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Will E-books Change the World?
by Terje Hillesund

☒ Abstract

This paper argues that the evolution of e-book technology is related to the penetrating impact of networks and information technology on society. It defines the concept of e-book and describes some aspects of e-book technology. By focusing on book production processes, the paper examines what probable consequences the development of e-books and a global network economy will have for publishers and book industries. E-books, along with other electronic formats, will trigger major changes as the digital products and distribution channels will force the logic of the network economy on the book publishing industry.

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Introducing the E-Book Question

Introduction

Information technology and especially the Internet have profoundly changed the ways of publishing. Newspapers, magazines and periodicals have for years been published online and all kinds of texts are now available in digitised form. At the turn of the century this digitalisation of the written language finally reached the book publishing industry; electronic books - or e-books - can now be bought and downloaded from various kinds of e-bookstores on line. E-books can be read on different handheld multipurpose devices like PDAs and pocket-PCs and on dedicated e-book readers like the American Rocket E-book (now RCA REB 1100) [1], the French Cybook [2] or the Italian Myfriend [3].

In this essay I shall define the concept of e-book and describe some aspects of the e-book technology. I shall argue that the development of e-books at this stage in history is by no means accidental. On the contrary, considering the rise of the network society, with its flow of information and money, where all kinds of digital media content are sold and spread through the networks, it was only a matter of time before someone started to tear the vast quantities of content of books out of their printed paper pages and attempted to generate income in the networks of the new economy.

Digital media and networks have created new products and marketplaces; e-books are the books of the network society. By focusing on new value chains and book production processes, I will examine some of the changes the network economy will bring upon the publishing industry. In doing so I also hope to shed some light on the changes awaiting booksellers, printers, librarians, researchers, students and readers.

The E-Book Question

To support my argument that the innovation of e-books was inevitable, I shall refer to some scholars who have reflected on the relationship between media technologies and society. They all claim, in different ways, that the development of technology and society are deeply interdependent and that it is impossible to analyse one without considering the other. The development of e-books can be seen as another, further step in what Walter J. Ong calls "the technologizing of the word" [4]. With e-books the creation, storing, uttering and receiving of literary works have been liberated from both the sound of the voice and the print on paper. In a Harold Innis and Marshall McLuhan-inspired, media deterministic way of the 1950's and 60's, it would be tempting to ask: How will e-books alter our concept of a book, our thinking and our consciousness? How will the digital word change the powers and patterns of society? Simply, will e-books change the world? [5]

These questions imply a media-deterministic and one-directional view on the causes and effects of technology, making technology the primal cause of change. This position has been criticised and modified by both media theorists and by many other scholars.

In the 1970's Raymond Williams complemented technological determinism with his own intentional view on technological research and development. He showed that many technological innovations, like motion pictures and television, were not only causes and agents of change, but just as much effects, the result of intentional research and development based on foreseen practices and social needs [6]. For Williams, technology is not a self-acting force, a more or less accidental activity, isolated from the rest of society. On the contrary, technological research and implementation is a central part of the economic and cultural development of modern society and as such technological development is embedded in society itself as one of its core activities [7].

According to Williams, in order to understand a technology like e-books, one should not just focus on its consequences, but more importantly analyse the development of e-books as part of a broader economic and social pattern. Why were e-books invented in the first place?

In the 1980's Joshua Meyrowitz, a medium theorist, tried to fill the gap between the grand theories of media determinists like Innis and McLuhan and micro-oriented social interaction theorists like Erwin Goffman [8]. By using a situational approach, Meyrowitz illustrated how new media are changing the structure of social situations. By changing the patterns of information flow, new media are creating new situations with new roles, new behaviour and new actors [9].

Even if Meyrowitz and Williams rejected the one-sidedness of media determinism and pointed to the fact that the theory did not explain exactly how media cause changes, they still

recognised that many media deterministic analyses have substantially contributed to our understanding of media and society. But not all recognised these insights.

In the 1990's Brian Winston challenged the concept of communication technology revolutions. Supported by findings in extensive empirical studies, Winston claimed that developments of new technologies are much longer and slower processes than usually assumed. Winston also argued that the innovation and development of new media is dependent on general scientific competence in society. More importantly, the acceptance and later diffusion of technologies are dependent on supervening social necessities and influenced by cultural and economic forces. Winston gives the social sphere primacy as the conditioning and determining factor in the development of new media [10].

Reflecting on the deterministic view on media influence, one could be attempted to drop this perspective all together, or at least minimise the ambitions of questions on the potential effects of e-books. Instead of asking global questions on the nature of the digital e-book galaxy and how e-books will change everything, including our minds, it would be safer to more cautiously ask if the invention of e-books will matter at all. Will e-books change anything?

Of course e-books matter, and the invention of e-books will have consequences. The point is that e-book technology is not the only agent of change and probably not the most important agent of change. Instead of isolating e-books as the focus of our research, we should broaden our perspectives and see e-books as part of larger and deeper economic and technological trends. In addition to view the e-book as a cause, we should look at the e-book as more of a symptom and itself an effect, the result of intentional research done with certain purposes and practices already in mind. Winston has an important point which can be applied here. The development of e-books is the result of social and economic necessities, rather than the consequence of ingenious ideas as technological myths often want us to believe [11].

In accordance with the governing ideas of non deterministic perspectives, we should ask questions like: What were the scientific and technological premises for the development of e-books? What purposes are e-books meant to fulfill? How will the economic interests of publishers and rights owners influence the spread and use of e-books? How will the conservative habits of readers slow down the diffusion of e-books? And most importantly, what economic and social forces created and shaped the e-book technology?

Brian Winston and many other theorists have in the past decade tried to describe and explain the information and network society that evolved during the most recent quarter of a century, much of it as media deterministic thinking. Manuel Castells, for example, remarked that a technological revolution, centred around information, transformed the way we think, produce, trade, consume, manage, communicate, live and die [12].

Castells argues that the dilemmas of technological determinism are false dilemmas. Technology is simply society and society cannot be understood or even represented without its technical tools. Castells has been criticised for not taking social conditions into closer consideration. His analyses therefore end up echoing deterministic positions of the past as well as those of the digital economy of today [13].

In spite of this criticism, Castells has been given credit for his overwhelming documentation of the impact of network technologies on both the global economy and on our daily lives [14]. At a micro level, we are all part of the network society when we use our credit cards, order a taxi, pay a bill, use a card key, pass a surveillance camera, watch cable TV, use our PC, surf the Internet or use our mobile phones.

At a macro level network logic is the central organisational principle of management and production in multinational companies. It is also a driving force in the ongoing concentrations of companies in most branches. Networks make the infrastructural basis of a global flow of information, money and commodities. In the modern economy both productivity and

competitiveness are dependent on an ability to generate, parse and make use of information.

Thus information is one of society's most important end products. Since information is digital, it is available at all times to those who have technological competence, financial resources and access. Patterns of presence in networks and patterns of access to information constitute, according to Castells, the patterns of power in modern society [15].

As part of this general tendency media industries have been transformed. New media are evolving, most of them centred around networks, especially the Internet. Radio, television and newspapers, as well as photography, music and movies, have been transformed into digital media [16]. Increasingly, these media are concentrated in multinational conglomerates like AOL/Time Warner, Disney, Viacom/CBS, Murdoch's News Corporation and Bertelsmann [17].

In addition to Castells and Winston, other theorists have examined central features of this transformation, that is the digitisation of media and their convergence on telecommunications networks. All media and telecommunication are based on related technologies, converging towards access and control on the Internet [18]. Networks and digital devices give traditional media new and common ways of distributing their content. This tendency is also a part of the development of printed media, of newspapers, magazines - and now books. The book industry, as all other media, is becoming an integrated component of the global communication industry [19].

It is exactly here, in the penetrating impact of network and information technology on society that we find the deeper reasons for the development of e-books. Perhaps traditional book technology is not suited to, or at least not sufficient for, the network economy.

It is a fact that information in a book is analog; it is locked-up in ink and printed on paper. In the network economy information is digital, which of course is essential for its migration and use. To be part of the new economy the content of books can no longer be longer locked inside the covers of books and stored in warehouses or libraries. It has to be freed and read. And e-book technology is a digital and network based technology for both distributing and reading books.

Was the development of e-books inevitable? Are e-books the vehicle for the book industry to play an important part in the network society of today and tomorrow? Or does the information society and network economy need the content of books available in a faster and more efficient way? Are e-books an answer to a social necessity?

In this essay I will claim that e-books are a social necessity and make this claim the premises of further arguments. I will argue that exactly because e-book technology meets the requirements of the network society, its development and diffusion will trigger major changes in the book industry and in our concepts of books and reading.

The Method

In support of these arguments I will follow the advise of Joshua Meyrowitz in neither being too macro- nor too micro-oriented in my perspective [20], but rather operate at a level of middle range theories. I will focus on the challenges book publishers face in the current information and network society. Information and communication technology, with all its publication forms and distribution channels, have created new value chains, giving traditional publishers both new competitors and new possibilities. I will show how this new situation forces publishers into new roles and patterns of behaviour, moving from traditional book producers to content providers with a whole range of products for sale, including e-books.

I will more specifically show how the new economy, with its network supported flow of

information and money, in a fundamental way not only changes the distribution and trade of books, but also in a rather fundamental way alters the ways book content is produced and, ultimately, changes the nature of the book itself.

By focusing on the situation of publishers and book production processes, I hopefully will shed some light on the actors and institutions surrounding publishers. If my assumptions about e-books are correct, then it will gravely affect authors, artists and illustrators, book distributors and retailers, educators, students and of course readers.

This is an uncertain way of predicting the future. We do not know how readers, teachers or publishers will respond to e-books because the technology could have unforeseen effects and new technologies not yet anticipated could change the picture altogether. But these uncertainties must not prevent us from pursuing this analysis. I will start by defining e-books, describe their development and indicate a probable pace of diffusion.

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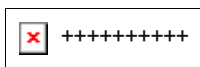
E-Books and the Book Production Process

E-Books: Definitions and Development

E-books are all about mobility and information flow. In its digital form the content of an e-book escapes the pages of an ordinary book because simply the content is no longer tied physically to paper. An e-book can in principle be available anywhere through the Internet, accessed any hour of the day. All you need is an Internet connection, an e-book reading device and money.

So what is an e-book? A narrow definition treats an e-book as a digital object designed to be read on a handheld reading device or to be listened to from a speech-generating tool. The core of this definition is that an e-book is content, a digital object containing an electronic representation of a book, most commonly thought of as the electronic analog of a paperback or cloth-bound book [21].

However, to think of an e-book as one digital object is misleading. An e-book is usually a collection of several digital objects or documents, which in turn are packaged and formatted with the intention of being displayed on a handheld device or read by a speech generating application. An e-book is a digital publication containing content files and style sheets in many forms, with metadata, digital rights, navigation and other components. The content is made up of text documents, digital pictures and illustrations. Style sheets give typographic and layout directives on how to display the content of the book while other files organise the order of the book's content. Metadata provides a summary about the book (for example, authors, publisher, ISBN and price), while digital rights management (DRM) files specify the rights of the owner of the book. All of these different documents are collected in one publication in a proprietary format, such as the .lit format used by Microsoft Reader [22] or the .rb format used by Gemstar [23].

In a narrow sense an e-book reader is most typically a handheld electronic device capable of displaying e-books. E-book reader software operates on an e-book reader providing copyright protection and book display functions [24]. PDAs, pocket PCs, laptops and dedicated readers like Rocket E-book, Cybook and GoReader [25] are examples of e-book readers, while MS Reader for the Pocket PC and Peanut Reader [26] for Palm and MobiPocket [27] are e-book reader software.

E-books in the strict sense are read on handheld devices. In a slightly wider sense, e-books are also those digital objects formatted in order to be read on e-book reading software made for personal computers, like MS Reader and Adobe Acrobat E-book Reader [28] (the former Glassbook). In many cases these applications themselves are called e-book readers.

In a much broader sense, the term e-book is applied to all linear texts of some length that can be shown on a computer screen. But in this sense e-books are difficult to distinguish from all other electronic texts, like those created in word processors and desktop publishing programs. Most of these were not created as "books". If they are and can be shown on a screen, they are definitely not made with the purpose of always being read on a monitor.

In the broad sense e-books have been around for several decades. In the Gutenberg Project [29] thousands of books, mostly classic and public domain literature, have been made available for free as digital documents since the 1970's. These kinds of books are usually available as simply text files, so they are not e-books in the narrow sense of the word. To be treated as e-books, they have to be converted into and formatted using a specific e-book reading application, for which a simple text file makes a good starting point [30].

Before the term e-book came around in the late 1990's it was not unusual to talk about electronic books in terms of files collected in the Gutenberg Project or books formatted on compact discs. There were also early unsuccessful attempts at making reading software for computers. These programs were meant to be reading software for what was then called electronic books [31]. Today the term e-book refers to digital objects specially made to be read with reading applications operating on either a handheld device or a personal computer.

This modern concept of e-books came into common use after Martin Eberhart and Jim Sachs both started their own companies and developed Rocket eBook and SoftBook, the first two handheld e-book reading devices. This meaning is frequently used in the Open E-Book Forum (OEBF), which is working towards standardisation of publication structures and copyright protection systems in e-books [32]. It is also in the narrow meaning that Microsoft most often uses for e-books.

Adobe uses the term e-book in a slightly different way than most others in promoting the Portable Document Format (PDF). PDF is first of all popular. Even if they are made to be printed, PDF documents can be read with Adobe's Acrobat Reader, certainly the most widespread reading software of all. In 2000 Adobe acquired Glassbook and their e-book reading software and made Adobe Acrobat E-book Reader a specific e-book reading program. Adobe, like Microsoft, is also developing font-rendering technologies to improve screen reading. This, and the fact that PDF documents can be optimised for screen reading, makes it natural to include PDF in our concept of e-books. E-book retailers like Amazon.com [33] and Barnes & Noble [34] are selling e-books in several formats such as Adobe e-books, Microsoft e-books and Gemstar e-books (Gemstar being the new name of both the Rocket and the SoftBook formats after Gemstar's acquisition of the Rocket and SoftBook companies).

Adobe and PDF demonstrate that it can be difficult to distinguish e-books - documents mainly made and meant for reading on screen - from other documents, like files developed in word processing applications and desktop publishing programs. On one hand digital objects that are meant for print, such as documents intended to be printed on demand, like PDF files, will in many cases be called e-books, mainly because they are distributed as digital objects, often read *before* they are printed locally. On the other hand, narrowly defined e-books, files meant for handheld devices or PC reading applications, in many cases have the technical capability of being printed and reproduced like traditional books and documents.

E-books, both in the narrow and in the Adobean sense, are distributed via Internet and sold in many ways. Some authors are selling their own e-books from their Web sites, such as Stephen King. Some e-book stores have specialised in selling e-books of one format only or books of one specific genre. Other complete e-bookstores, like Amazon.com and Barnes & Noble, are

selling all kinds of e-books in several formats from all of the major book publishers. In the e-book trade there are many different business models, but there are commonalities: they all use the Web and online payment systems and they usually include some kind of copy protection scheme.

E-books are produced by many kinds of electronic publishers, from bestseller publishers to university presses and multinational publishing conglomerates. Most traditional publishers are moving gently and cautiously into the e-book business. For example, in Norway and Sweden Aschehoug and Bonniers have stared to sell a limited number of e-book titles online. In the U.S., major publishing companies, like Random House, Simon & Schuster and McGraw Hill, have launched extensive e-book production plans and are rather optimistic about the e-book future [35].

In the mean time the rest of the world's book industry is waiting, watching and asking: When do we have to act?

Diffusion

When will e-book reading and sales of e-books take off? How fast or slowly will e-book technology diffuse and become a widespread way of reading?

Today there are two factors working against e-books and hindering diffusion. These factors include the overall poor quality and high prices of reading devices and the lack of proper and interoperable digital rights management (DRM) systems. The quality and prices of devices critically influence consumers; proper DRM systems cool the eagerness of publishers to take on the costs of producing e-books.

E-books in some way will compete with traditional books. The developments of writing systems, script and printed books are, in spite of new technologies, among the greatest achievements of mankind. Traditional book technology has evolved over five centuries and has reached a very high level of performance. Even if we all take it for granted, the book is a highly developed and extremely complicated technology [36]. The readability of a book is the result of many interdependent factors and features that affect the rhythm of reading - page size and layout; font face and size; inter-character and inter-word spacing; word shapes (including kerning and ligatures); line length, hyphenation and inter-line distance (leading); the use of margins and indents, paragraphs, headings, chapters, footnotes, page numbers, pictures, graphics, charts and tables of content; and, the quality of paper and print. All of these factors are based on the knowledge of typographers, book designers, editors and publishers [37].

E-books cannot yet beat traditional books as reading technology. E-book reading devices and software applications of today are far from being competitive in terms of legibility - and the main problem is the display. Even if LCD screens of handheld devices did not have the same problems of flickering and glare as typical displays of personal computers, LCD screens are by no means optimal for reading. They are often too small. If they are large, then they are too heavy, reflect light too easily and can't be used as reading devices in outdoor daylight. Most importantly they don't have the resolution needed to properly render highly legible serif typefaces like Times and Garamond. Even sans-serif types, like Arial, are not very well represented on screens today. In the use of pictures, illustrations and sophisticated layout, e-books are not even close to the possibilities and qualities of printed books.

The problem of resolution is not likely to be solved in the near future. Reading devices today have display resolutions from 72-106 dpi; at least 200 dpi is an acceptable level of character representation. The development of LCD screens has been surprisingly slow and there are no indications that commercial 200 dpi screens will be available in the next several years [38].

New and different screen technologies are being developed. Both OLED (Organic Light-Emitting Diode) screens and e-paper technologies are promising. In five to ten years there can be great improvements in the readability of screens. Other improvements will also occur with handheld technology in terms of processors, memory cards, batteries, materials, wireless connectivity and software, all of which will make these devices easier to use and less expensive. Even if the readability of handheld devices will not match traditional books in many years, there will be millions of devices and mobile terminals around that could be used for e-book browsing and reading [39].

Parallel to the development and spread of hardware, new e-book reading applications will optimise legibility. Both Microsoft and Adobe have developed font-rendering technologies based on the characteristics of LCD screens (ClearType and CoolType), improving representation of letters as compared to letter representation on traditional monitors. Microsoft, and probably Adobe, will design new typefaces exploiting the possibilities of ClearType and CoolType. In addition, the underlying parameters controlling the rendering of texts on screens will be optimised for screen reading. Screen rendering will no longer be influenced by print parameters as they are today.

The research and development of screen-reading applications has only just begun and great improvements of these applications can be expected in the near future. These efforts will not only benefit anyone reading e-books on handheld devices but also those reading books on personal computers using word processors and Web browsers. The development of the e-book technology has put a new and fresh focus on display reading.

Even if e-books cannot beat traditional books yet, these collective efforts will improve the legibility of e-book devices and make e-book reading more tempting for larger audiences. Readers will also consider the benefits of the e-book technologies such as potential lower unit prices, immediate access, large storage capacities, highly developed search functions, hyperlinks to both internal and Internet resources, adjustable fonts and sizes (according to individual preferences), speech generating plug-ins and the combined use of e-book readers with PDA functions, e-learning applications, music and video playing, and mobile telephony.

As Winston and others have demonstrated, diffusion is not only a matter of technology. Diffusion correlates to cultural and social needs [40]. Even if e-book technology improves remarkably within the next three to five years, it will still meet a lot of resistance. There is no reason to assume that e-books will replace traditional books in the near future or that readers will abandon paper for handheld readers.

Groups most inclined to start reading e-books are those that are interested in new technologies and devices, for example those naturally using computers, networks and cell phones. Rapid diffusion is likely to be dependent on how quickly schools and universities take advantage of e-books, how fast e-books become a natural part of network-based e-learning and on how fast e-book reading devices are established as indispensable lifestyle items among really serious readers. It is not a very daring guess to say that this will take some time.

Diffusion of e-books among readers is also heavily dependent on publishers. For a technology to be widespread, there must be a great and varied number of e-book titles available. It will be up to publishers to bring this variety to the market. There will be resistance since publishers have, after all, built their businesses and fortunes on the production of traditional books. The major concern among publishers is a reliable copy protection system that protects the publishers' investments in new technologies [41].

DRM systems distribute rights among participants in an e-book transaction and provide a secure distribution of e-book titles, protecting copyright against unauthorised duplication or reproduction. A DRM system is both an encryption and distribution system.

Some e-book distribution systems, like those of Gemstar and Cytale, already have secure DRM

systems. These are proprietary systems closely related to their own Web servers and their own particular types of reading devices. Specific devices contain a hardware-based unique identifier that allows content retailers to encrypt each purchased title uniquely for download to that device. Other systems designed for a broader use are being developed; both Microsoft and Adobe have their own DRM systems.

The main problems of DRM are not technical, but social and cultural. Authors, readers, booksellers, libraries and authorities all claim their cultural and legal rights and some of these rights and interests are in conflict [42]. A customer thinking of buying an e-book may want to keep her privacy and resist being registered in a remote database in Ohio or Paris. As the owner of an e-book, she may also want to give the book away, lend it to a friend or to make a copy or two for her own personal use, all of which may be in conflict with the terms a publisher wants to offer when selling the book. The publisher on the other hand does not want to lose sales due to perceived illegal copies of an e-book in circulation.

In addition to the many conflicting interests and rights on a micro level, these interests and rights also differ on a macro level, that is from culture to culture and from country to country. Customer rights and copyright laws are not the same everywhere. For example, publishers and e-book retailers in U.S. are not regulated equally in other places in the world.

In a global e-book economy, there will be no DRM system that will comply with all the different interests at the same time. There will be many different and competing DRM systems, all with different compromises. There will be many different and competing reading systems. This situation will reduce the interests of both consumers and publishers and thus slow down the diffusion of e-books, largely because the number of available titles will grow slowly and consumers will not have easy access to all titles at any given moment.

Publishers will never be completely confident in their DRM systems. If one unprotected copy is created, it can easily be made into many multiple copies easily accessible on networks [43].

This problem is not specific just to e-books. Printed books can be scanned just as easily as any e-book. It is a problem for any content in digital form, be it music, video and software. Much effort is being dedicated to develop efficient and fair DRM systems that will make digital content easily accessible to customers and at the same time protect the rights of authors and publishers. The balance between acceptance by consumers and demands for control by publishers, though, has yet to be established. The danger is, as Clifford Lynch points out, that content and copyright owners are all too eager to control access to digital content. This interest in control of content will disturb a time-tested balance between individual and social needs for free access to information and the economic ambitions of corporations [44].

Because of its many social, cultural, legal and economic implications, the DRM question will affect the diffusion of e-books. Many DRM problems will need to be sorted out before e-books really tempt large numbers of readers. Acceptable DRM solutions will probably also be in store when e-book technology becomes part of the ever-growing wirelessly connected world of mobile devices.

E-book technology is in a very early phase of development and its diffusion is starting very slowly. Improvements in the basic technology will accelerate the pace of the e-book diffusion in the next three to five years. If that occurs, e-books will be fairly widespread in ten to fifteen years.

Book Production Processes

For the last three decades, book production has been largely digital. Writing, editing, layout and pre-press preparations are computerised and the publishing workflow is all network based.

Distributors and retailers are heavily dependent on databases and ordering software and on online communication. Libraries have collected vast amounts of information about books in databases; authors and researchers can easily browse all of the major libraries in quest of relevant literature. References and abstracts can, in seconds, be downloaded to personal bibliographies.

The only missing component in this network is the physical content of books. E-books will change this situation altogether. As a digital document, an e-book will be accessible and downloadable at all times and from all over the world, requiring only an Internet connected computer and some way to complete an online financial transaction. In the near future theoretically all you will need is wireless information.

Networks will provide whole new ways of representing and distributing content, giving authors, libraries, distributors and publishers new challenges and possibilities [45]. This new situation will create new roles and new patterns of behaviour. Publishers will no longer be mere producers of paper books, but digital content agents, producing content in several formats and for different distribution channels. Publishers will produce books on paper and on demand in various digital formats, changing the structure of book production.

Today, traditional books start with an author using word processors and other programs to create text and illustrations. As the book evolves, the author works with an editor and publisher, by e-mail and post, to refine the book for a targeted audience on a specific schedule. Much of this editing and correcting is done both on paper and computer. When the book is completed in a form acceptable to all parties, text files and illustrative material are sent to a graphic arts designer where the physical creation of the book begins, with desktop publishing programs like QuarkXpress or Adobe InDesign. As these programs generate output, there is further editing and proofreading of the content. When the files are finally ready, digital master files are created for pre-press work and printing.

This workflow is well suited for production of traditional books, but does not work well for multimedia. In different media environments, content must have the ability to be represented and stored in various formats and modified in different digital ways. A condition for the varied and rich use of book content is therefore a separation of the semantic content structure of the book from formatting information for typography and layout.

Desktop publishing applications of today do not separate content from style. On the contrary, when typographers and book designers have added their elements to files, it is very difficult to separate semantic content and formatting instructions. This is especially troublesome, as much of the content editing - proofreading and other linguistic changes - has been done directly into these documents, making the master files the containers of the final and authentic text content. These documents are often stored by a pre-press or printing company and generally are unfit for use in most networks.

Publishers have several ways of breaking this deadlock. The easiest way out is to rely on Adobe and their Portable Document Format (PDF). PDF-files are platform independent and highly transmittable documents and PDF files can be extracted from all kinds of printable formats, preserving the original content, typography and layout. This makes PDF ideal for later print on demand. Its application means that a publisher makes only minor changes in the book production process. But to rely on PDF as the only e-book format could be risky.

As an e-book format, PDF is, in many ways, self-contradictory, static and made for print only. The capability of PDA documents to preserve the exact visual appearance of a printed page is highly cherished. However it is a liability in the e-book environment, where flexibility, dynamic typography, screen reading optimality and re-flow are preferred qualities.

The pages of a PDA document seldom fit the display sizes of handheld reading devices, and if they do they are rarely optimised for screen reading. Adobe, however, is working on improving

their e-book reading software and they are creating features in desktop publishing applications (like PageMaker 7.0) to make it easier to pre-format books and documents to fit different display sizes and e-book reading applications, still using PDF. Only time will show if Adobe succeeds in transforming PDF into a dynamic, e-book-friendly format.

Publishers that rely exclusively on PDF reduce opportunities to take advantage of other e-book formats, sales channels and possible market shares. Other that PDF, most e-book formats use the Open E-Book (OEB) standard as a common file format in the production of e-books. Inaccurately, OEB is called by some as a subset of HTML adjusted for the rendering of e-books. OEB is actually a more elaborated format, following the rules of XML (extensible markup language) and XHTML (which is the XML version of HTML), where separate style sheets format e-books. XML is a language used for structuring of information and for transferring of data across different platforms. XML is a format publishers will eventually use a great deal, because it can be used for metadata, business transactions and DRM solutions as well as in e-book production.

In a period of transition most publishers will rely on some kind of conversion process. They will edit and produce their books more or less as they are used to, using word processing and desktop publishing tools. The desktop publishing application files will be converted into suitable XML or OEB documents and from these documents new e-books will be produced. Today this conversion is quite difficult and resource consuming, but some vendors are investing heavily in XML, hoping to make conversion as easy as pressing a button.

Most book publishers with intentions to exploit the digital marketplace will examine their backlists and decide on which books will need to be converted into a digital form. Many older, out-of-print books, over which publishers control the rights, are not digital; if they are in some digital form, the files may be in some long lost format or are incomplete or obsolete. A great deal of scanning and conversion may be required to get these books into circulation as e-books. In the course of this digital conversion publishers will probably select XML as the preferred format [46], reducing further opportunities for PDF to appear as the sole e-book format.

The most demanding process for publishers will be to change radically the whole production of books, making XML the preferred format. Unburdened by book publishing traditions, new e-publishing companies are automatically using XML [47]. In this new production line authors work in word processing applications using templates, enabling automatic conversion into XML and OEB, from which all kinds of books can be produced. From this XML starting point, content can be used in other digital environments, such as Web sites, e-learning courses, CD-ROMs or in online encyclopaedias. XML-based workflow is by far the most flexible way of producing book content.

Nevertheless, in this new workflow the tasks of authors and editors are very much the same as they were before - to produce high quality content. The main difference is that *all* content editing, including proofreading, has to be completed before styling in different formats begins. *If* last second changes are made, there have to be routines to make sure that these changes are also made in XML. This new way of production requires detailed planning, as some of the input has to be produced in several versions depending on the nature of the eventual output formats. On the other hand, when a carefully prepared production scheme is mapped out, the separation of content and formatting makes both multi-format productions and frequent updating easier. Authors and editors are essentially preparing one new XML-based version of a book that can be used to generate a nearly infinite variety of new editions in different formats.

Whether publishers choose a transitional or a radical adoption to production, books have to be finished and produced in their final formats. Today most publishers use external graphic arts, pre-press and printing companies to make up and produce physical printed books. This situation will probably continue as these companies often do a good job in preparing book content for further print-on-demand utilization. Conversion services as well will be outsourced;

a variety of conversion companies will offer publishers formatting services, creating books in different e-book formats. Other companies, specializing in digital text services, will offer formatting, along with DRM, Web site construction, maintenance, hosting and payment systems. Obviously, content or digital assets management will be rapidly growing businesses.

Strategically, publishers will have to consider whether or not they want to do preparation and formatting within the house and to what degree they want to outsource these and other functions related to e-books. Given the variety of business models, publishers will chose according to their size, abilities, industry relations and corporate position. Whatever choice, the book production process will forever be changed.

Book Production Structures

Even if the core activity of publishers and authors will be the same - to produce quality book content according to scientific and literary norms - publishers will face some challenges in changing the production process to fit the digital use of content. The challenges will be both cultural and social.

Books have for centuries been more or less synonymous with printed books. E-books and digital publishing challenges traditional concepts of books. The features of e-books allow new genres, quality norms, uses, and, as we have described, ways of producing books. Most authors, editors and publishers have little understanding of XML-based production processes and the potentially rich uses of digital content. They do not understand the language of the new actors invading the book industry.

However, some publishers are already changing their production process making it far more flexible in terms of multiuse of content. This change requires learning a new vocabulary and realities of XML-based production. It also means communicating with new actors, in addition to the familiar pre-press and printing companies. Whatever policies publishing companies choose regarding outsourcing, the company's authors, editors and graphic designers will have to relate to new display rendering technologies, with their special requirements on structuring and formatting of books. To be competitive in the world of digital books, a certain level of competence in these areas will therefore have to be developed within the organisation of publishers.

E-book technologies involve new ways of representing and distributing book content. For publishers this mean using the Internet as both sales and marketing channels. Publishers will need to have in place digital asset and rights nanagement systems and Web hosting facilities so they can interact with e-bookstores and other publishers online. Given the variety of business models and technological solutions, publishers will develop marketing and sales strategies to take advantage of many new possibilities.

This new diversity of distribution channels will in turn alter book production. Many new questions will have to be answered. Will new printings of traditional books be issued on demand, or printed in advance and warehoused? What updating routines will be required for new editions? Which e-book formats will be produced? Can the content of the book be use on CD-ROMs or in e-learning applications? Can parts of the content be used in online encyclopaedias? What parts of the book should be used as "teasers" online? What interactive features should be implemented? What marketing strategies should be developed? Should authors have independent Web sites?

In order to answer these questions, publishers will need to gather much experience about these new ways of collaboration. Exactly how publishers will develop their organisations in order to meet these new challenges is too early to predict. Some publishers will continue developing their multimedia departments, others will integrate ordinary print and digital

content productions. Most publishers will reorganise their marketing and sales departments. In all cases more teamwork and project-oriented workflow will likely have organisational consequences. It is also likely that different publishers will cooperate more extensively than they already do. Whatever solutions must come, what seems obvious is that new book content production processes and distribution and marketing channels will demand new ways of organisation.

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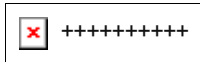
Will E-Books Change the World?

Book Industry Structures

The Internet, handheld computers, liquid crystal displays and enhanced font rendering are the technological basis for the development of e-books. E-books provide new ways of representing content as well as new ways of distributing and selling books. This new medium has created a new situation and shaken some elements of the publishing industry. New patterns of behaviour and new organisations have started to evolve in order to meet these challenges as publishers and authors, especially in U.S., have started to recognise the potentials of e-books in the network economy.

Depending on scale and pace, the diffusion of e-book technology will also affect the rest of the book industry. In a research study made for the Association of American Publishers, Andersen Consulting predicts e-book sales will represent 10 percent of the total book market in 2005 [48]. If this prediction partly comes true, no part of the book industry will be unaffected. Let me point out some of the probable effects.

As digital publishing spreads, the graphic industry that handles traditional books will see fewer books; traditional books will, in increasing numbers, be printed on demand. This will increase competition; parts of the printing industry have already started to reorganise in order to meet the change. Future skills, in design, typography and photography, will be directed towards digital publishing. The design of e-books will be, in the future, a new occupation. Parts of the traditional book production industry will probably become extinct in this process.

E-book sales and print on demand will leave book retailers with fewer printed books to sell; fierce competition will force some traditional (and probably independent) booksellers out of business. These changes will concentrate retailers into national and international book chains. Many consumers will see their local, independent bookshops vanish, but at the same time a world of books will become increasingly accessible through the Internet. Instructors and students will probably see less expensive and more up-to-date content. E-books, print-on-demand and the Web have given and will continue to give education new instruments to explore. Education and our concepts of reading and learning will certainly change. What will be the role of libraries? [49] In the digital future will libraries be able to collect and gather information and continue to provide it freely, as they do today?

This, and a lot of other questions, cannot be answered yet. But it is obvious that the diffusion of e-books will bring changes. In many countries there are fine-tuned balances between different parties of the book trade; even a moderate spread of e-books could therefore bring major changes in the structure of the book industry.

In this paper I have argued that in understanding these changes one should broaden the perspective and not focus just on e-book technology itself. One should rather look at e-book

technology as a vehicle bringing the book industry into the new network-based digital and global economy. A broader perspective will also help explain what has happened to the e-book industry itself during the last few years.

In 1999, the e-book industry was dominated by small U.S. start-ups like NuvoMedia (Rocket eBook) and SoftBook and many small, Web-based, often amateur-looking e-book retailers. Happy e-book enthusiasts discussing the future of reading dominated newsgroups and e-book mailing lists. In these same discussion groups there was a significant change in mood during the spring of 2000. Gemstar acquired NuvoMedia and SoftBook and with the launching of MS Reader it became clear that Microsoft had serious intentions about e-books. Many participants in newsgroups realised that the times for innovation by creative individuals had already past.

And indeed they had. Today great multinational companies like Gemstar, Microsoft and Adobe dominate the e-book industry. Gemstar has joined forces with and licensed production of e-book readers to the electronic giant Thompson Multimedia (under the RCA brand). Microsoft's reading technology is an integral piece of its move to be a player in every facet of the e-book market. Microsoft wants every reader on earth to use MS Reader software, operating on Windows; they want all publishers to use their e-book editing applications and all publishers and e-book retailers to use their content asset servers and digital rights management systems. The same ambitions apply to Adobe, ready to strengthen its along important position in the world's graphic and publishing industries. In the background, the telecommunication and mobile phone giant Nokia hopes to develop its wireless appliances into popular e-book reading devices, delivering wireless technology to handheld e-book readers around the world. Palm, Casio, Compaq and Hewlett Packard all reckon e-book reading software will add value and attract customers to their electronic devices.

All these companies are at the heart of the information economy. Many of these are world leaders; their strategic moves into the e-book business are part of larger plans to strengthen their dominant positions in the digital content delivery infrastructures of the world.

Nearly all of the major U.S. publishing companies have launched extensive e-book production schemes. McGraw-Hill, Random House, Simon & Schuster, Harper Collins and Time Warner all have extensive e-book plans. They have all signed agreements with Amazon and Barnes & Noble, the dominant e-book retailers. Since many of these publishers are integral components of multinational media conglomerates, such as AOL/Time Warner and Bertelsmann, their strategic moves into the e-book business are part of larger plans to strengthen these companies as dominant digital content deliverers around the world.

In less than two years a large part of the e-book industry has been brought into the global economy by some of the most powerful companies in the world. They trust e-book technologies and see the medium as a way to increase revenues and profits. The features of digital books make them ideal for distribution and sales globally and media conglomerates have the infrastructure and market positions to exploit these possibilities.

In the meantime independent publishers are a bit bewildered. Some have started small-scale production and sale of e-books, others are planning to do so while yet others are waiting for the right moment to make their move. Most publishers - in the U.S. at least - envision electronic publishing and e-books important to their future. Despite poor digital content sales and recent dot.com crises, U.S. publishers continue to convert their content into malleable digital formats like XML [50].

The structure of the traditional book industry has gone through a number changes recently, with the book trade becoming an integrated part of global communication industries [51]. This tendency will probably accelerate as digital books bring the publishing industry into middle of a network-based media economy.

Right now in the e-book business there are almost daily announcements of new ventures,

alliances and acquisitions [52]. As publishers move into e-books, they will face a variety of challenges in coping with new technologies, production processes and sales and marketing channels. For most publishers this will call for collaboration and strategic alliances. The publishing industry will not escape the logic of the network economy. In most countries we will see a concentration of the publishing business into a few dominating companies. In spite of language and political borders, the book industry will be global, like much of the rest of the economy, with many publishers being part of multinational media companies. Ultimately who will master the game on a global basis?

What About the World?

Computers and networks have changed society and our way of thinking and living [53]. During the last quarter of the last century a new information and network society evolved. The development of e-books is part of this history, in turn changing the whole book industry. In this paper I have tried to explain how the book industry, in part because of e-books, is becoming part of the network society.

E-book technology has a long way to go before it can equal the readability and richness of traditional books [54]. Nevertheless, e-books have characteristics that in some ways supersede those of traditional books, being more flexible and accessible than paper books will ever be. E-books are a new, self-contained medium that will have an enormous impact in time on society.

Examining e-books relative to communications technologies over the past several millenia [55], one could be tempted to make some major predictions for a bright future for e-books. In many societies, printed books have been associated with enlightenment, education, scientific and cultural development, the national state, democracy and capitalism [56]. Modern society is unthinkable without printed books. E-books, however, make society thinkable without printed books. But before I start speculate on the ways in which e-books could change the world, it might be a good idea to wait and see how - or rather if - the diffusion of e-books will happen. 🅵🅼

About the Author

Terje Hillesund is an Assistant Professor at Stavanger University Center where he leads a national research program on e-books and their impact on the Norwegian book industry.
Web: http://www1.his.no/ebok
E-mail: terje.hillesund@c2i.net

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Editorial history

Paper received 20 August 2001; accepted 14 September 2001.

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