few years, when new technologies like the General Radio Packet Service (GPRS) or the Universal Mobile Telecommunication System (UMTS) will improve bandwidth dramatically.

Offline media (i.e. portable storage media) like Compact Discs (CDs) or Digital Versatile Discs (DVD) can be used to distribute digital contents through traditional retailers. DVDs offer up to 27 times more capacity than ordinary CDs and are therefore capable of storing

Figure 1: Transport media and reproduction devices





movies or large quantities of music in conjunction with powerful compression mechanisms.

2.2. End Devices

As mentioned above, end devices can be divided into stationary and mobile devices. Desktop personal computers (Desktop PCs) and television sets (TV sets) can be considered the most important examples of stationary devices. Since the discussion of the potential convergence (see for example Stipp 1999; Bienert 1999) of TV and PC in one enclosing type of device has not been settled yet, this paper will, based on the status quo, cover both types of appliances.

Desktop PCs have been developed from data-centric terminals to universal communication devices with sophisticated multimedia and interaction capabilities over the last decade. Because of the wide spread implementation of Internet-technology and drives for different storage media, the PC has become a very interesting target device for the media industry.

Another approach is digital TV. At present, users of digital TV need supplementary Set-Top-Boxes that prepare digital contents for ordinary television sets. Besides technical differences (less information processing and

storage capabilities, less interactivity, higher quality for replaying video and audio contents) the main distinction between PCs and TV sets is user behaviour. Whereas PCs are typically used for information-based purposes (retrieval and processing) in an interactive way, the TV is usually utilised in a more passive and also entertainment-oriented manner (see Blödorn et al. 2000, 173). At present, consumers spend a greater share of their daily media budget on watching TV than using the PC-based Internet (see ARD 1999, 68-85).

Particularly because of the technological progress in the reduction of electronic components, mobile devices have been made possible over the last century. These can be divided into multipurpose and special purpose devices. Multipurpose equipment like notebooks or subnotebooks have similar reproduction and processing capabilities like desktop PCs. They can be connected to the Internet via ordinary telephone modem or other access technologies. Personal digital assistants (PDAs) are considerably less powerful than notebooks. In contrast to (sub-)notebooks they are typically used under mobile circumstances. Many of the available PDAs will be capable of accessing the Internet by mobile communication technologies within the next few years.

Next to multipurpose devices there are highly specialised appliances like eBooks for reading (see section 4.1.), mp3-player for music, and a set of recently announced Internet-Appliances that focus on Web-access and mobile phones for speech-oriented interpersonal communication. Mobile phones are increasingly used for Internet access via WAP (see section 4.2.). Therefore, the media industry has shown considerable interest in mobile phones as a new target device recently. Following the announcements of the relevant manufacturers, mobile phones and PDAs will probably merge into one device (see Luxa 1999, 173). Some of these products might even support mp3 for audio replay.

2.3. Bundling of Transport Media and Devices

From the technologies described above, numerous combinations of transport media and end device may be constructed. In order to reduce this complexity, this paper will abstract from available products and constitutes a number of generalised media/device packages. To achieve this, a nine-field matrix is established that opposes devices and transport media (see fig. 2). Devices are divided into mobile and stationary (TV-based vs. PC-based) appliances as mentioned above. With regard to transport media, we differ between

online media and offline media. Since bandwidth of networks is a very important feature for the media industry, we further distinguish between narrow-band and broadband networks.

The resulting categories will be described further:

- (1) Mobile Information Devices (MID): This category pools available mobile devices with online capabilities. Typical examples of MIDs are WAP-compliant mobile phones and PDAs, that access the Internet over low bandwidth mobile communication networks. Usually, these appliances are restricted in terms of processing power, memory, display capabilities and input facilities. This is mainly due to constraints in size and battery lifetime (see WAP Forum 1998, 9).
- (2) Mobile Information Devices 3rd Generation (MID 3G): Technological advances are expected to lead to substantial improvements in both mobile transmission technology and end device capabilities. The resulting infrastructure and services are called 3rd Generation applications. However, considerable constraints because of size and batteries will remain in most products.
- (3) Online Multimedia PC: One of the most popular platforms to access the Internet are stationary desktop PCs coupled with ordinary modems or ISDN connections. Transmission of data is clearly the bottleneck of this configuration, because multimedia capabilities of modern PCs are typically on a convenient level.
- (4) Broadband Multimedia PC: Just as mobile transmission, wired-based networks are very likely to offer broadband capacities in the near future. Therefore, private as well as corporate users will be able to access the Internet with substantially higher bandwidth. An additional technical option is to receive television via TV-cable.

- (5) Offline Multimedia PC: Desktop PCs with CD-ROM or DVD-drives serve to utilise the adequate offline media. In this case, physical storage media has to be transported to the end-user beforehand.
- (6) Online Digital TV: Digital TV sets differ from their PC-based counterparts with regard to information processing and storage capabilities as well as input devices. Their main focus is to receive broadcast-oriented contents, although feedback channels are possible from a technical standpoint. Though still limited, some manufacturers additionally support access to the Internet.
- (7) Offline Digital TV: As well as PC-based end devices, television sets support being connected with DVD-drives. DVDs offer significant advantages over analogue video-tapes and are therefore expected to replace the latter within the next few years (see Sedman 1998, 58).

3. Evaluation of New Media and Devices

In order to evaluate the new media technologies described above, we first define a list of relevant technical and non-technical requirements of digital media-products. Based on this collection of requirements the different categories (MIDs, MID 3Gs, Online Multimedia PCs etc.) will be appraised.

3.1. Technical Requirements

Technical requirements either affect the available transport media, the addressed end device or both (see fig. 1). Following this criteria, we will start by examining requirements relevant to the transport media. Three important aspects dominate in this area: The access mechanism, the number of simultaneous recipients and the support of feedback channels in case of transmission media. With regard to access mechanisms a distinction between push and pull mechanisms has to be made. Pull-oriented access is character-

ised by the data transmission being triggered by the end user (which is typical for web applications or video-on-demand), whereas push-oriented transmission is triggered by the sender. Push-services can be time-scheduled (e.g. television broadcast) or event-based (e.g. e-mail newsletter). Furthermore, push-services can address one or more recipients¹, respectively a distinction between broadcast-oriented (e.g. television, radio) and unicast-oriented services (e.g. web applications) has to be made (see Kauffels 1994, 22). In addition to this, feedback channels for transferring data from the user to the service provider is critical for interactive applications like information retrieval or online-shopping. Today, the Internet infrastructure primarily supports unicast transmissions with decent feedback channel mechanisms (IPMI 1997, 3), whereas the main focus of the digital TV-infrastructure is broadcasting with limited feedback abilities (but considerable higher bandwidth). However, both technologies are being worked on to support unicast and broadcast transfer mode as well as adequate feedback channels in the future.

Next, we will consider device-specific requirements, which mainly affect reproduction, storage capabilities and input facilities. Displaying and synchronising different kinds of media types is a basic demand with regard to reproduction. At this point, a distinction between static (time-invariant) and dynamic (time-variant) media types has to be made (see Grauer and Merten 1996, 9). On the one hand, typical examples of static media types are text, graphics and pictures. On the other hand, video and audio belong to the category of dynamic media types. Not all kinds of devices support all media types. Especially MIDs do not fully support video and audio contents, which is due to their limitations in display size, missing speakers or weak in-

¹ Pull-services typically address only one end-user (the one who triggered the transmission).

formation processing characteristics. Next, storage capabilities enable asynchronous download and consumption of contents in case of online-media usage. Typically, end devices with roots in information technology (like PCs, PDAs and Notebooks) possess sufficient persistent storage capacity. In contrast, most of the entertainment electronics lack comparable characteristics. However, this is very likely to change in the future. Another important aspect of end devices are input facilities. Typically, PC-based end devices possess the most advanced mechanisms for user input (keyboard, mouse, joystick etc.). In contrast, mobile or TV-based devices usually lack sophisticated input facilities.

Following, requirements that affect both end device and transport media capabilities are considered: volume of data and speed of distribution. The volume of data being transferred has to be handled by both the transport media and the end device. With regard to static media types like text-oriented contents, the number of chars is a good indicator of volume. Examples for short text messages are news headlines, stock market information, weather forecast etc. These can be handled by MIDs with small displays and limited bandwidth. Dynamic media types typically demand more bandwidth, depending on the technical quality of the content. For a given quality of service the length of time is a good measurement of volume. In cases where speed of distribution is not an issue, bandwidth can be substituted by local storage. In contrast, time-critical information like stock market news or sport results have to be transferred to the customer as soon as possible. Obviously, transmission media like the Internet or digital TV have a natural advantage over storage media like CD-ROM or DVD. As well, mobile devices benefit from the fact that the respective customer can be reached wherever he or she is located at a given point of time, even in transit.

3.2. Non-technical Requirements

Following fig. 1, non-technical requirements can be viewed from the end-users' perspective (user behaviour) and from the perspective of the media industry (business model).

End users have certain usage patterns and behaviours that are closely correlated to end devices and transport media. Numerous criteria to describe usage patterns exist (see Noelle-Neumann et al. 1999). In this paper, we will concentrate on aspects that are especially important for the appropriate selection of content and services for specific target devices. As we have exemplarily mentioned above, PC-usage differs from TV-usage in terms of user activity (active vs. passive) and purpose (information and entertainment). Another important aspect has to be considered in view of user attention. For example, MIDs are typically being used in mobile circumstances and are therefore not suited for complex content difficult to understand.

One of the most important viewpoints of business models is revenue generation (see Bailer 1997). In this regard, we distinguish between user-generated revenues, advertisement-generated revenues and sales on commission. Traditional business models of the media industry heavily rely on the first and second variant (see Schumann and Hess 2000, 20), but commissions will become more important in Online-based activities (see Zerdick et al. 1999, 165). The ability and flexibility to generate income with a combination of the given sources depend on technical preconditions and user behaviour. For example, advertisements have to be bundled to editorial contents either in time (like commercials on TV) or in placement (like banners on the Internet). However, some devices are not suited for these kinds of bundling. E.g., users presumably will not accept

text-based banners or commercials on WAP-based mobile phones due to small displays and low bandwidth.

3.3. General Survey

Subsequently, new devices and transport media will be judged against the requirements of digital products as defined above. Table 1 shows a matrix that opposes demands and technical approaches.

A short column-by-column discussion of this matrix will follow in order to clarify some of the propositions that have been made above.

Mobile Information Devices (MID)

The available mobile end devices are not very well suited for digital media distribution due to a number of reasons. First, small displays and low-quality reproduction of text and pictures restrict potential uses. Typically, video and audio is not supported at all.

Equally, low bandwidth constrains content providers to very small, mainly text-based information with low demand in terms of typographic and other design oriented aspects. Advertising is difficult for the same reasons, so that most services will have to be based on user payments or commissions (see below).

MIDs are especially well suited for short, up-to-date contents like stock information, sports news, traffic conditions, train delays and the like. For example, these can be distributed via push-mode effectively, because the potential accessibility is high. Equally, pull-oriented information services for WAP-enabled devices are possible (e.g. timetables, hotel and restaurant recommendations, directions etc.). However, these applications cannot heavily rely on interaction, since user input and hyperlink-based navigation systems are difficult to use because of the lack of adequate input facilities.

Table 1: Evaluation of different categories of new media technology

		Category	1)	2)	3)	4)	5)	6)	7)
Requirement			Mobile Information Device	Mobile Information Device 3G	Online Multimedia PC	Broadband Multimedia PC	Offline Multimedia PC	Online Digital TV	Offline Digital TV
access mechanism	pull		0	+	++	++		0	
	push		++	++	+	+	(not relevant)	++	(not relevant)
simultaneous recipients	unicast		++	++	++	++		0	
	broadcast		--	0	-	0		++	
feedback channel	supported		++	++	++	++	--	-	--
reproduction	text		-	0	+	+	+	0	0
	pictures		--	0	++	++	++	+	+
	audio		--	0	+	++	++	++	++
	video		--	-	0	+	++	++	++
storage capabilities	supported		-	0	++	++	(not relevant)	0	(not relevant)
input facilities	keyboard		0	0	++	++	++	0	0
	mouse, joystick		--	--	++	++	++	-	-
	pen		0	0	-	-	-	-	-
volume of data	low		++	++	+	+	-	++	-
	high		--	-	0	+	+	++	+
speed of distribution	low		++	++	++	++	++	++	++
	high		++	++	+	+	--	+	--
purpose	information		++	++	++	++	++	0	0
	entertainment		-	0	+	++	++	++	++
activity	passive		0	+	0	+	+	++	++
	active		0	+	++	++	++	0	0
user attention	low		++	++	++	++	++	++	++
	high		-	-	+	+	+	0	0
business model	advertisements		-	0	+	+	-	++	0
	recipient payment		+	+	-	0	++	+	++
	commissions		0	+	++	++	--	0	--

Legend: ++ strong support -- weak support

To sum up, most of the traditional contents produced by the media industry are not suited for mobile devices. Therefore, it can be expected that for the purpose of a device compliant selection and configuration of contents predominantly new, specific contents will have to be created. Hence, the provision of online-services for MID3s will entail technical and organisational consequences for many media companies.

Mobile Information Devices 3rd Generation (MID 3G)

Following announcements of the manufacturers, mobile devices of the next generation will be characterised by

significant improvements in terms of bandwidth and a functional convergence between mobile phones and PDAs. The broad support of the WAP-Standard enables contents to be distributed in a unicast-oriented manner via push or pull-access. Also, information processing and reproduction capabilities will be enhanced. Nevertheless, sophisticated technical input and output facilities comparable to those of stationary devices will not be widely implemented in mobile devices any time soon.

A specific problem in content creation will emerge from the multiple variants of possible mobile end devices. From

today's perspective it seems likely that products of diverse manufacturers will differ considerable in hardware (e.g. display size). Consequently, the implementation of user interfaces might cause problems greater than those in the area of (incompatible) HTML-browsers.

Online Multimedia PC

Typical characteristics of available desktop-PCs are advanced reproduction, storage and interaction capabilities in relation to low bandwidth access to the Internet. For this reason, the distribution of high volume and high quality dynamic media (especially video) is difficult. Static media types

like text and pictures are easier to publish from a technical point of view, however, users are often not willing to read long and complex contents on screen. Therefore, printer-friendly versions (e.g. PDF) of high volume contents are widely spread.

With regard to access mechanisms, pull-oriented mechanisms prevail in the area of web-services. Video-broadcasting (for example live events) is still a problem, although an Internet infrastructure for broadcasting applications already exists, but is rarely used (so called Internet-MBone). In general, Internet-based broadcasting services assume high server and bandwidth capacities and cause inefficient backbone load.

One of the most important advances of PC-based devices are multiple input facilities like keyboard, mouse or joystick. Therefore, online multimedia PCs are one of the most promising platforms for application-based, transactional or communication-oriented services. A common feature of these new services is interactivity. That means, that in contrast to traditional media products the user actively employs the product instead of passive consumption.

The question of how to refinance online-services is still unsettled. Advertising and sponsoring become more and more accepted amongst recipients. However, these types of business models often do not last to generate enough income for costly web-sites. As well, user-payments have not been successful up to now (especially in the area of general interest publications), because equivalent services are easy to find (see Zerdick et al. 1999, 171). Therefore, commission-based business models are widely perceived as the most promising approach for online-services.

Broadband Multimedia PC

Broadband multimedia PCs distinguish themselves from ordinary online multimedia PCs by broadband access to

the Internet. Simultaneously, information processing and reproduction capabilities will be further improved.

Especially because of broadband Internet access, new alternatives arise for pull-oriented distribution of video- and audio-based content (like video-on-demand). Research suggests that this kind of service will become very popular (see Albers et al. 1998, 277). Also, user payment is widely accepted in this area, both pay-per-view and pay-per-period are technically possible. However, up to now most customers do not use PCs for passive consumption of contents. This attitude towards PC-based end devices might have a limiting effect for the time being.

To what extent the Internet can be used for push-oriented broadcasting depends on the development of the Internet-Mbone and its support through widely spread software products. Yet, a prediction is difficult at this point of time and will therefore be omitted.

Offline Multimedia PC

Offline multimedia PCs utilise storage media technologies like CD-ROM or DVD to distribute digital contents. Due to the time delay caused by physical transportation, storage media is not suited for timely contents. Typically, CD-ROMs and DVDs are used repeatedly by the recipient, like reference books, text archives or computer games. In contrast to online-based services user payment is an established source of receipts. With regard to advertising, storage media is best qualified for long term image advertising. Otherwise, users might be annoyed by obsolete advertisements. In comparison to online media, advertising is not widely prevalent on digital offline media.

So far, one of the most important advantages of storage media like CD-ROMs and especially DVDs has been their large capacity. However, this ad-

vantage becomes less important in view of rising bandwidth capacity of online media technologies. Hence, the substitution of storage media through network-based media becomes likely in some areas (see Turecek et al. 2000, 188). As an example, video stores lending DVD or ordinary video tapes are faced by potential competition with video-on-demand providers (see Zerdick et al. 1999, 60; Paukens and Schümchen 2000, 69).

Online Digital TV

Online digital TV focuses on broadcast-oriented distribution of movies, sports events and other TV programmes. Static media types like text and pictures suffer from poor readability, at least on conventional television screens. This is not only due to technical reasons, but also to the fact that recipients are used to sit in a longer physical distance from the screen (see Zimmer 2000, 117). Another limitation is to be seen in the lack of adequate input facilities in most digital TV-sets. Because additionally the traditional user behaviour tends to be passive consumption, it will probably be difficult to establish complex, interactive services (see Paukens and Schümchen 2000, 73).

Nevertheless, digital online TV is one of the most flexible platforms with regard to business models. Both user payment and advertising have been deployed successfully. Especially video-on-demand in conjunction with pay-per-view seems to be a promising approach (see Albers et al. 1998, 277). However, it must be pointed out that there is a negative correlation between quality and scope of free-TV programmes and pay-TV usage in a mutual market (see Zerdick et al. 1999, 41). As well, it is not clear whether recipients are willing to use digital TV as a technical platform for transactions (online-shopping). Previous studies indicate, that this kind of service is not very important for customers (see Albers et al. 1998, 278).

Video-DVDs can be seen as an alternative to conventional video tapes. Physical production and distribution generate costs and take time, so that DVDs are not suited for up-to-date, obsolescent, changing or low volume contents. In view of business model, user payment is well established (purchase or renting). In analogy to video tapes, advertising will have a minor importance. At present, DVD-based transactions are not possible because of missing online-capabilities and therefore business models based on commissions have no significance.

4. Two exemplary Concepts in New Media Technology

At this point, two major technical concepts important for the media industry shall be discussed in greater detail. Following predictions of business analysts, mobile end devices have an extraordinary potential for growth (see e.g. Forrester 1999). In section 2.3, this kind of device has been labelled MID. In order to classify strategies of end device manufacturers, two additional criteria are being used: the range of supported functionality and mobile data communication capabilities. In respect of these criteria the positions of some exemplary mobile end devices mentioned in section 2.2 are shown in

fig. 3. Also, the category of MID 3Gs has been added to demonstrate the prevailing technological trend.

From this, two different strategies can be derived. On the one hand, there are specialised end devices mainly for the reproduction of digital contents (eBooks) with limited support of additional functions and constrained online capabilities. EBooks will be discussed in section 4.1. On the other hand, most other mobile devices are being driven in the direction of multi-purpose devices with strong communication capabilities. Target applications of MID 3Gs are not only distribution of contents, but a broad range of interactive services. In common, this kind of services are called "Mobile Commerce" and will be considered in section 4.2.

4.1. eBooks

The main purpose of eBooks is to complement or even substitute traditional, paper-based distribution of text-oriented contents. Typical properties of eBooks are evaluated and commented in table 2.

Overall, eBooks imitate paper-based books in view of user function and business model. However, substantial additional value (apart from potentially lower prices and memory) cannot be

identified easily, at least for general intended purposes like consumption of best seller novels. Additionally, contents cannot be rented using available eBooks because of technical issues. Also, eBooks are not as robust as traditional books and some products are not suited for outdoor usage (e.g. on beaches).

Yet, some niche applications profit from eBooks. For example, technical manuals, lose-leaf collections, catalogues, time-table information or massive textbooks benefit from memory capacity, unproblematic updates, support of hyperlinks and search mechanisms. As well, customers with weak eyes take advantage of variable type sizes.

From the perspective of the media industry, two aspects of eBooks are of particular interest and will be discussed in more detail: copyright protection and costs. Missing support of copyright protection has been one of the most important drawbacks of past attempts to establish electronic reading devices. However, modern versions of eBooks use cryptography in order to prevent unlicensed copying of digital contents. Because of this, many major publishers have shown considerable interest in eBooks recently. With regards to costs, both production and distribution of contents for eBooks potentially reduce

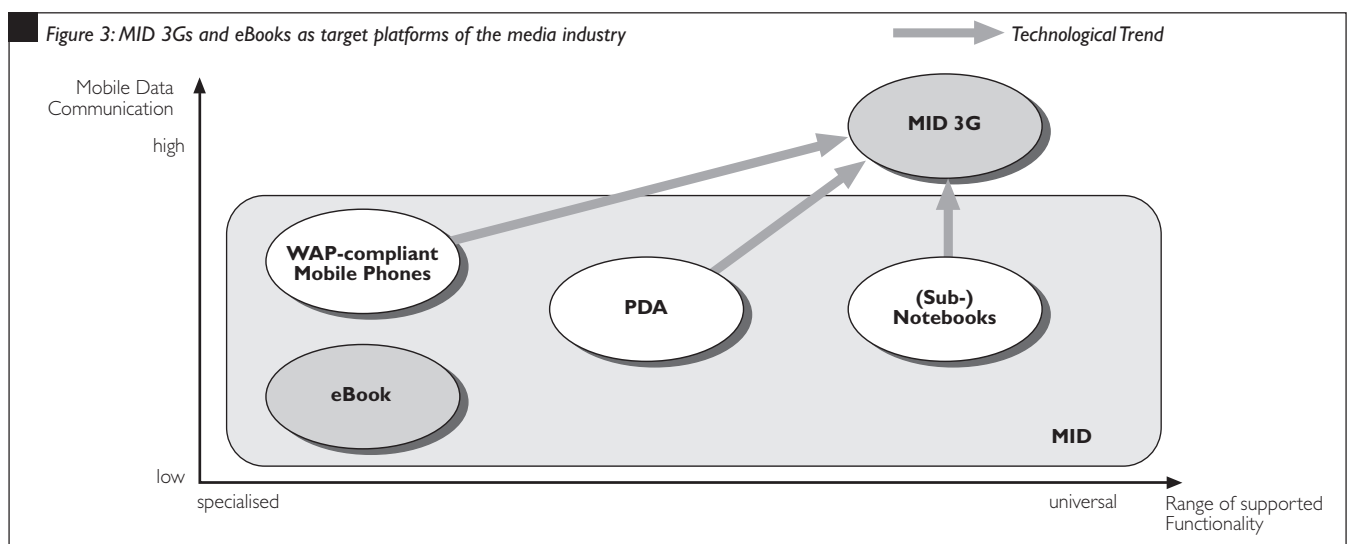


Table 2: Evaluation of eBooks

Requirement	eBooks (evaluation and comment)
access mechanism	pull ++ Download of contents via Internet or specialised terminals
	push - Limited, because permanent online-access is not supported yet
simultaneous recipients	unicast ++ Intended mechanism of distribution
	broadcast - Not supported in available products
feedback channel	supported - Not supported in available products
reproduction	text ++ Comparatively good readability of text
	pictures 0 Varies in dependence of product (typically no colours, though some products offer grey-scale, mostly pixel-oriented, typically low resolution)
	audio 0 Varies (typically low quality)
	video - Not supported in available products
storage capability	supported + Varies in dependence of product (potentially high, but adds significantly to the cost of the end device)
input facilities	keyboard - Not supported in available products
	mouse, joystick - Not supported in available products
	pen ++ Supported, intuitive handling ("book-like")
volume	low + Possible, but laborious, because eBook has to be connected to the Internet for each package of content
	high ++ Intended application area, memory capabilities depend on product and configuration
speed of distribution	low ++ Intended application area
	high + Slightly limited, because permanent online-access is not supported yet
purpose	information ++ No obstacles observable
	entertainment 0 Possible, but limited by traditional user behaviour
activity	passive ++ No obstacles observable (apart from the user selecting the required contents)
	active 0 Available products do not focus active user behaviour (limited support of user interaction)
user attention	low ++ No obstacles observable
	high ++ Intended user behaviour, possibly limited by mobile usage
business model	advertisements 0 Possible, but only little experience up to now. In analogy to traditional books advertising is probably of minor importance. However, advertising might be possible in electronic newspapers based on eBooks.
	recipient payment + Intended source of revenues. However, renting of digital contents is not supported yet in available products.
	commissions - User transactions are not supported yet.

Legend: ++ strong support — weak support

costs compared to traditional books. Particularly, expenses for paper, print-services, stock and physical shipment cease to apply. Next to reductions in price, two other consequences occur. Firstly, publishers can efficiently offer highly specialised contents for limited target groups because of decreasing overhead costs. Secondly, authors can circumvent traditional publishers and distribute their contents with pure online-publishers or even without help.

Still, the future of eBooks is difficult to predict. Proprietary approaches from Nuvomedia and Softbook have been available in the U.S. since autumn 1998. However, both companies have failed to establish eBooks as a mass medium and sold only a few thousand devices. Both Nuvomedia and Softbook have been acquired by Gemstar International in spring 2000. A new generation of eBooks has been announced by Gemstar to appear by the end of 2000. Improvements focus on better usability and ex-

tended memory. Other eBook manufacturers like Librius changed their strategy and produce specialised, device-independent reading software for PDAs and Subnotebooks. Additionally, major software companies like Adobe and Microsoft also work on similar technological alternatives.

In general, mobile reading devices and appropriate contents are not likely to enter the mass market in short term. It seems more likely, that eBooks will be

used in niche markets first and might diffuse from that base into the mass market.

4.2. Mobile Commerce

Following a widely accepted definition of electronic commerce (see Picot et al. 1998, 317) mobile commerce (M-Commerce) will be defined as every kind of business activity based upon mobile information devices. Different types of M-Commerce services can be divided into four categories (see Heil 1999, 84 for a classification of online services in general): Information-oriented services, application-oriented services, transactional services and communication-oriented services.

This paper has mainly focused on information-oriented services so far (see section 3.3). Supplementary, services that support navigation and information retrieval are possible. This kind of service is commonly called "WAP-Port-

mobile Internet access. Therefore, a possible business model might be based on commissions for user click-through to charged information sources.

Application-oriented services will be especially appealing to the end-user under the condition that they do not require complex operations. Subsequently, individual and anonymous services will be distinguished. On the one hand, individual applications like calendaring, task management or address lists are interesting approaches particularly for business purposes. However, media companies can not benefit from their core competencies in this area. On the other hand, anonymous applications like those known from the Internet (e.g. product configuration, price comparisons, routing etc.) cannot be transferred to mobile devices easily, because these applications typically use applets or a sequence of forms for data input. This kind of interaction is difficult to handle on mobile devices as we

Transaction-oriented services can be considered as a special kind of application-oriented service. Additionally, transaction-oriented services obligatory execute some type of business transaction. One of the major difficulties of transaction-oriented services with mobile devices is user interface. For example, ordering simple products like books or CDs can take a significant amount of inconvenient interaction. Complex products that have to be configured are even more demanding. Other problems arise because potentially significant amounts of product information and business conditions must be transferred to the potential customer as well. Summarising, transaction-oriented mobile commerce services are most promising for simple, standardised products that fit the needs of customers in transit, for example intermediation of lifts or booking services (hotels, tickets). However, a reasonable alternative to mobile transaction-oriented services are call

Table 3: Communication-oriented services

	one-to-one communication	many-to-many communication
synchronous	This kind of service will be difficult to establish, because ordinary mobile phone calls basically offer a convenient alternative.	Mobile chat systems will be difficult to handle for customers, because real time communication are constrained by small displays and inadequate input facilities.
asynchronous	SMS and mailbox systems are already in use. In future, WAP-based E-Mails might supplement these services.	News groups can be accessed via mobile devices. No serious obstacles apart from small displays and inadequate input facilities.

tal" and helps users to find relevant information sources via catalogues or search engines (see Hess and Herwig 1999, 551). In analogy to common Internet-portals there will probably be general-interest portals as well as numerous special-interest portals, both of which will provide a number of additional services. Because it is difficult to enter Internet-addresses (URLs) via small phone keys or other, comparatively inefficient input facilities, portals are likely to become quite important for

have mentioned above. Therefore, only simple applications are likely to appeal to the mass market. With regard to revenues, user-payment is possible for premium services with significant user value and unique selling point. Additionally, business models based on commissions are possible. In this case, the application should prepare transactions with business partners (for example, a hotel guide offered by a media company may be linked to appropriate booking systems).

centres, especially if the customer uses a mobile phone to access these services. Also, transactional offerings are typically new for media companies. Therefore, adequate partnerships are important for launching this kind of mobile service (for strategic alliances of media companies in the online-business in general, see Lichtenberg 1999, 26).

Finally, communication-oriented services support communication amongst users. Internet E-Mail, chats and news

groups are well known examples. Today, most mobile phones already support sending short messages using SMS (short message service). In spite of inconvenient input facilities, SMS is widely used by the customers (see IDC 1999), which is mainly due to lower costs in comparison to mobile telephone calls. In the future, more sophisticated services can be implemented using WAP. For classification, communication processes can be synchronous or asynchronous. Further, a distinction between one-to-one and many-to-many communication is being made. Table 3 shows and evaluates the resulting categories of communication services.

In conclusion, asynchronous news groups are most likely to be successful. Media companies can profit from professional know-how in moderating groups or providing additional, editorial contents. Again, the business model may be based on user-payments or even commissions.

5. Conclusion

The goal of this paper was to assess the impact of new digital media and devices on the media industry. In order to achieve this, relevant technologies have been described and bundled in section 2. After this, general requirements of digital media products have been developed in order to evaluate major technology trends in section 3. Three major outcomes can be pointed out:

- The portability of contents from one class of devices (e.g. PCs) to another (e.g. MID) is difficult due to significant technical differences. Therefore, new devices and transport media must probably be supported with target media specific contents.
- Starting from conventional publishing, technical innovations also enable new kinds of distribution (for example video-on-demand) as well as sources of income (for example pay-per-view).

- Additionally, interactive online technologies provide completely new types of services based on applications, transactions or user-driven communication. Establishing these kinds of services present major challenges for the media industry, because they draw media companies away from their traditional, content-oriented activities.

From business-oriented perspective, especially the latter aspects are relevant. On the one hand, new markets emerge that the media industry can share in. On the other hand, conventional media products are in danger of being substituted. For example, classified ads of newspapers are increasingly being displaced by specialised online brokers. Therefore, traditional media companies are under pressure to exploit upcoming technologies before newcomers or companies from the IT-industry break into their established markets.

Supplementary, two exemplary concepts (eBooks and mobile commerce) were discussed in greater detail. With regard to eBooks, major technical improvements have been achieved throughout the last couple of years (Internet-based distribution, protection of copyrights, readability etc.). However, it is not expected that eBooks will become a mass media device, because for general purposes (reading literature or news) eBooks do not provide substantial additional value in comparison with print products or established digital end devices like PDAs or (sub-)notebooks. Therefore, the greatest potential for success is to be seen in niche products like technical manuals.

Also, provision of mobile commerce services is difficult. Restrictions are mainly due to limitations with regard to small displays and insufficient input facilities of mobile devices. This weaknesses can not be compensated by considerable transmission capabilities that are expected within the next few years. Consequently, mainly low vol-

ume contents and simple applications will be successful. Also, a major problem will be to achieve convenient user interfaces for a range of devices with different hardware capabilities (e.g. display and input).

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