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ISSUES AND CHALLENGES IN THE EVOLUTION OF MULTIMEDIA

The case of the newspaper

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This article examines the key issues facing the emergence of multimedia in the newspaper industry. It looks at the underpinning forces coming from both the newspaper industry and the relentless advance in information and communication technologies. The fast growth in the number of newspapers in the Internet is then examined and the major business issues and dilemmas are discussed in detail. The rise of a variety of alliances bears witness to the need to collaborate to reduce the uncertainty of the multimedia newspaper (ad-)ventures.

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In a Commencement Address delivered at the School of Journalism, Colorado University, in 1994, Roger Fidler, at the time Head of the now defunct Knight-Ridder's Information Design Laboratory (IDL) in Boulder, depicted his *mediamorphosis* 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.¹

In Fidler's view, affordable portable flat panels capable of delivering full multimedia content could, by the year 2005, overtake PCs as a method for obtaining information in the US². By this time, he reckoned

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he will be able to plug it into a hotel telephone socket overnight and take delivery of the full electronic text of his daily reading—the *Miami Herald*, the *New York Times*, and the *Wall Street Journal*. Customers will be able to click on an electronic pen and pull up a story they are interested in. They will be able to display this at whatever size they want, and if they are interested in a soccer game they will be able to click on a sports picture and get a two-minute video of highlights.³

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 (IDL) established in 1992. In July 1995, however, IDL closed down its operation bringing to a sudden halt work on its flagship project: the portable, interactive flat panel known as *The Tablet*. Admittedly, the reason may have had a great deal to do with Knight-Ridder's difficult financial situation⁴. Behind the decision, however, there was also a fundamental change in Knight-Ridder's appreciation of the pace of technological developments and commercial opportunities for the multimedia newspaper. Basically, the company no longer perceived the portable-tablet electronic newspaper as a viable commercial (ad-)venture for the near future.

This essay is about the nature of this (ad-)venture. It first identifies some of the key developments underpinning the present drive towards the multimedia newspaper. Then, it examines the major business issues and dilemmas facing the current emergence and eventual take off of the multimedia newspaper. In so doing, the paper does not seek to distinguish in detail the different degrees of 'multimediatization' or original editorial found in the content of the many emerging electronic newspapers. We shall see however that most of these newspapers are in the early stages of a learning process either transferring the paper version content to the screen and/or adapting it for the screen; a smaller number are mixing some paper based editorial with editorial original to produce the electronic version.

Underpinning forces

The first serious manifestations of electronic 'newspaper' prototypes and services began to appear around the late seventies and early eighties. It was during this time that the concept of a personalised, interactive news system making fully integrated use of text, audio, still image, animation and video began to take shape. In the late 1970s, for instance, MIT started work on electronic publishing and subsequently the Media Laboratory was founded in the early 1980s,⁵ building primarily on the work of the Architecture Machine Group, headed by Nicola Negroponte since 1968. The Media Lab's work on the electronic newspaper concentrated on NewsPeek,

a selective home-publishable semiautomatic electronic newspaper that knows the reader, made of material drawn daily from Dow Jones News Retrieval Nexis, XPress, and wire services, along with television news.⁶

Almost a decade and a half later, a wave of electronic products and services is beginning to sweep the newspaper arena. In fact, most of the major developments have occurred in the last two to three years, as a rapidly increasing number of newspapers seem persuaded that this time they must enter the learning process or risk losing out on the future electronic multimedia newspaper. In addition, this perception seems to fit well

the long-term evolution of both the industry and information and communications technologies (ICTs).

Newspaper industry

The newspaper industry is in need of reinvigoration. In 1991, an EC report put at £61.5bn (75.5 BECU) the value of the entire European print publishing sector, and at £20.3bn (25 BECU) the value of the newspapers sector alone⁷. The industry, however, has shown serious signs of lack of growth and dynamism in recent times. Thus, in 1970, 75% of Americans read a daily newspaper. By the mid 1980s this figure had fallen to about 60% and has remained stagnant since then⁸. In Europe, the strongest markets 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 newspapers⁹. 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 £3.5bn 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.¹⁰

In France, the situation is no better for national dailies. Their readership has dropped to 2.5 million today from 6 million just after the Second World War¹¹. In Germany, rising cover prices associated with the reunification has led to the closure of three of the five ex-GDR papers¹².

A worrying tendency has been 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. For the European Newspaper Publishers' Association, these increasing costs will flatten newspapers' revenues, maybe even amounting to the collapse of titles already hit by the recession¹³. The year 1996, however, brought some relief to newspaper publishers as the cost of newsprint fell from a high of US\$750 per metric ton to under US\$500 per ton. But the good fortune is not expected to last for long and industry executives believe that the business environment for newspapers remains volatile¹⁴. Another worrying tendency has been the relative decline in a critical source of revenues—advertising. Figures from US consultants, The Kelsey Group, showed that the newspapers' share of advertising revenues had declined from 27.1% in 1980 to 22.6% in 1994¹⁵. In this year, newspapers still generated the largest volume of advertising revenues of any media but their growth was the slowest. This relative decline has tended to accompany decline in circulation, however, there are also indications that people are increasingly selecting more targeted media to place advertisements¹⁶. On a positive side, and maybe associated with the latter point, some of the regional and niche press appears to be quite healthy and profitable with, for instance, an increase reported in niche market periodicals in France¹⁷. Indeed, even in Germany the 15 regional newspapers in the former GDR are reported to be still flourishing¹⁸.

Information and communications technologies

Undepinning the present drive towards multimedia is the progress in information and communications technologies. Among the most conspicuous advances are the relentless

decline in microprocessor and personal computing price/performance, accompanied by constant advances in software which are enabling much greater user-friendly access to computing power. At the same time, wireless communications are fast expanding while other telecommunications advances are creating the necessary bandwidth (the superhighways) for the transmission of integrated digital audio, visual and data information. Digital compression technology now allows large amounts of information to be transmitted over telephone wires; and high capacity fibre optic can handle 100 times the amount of information as the old-fashioned coaxial telephone lines.¹⁹

Industrially, a key manifestation of this process is the convergence of previously separate areas of industrial activity. The limits are blurring among a range of activities, including telephony, broadcasting, wireless communications, cable television, personal computing, consumer electronics and, critically for newspapers, publishing. Perhaps the most striking manifestation of these developments is the rapid growth being experienced by CD-ROM technology and the Internet²⁰. With the Internet, nobody knows for sure the number of users, but figures range from 25 to 40 million²¹. The critical point, however, is its rapid growth with some estimates suggesting 10% a month, or, a rate of one new user every two seconds²². Other striking Internet statistics show that from its origins in the early seventies the number of computers connected to the Internet (ie hosts) has grown from 4 in 1970 to 4 million in 1995, with growth increasing dramatically in the last five years (see *Figure 1*)²³.

Advances on the CD-ROM market are also impressive although not quite striking as developments in the Internet. Thus, in 1994, close to 92 million CD-ROMs were sold for a population of CD-ROM drives close to 27 million²⁴. A report expected Europe to show big market gains for CD technology in 1995. An 80% increase over the previous year is forecast, with sales reaching £1.06bn and the number of units sold doubling to more than 8 million. In addition, it is estimated that, by 1996, 80% of PCs sold to the home market could have CD-ROM drives²⁵. Another technology which is making significant inroads is set-top boxes (STBs) for digital interactive TV. STBs are basically special-pur-

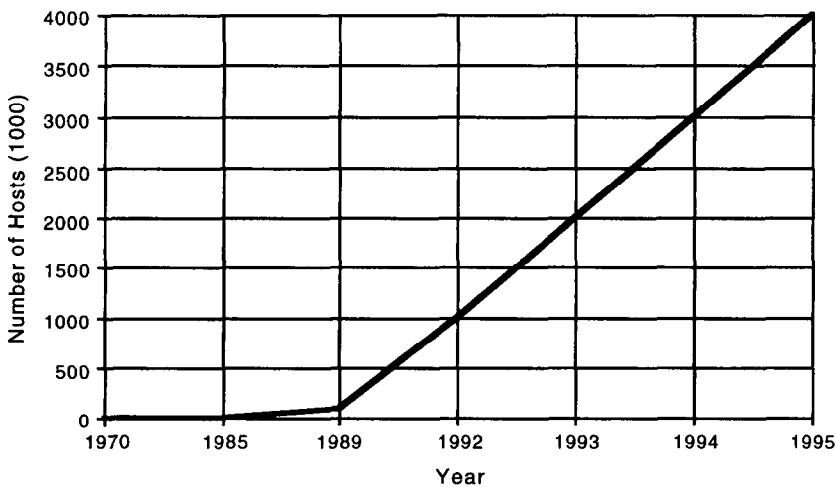


Figure 1. Growth of hosts in the Internet. *Source:* Based on figures given in Byte (July 1995).

pose computers and may also enable connection to the Internet. The number of STBs in existence is difficult to calculate but, as a report put it, by early 1995 there were probably barely more than 10 000 homes currently wired up.²⁶

This is changing fast however. Witness, for instance, BSkyB's recent call for tender for 900 000 STBs for the expected launch of its digital TV service in the UK. Also, WebTV Networks Inc. of Palo Alto, California has begun marketing an STB and Internet access service for viewing the Web through the TV display. WebTV executives are encouraged by a commissioned survey of non-Internet users in the US which showed that 52% of these users would prefer to surf the Web on a TV set against 31% who favoured the PC²⁷. Leading analysts expect WebTV and its competitors to earn a sizable chunk of the home Internet market—and bring lots of new users to the Internet.²⁸

Philips CD-i is another TV-oriented technology initially confined to edutainment, but now offering Internet access through the TV display, following Philips' introduction of an Internet connection system²⁹. However, it is too early to say what impact the new system will have on the market spread of CD-i technology.

Finally, there are the personal, portable 'pads' or 'tablets', pioneered by Apple's Newton MessagePad, a handheld device boasting a pen-based interface, handwriting recognition and communication capabilities. Introduced to the market as a Personal Digital Assistant (PDA), the 'immature' Newton encountered limited success immediately after its launch in 1993. Around 80 000 units were shipped that year, followed by 60 000 in 1994. In 1995, however, the Newton was showing signs of coming back with improved technology and market performance. In addition, the entire market of handheld devices, including PDAs, personal communicators, organizers, etc, also exhibited strong performance with sales close to 1 million units in 1994. Industry observers predict a growth to 6 million units a year by 2000 and to 10 million a year by 2003³⁰. The future looks confident,

Call them as you like—PDAs., personal communicators, organizers, palmtop, or hand-held PCs—but sooner or later, you'll almost certainly be using a small computing device to communicate and manage information.... the good news is that PDAs are evolving rapidly. Prices for both systems and services are dropping. User interfaces and hardware designs are growing better suited for important tasks. Desktop connectivity—which was at first almost nonexistent—is widely available and much more sophisticated. Battery life is improving. More development tools are available and software is multiplying. Perhaps most significantly, wireless communication services are becoming more affordable and widespread.³¹

Newspapers and the Internet

Thus far, the Internet has emerged as a clear favourite for newspapers (and other organisations) engaging in multimedia news editions. There are newspapers in other online services such as Prodigy, CompuServe and American Online as well but they amounted to less than 50 on a recent count. By contrast, the growth of newspapers on the World Wide Web (WWW) has been nothing short of amazing in the last two years. A recent count done by INES, the Initiative for Newspaper Electronic Supplements founded by IFRA, the European institute for newspaper technology research, identified 333 newspapers on the Web. An update four days later identified 386 newspapers scat-

tered throughout the world. The largest concentration was in the US, with 171 online newspapers³². Similar figures come from Steve Outing's excellent analytical monitoring of online newspaper development. Outing's column is also on the Web³³. On 9 October 1995, he reported the existence of more than 500 supplemental online services either in operation or under 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 online newspapers by the second half of 1997³⁴. This 'target' is well on its way as 1600 newspapers worldwide were estimated to be online in November 1996, and the growth rate is about 50 new per month³⁵. In addition, the increase is now coming more from medium sized newspapers since most of the major newspapers are already on the Web.

The Internet has clearly captured the imagination of newspapers and has developed into the prime arena for experimentation with multimedia. However, everything is at a very early stage. Content-wise, for instance, most of these newspapers are basically transferring paper version content to the screen and/or adapting it for the screen; a smaller number are mixing some paper version editorial with editorial original to produce the electronic version. More original forms of electronic content, such as completely new titles and editorial, or, even established titles with wholly original electronic editorial are still a tiny minority. For instance, a recent survey in the US found that a third of the surveyed newspaper sites on the Web provide most of their print product online. One quarter of the sites provide news updates throughout the day and roughly the same group provide original content online. Less than 10% of the sites provide customized news delivery and 43% provide searchable archives³⁶.

Not that these ventures are making much profits, for the commercial demand for online news services is incipient and the industry is yet to work out the most effective ways to become commercially viable. A critical indicator is the number of daily visitors to the sites. Here, Mensing's (1996) US survey found that only 13% of those who responded³⁷ estimated the number of daily visits to their sites at over 10 000. Comparing this with the millions of readers of the best-selling dailies helps to underline how incipient the development of the Web newspaper still is. This is also reflected in the expectations

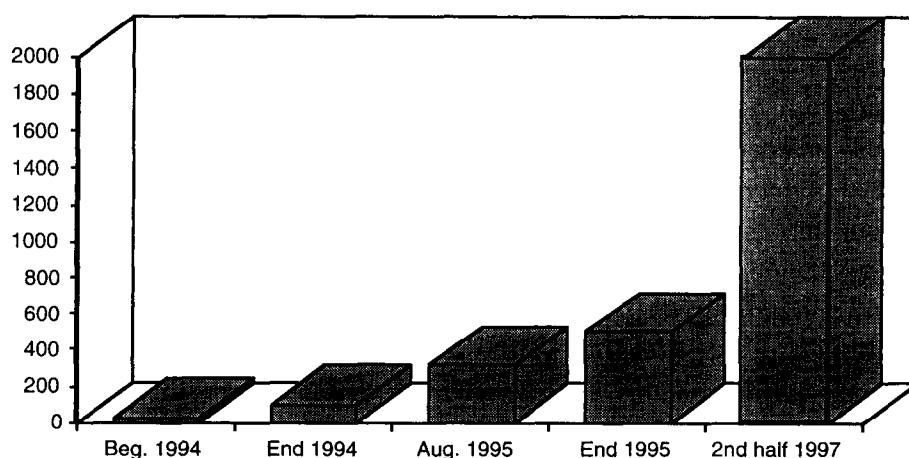


Figure 2. Growth of newspapers in the Internet. *Source:* Based on figures given in Outing (21 August 1995).

of profitability by developers of newspaper Web sites. For instance, Mensing found that almost two-thirds of respondents expect to be profitable only by the third year of operation. In contrast, only 10% expected short-term profitability by year one.

Nevertheless, few would dare to claim that the electronic multimedia newspaper is just a fad. In this, a major factor facilitating growth is the relatively low production and distribution costs of an Internet site compared with the massive investment to start a printed version of a newspaper. This favourable picture is especially true as the cost estimates of most electronic newspapers leaves out costs for content origination, which they simply re-use from the paper version of newspapers. For instance, it has been estimated that it

must be at least 400 times cheaper to distribute a publication by e-mail [electronic mail] than on paper.³⁸

In addition, a report finds that one the largest investments made for the UK's *Electronic Telegraph* was its £30 000 SUN computer server³⁹. Compare this with the recent \$250 million planned investment by the *Washington Post* to convert to full-colour printing by 1998,⁴⁰ and sound economic reasons for the choice of the Internet become apparent. *Table 1* provides an idea of the volume and pattern of expenditure on web sites currently being incurred by US newspapers. The largest proportion of sites are spending less than \$50 000—a figure which is consistent with the fact that most newspapers are basically transferring paper version content to the screen and/or adapting it for the screen. On the other hand, the proportion of sites spending between \$250 000 and \$1 million is expected to increase from 15 to 20%.

The relatively low investment is also consistent with the size of the web operations as shown by the number of people employed in them. Mensing (1996) found that approximately 28% of the sites have no full time staff, with print employees doubling up to run the online operation; close to 27% have 1–5 (full-time equivalent—FTE) employees; just over 24% have 5.5 to 10 FTE employees; and approximately 16% of the Web newspaper sites have more than 10 full-time staff. This must be placed against a background of labour-intensiveness reflected in a cost structure in which more than half of the cost (54.8%) for online newspapers is accounted for by salaries, with hardware as the second biggest contributor with a 14% share (*ibid.*).

The Internet is thus providing newspapers with a relatively low-cost way to enter the multimedia learning process. The fact that most sites remain small and experimental, however, shows that this learning process is unlikely to be short-term. Indeed, major business issues and dilemmas will have to be solved before a significant commercial take off of the multimedia newspaper.

TABLE 1. ESTIMATED EXPENDITURE BY WEB NEWSPAPERS (\$)

US(\$)	1996 (%)	1997 (%)
<50K	42	38
50K–250K	36	35
250K–1 million	15	20
> 1 million	6	7

Source: Based on figures given in Mensing (1996).

Major issues in the path of the multimedia newspaper

Few industry observers would doubt that, in the long-term, newspapers are likely to become electronic suppliers of multimedia news and information which will be more customised to the preferences of different regional markets and even individuals. This realisation merely poses the problem however, for, the basic challenge facing newspapers today is the practical transition or progression from current technical and business practices and markets into the opportunities beginning to open up with multimedia. Uncertainty is the name of the game at this stage. There is uncertainty

about profitability from a multimedia venture, how it should be done, *if* it should be done... There's also the question of what happens to the print product, and print revenues.⁴¹

Will the printed product be 'cannibalised' by the new emerging services or could they support each other? There is also uncertainty about charging and payment methods, copyrights, and the most effective ways of organising relations between the new services and the present newsroom.

The relative cost/performance and revenue issue

As it is often the case with new technologies, their initial cost/performance is hardly competitive with what is on offer from the well-proven, standardised, products and production methods of an established technology. For instance, the

amount you pay to load the articles into your computer over the telephone is more expensive than buying a paper, and most people don't enjoy reading text on a computer screen.⁴²

Of course, we have seen that some sectors of the population (eg blind people) can gain immediate benefits from a new technology. But this is different from mass diffusion. The latter normally has to wait for significant improvements in (price/performance) competitiveness in order to make definitive encroachments into the market space controlled by a well established technology. Today, for instance,

most publishers admit they won't see any significant revenue from new media any time soon.⁴³

Rather, multimedia will be an additional and very important revenue stream to us 10 to 15 years from now.⁴⁴

MIT Lab's Bender basically agrees and points to the economies likely to encourage publishers to adopt the new media:

There isn't yet a market saying 'give me electronic delivery', but publishers are beginning to realise that squeezing trees and squashing ink is an expensive business. Electronic products will eventually become more cost-effective.⁴⁵

One factor favouring this perception is the relatively low cost of starting production and distribution of a multimedia newspaper service as compared with the massive influx of capital required for the establishment of a printed newspaper. For instance, Todd Chronis, founder of News In Motion dismissed as a myth the idea that to engage in electronic publishing it takes a large staff and millions of dollars in losses for a few years. He argues

[o]ur production team outputs one electronic paper in four man-days... [and losing millions of dollars]... That's certainly not in my business plan, although others have announced that is in their plans.⁴⁶

As we have seen, this relatively low start-up investment is very much behind the rapid increase in the number of newspapers moving into multimedia (one way or another), in spite of the lack of obvious pay-off in the near future. Put another way, low entry barriers are facilitating widespread experimentation.

The great missing ingredients at this stage are profitable commercial approaches including charging and payment mechanisms and revenue-sourcing from new interactive forms of advertising. In this critical area, the largest proportion of organisations are simply embarking on a discovery and learning process, particularly reflected in the many online services which are opening up free-access sites on the Internet. Here, the general understanding seems to be,

first, there is no right or wrong way to approach electronic publishing. Different products and markets need different strategies. Second, no one has yet figured out the likely relationship between electronic publishing and advertising.⁴⁷

In this context, a variety of charging and payment mechanisms is being implemented for fax, online and CD-ROM services. Perhaps the most traditional form is the simple annual subscription. The fee arrangement of the Financial Times' fax edition is particularly interesting since the readers get the service for free and the payment is made by the institutional customers on the basis of number of copies. The purchase of a monthly CD-ROM is another way of collecting revenues from readers of broadcast news. In this case, the news items are encrypted and the monthly CD-ROM is necessary to decode them and make them accessible to the user.

Online news services such as the San Jose Mercury Center, Personal Journal and Digital Ink work on the basis of a monthly subscription fee for a fixed number of hours, plus extra cost for additional access to the service⁴⁸. Another mechanism given by Online Services other than the Web is paying magazines

a percentage based on the amount of time members spend in the online magazine, or based on how many subscribers sign up for the online service because of a particular magazine's presence there.⁴⁹

On the World Wide Web, Outing's column has been featuring ideas on potentially successful business/revenue approaches. Outing himself favours Individual Inc.'s Newspaper model with its three tiered system,

where some content is offered free to attract traffic; some premium content is accessible only if you pay a modest monthly subscription charge; and some content is available only on a pay per view schedule... Imperative is offering enough free content to make it worthwhile for non-paying visitors to want to come back again and again.⁵⁰

It is all about attracting and keeping a significant—hopefully growing—audience to the site, since this is almost certain to attract advertisers, a highly coveted source of revenue which is proving rather difficult to tap for news services on the Web. An appropriate judgement on how, when, and what level of charging is something that publishers will probably learn by trial and error during the evolution of their products and services. Today, most free publications in the Web are uncertain of how to proceed. For instance, Time Warner's Pathfinder, a Web site linking Time Warner magazines is offering free access at the moment but is signalling an eventual switch to a paid method⁵¹. The following caption is found in Pathfinder web site:

Overall, this is an excellent site, well worth a visit. It's so good, in fact, that sometime soon you'll probably have to start paying to get it.⁵²

Obviously, the transition will have an impact on the number of visitors. The point is not to scare most of them away. An indication comes from the effect of a subscription charge applied by Individual for its Newspaper service. One month after the charge was implemented, the number of registered users had fell from 80 000 to 15 000 users willing to pay⁵³.

Many online news services hope to make money by allowing readers to purchase items from advertisers directly online in the near future. Also in the pipeline are plans to provide catalogues, and advertising packages online⁵⁴. Two problems, however, cast shadows on these hopes: the emergence of direct advertising and the lack of confidence in the security of payment mechanism.

On the first score, the problem is that many companies are finding that they can establish their own sites on the Internet as a form of direct advertising. Potentially, this means bypassing the need for advertising in another online publication, although advertising agencies are still required⁵⁵. Indeed, recognising this phenomenon, some companies are responding with ingenuity, turning the threat into an opportunity. Outing's column reports of a small weekly which has set up a business line producing homepages for companies wanting direct presence in the Net⁵⁶. Another newspaper is using the online service to provide a free added-value extension on to the Net to advertisers in the printed newspaper. In this way, the company benefits from its work on the Net by enhancing its relation with advertisers, while demonstrating the value of the new medium to them⁵⁷. A benefit of a similar nature is reported by *The News and Observer* of Raleigh, N.C. According to executive director Frank Daniels III, the online service Nando Land has increased the paper's visibility in the community, helping to raise the number of readers from just over 50% of the city's adult population to 65% during the period 1990–95⁵⁸. To an important extent, these two examples help to allay fears of the electronic service necessarily 'cannibalizing' the user base of the existing businesses. Indeed, this fear does not seem to be widespread at all. For instance, only 2 of the 82 online editors who responded to Mensing's (1996) US survey felt that the online product decreased interest in the print product. Close to 46% felt that it had no impact and over one-third felt that the online product in fact increased interest in the print product. It seems clear that, with ingenuity, the online and print products can actually supplement each other.

On the second score, there is a widespread image that the Internet is not a secure medium for commercial transactions. It only seems a matter of time, however, before this problem is sorted out. Following a fiasco by current Netscape encryption technique,⁵⁹ much of the hopes rest on the coming implementation of drastically improved authentication and encryption technology which is promising almost totally secure protection to money transfer⁶⁰. Both Netscape and Microsoft are doing this and it has been estimated that the Internet could become safe for general commerce in less than two years⁶¹. In parallel, similar advances in metering techniques are promising serious inroads into the thorny problem of protection of copyrighted material⁶². Thus,

US company Folio Corporation announced in March 1995, the development of technology which will allow a publisher to monitor and record use of its information on the Internet and other wide-area networks, thereby facilitating copyright compliance... The new metering technology will allow monitoring on a per transaction basis so that users only have to pay for what they use⁶³.

This rather visible trajectory of technical solutions is much less defined in areas involving people as both *direct users* and *direct producers* of the multimedia news services.

Interactivity, personalisation/serendipity, updating

Today's newspapers live a one-to-many model of news and information processing and distribution. They do not have to worry much about interactivity, personalisation, and updating. The rules of the game are fairly clear and standardised, the newspaper sends out the editorial selection and readers 'consume' the newspaper, commonly, in a non-linear serendipitous fashion, with readers selecting articles of immediate direct relevance but also those which attract their attention as they open the pages of the newspaper.

The electronic newspaper shakes the stability of this model and raises major questions regarding interactivity, personalisation/serendipity and updating. The uncertainty is how to profit from them without losing some of the advantages of the newspaper. For instance, how can interactivity be profitably implemented without incurring serious disruptive effects? Today, interactivity is certainly a major selling aspect and, already,

almost all services provide bulletin boards for readers to post comments and questions on articles they have seen. *The New York Times* holds formal, schedules sessions during which readers can 'talk' online to journalist and editors. *Time* magazine has hosted celebrity hours, during which readers can communicate electronically with well-known personalities.⁶⁴

These 'inter-activities' are certainly important steps in the learning process. The Mercury Center reported receiving hundreds of messages from the 5000 or so members they had attracted by late 1993. They use message boards to communicate with editors, reporters and executives of the paper.

The questions and comments are not always easy to answer or keep up with, but we try to do so within 24 hours, sometimes within a few minutes of receiving them.⁶⁵

The problem is in the scale of numbers, because a much larger interacting audience may simply overwhelm the service and the normal operation of a newspaper. Thus, once a paper opens itself up for interaction, it must prepare for some pretty fundamental change in the way it sees itself and its relation with its customers. As Mercury Center's Mitchell put it,

[a]fter decades in the wholesale information business, we're about to go retail.⁶⁶

Ultimately, what forms of interactivity will predominate will again be a matter of practice and research⁶⁷.

Another area of contention is that of personalisation/serendipity. The issue centres on the meaning and extent of personalisation, particularly, as perceived in the 'Daily Me' concept popularised by the Media Lab.

In the end, modern telecommunications will lead us inevitably to the smallest news product imaginable: the personalised newspaper, or Daily Me, whose content has been tailored to meet an individual's needs and interest. Computerized 'butlers' or 'agents' will act on your behalf, culling articles of interest from traditional and non-traditional news sources, before sending them down the wire to your home. Luddites see the Daily Me engendering a fragmented world populated by self-interested myopes. Stay with tradition, they say. Let the editor publish articles that establish the point of view of the community of readers. They want news pushed upon them. The Daily Me supporters want to pull news in⁶⁸.

One of Benders 'Luddites' seems to be Mark Potts from the Washinton Post. He argues

'The Daily Me' is badly flawed. For a start, news is, by definition, what's new. It's not something you already know about. There is a huge amount of serendipity involved—and no computer filter

can replicate that. A steady diet of news about your pet topics might be great—in part. But it wouldn't tell you much else of what is going on in the rest of the world... We think the newspaper—or magazine—of the future has to be much more than the 'Daily Me', or news by the bit... Electronic publications should be assembled by editors just as paper publications are now... we think that the basic product should be the same surprising mixture of stories that has made newspapers successful for centuries⁶⁹.

As in most issues, the balancing option will probably combine the desirable elements of the two positions. On the one hand, 'The Daily Me' helping to bring speeded up access to personally relevant information and news and, on the other, the 'serendipity' approach giving readers the possibility to skim through publications choosing 'surprising' items. Indeed, Bender does not dispute this possibility. He sees an alternative interpretation of the Daily Me.

Regardless of whether one subscribes to the 'push' or 'pull' model of news, such a system could personalise articles for readers. A more complex scenario might involve varying the degree of detail and background information provided in an article, reflecting what the reader already knows, or does not know, about the topic. Providing readers with the proper context is as important as providing the content itself⁷⁰

Ultimately, serendipity cannot be disassociated from the context (ie activity, time and place) within which the reader's consumption of news and information is realised. In the workplace is likely to have less importance than during, say, leisurely weekends and holidays⁷¹.

A third area of uncertainty is that of news *updating*. The issue is how much updating readers are likely to demand from online publications. On the one hand, the fear exists that if newspapers do not update their stories throughout the day, readers will be able to do it from the wire services such as Reuters. On the other hand, updating everything might not be feasible for newspapers. In particular, Fidler believes readers will be uncomfortable with continuous updating, because this would make them feel that they are constantly missing something⁷². On the other side, Bender and other colleagues in the Media Lab's Electronic Publishing Group believe that newscasting should be personalised and provide relevant feedback and continuous updating⁷³.

The relation between the new service and the print newsroom⁷⁴

New multimedia services have tended to emerge and grow with little interaction or integration with the mainstream newsroom operations of newspapers. Outing reports of a tendency toward splitting and locating new media operations physically away from the newsroom operation⁷⁵. Admittedly, new ventures necessitate management autonomy if they are to succeed in developing their own space and dynamics. The problem with the emerging electronic services, however, is that they also necessitate a great deal of content from the newsroom in order to enrich their supply to customers online. The issue is once again how to strike the balance most appropriate to the dynamics and culture of the overall organisation. Undoubtedly, there will be no single universal recipe but the basic message to online services seems straightforward enough: whether you are in the same physical location or not, keep the lines of communication open with the newsroom. For Outing, this means that

Online managers should be attending newsroom daily managers' meetings; it's vital that the online operation be treated on a par with the newsroom departments. And if you can't be located physi-

cally close to the newsroom power center, then consider having a newsroom–online liaison with a desk in the city room⁷⁶.

One example of close integration in the same physical location is the Wall Street Journal. Here, the online operation—the Wall Street Interactive Edition (WSIE)—is located in the Journal’s national newsroom. The reported benefits of this proximity for WSIE are: better clueing on major news events and other issues; and a great deal of interaction as a result of high level of curiosity generated by visible presence. There is even a sort of ‘technology transfer programme’ with newsroom staff joining the WSIE desk for periods of two weeks. The result is an increasing ‘cross-pollination’ manifested in ideas and suggestions from print staff who now have a better understanding of the rationale of the electronic operation.

A less integrated approach is that of the Atlanta Journal–Constitution. Initially, the online operation evolved with little interaction with the print newsroom. Recently, however, a dialogue has been established with a view to defining how best newsroom staff can participate in the creation of online content. The perceived benefits are not only in terms of online content–creation; they are also cross-educational for the people of the two operations involved.

These, and undoubtedly other developments and challenges, will continue to be for many a year part of the companies’ learning process towards the multimedia future. In my view, this long-term future is still encapsulated by the *mediamorphosis* vision of the portable-flat-panel delivery of multimedia news content. Today, there are no certain answers to many of the issues facing newspapers. Ultimately, these answers will only be the result of research and experience and, in this process, most companies realize that they need to collaborate if they are to reduce significantly the high-risk and cost of learning.

Learning together through collaboration

The MIT Media Lab with its 300 inventors and an annual budget of \$12 million is a conspicuous example of companies pulling together behind research work which will benefit all of them. Eighty percent of the funding comes from industry and 20% from the US government. Sponsoring companies include some of

the largest names from the world of media, computers and telecommunications. They include Knight-Ridder and Reuters, Apple and IBM, BT and Deutsche Bundespost.⁷⁷

The Lab’s five-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*.⁷⁸

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.⁷⁹

This comprehensive research programme has seen over 40 individual projects initiated over the past years. The entire effort is advancing ‘the field’ rather than the specific interests of any single organisation. Sponsoring companies have access to the

Lab's research and they may well benefit from specific products. At the same time, through the Lab, they are sharing the costs of what is effectively a common research programme.

Other forms of alliances are also proliferating, some of them with commercial aims in sight. Thus, a recent survey found

a significant trend toward more industry partnerships. There are 3 times as many partnerships today as there were in 1990.⁸⁰

One such collaborative venture is, Partners Allied for Exploring Technology (PAFET), an alliance of 6 regional US newspaper and media groups that have come together to develop interactive services and create a

central research resource to help member companies to make better individual decisions concerning the future.⁸¹

Another large grouping is New Century Network, formed by eight of America's largest newspaper companies with a view to driving the industry into broader use of online services and other forms of electronic publishing⁸². New Century Network

want to help newspapers share content and reach technical standards that accelerate the development of electronic services that complement the printed page.⁸³

They have invited every daily newspaper in the US to participate as an affiliate.

Our goal is to help all newspapers to strengthen their relationships with customers and retain their brand leadership as information providers.⁸⁴

At present, NCN has about 70 newspaper Web sites as affiliates and is about to start selling national ads into groups of newspaper sites. This is the first concerted newspaper industry attempt to counteract fragmentation in order to gain advertising share away from the larger Internet search and directory sites such as Yahoo! and Infoseek which are getting the majority of the advert placements⁸⁵.

And it is not just different companies joining forces to face common problems. Individual companies are also pursuing alliances as part of the constituency-building around their own products. They realise the importance of this strategy to enhance the content, service and market dissemination of their products. For instance, Individual Inc., a provider of personalised news and information, has established alliances with many prominent industrial players including Knight-Ridder, Lotus, Motorola, Apple, Prodigy, Gartner Group and AT&T⁸⁶.

Outside the US, collaborations are also shaping up. Singapore has formed the Singapore Digital Media Consortium (SDMC), which will pool resources from both the public and private sectors to do pre-competitive research. Interestingly, SDMC is establishing an international collaboration with the MIT Media Lab to design and develop a scaleable, multi-network system for high resolution and time-sensitive information. An exchange programme with Media Lab will also be pursued⁸⁷.

In Europe, one interesting collaborative venture is Internet Telecom Observer, a partnership including radio, TV, print, and industry. Its mission is twofold.

First, to be your top news source for all aspects of the telecommunications galaxy, from routers to social trends. Second, to serve as a laboratory for exploring the practical aspects of convergence—the merging of previously separate media into something we strive to make greater than the sum of its parts.⁸⁸

The best-known effort originated in Europe, however, involves more than 60 newspapers who have joined behind the Initiative for Newspaper Electronic Supplements (INES) founded by IFRA, the European institute for newspaper technology research. INES comes from the mixture of fear and opportunities driving newspapers to enter the learning process. The fear is that failure to act today in the face of the emerging multimedia challenge

could result in a loss of importance and influence by the **newspaper**. If newspapers take the initiative, on the other hand, they can assure themselves of their rightful place in the coming blended-media landscape.⁸⁹

INES is neither exclusively European nor exclusively newspapers. Among its members are Knight-Ridder, *The Chicago Tribune* and *Los Angeles Times* and electronic companies are also invited to become members.

INES' specific aims are consequent with its origins in the newspaper industry. Thus, its purpose is not to promote multimedia technology but

to help newspapers create **supplementary** services, not replacements for the printed product. At first, those services might not exploit the possibilities of blended media to the fullest; they might be audiotex or fax-based services aimed at niche markets. They nevertheless represent a preparatory step for entry into the blended-media environment.⁹⁰

A distinctive aspect of INES is that it does not develop any technology by itself. Its mission is more to cooperate with newspapers and suppliers to develop strategies and concepts that are useful in the creation of electronic supplements. INES also sees itself working with industry on the selection or development of standards for technical and other aspects. And it has the task of informing partners and creating awareness about technological and industrial trends and developments relevant to the partners' businesses.

Since these are all activities of common importance to newspapers, it makes sense for them to join forces. Collaboration helps newspapers to expand on their expertise, to reduce risks, costs and uncertainty and, also, to keep watch on each other's activities. This message was clearly amplified during a recent conference on Media Alliances. Thus,

The message... was simple: In developing new media ventures, it's foolish to do it alone. Whether you're AT&T or the Podunk Daily News, you do not have all the skills and resources in-house that are required to do the best possible job, so go out and partner up with your friends or even your enemies. It's just too tough out in the electronic services marketplace to go it alone.⁹¹

At the same time, caution is necessary because partnering is not a straightforward path to riches. Witness the results of some recent statistics on the fate of partnering ventures. Ninety out of 100 media alliance 'explorations' failed to reach agreement; 50% do not last longer than 4 years; average duration is 7 years; and the number of partnerships achieving long-term success is 2⁹². Clearly, there are no quick recipes in the path towards the multimedia newspaper. But, in the near and medium-term future, collaborations are most likely to remain a prominent feature of the evolution of multimedia in the newspaper industry.

Conclusion

In the last few of years, there has been much hype about the development and impact of multimedia on a range of industries, including the publishing sector. Few studies how-

ever have looked closely at the issues and challenges involved in such a process. This paper has attempted to improve such a situation by looking at the specific case of the newspaper industry. It has shown that the multimedia transformation of the newspaper industry is not likely to happen rapidly. At the same time, the long learning process towards multimedia has started and it looks very much like being irreversible. Underpinning this process is the combined effect of both declining revenues in the newspaper industry and relentless cost/performance advances in information and communications technologies. The result has been a rapid increase in the number of newspapers establishing Internet sites. *De facto*, the Web has become the prime arena for multimedia newspaper developments in the near and medium-term future.

At the same time, players engaging in multimedia news (ad-)ventures are facing a great deal of uncertainty and dilemmas regarding the most appropriate commercial products and revenue-raising models. At present, profitable ventures are difficult to find, although this should improve with advances in the areas of encryption and metering technology which are promising viable solutions to the critical problems of payment methods and copyright enforcement. Major conceptual dilemmas, however, subsist regarding the key aspects of interactivity, personalisation/serendipity, updating, charging policies and the relation with the print newsroom.

In these circumstances, newspapers and other organisations with a stake in the multimedia newspaper are establishing a variety of alliances. Through collaboration they are able to expand on available expertise as well as reducing risks, costs, uncertainty and, also, keeping watch on each other's actions. There are however no quick recipes in the path towards the multimedia newspaper. Re-inventing an industry has never been a straightforward matter.

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Notes and references

1. Fidler, R., Commencement Address, School of Journalism, Colorado University, 13 May 1994. E-mail collected via Internet on May 18, 1994. *Mediamorphosis* 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'. (Fidler, R., *Mediamorphosis: The Coming Transformation of Newspapers*. Boulder, Colorado, IDL, 1993, p. 2.)
2. See *Financial Times*, 30 May 1994, p. 9. In Fidler's words, '[e]arly in the next decade, or perhaps sooner, portable tablets the size and weight of a standard printed magazine are likely to be at least as commonplace as cellular phones and digital machines are today. It should be possible to use them while lying in bed, riding on a subway, or sitting on a park bench. These devices can be expected to combine the readability and ease of using paper with the interactivity of personal computers and the compelling qualities of video and sound. They will have many uses. Some will be used as personal organisers and note-pads, but mostly they will be used as portable media for viewing and interacting with all kinds of formatted documents'. (Fidler, R., *The digital newspaper: building on the document model in IFRA (eds), Newspaper Techniques* (Munich, IFRA, January 1994), pp. 4-9, quotation p. 8).
3. *Ibid.* 'The Knight-Ridder electronic newspaper will make in-depth information available. By touching the screen, consumers will be able to reveal story stacks, and additional information such as charts, tables

- and videos. Even advertisements will be stacked in layers to entice the consumer. Readers will be able to obtain additional information about a product, activate video commercials and order products with a built-in device'. (*Financial Times*, *op cit*, ref. 2, p. 18).
4. Knight-Ridder's 1995 economic performance was severely affected by a long-running strike at the newspapers *Detroit Free Press* and Gannett Co.'s *Detroit News*. 'Largely due to the Detroit situation, operating revenue in the newspaper division was up less than one percentage point last quarter, operating income fell by 63% and advertising revenue was flat.' (Case, T., Severe cutbacks at Knight-Ridder Newspapers, *E and P. Web Edition*, 4 November 1995).
 5. The idea for the Media Lab, modelled on MIT's successful AI Lab, was conceived in 1979 but, Negroponte says, 'it took five years to raise the money and build the lab'. (*The Guardian*, 22 July 1993, p. 19).
 6. Brand, S., *The Media Lab: Inventing the Future at M.I.T.* (Penguin Books, NY, 1988), p. 36. A demonstrator of NewsPeek was produced but it had limited personalisation, it could not be individualised for each visitor to the Lab and that was 'a significant frustration, since the idea of intense personalization to the user is at the heart of most of the Lab's projects.' (*Ibid*, page 37).
 7. C.E.C./DGXIII, *Main Events and Developments on the Electronic Information Services Market*. Annual Report 1992 (Brussels, IMPACT, C.E.C./DGXIII, 1992).
 8. See *Financial Times*, *op cit*, ref. 2, p. 9. Also, *Financial Times*, 13 March 1995, p. 13.
 9. Simpson, P. (ed.), *European Newspaper Industry* (London, PIRA International, February 1994). Found in Internet address <http://mediator.pira.co.uk/NewspapIndPira/index.html>.
 10. *Personal Computer World, Digital Dailies*, September 1993, pp. 390–394, quotation p. 390.
 11. *Financial Times*, 13 January 1995, p. 16.
 12. *Ibid*.
 13. *EuroBusiness*, February 1995, p. 7. 'An OECD report says that demand for paper products from its members will grow from 150 million tonnes a year now to 200 million tonnes a year by 2010. But trees don't grow any faster, so if you want paper, you will have to be prepared to pay for it—prices in Europe rose by 20% between 1993 and 1994.' (*MacFormat*, November 1995, p. 48).
 14. Outing, S., Newsprint savings present a cyber opportunity, *Editor and Publisher Web Edition*, 13–14 November 1996, (electronic magazine).
 15. Outing, S., Report from San Diego: don't do it alone, *Editor and Publisher Web Edition*, 4 October 1995, (electronic magazine).
 16. *Noticias de la Comunicacion*, 15–21 Noviembre 1993, p. 6.
 17. *Financial Times*, *op cit*, ref. 11.
 18. Simpson, *op cit*, ref. 9.
 19. *Financial Times*, 8 July 1993, p. 22.
 20. The Internet is a worldwide network of computers which can exchange information with one another. There are several areas in the net, including the World Wide Web (WWW), FTP, Gopher and Usenet. By far, the most popular sector is the World Wide Web, 'a simple multimedia format originally developed at CERN to provide a mechanism for sharing information between collaborative researchers. The Web's attraction is its graphical interface, point-and-click interactivity and hypertext links. Compared with the realtime interaction found on CD-ROM, it is definitively clunky in response, but then you have access to a lot more information than can fit onto a 600Mbyte CD-ROM' (*MacUser*, 26 May 1995, p. 77).
 21. *Ibid*.
 22. Simpson, *op cit*, ref. 9.
 23. See also *Business Week*, 27 February 1995, pp. 34–40, for a special report on the Internet.
 24. *MacUser*, *op cit*, ref. 20.
 25. *Financial Times*, 21 August 1995.
 26. *MacUser*, *op cit*, ref. 20, p. 69.
 27. Outing, S., When newspapers meet TV on the Web, be prepared, *Editor and Publisher Web Edition*, 6 December 1996, (electronic magazine).
 28. *Ibid*.
 29. *Business Week*, 13 November 1995, pp. 52 and 54.
 30. *The Sunday Times Innovation Web*, 3 September 1995.
 31. *Byte*, June 1995, pp. 147–156, quotation p. 147. See also *The Sunday Times*, 15 October 1995, p. 12.
 32. See INES, Newspapers on World Wide Web (Internet address: <http://www.gt.kth.se/ines/newsstand.c>) The first count was dated 8 October 1995, the second 12 October 1995.
 33. Internet address <http://www.mediainfo.com/edpub/>
 34. Outing, S., Join the party! 300-plus newspapers are online, *Editor and Publisher Web Edition*, 21 August 1995, (electronic magazine).
 35. Outing, S., US news media continue march onto Web, *Editor and Publisher Web Edition*, 6–7 November 1996, (electronic magazine).
 36. See survey results at Mensing, D., Profit strategies for online newspapers: a preliminary report on the costs and revenues of daily Web newspapers (1996), found in Internet address <http://unr.edu/homepage/>

- dmensing. Mensing's survey involved 82 US newspaper online editors from a total sample of 187 who were sent the survey—two-third had circulations over 100 000. The survey was conducted during April–August 1996.
37. This question did not receive an answer by 25% of those who returned the survey.
 38. *The Guardian OnLine*, 23 June 1994, p. 5.
 39. Cracknell, D., *News in the World Wide Web* (Warwick University, England, 1995), electronic version. Journalism diploma project on the future of electronic newspapers found in Internet address: <http://www.warwick.ac.uk/guest/cracknel/index.html>.
 40. *Financial Times*, 15 May 1995.
 41. Sikes, A., President of the New Media and Technology Division of Hearst Corp. Quoted in *Advertising Age*, 11 April 1994, p. 6.
 42. Ingle, R., President and executive editor of the San Jose Mercury News. Quoted in the *Financial Times*, 29 August 1994, p. 12.
 43. *Advertising Age*, *op cit*, ref. 41.
 44. Ward, J., President of Meredith Multimedia Interactive. Quoted in *Advertising Age*, *op cit*, ref. 41.
 45. Quoted in *Personal Computer World*, *op cit*, ref. 10, p. 392.
 46. Chronis, T., News In Motion: An International Electronic Multimedia Newspaper in IFRA, *op cit*, ref. 2, pp. 28–30, quotation in p. 29.
 47. *Financial Times*, 27 February 1995, p. 12.
 48. Mercury Center 'costs \$9.95 a month for five hours' use. Extra hours cost \$3.50 each. Access to our electronic library costs extra. We charge 80 cents a minute from 6 a.m. to 6 p.m. Monday through Friday, providing us with an interesting test of the potential for such a service among small businesses. All other times, it costs just 10 cents a minute. Early results suggests that there is an enthusiastic market for parents helping kids with their homework, not to mention jobs applicants researching potential employers and sports fans tracking their teams.' (Mitchell, B., First Steps in the Electronic World for the 'San Jose Mercury News' in IFRA, *op cit*, ref. 2, pp. 16–19, quotation pp. 17–18) Digital Ink also charges \$9.95 a month, with five free hours and additional hours costing \$2.95 each (W. Webb, Washington Post Debuts Digital Ink, *Editor and Publisher Web Edition*, 29 July 1995, electronic magazine.). In turn, Personal Journal charges a monthly fee of \$12.95 in the US—which includes the first edition of Personal Journal every business day. Updates are then available around the clock every business day, weekends and holidays for an additional 50 cents fee. (Personal Journal site in the Internet—<http://bis.dowjones.com/pj.html>)
 49. *Advertising Age*, *op cit*, ref. 41.
 50. Outing, S., Paying for content on the Web: an opposing view, *Editor and Publisher Web Edition*, 20 September 1995, (electronic magazine).
 51. *MacUser*, *op cit*, ref. 20.
 52. See Pathfinder Home Page in the Internet (<http://www.gnn.com/gnn/wic/news.04.html>)
 53. Outing, S., Media alliances conference wrap-up: part 2, *Editor and Publisher Web Edition*, 5 October 1995, (electronic magazine).
 54. *Financial Times*, *op cit*, ref. 42, p. 12. On concepts of advertising for multimedia, see S. Stefanac, Interactive advertising, *New Media*, April 1994, pp. 34–52 and *Financial Times*, 23 May 1994.
 55. *MacUser*, *op cit*, ref. 20.
 56. Outing, S., How to make money on the Internet: don't sell ads!, *Editor and Publisher Web Edition*, 29 August 1995, (electronic magazine).
 57. Outing, S., Using an online service to strengthen the newspaper, *Editor and Publisher Web Edition*, 29 September 1995, (electronic magazine).
 58. Moritz, B., New Media World: If They're Ready, Papers Stand to Win, 22 May 1995, electronic report found on PIRA site on the Internet. 'Daniels attributes the growth to Nando Land. The paper is receiving more than a million calls per week via computer modems. Of that number, 60 percent of the 'hits' are from the United States, 15 percent are local and the remaining 25 percent are foreign enquiries.' (*Ibid.*)
 59. Two students broke the supposedly secure encryption almost immediately after its introduction by Netscape.
 60. For a discussion surrounding the implications of control and use of the 'unbreakable' Clipper chip, see Denning, D., Resolving the encryption dilemma: the case of Clipper, *Technology Review*, October 1995. Electronic version found on Internet address <http://pathfinder.com/@XT1ecnFR4AAAQEIM/pathfinder/pulse/news/techrev/techrevhome.html>. Clipper uses Skipjack encryption algorithm and keys of 80 bits—24 bits longer than Data Encryption Standard (DES) keys which was adopted as a federal standard in 1977. The extra 24 bits provides 224 or about 16 million times the security against trial-and-error guesses at keys.
 61. *Financial Times*, 4 October 1995.
 62. Another method is used by Infoseek who sells information about the Internet. Infoseek 'doesn't use secure Netscape technology; instead, it gets would-be subscribers to dial a number in the US and tap in their credit card details. The automated answering service gives the caller a reference number to use as a

- password which lets Infoseek refer the credit card number to the Web authorisation process.' (*MacUser*, *op cit*, ref. 20, p. 70)
63. *Financial Times*, 20 March 1995, p. 13. See also *Interactive Age*, 1 November 1995.
 64. *Financial Times*, *op cit*, ref. 42.
 65. Mitchell, *op cit*, ref. 48.
 66. *Ibid.*
 67. For a discussion challenging some of the present efforts aiming at providing, for instance, teleshopping and information delivery through Interactive TV, see Schwartz, E., Forum: the misdirection of interactive TV, *Technology Review*, November/December 1995. Electronic version found on Internet address <http://pathfinder.com/@XT1ecnFR4AAAQEIM/pathfinder/pulse/news/techrev/techrevhome.html>. Schwartz argues that people associate TV with games and entertainment. 'People watch television first and foremost for entertainment. It stands to reason, then, that the applications that enhance this experience, such as interactive game shows and video action games, have the best chance of succeeding in the new TV market. GTE has learned that lesson the hard way. After ten years of developing and testing education, information, and time-saving features, the telecommunications giant has found that people like its cable-based 'mainStreet' brand of interactive TV for the games. The GTE customers I visited near Boston are interested in using their remote control to register answers to game shows, compete in trivia games, predict during football season whether the quarterback will pass or run the ball, and participate in events such as voting for their favorite actors on Oscar night. Coming soon: betting fake money on horse races.' (*Ibid.*)
 68. Bender, W., Read all about it in the Daily You, *Communicating Business* (London, UK, Forward Publishing, Winter 1994/95). Electronic version found in News in the Future Internet site <http://nif.www.media.mit.edu>
 69. Potts, M., The Washington Post Company's View of the Future of Electronic Publishing in IFRA, *op cit*, ref. 2, pp. 19–22.
 70. Bender, *op cit*, ref. 68.
 71. See Cracknell, *op cit*, ref. 39.
 72. *Financial Times*, 10 March 1994, p. 18.
 73. *Personal Computer World*, *op cit*, ref. 10, p. 391.
 74. This section relies heavily on Outing, S., Should new media be part of newsroom operation? *Editor and Publisher Web Edition*, 12 October 1995, (electronic magazine).
 75. *Ibid.* This is the case of the Washington Post's Digital Ink, the News and Observer Co.'s NandO.net, and the Atlanta Journal-Constitution's Interactive Studio.
 76. *Ibid.*
 77. *Financial Times*, 15 June 1994, p. 16.
 78. Negroponte, N., Personal communication with A. Torres (ICT, NewsPad), 1 July 1993. See also *El País*, 16 Noviembre 1993, for an interview with Jerome Rubin, responsible for the News in the Future programme.
 79. From News in the Future Home Page in the Internet (<http://nif.www.media.mit.edu/>)
 80. Outing, *op cit*, ref. 15. 'Among the newspaper groups in these various alliances are Cox Enterprises, Dow Jones, Gannet, Knight-Ridder, Newhouse, News Corporation, Times-Mirror, the Tribune and the Washington Post Companies.' (J. Tewlow, New Technology Create New Markets—An Overview in IFRA, *op cit*, reference 2, pages 9–12, quotation in page 10)
 81. *Financial Times*, *op cit*, reference 8. The six are A H Belo Corporation, based in Dallas; Central Newspapers of Indianapolis, Cowless Media Company of Minneapolis; two California based companies, Freedom Communications of Irvine and McClatchey Newspapers of Sacramento; and the Pulitzer Publishing Company of St Louis. The combined circulation of Pafet papers is about 4m daily. (*Ibid.*)
 82. New Century Network was formed by Advance Publications, Cox Newspapers, Gannet, Hearst, Knight-Ridder, Times Mirror, Tribune and the Washington Post. The companies own 185 daily newspapers with a total Sunday circulation of more than 23 million and expect to put all but their smallest newspapers on-line within the next three years. (*Scotsman*, 20 April 1995, page 20)
 83. *Ibid.*
 84. Quoted in *ibid.*
 85. S. Outing, New Century Network Ready to Go with National Ad Network, *Editor & Publisher Web Edition*, 20–21 November 1996, electronic magazine.
 86. From Individual Inc. Home Page in the Internet. (<http://www.bookwire.com/individual/description.html>)
 87. *IT Focus*, August/September 1994, page 6.
 88. *Internet Telecom Observer* Home Page in the Internet (<http://telobs.com>), October 1995. Partners include Hewlett Packard, Kodak, CERN, *Le Monde*, *The Guardian*, *The Economist*, *Advertising Age*, and *Tribune de Genève*. (*Ibid.*)
 89. INES Literature (INES Media Concepts, Darmstadt, Germany). no date.
 90. *Ibid.*
 91. Outing, *op cit*, reference 15.
 92. M. Fitzgerald, Strategic Alliances by the Numbers, *Editor & Publisher Web Edition*, 7 October 1995, electronic magazine.