

Newspapers: the Slow Walk to Multimedia

Alfonso H. Molina

IN THE LAST FEW YEARS there has been much hype about the development and impact of multimedia on a range of industries, including the publishing sector. Few studies, however, have looked closely at the developments involved in such a process. This article attempts to improve the situation by reviewing the specific case of the newspaper industry.

The newspaper industry is one of the main information processing and distribution sectors of the economy. It has used text, pictures and graphics for decades and is a natural candidate for multimedia. Indeed, ignoring multimedia is not an option since, in the long term, the economic cost of inaction could be massive. In 1991 an EC report put at £61.5 billion (75.5 BECU) the value of the entire European print publishing sector, and at £20.3 billion (25 BECU) the value of the newspapers sector alone.¹ The industry, however, has not been amongst the most dynamic sectors in recent times. Thus, in 1970, 75% of Americans read a daily newspaper. By the mid-1990s this figure had fallen to about 60% and has remained stagnant since then.² In Europe the strongest market for newspapers are Germany, UK and France, accounting for 60% of Western Europe's daily sales, 71% of its paid-for weeklies and 78% of its free newspapers.³ Here market saturation and long-term decline is also visible. In the UK, for instance, although the industry is still huge, employing almost 70,000 people and generating £3.5 billion annually, the "sector has undergone a decline recently; only 7% of Britons read a paper on the way to work and 30% fewer read newspapers than 30 years ago, although this is still higher than our European and American counterparts".⁴

A worrying tendency is the rising costs facing the industry. In the last few years the prices of pulp, paper and newsprint services have risen sharply, increasing cost pressures on publishers. Another worrying tendency is the relative decline in a critical source of

Recently there has been much hype about the development and impact of multimedia on a range of industries. Few studies, however, have examined the developments involved in such a process. This article aims to improve such a situation by reviewing the evolution of multimedia in the newspaper industry. It shows that the bulk of this industry is taking a gradual evolutionary approach to electronic news systems, with the Internet emerging as a favourite channel for experimentation. The challenge is the creation of the new world of technical, business and market practices which will realize the promise of multimedia. © 1997 Elsevier Science Ltd

revenues: advertising. Recent figures show that the newspapers' share of advertising revenues has declined from 27.1% in 1980 to 22.6% in 1994. In this year newspapers still generated the largest volume of advertising revenues of any media but their growth was the slowest.⁵ On the positive side, the regional and niche press appears to be quite healthy and profitable with, for instance, an increase reported in niche market periodicals in France.⁶ Indeed, even in Germany the 15 regional newspapers in the former GDR are reported to be still flourishing.³

This picture provides the context for the evolution of multimedia in the newspaper industry. The issue is not whether, but how, the industry is facing up to the challenge.

The Multimedia Evolution

The ultimate vision of multimedia in the newspaper industry is that of the "personalized multimedia



newspaper", i.e. a personalized, interactive electronic news system making fully-integrated use of text, audio, still-image, animation and video. This is yet far from reality but the first tentative steps are being taken.

It can be said that the first serious manifestations of electronic prototypes and services related to this visionary concept began to appear around the late 1970s and early 1980s. Examples are MIT's NewsPeek electronic newspaper, TEXTALK, the Swedish Talking Electronic Newspaper for the blind and Knight-Ridder's Viewtron, an electronic information service which came to an end in 1986 after losses of \$50 million. Over a decade later, a larger wave of electronic products and services is reaching the market, signalling the start of a widespread learning process in the direction of the "multimedia newspaper".

One of the driving forces is the perception of threats and opportunities. "This is new to us. We don't pretend to have all the answers, but it's important to get on the learning curve now. Newspapers without on-line services will be left behind."⁷

As a result, newspaper corporations and startup ventures are experimenting and beginning to launch services which show a variety of combinations of technology, distribution and delivery concepts, media mixes (i.e. text, image, audio, video etc.), and degrees of interactivity and personalization. Ultimately, behind each of these configurations there are emerging sociotechnical constituencies* beginning the long battle for survival, growth and shaping of the multimedia arena.

Technically, approaches to news distribution and delivery include CD-ROMs and on-line PCs, TVs and PDAs receiving broad- and narrow-casting through CATV, telephone network and wireless. In terms of media mixes, a distinction can be made of degrees of "multimedia-ness", i.e. from the digitalization of a single medium such as text-only to full multimedia integration of text, image, audio, video etc. Admittedly, in strict sense, use of a single medium such as text is not multimedia at all. Nevertheless, the distinction seems useful to generate an evolutionary picture embracing from simple to complex expressions of electronic news systems. Interactivity and personalization are less clearly defined concepts which may go from simple selectivity of news channels on TV, or keyword-based information search facilities, to a news system which allows complete customization to the interests and profile of individual users. To a large extent, the meanings of all these concepts are also the subject of evolution. They will

be defined and re-defined as the information industry advances along the learning process leading to the multimedia vision. In this process, the content of the vision itself will acquire tangible reality in years to come. It will be to a large extent a reflection of the effectiveness of the constituency-building processes now beginning to unfold. Figure 1 provides a useful way to illustrate some of the main developments currently taking place. The three-dimensional "evolutionary space" defined by the axes of multimedia-ness, personalization and interactivity enable these developments to be placed relative to each other, thus highlighting the main thrust of the present evolution.

Dominant Feature: Gradual Evolution from Core Competences

An immediately dominant feature is the largely incremental activities of established newspaper companies represented by the shaded area in the lower left-hand corner of Figure 1. Overwhelmingly, established companies are building on core strengths and gradually approaching the evolution into multimedia. A few seem to be taking some more daring experimental steps, but on the whole no attempt at a "great leap forward" onto the market has occurred at this stage.

In the gradual evolution, newspapers are generating electronic editions of their newspapers for transmission or delivery. Recent fax editions such as those of the *Financial Times*, *Los Angeles Times*, *The New York Times* and *The Globe and Mail* (Canada),⁹ are good examples of this.

A more advanced approach makes use of PCs and CD-ROMs. Here, newspapers are producing electronic editions of their huge databases of articles for distribution to PC users having access to CD-ROMs and/or data networks such as Internet. Articles from many newspapers around the world can now be "read" on CD-ROM and also on-line. In Europe and the USA, this includes national dailies such as *The Guardian*, *The Financial Times*, *Le Monde*, *The New York Times*, *The Washington Post* and *The Chicago Tribune*.¹⁰ Knight-Ridder is also present with its regional on-line services which cater to local audiences. The first such service began in April 1994 with the launch of the Mercury Center.¹¹

Among on-line services, the Internet has emerged as a clear favourite for newspapers (and other organizations) engaging in multimedia news editions. There are also newspapers in on-line services such as Prodigy, CompuServe and American Online, but they amounted to less than 50 in 1995. By contrast, the growth of newspapers on the World Wide Web (WWW) has been nothing short of amazing in the last 2 years. A count done by the Initiative for Newspaper Electronic Supplements (INES) founded by IFRA, the European Institute for Newspaper Technology Research, identified 386 newspapers scattered all

*Sociotechnical constituencies are defined as dynamic ensembles of technical constituents (e.g. machines, instruments) and social constituents (e.g. institutions, interest groups) which interact and shape each other in the course of the creation, production and diffusion of specific technologies.⁸

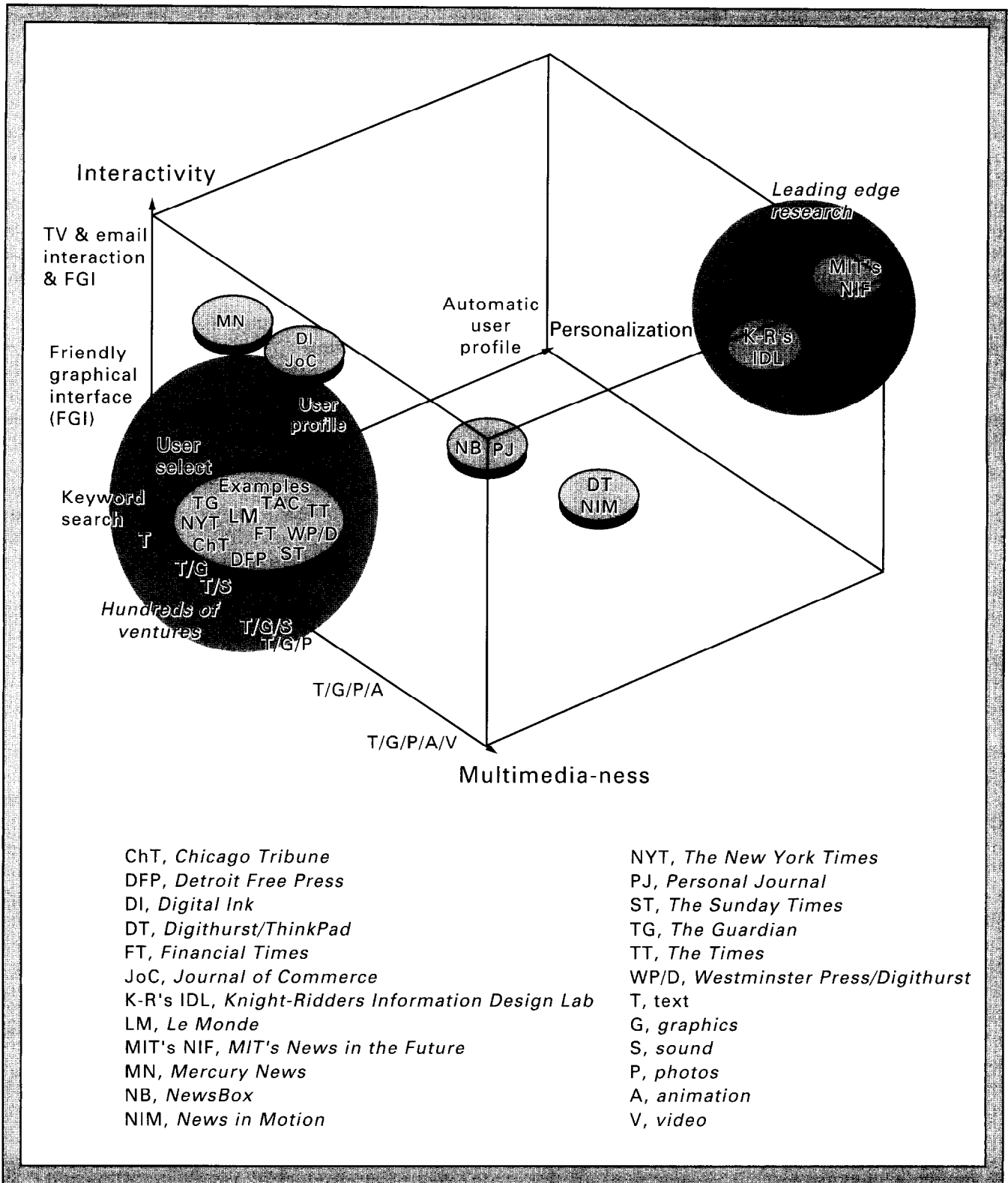


FIGURE 1. Approximate evolution of multimedia in the newspaper industry.

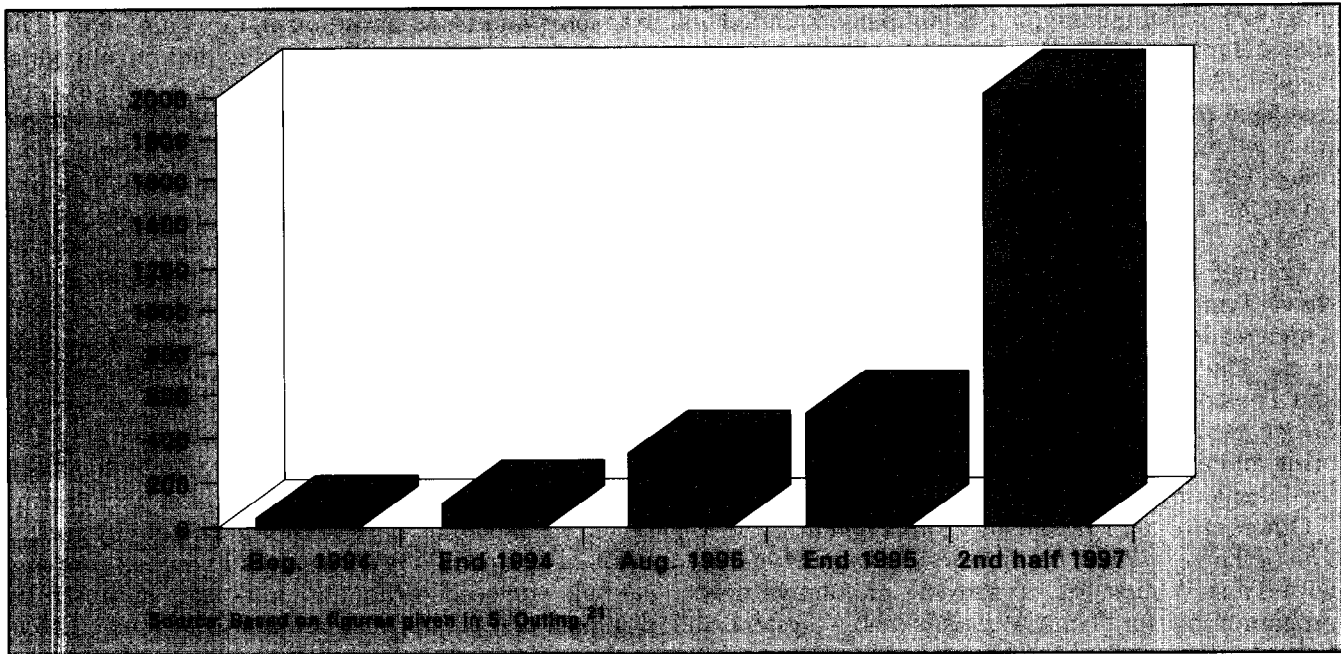


Figure 2. Growth of newspapers on the Internet.

over the world. The largest concentration was in the USA, with 171 on-line newspapers.* Similar figures come from Steve Outing's analytical monitoring of on-line newspaper development. Figure 2 gives an idea of Outing's estimated growth in the number of newspapers on the Internet; from a low of 20 newspaper in early 1994, he expects to see a high number of maybe 2000 worldwide on-line newspapers by the second half of 1997.¹²

Profits are some way off, however, for the commercial demand for on-line news services is incipient and the industry is yet to work out the most effective ways to become commercially viable. Nevertheless, a major factor facilitating the rapid growth is the relatively low cost of starting an Internet site, compared with the massive investment to start a printed version of a newspaper. For instance, a report finds that one of the largest investments made for the UK's *Electronic Telegraph* was its £30,000 SUN computer server.¹³

Along with the mass migration towards the Internet, there are also some more specialized ventures. An interesting approach was reported in an experimental news service announced in the UK, in early 1994, by the multimedia company Digithurst and the regional newspaper company Westminster Press. This service would target teleworkers and combine broadcasting and CD-ROMs to deliver text and graphics on a monthly/daily basis.¹⁴ An interesting feature of the monthly CD-ROM is that it enables the publisher to

charge the reader for the service. The reason is the broadcast news can be encrypted and the monthly CD-ROM is necessary to decode them and make them accessible to the reader.

Thus far, CD-ROM and PC on-line newspapers have been low in "multimedia-ness", with text and some limited graphics (e.g. maps) as the predominant media. Interactivity and personalization have also been rudimentary with capabilities mostly confined to article selectivity and keyword search facilities. CD-ROMs and on-line services, however, have offered newspapers a relatively low-cost entry into the multimedia learning process. In the near future, the movement towards the Internet is set to continue and, with further technical advances and experience, one would expect "multimedia-ness", personalization and interactivity (see Figure 1) to increase in richness and sophistication over the medium- and long-term future.

Interactivity, Personalization, User-interface and Variety of Services

Indeed, more advanced forms of selectivity, personalization and interactivity are already being implemented by a number of newspapers. For instance, subscribers of San Jose Mercury News' Newshound use strings of words to narrow down the selection and increase the relevance of the stories.¹⁵ In turn, Dow Jones has launched its Personal Journal with the slogan "the first newspaper published for a circulation of one".† One organization which has gone down the path of personalization further than

*See Internet address <http://www.gt.kth.se/ines/newsstand.c>

†See Internet address <http://bis.dowjones.com/pj.html>

most is Individual Inc., a US company founded in 1989.* Individual's on-line service is called News-Page. Its AI-based technology filters 15,000 news stories from over 400 sources (newspapers, magazines, trade weeklies etc.), matching each incoming story to one of 850 relevant topic areas.

On the side of interactivity, the Knight-Ridder's Mercury Center was one of the first to allow readers to contact editors through e-mail.¹⁶ *The Times* from News International offers an electronic forum in which readers can debate certain sections via e-mail,¹⁷ as do *The New York Times*, *The Chicago Tribune* and *The Los Angeles Times*. More recently, *The Wall Street Journal Interactive Edition* claimed it would bring an entirely new and comprehensive edition of the Journal to the WWW.¹⁰

Others are exploring the interactive potential of TV. *The Chicago Tribune*, for instance, has a joint venture with Time Warner Inc. to provide interactive news programming for Time Warner's cable system in Orlando.¹⁰ As part of the experiment, a camera has been installed in the newspaper's editorial room so that journalists are able to offer interviews direct on TV.¹⁶ Expectedly, TV organizations such as NBC, CNN and CBS are not standing idle in the face of this newspaper activity. Indeed, they are also opening sites in the WWW and bringing to bear their long-standing experience on visual presentation to the competitive fray. Referring to CNN Interactive, Outing sees, "a serious competitive threat to what many newspapers are trying to accomplish on-line".¹⁸ The fact is that multimedia news services on-line simply erase conventional industrial boundaries. It opens a new arena in which the newspaper or TV-service origin of news is irrelevant.

A critical element in the competitive challenge is the user-friendly on-screen navigation and display of information (i.e. the look and feel facing the user as s/he interacts with the service). Here, newspapers are also making progress with, for instance, *The Washington Post* launching Digital Ink Co., "an electronic version of its paper that mimics the Post's editorial design—from headline and body type to photos".¹⁹ Digital Ink went on-line in July 1995 through AT&T's Interchange network but Internet connectivity was expected to follow suit soon after. The initial judgement was that Interchange helps the Post to fulfill their promise by providing "a more flexible, seamless environment . . . Subscribers to Digital Ink arrive at the *Post's* content as soon as they log on. And it looks good, with thumbnail photos, section heads and a sidebar list of hyperlinks".²⁰

Another organization treading similar steps is Knight-Ridder. The company was expected to launch an experimental PC, *newspaper-format*, version of its

transport and trade daily *Journal of Commerce*. The rationale, according to Ridder, is "that on-line databases are fine, but that people like headlines, and prefer journalists to make judgements on the relative importance of stories, rather than simply offering relatively undifferentiated lists of information".² In this vision, the "new electronic newspaper should resemble an old-fashioned newspaper as much as possible".²¹ As such, not only is the presence of a human editor essential, but the strategic emphasis should be on the incorporation of new technology into today's newspaper format rather than the reverse. An important lesson which is beginning to emerge, however, is that the on-line newspaper should not be a mere copy of the printed version. As it has been argued, on-line "is a different medium, and on-line services need to be designed to fit the environment. Print design on a WWW site doesn't make sense and seldom succeeds—though you can successfully design WWW pages that maintain some look and feel of the print product, as evidenced by the Wall Street Journal's Web".²²

Finally, behind the user interface is the key factor of quantity, quality and appeal of the battery of services offered by newspapers or, indeed, any other organization converging onto the emerging arena of multimedia information services. News are likely to be only part of the battery of options organizations will be offering. For instance, "the Post on-line service will go beyond the traditional print newspaper, providing additional news and information—in areas such as business, sports, education and entertainment—calendars, games, contests, conversation groups and other interactive activities. It will be a one-stop venue for Washington-area residents to turn for on-line news and information".²³

Venturing Further into Multimedia and the Portable Electronic Newspaper

Moving outwards along the axes in Figure 1, it is possible to see a number of organizations experimenting with more advanced forms of interactive, personalized multimedia. Initially, news services with greater multimedia-ness are being pioneered mainly by multimedia companies who have been venturing into the market or begun joint developments with newspapers for products with a potential market. One of the best publicized operational ventures is News In Motion, a weekly news service from US start-up WalkSoft, NY, which includes colour pictures and animations.²⁴ The reader can download News In Motion to a PC by dialling a toll-free 0800 number. The newspaper is also available on diskette. The eventual goal of WalkSoft is to produce a 1-dollar daily issue.

Advancing towards portable delivery platforms.
A more advanced multimedia news system which

*See Internet address <http://www.newspage.com/NEWSPAGE/nptb-individual.html>

reached the headlines in 1993 attempted to combine full-multimedia content with portable delivery platforms. The multimedia company Digithurst offered it to newspapers who may have wanted to target the corporate users market. The concept combined Tele-text data, digital video and sound, electronic photographs and graphics and it was delivered through a portable PC.⁴ In late 1993, the system made use of a £3000 IBM Thinkpad as the portable delivery platform. The total cost was around £10,000 which put it squarely beyond the reach of the consumer market. It has not been back on the news.

Portability and interactivity was also the theme of Dow Jones' Personal Journal, which was expected to download the electronic equivalent of a daily newspaper to portable, hand-held or desktop PCs.²⁵ Personal Journal would be accessible through a toll-free number and users will specify a profile of topics to be included in the daily download. A feature with potentially interesting commercial consequences was the intended inclusion of Personal Journal as an application in Microsoft's WinPad operating system for PDAs such as the Compaq Companion. However, there have been no indications of the portable application becoming operational and the Microsoft-Compaq connection may have fallen prey to the souring of relations between these two companies.²⁶

These difficulties made all the more intriguing an announcement made in early 1994 by Associated Newspaper Ltd (*Daily Mail, Mail on Sunday, Evening Standard*) of a service claiming a "leap forward" into the cheap-PDA-based, multimedia newspaper with some degree of interactivity and personalization. Named NewsBox, the system did not seem to offer full-multimedia, but it claimed at least two areas of important innovations, namely, the delivery platform and the production/transmission system.

The delivery platform was described as a 4-lb portable device about the size of a large paperback, with a large LCD screen on the left and controls on the right when it opens up. The device would have a radio antenna on the "book's spine" and a 90-Mbyte drive for storage. It was expected to sell for \$500 primarily to the commuter market. Each night, the NewsBox would be plugged into a docking station recharging its batteries and receiving the morning news via radio (through special radio/TV broadcast) or through a dedicated telephone connection.²⁷ NewsBox's market debut was initially announced for December 1994. It did not happen and, as an article suggested, "Newsbox may never make it beyond the laboratory".¹⁷

Research (experimental) Ventures: Building the Future

In a Commencement Address delivered at the School of Journalism, Colorado University in 1994, Roger Fidler, at the time Head of Knight-Ridder Information

Design Laboratory (IDL) in Boulder, depicted the following vision:

"I have no doubt that before the end of this decade the digital revolution will launch an all-out assault on the last bastions of the Industrial Age publishing printing presses and delivery trucks. I am also convinced that sometime within the first decade or two of the new millennium, pigmented ink and pulp paper will finally begin to give way to digital ink and silicon paper in the form of portable information appliances. . . . Within the next two decades we will no longer make distinctions between print and broadcast journalism."²⁸

Fidler encapsulates his vision with the term "Mediamorphosis". This is defined as "the evolutionary transformation of print media from ink-on-paper to digital displays, and the technological merging of media that will occur within the next two or three decades".²⁹ Critical to this future will be the availability of affordable, portable, flat panels capable of delivering full multimedia content. In Ridder's view this consumer device was still probably 5 years away as a commercial product. But, by the year 2005, according to Fidler, in the USA such devices could overtake PCs as a method for obtaining information.² In this Mediamorphosis vision, consumers will be able to subscribe to the newspaper and receive it electronically over the wire at night; or simply get it in the morning at a newsstand by purchasing a memory card which could be inserted into the portable device. The advancement of this vision was the business of Knight-Ridder's Information Design Laboratory established in 1992.

Information design laboratory (IDL). Knight-Ridder's literature described IDL as an applied research group that investigates, evaluates and prototypes evolving newspaper products. Its declared mission was to explore new media technologies, to seek out new ventures and new alliances, and to boldly go where no-one has gone before.³⁰

The prototype newspaper being developed by IDL for these services sought to combine the look and feel of today's printed newspaper with the power of a computer. IDL's flag-ship project was The Tablet, a portable, handheld, interactive flat-screen which would receive the full content of newspapers electronically. This project was the most closely identified with Fidler's Mediamorphosis vision and the Lab itself.³¹

At its peak, IDL's staff amounted to nine people. In July 1995, however, The Tablet came to an abrupt halt as Knight-Ridder took the decision to close down the Lab and replace it by a New Media Center in San Jose. Behind the decision to close down IDL, there was a fundamental change in Knight-Ridder's appreciation of the pace of technological developments and commercial opportunities for the multimedia newspaper. Basically, the company perceives potential shorter-term commercial opportunities in the WWW and has

revised the time-scale for the commercial viability of the portable tablet. Knight-Ridder is now aiming to put all its 27 papers in the WWW during the coming year, with the support of the San Jose New Media Center.

For Fiddler, the vision of the flat-panel newspaper concept is not going to die with the closing of IDL* and, indeed, Knight-Ridder will "remain open to flat-panel publishing opportunities in the future... [the problem is that... the revenue opportunities were still further out than we hoped they might be at this time]".³² Ultimately, in the learning process advances will come from diverse directions. One example is the European NewsPAD project mentioned in the Acknowledgement which has now reached the point where a prototype portable platform is expected to be piloted in Barcelona in the near future. The message is clear: at this early stage the field is wide open for ingenuity and trial and error.

The MIT media laboratory. No place is doing more to build the "personalized" multimedia news system of the future than the MIT Media Lab with its large number of inventors and sponsors, including Knight-Ridder, Reuters, Apple, IBM, BT and Deutsche Bundespost.

The Media Lab's 5-year programme "News in the Future" was launched in July 1993 with the challenge to "develop a) *computer understanding of news content*, and, b) *computer understanding of a specific person's needs and interests*. The two join together into a *personalized multimedia news system*".[†] The goals include "enhancing the efficiency of production, the timeliness of delivery, the convenience of presentation, and the relevance of editorial and advertising content to the consumer".[‡] This comprehensive research programme has seen over 40 individual projects initiated over the past 2 years. The 5-year programme has now entered its last phase. Fulfilment of its ambitious goals would make deep inroads into the vision of the personalized multimedia newspaper. In the process, the very meaning of "personalization" will be shaped. Indeed, according to W. Bender, leading researcher in the Media Lab's Electronic Publishing Group, "the word 'newsworthy' will be redefined according to the area the reader lives in, and his or her background and interests... The user may eventually be given the option to edit what is seen on the screen or printed out".⁴ Of course, this is the vision, and it will take a good while before it happens for all of us. In the meantime, progress is being made with a product

named "Fishwrap"—after the journalist's motto: "Yesterday's news wraps today's fish". It is a prototype electronic newspaper developed at MIT, and it attempts to balance an individual's desire for specialization with a need to participate, and know about, the world at large.³³ From Fishwrap to the mass market, the resolution of technical problems is only part of the picture.

Concluding Remarks

The main message to come from this review of multimedia development in the newspaper industry is that the transformation of the newspaper industry is not likely to happen in a hurry. At the same time, the long learning process towards multimedia has started, and it looks like being irreversible. In the process, as happens with all emerging technologies, some players will be more daring than others, with the established organizations likely to be the most conservative. This is indeed corroborated by the review which has shown that the bulk of the newspaper industry is taking a gradual evolutionary approach to electronic news systems. Most newspapers are at the low-end of the learning process, primarily experimenting with on-line and CD-ROM versions of their papers. There is, however, a rapid increase in the number of newspapers now establishing a presence on the Internet, making the WWW the prime arena for multimedia developments in the near and medium-term future.

On the other hand, the more innovative and riskier steps almost invariably involve multimedia companies venturing solutions which tend to push the technological frontier. Here the picture is rather diffuse but the number of leading-edge technical ventures continue to be small, with some of the high-profile experiences falling by the side. In particular, progress towards the vision of the portable flat panel shows contradictory signs with leading players such as the IDL's Tablet fading and others emerging in the midst of a gradual market advance by portable handheld devices.

In the longrun, few industry observers would doubt that newspapers will become suppliers of multimedia news and information which will be more customized to the preferences of different regional markets and even individuals. The big challenge is how to make an effective transition from current technical and business practices and markets to the new ways which will profitably exploit the opportunities opening up with multimedia. Here, uncertainty is the name of the game at this stage. There is uncertainty about profitability from multimedia ventures, about what will happen to revenues from the print product; for instance, will the printed product be "cannibalized" by the new emerging services or could they support each other? There is also uncertainty about charging

*Personal communication with R. Fidler.

†N. Negroponte, personal communication with A. Torres (ICT, NewsPad), 1 July 1993.

‡See Internet address <http://nif.www.media.mit.edu/>

and payment methods, copyrights and the most effective ways of organizing relations between the new services and the present newsroom. These and undoubtedly other issues will continue to be for many a year part of the learning process towards the ultimate multimedia future. Most organizations are left with little option but to launch themselves into a discovery and learning process in which there are no simple recipes. Different products and markets will require different responses and, ultimately, these

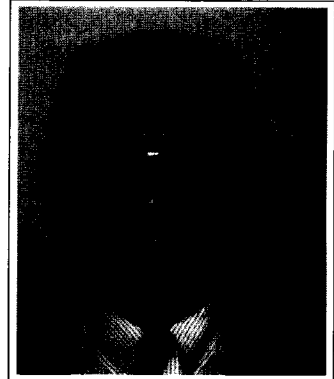
responses will be the result of research, experience and innovativeness.

This paper was written as part of the work of ESPRIT Project OMI-NewsPad. This project is part of the Open Microprocessor Systems Initiative (OMI) and aims to develop a portable delivery platform for a multimedia news service. Partners in the project are Acorn Computers (UK), El Periódico de Catalunya (Spain), Institut Català de Tecnologia (ICT) (Spain), Archimedes (Greece), CARAT (France) and the Technology Management and Policy Programme (Tech-MaPP) of The University of Edinburgh (UK). I am grateful to my colleagues in the project for valuable and fruitful interaction.

References

1. *Main Events and Developments on the Electronic Information Services Market. Annual Report 1992*, IMPACT, C.E.C./DGXIII, Brussels (1992).
2. Any which way you want to read it, *Financial Times*, 30 May, 9 (1994).
3. P. Simpson (ed.), *European Newspaper Industry*, PIRA International, London (1994), <http://mediator.pira.co.uk/NewspapIndPira/index.html>.
4. Digital dailies, *Personal Computer World*, September, 390-394 (1993).
5. S. Outing, Report from San Diego: don't do it alone, *Editor and Publisher Web Edition*, 4 October (1995).
6. Press feels the pressure, *Financial Times*, 13 January, 16 (1995).
7. A fever caused by fear, *Financial Times*, 29 August, 12 (1994).
8. A. Molina, Transputers and transputer-based parallel computers: sociotechnical constituencies and the build-up of British-European capabilities in information technologies, *Research Policy* 19, 309-333 (1990).
9. Faxing daily papers around the world, *Financial Times*, 23 May, 15 (1994).
10. Not just ink-stained wretches, *Business Week*, 28 March, 55-56 (1994).
11. Knight-Ridder: once burned, and the memory lingers, *Business Week*, 11 April, 34-35 (1994).
12. S. Outing, Join the party! 300-plus newspapers are online, *Editor and Publisher Web Edition*, 21 August (1995).
13. D. Cracknell, *News in the World Wide Web*, Warwick University (1995). Electronic version found at <http://www.warwick.ac.uk/guest/cracknel/index.html>.
14. Electronic paper aims to reach teleworkers, *Computing*, 3 February, 30 (1994).
15. Enter the bespoke newspaper, *Financial Times*, 13 March, 13 (1995).
16. Mañana, periódicos electrónicos, *El País*, 20 Octubre, 1 (1993).
17. Three wise men, *Scotland on Sunday*, 18 December, 1 (1994).
18. S. Outing, CNN's web service should make online newspaper editors very nervous, *Editor and Publisher Web Edition*, 31 August (1995).
19. S. Stefanac, Interactive advertising, *New Media*, April, 34-52 (1994).
20. W. Webb, Washington Post debuts Digital Ink, *Editor and Publisher Web Edition*, 29 July (1995).
21. New tools, old style newspaper, *Financial Times*, 10 March, 18 (1994).
22. S. Outing, Newspaper "look" doesn't work online, *Editor and Publisher Web Edition*, 29 September (1995).
23. Newspaper services in interchange, *Editor and Publisher and Planetary News*, <http://www.mediainfo.com/edpub/e-papers.interchange.html>.
24. Electronic newspaper offer color pictures, *Byte*, September, 40 (1993).
25. Dow Jones to beam the news to PDAs, *Windows Magazine*, January (1994).
26. Newton bounces back, *The Sunday Times*, 15 October, 12 (1995).
27. Mail PDA set to revolutionise the way newspapers are read, *PC Magazine*, February, 27 (1994).
28. R. Fidler, *Commencement Address*, School of Journalism, Colorado University, CO, 13 May (1994).

29. R. Fidler, *Mediamorphosis: the Coming Transformation of Newspapers*, IDL, Boulder, CO (1993).
30. Knight-Ridder Inc., *Information Design Laboratory Overview*, Knight-Ridder Inc., Boulder, CO.
31. Ridder moves back the future, *Financial Times*, 7 August, 10 (1995).
32. W. Webb, Flat panel newspaper falls flat, *Editor and Publisher Web Edition*, 12 August (1995).
33. W. Bender, Read all about it in the Daily You, *Communicating Business*, Forward Publishing, London (1994/95). Electronic version found at <http://nif.www.media.mit.edu>.



Alfonso H. Molina is Founder Director of the Technology Management and Policy Programme (TechMaPP) at the University of Edinburgh, UK.

stresses that the skills base can be reinforced through continuous application. Brand, image, goodwill are also sources of diversification.

The exploitation of core outputs is a way to leverage a firm's competencies as companies realize a range of new products through the use of their core products/processes/services. However, a deeper understanding of how diversification relates to the use of change of a firm's organizational routines is also needed. When Canon entered the US market for personal copiers it exploited existing technological resources but changed the organizational routines.

A matrix can be built using two dimensions—the use of existing resources and the use of existing organizational routines. Firms can diversify into new activities in which they replicate existing organizational routines but which need new complementing resources. Or in resource-based diversification, they can deploy existing resources and develop new organizational routines. Entering new businesses can require firms to innovate both their resources and organizational routines or they can replicate both. The pathways can be identified. By using such a matrix, the process of diversification can be conceptualized and interpreted while at the same time providing a management tool. The framework proposed may be used for an initial analysis of the decisions related to diversification or it can allow a retrospective analysis aimed at understanding the reasons for success or failure of diversification. A further use is the indication it gives of what corrective actions should be taken in the future in changes in resources and organizational routines.

Newspapers: the Slow Walk to Multimedia

Alfonso H. Molina

The ultimate vision of multimedia in the newspaper industry is that of the 'personalized multimedia newspaper'. The first manifestations were in the early 1980s. Today the foundations of a widespread learning process in the direction of the 'multimedia newspaper' have been laid. One of the driving forces is the perception of threats and opportunities.

Newspaper corporations are experimenting with services which have a range of combinations of technology, distribution and delivery concepts, media mixes and degrees of interactivity and personalisation. The three-dimensional 'evolutionary space' defined by the axes of multimediality, personalization and interactivity highlight the main thrust. A dominant feature is the largely incremental activities of established newspaper companies. Electronic editions of newspapers are being generated for transmission or delivery. Use is made of PCs and CD-ROMs. Among on-line services, the Internet has emerged as a clear favourite for newspapers engaged in multimedia news editions. Profits are not yet being made as the industry has yet to determine the most effective ways to become commercially viable. There are also some more specialized ventures, such as that targeting teleworkers and combining broadcasting and CD-ROMs to deliver text and graphics on a monthly/daily basis.

The movement to Internet will continue and 'multimediality', personalization and interactivity should increase in sophistication in the medium and long term. More advanced forms of selecting, personalization and interactivity are being implemented by some newspapers. The Knight-Ridder's Mercury Center was one of the first to allow readers to contact editors through e-mail. Others are exploiting the interactive potential of TV. A critical element in the competitive challenge is the user-friendly, on-screen navigation and display of information. Knight-Ridder has been experimenting with a PC newspaper format version of its transport and trade daily *'Journal of Commerce'*. Behind the user interface are, of course, the key factor of quantity, quality and appeal. News is likely to be only part of the range of choices offered.

Some organizations are experimenting with more advanced forms such as 'News in Motion' which includes colour pictures and animations and is available on diskette. Portability and interactivity have been the theme of Dow Jones' Personal Journal. Associated Newspaper Ltd's 'newsbox' claims two areas of innovation—the delivery platform and the product/transmission system. Knight Ridder's Information Design Laboratory (IDL), foresaw a time when no distinctions would be made between print and broadcast journalism. But IDL has been closed—the field remains open for trial and error. The main message is that, despite the developments, the transformation of the newspaper industry is not likely to happen in a hurry. Most newspapers are at the low-end of the learning process, experimenting with on-line and CD-ROM versions. The more innovative steps are taken by multimedia companies trying solutions pushing out the frontiers of technology. Most organizations will have little option but to learn; different products and markets will require different solutions and these will be the result of research, experience and innovativeness.

page 227

Strategy Japanese Style: Mobilizing the Manufacturing Workforce

M. Hossein Safizadeh

The absence of strategically relevant issues in strategic management is not limited to one area. An information-based planning approach for making strategy formulation an integrated, company-wide activity is suggested based on manufacturing requirements planning (MRP) and manufacturing resource planning (MRPII) which is broadened to become long-term through strategic resource planning (SRP).

Strategic management does need to cover manufacturing issues because environmental changes affect the manufacturing unit directly. Interfunctional strategic communications need to be improved and simulation analysis can be useful in answering 'what if' questions. In short, the traditional view of strategic management needs to be revised. Strategic management requires a complete understanding of the capabilities and limitations of all functions by everyone in the planning process. The responsibility for designing a strategic-based decision support system is that of the management information system (MIS). Provided that MIS works effectively, the strengths and weaknesses of all functions would receive due consideration in formulating the business strategy.

Two information systems concepts credited for bringing harmony between the activities of manufacturing and the other functions are materials requirement planning and MRPII. MRPII should be a company-wide information system which allows the business to work with the same numbers and assumptions. Supplementing MRPII data with computer integrated manufacturing (CIM) which includes CAD/CAM and CAE make the database more comprehensive. SRP takes the integration of functional activities one step beyond MRPII to include strategy for strategic business units. SRP needs a database to organize and distribute strategic data and to keep track of functional strategies. To do this, input from internal analysis, external analysis and MRPII is needed. Under SRP internal and external developments are communicated to relevant managers as they occur. The responsibility for evaluating strategic inputs rests with top management. After the business strategy has been formulated, it together with its concomitant functional strategies should be communicated back to the functions. The nature, scope and time horizon for strategic issues do vary across different functional areas but data processing advances and SRP can help. SRP improves the planning process by receiving and disseminating functional strategies throughout the organization. When successfully implemented SRP has the potential to solve many problems.