The future of Magazines and Direct Mail 2015-2020: Implications for the printing industry

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Pira Consulting Report

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Prepared for BPIF.
by John Birkenshaw

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Pira International
Registered office: Cleeve Road, Leatherhead, Surrey, KT22 7RU, United Kingdom
Main line +44 (0) 1372 802000 Facsimile +44 (0) 1372 802249
(Registered number: 3858209) England (Limited liability)

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Executive Summary

This report is the outcome of a technology mapping study to identify the key technology developments necessary to address future customer requirements related to Magazines and Direct Mail over a period of 10-15 years. Technology mapping involves developing a vision of what a product or service will look like at a specified date in the future, and identifying the key enablers and technology requirements necessary to achieve this.

Future of magazines

Magazines are a very successful print product sector – their business model of using editorial content to define and attract an audience which can then be used to accurately target advertising is well proven. Amongst consumer magazines there has been a recent introduction of a number of new weekly titles which are giving overall readership levels a boost. Customer magazines are also in a strong growth phase. But Business to Business titles are experiencing some decline as a result of advertising transferring to the Internet.

However, the outcome of this study is that the long term future of printed magazines will not be so secure. The key reasons for this are:

- advertising is migrating to e-media
- publishers are not investing in the future of the printed product – but they are, heavily, in the future of e-media products
- today's younger generation, that is, tomorrow's adults have been brought up in an e-media world and will be less inclined to read printed products
- publishers' on-going drive to reduce costs makes e-media publishing an attractive proposition since paper, printing and distribution costs can be eliminated

As a consequence of these trends, it is thought that the market for printed magazines will decline, and the current business model be difficult to sustain in all cases. These trends will impact some types of magazine sooner than others, with TVlistings and B2B magazines leading the way. It is also the case that some "youth" and "music" titles already have an on-line readership many times that of the printed version. Others, especially coffee table magazines, will continue.

A number of key themes have emerged from the technology mapping process:

- Giving readers choice – this operates at a number of different levels – for some magazine products it will mean customisation of content for all or part of a publication.
- Many magazines will become prestige items (more like a coffee-table book). They will be produced to very high quality, be relatively expensive and be produced in relatively small quantities compared with current batch sizes.

- The magazine product will routinely be a dual-media product (print and e-media).
- Magazines will be printed on lightweight high quality recycled and recyclable paper.

The lifetime of the printed magazine product can be extended if production costs can be dramatically reduced, for example, by 50%. While this is a serious challenge there are many possibilities for making a serious reduction in production costs.

In the light of these trends, together with the expected future characteristics of printed magazines, and the need to cut unit costs of production, several necessary key technology developments have been identified, including:

- New press design concepts to radically reduce make-ready times, start up waste, and press manning levels
- The development of "single-fluid" inks (to remove the ink/water balance issue on press start up, and hence cut paper waste)
- The development of lightweight recycled papers with high bulk and stiffness – an apparently conflicting combination of properties but to which nanotechnology and other approaches may be able to make a serious contribution.
- The use of digital print technology (probably inkjet) to enable customised sections to be printed.

Future of Direct Mail

Direct mail can be defined as a printed product, addressed and delivered to a definite individual who matches some selection criteria, with the purpose of stimulating some action that leads to a sale or potential sale, or that provides profile data for subsequent use, or may simply provide the recipient with information. It is one print product from the broad class of promotional print items, but also one medium amongst the several used by the Direct Marketing Industry. During the 90s it experienced phenomenal growth although this has slowed somewhat in the UK recently. However in other parts of Europe, especially Central and Eastern Europe, the prospects for growth are high.

In 2015-2020, direct mail will face much more competition as an advertising medium than it does now. Other media will all be technically sophisticated and being used in a communications environment providing interactivity and much visual stimulation. But direct mail has certain powerful attributes that now separate it from the crowd and will continue to do so to a large extent.

For direct mail, distribution and postal costs are a key issue – but new services and pricing models, largely based around zonal pricing, will appear shortly which will make a large impact on the costs of delivering a substantial proportion of direct mail.

In 10-15 years time, key characteristics of direct email are expected to be:

- It will continue to be a "push" medium and complement company websites and email marketing
- B2B Direct Mail will have moved almost entirely onto the web
- Some Direct Mail products will be directly trackable and their response measurable. That is, when delivered, when opened, what action occurred, the value of sale etc. To that end, direct mail products will routinely incorporate PIN codes, possibly encoded as bar codes and RFID technology.
- Direct Mail products will exploit physical characteristics such as touch, feel, smell, sound, animated graphics – i.e. appeal to ALL the senses
- Direct mail products will become more attractive and more complex to differentiate themselves from each other and other printed matter. Paper type, special inks and varnishes and a wide range of finishing techniques will contribute to this.
- Direct Mail products will have customised content, not just personalisation
- Direct Mail products will have a communication ability, partly to facilitate tracking and measurability, but also to provide a response mechanism so that sales transactions may be completed then and there, or a topical message may be transmitted/received as the package is opened
- Direct Mail products will incorporate 2D bar codes as a simple low cost method of obtaining feedback and completing a sales transaction (in conjunction with a mobile communications device perhaps).
- Some Direct Mail products will become magalogues – a cross between magazines and catalogues
- Software advances will make direct mail easier to do at lower cost, so lowering the barriers to entry and enabling a wide range of companies and organisations to use it.

To facilitate these developments, key production technologies required are:

- Integrated pre-media systems with artificial Intelligence assisted automatic makeup of pages to escape the formality of template design systems
- Digital print and hybrid (digital plus litho) presses
- 6-colour digital print, spot varnish, texture printing and special effects (such as appeal to all senses including taste & smell)
- 2D bar codes combined with suitable software to run on mobile devices (phone or PDA etc.)
- Printed electronics (sensors, conductive inks, suitable printing technology, circuit development)
- Low cost flexible display "screens" (e.g. e-paper, or equivalent technology)
- Suitable paper substrates including special coatings or films onto which electronic circuits can be printed
- Short range, low power (consumption and emission) transmitters/receivers (e.g. Zigbee)
- Automated-setup dedicated finishing equipment

General Conclusions

- The future environment for print products will be one within which e-media are commonplace and with which a major proportion of the adult population feels completely comfortable. Computer and (mobile) communications technology will be low cost and access to the Internet will be available more or less everywhere. To continue to attract readers/consumers and advertising revenues, print will need to focus on and develop its unique attributes.
- Both for printed magazines and direct mail products, partnerships will be vital between suppliers in order to optimise a total process as opposed to single elements within it, for example, ink, paper, press will need to be developed together to bring real cost reduction in web printing.
- Similarly, in both product sectors, print companies will need to work much more closely with their customers to gain efficiencies, and be able to use production processes creatively for customer benefit
- Digital printing will be an important (but certainly not the only) printing technique for both magazines and direct mail in 2015 and onwards.

Implications for suppliers

Equipment and software suppliers to print companies will face continuing demand to provide automation, effective solutions for smaller batch sizes, digital print systems with improved image quality and production speed suited to bulk production, and all working with minimum waste levels. It will be necessary to work in partnership with ink and paper manufacturers to bring about developments that optimise the overall process. The printing of electronics (currently being developed for, for example, packaging applications) is likely to become a requirement within the production of direct mail and just possibly magazines.

Implications for printing companies

Magazines

- Considerable care will be required with future press investments given the 10 year payback which is common with heatset web-offset machines. The current trend to higher pagination presses is understandable in relation to the next 5 years or so, but may be questionable beyond that. Press designs that focus on minimising make-ready, waste and provide format flexibility may be preferred.
- In 10-15 years time production volumes will be reducing which could contribute to excess capacity and the inevitable consequences.

Direct Mail and general printers

- Printers will need to develop different production lines to cater efficiently for the different types of direct mail (high volume commoditised vs. low volume targeted and customised). These require different types of production equipment and training.
- In the future, finishing will play an even greater role in the production of direct mail items. Innovative methods will be used more, and will be critical in making

direct mail products that stand out from the crowd. It will be finishing that differentiates a professional printer's product from the DIY product, and that differentiates one printer from another.

- Direct mail products will need to have increasing functionality which may be provided initially by 2D bar codes and in the longer term the inclusion of electronic devices.

1 Introduction and rationale

The print supply chain involves many players and it is very difficult for any one company to really appreciate the needs of other companies in the supply chain, and indeed those of the end consumer. This study addresses this problem by identifying technological development needs throughout the supply chain. It highlights known developments that may be relevant and encourages further development to meet additional specific needs thereby suggesting focused R&D effort which is market 'pull' driven. Each supplier in the supply chain should be able to see the opportunities available, see where to focus their R&D, and how they can align their individual strategic planning with future developments. Printing companies in particular will gain insights into vital issues impacting on future investment decisions.

1.1 Objective

To identify the key technology developments necessary to address future customer requirements related to Magazines and Direct Mail over a period of 10-15 years.

Magazines and Direct Mail were selected as two key product sectors because they have potential for substantial change driven by uptake of emerging technology. They are both product sectors funded substantially by advertising revenues, but since advertising funds a large proportion of printed matter, there may be some transference of implications into other product sectors.

1.2 Scope

Both magazines and direct mail have to satisfy the needs of more than one category of customer. Both have to satisfy an end consumer, but then there is also the advertiser, and the needs of the publisher. Therefore the project looks beyond just the printed product itself but also to the processes of its creation, distribution and end use, and maybe ultimate disposal.

1.3 What is technology mapping?

This study has employed a technique called technology mapping which is:

- A process of developing a vision of what a product or service will look like at a specified date in the future
- A means of identifying the key enablers and technology requirements necessary to achieve the vision
- A technique for illustrating the development path required for the supporting technologies

Ideally the process should:

- Describe a desirable future or vision
- Write the history of that future, which describes the technological capability required and by examining the gap between it and current technology capability identifies the critical path of developments necessary to achieve that future vision
- Develop a timeline of the key milestones to achieving that future vision
- Separate the near term opportunities
- Identify in detail the future technological advancements which will be necessary to deliver the vision
- Identify long term objectives requiring R&D
- Map the outputs

In practice it is not easy to follow this rigorous process. Nevertheless it is basically the methodology used for this study.

The core process used has been that of gathering suitable groups for workshop discussions. There are two basic stages, each with one or more workshops:

- Envisioning the characteristics of products and the business environment in 10+ years time
- Suggesting technologies that would be necessary to enable products with those characteristics to exist, be manufactured etc.

The input and output of these workshops has been supplemented by other research with the aim of producing technology maps plotting development paths between now and then.

2 Magazines

2.1 Overview

Magazines are a very successful print product sector – their business model of using editorial content to define and attract an audience which can then be used to accurately target advertising is well proven. And of course there are a number of spin-offs from this particularly in the B2B sector. The degree of market segmentation varies considerably from one country to another, the UK being at something of an extreme with more titles on sale than any other European country.

A marked difference between countries is the proportion of magazines sold on subscription. Publishers would clearly like to have a higher proportion bought on subscription for at least cash flow and sales forecasting reasons. If publishers did manage to substantially change the proportion sold on subscription it could have a significant impact on the volumes needed to be printed (as opposed to the numbers sold) so reducing run lengths and overall waste levels.

B2B publishers in particular have diversified into web-sites (especially for classified adverts), e-newsletters, conferences and training, databases and directories. While B2B in general has experienced a downturn in the early years of this decade, the same is not entirely true for some Eastern European countries although it should be noted that in these countries B2B publishing is currently a much smaller business than in the West.

Overall the Internet is having a marked impact on B2B magazines with "Web-only" customers now amounting to at least 20% of total audience. More than 65% of publishers in this sector have websites with web-only advertisers.

Contract publishing (also known as Customer publishing or Custom publishing) is growing strongly. These magazines are those published on behalf of a major company (e.g. an airline) and generally distributed free to customers. They are seen as having a role in customer retention, attracting prospective customers, staff information, relationships with business partners, dealers and distributors. UK turnover exceeds £385m (2005) up 10% from 2003. Growth in 2005 is expected to be 13%. Turnover is expected to exceed £531m by 2009 (APA Mintel Report 2005). In the UK there are in excess of 700 titles, the largest sectors being retail, financial, utlities and public sector.

The APA Advantage Study (March 2005) reported that

- Customer magazines increase share of expenditure by 8% amongst readers
- Customer magazines increase brand loyalty by 32%
- Customer magazines provide brands with the opportunities to spend more time with their consumers

- Customer magazines which contain independent editorial content enhance the corporate brand image by 9%.
- Customer magazines have a positive impact on consumer behaviour – 44% of all people who receive a customer magazine take some form of positive action as a result.

It is interesting to consider the question of whether these are really magazines or a means of promoting the company sponsoring the magazine, but they do carry third party advertising, and so for the present are classified as magazines. Pan European publishers produced more than 3200 publications for clients in 2002, a business valued at over 1 billion Euros. Western Europe is the most mature market but Estonia and Czech Republic are leading the growth in Eastern Europe.

Many magazine titles are now delivered electronically, as well as appearing in print. Attractions of the process are clearly related to timeliness, and the elimination of printing and distribution costs. Several software platforms are available for the purpose such as Qmags, Zinio, and Newsstand. (The Zinio digital magazine reader, for example, supports embedded animations in Flash or animated GIF formats, sound in MP3 and Windows media formats, and movies in various formats.)

The move to e-media has been particularly strong amongst magazines in the music sector and those aimed at young people. In February 2006, a long running music magazine, *Smash Hits*, ceased as a printed product, and titles such as "loaded" are said to have an on-line readership 20 times that of the printed version.

Circulation

In general, magazines continue to have a healthy circulation and circulations of some of the titles with the largest readership are continuing to grow. In a number of western European countries, between 80 – 95% of the adult population read magazines on a regular basis. Consumer expenditure on magazines is predicted to rise by an average annual compound rate of 2%, reaching $37.236 billion in 2006, but this includes (and may be substantially accounted for by) increased cover prices. B2B magazines are however, different and are experiencing overall decline as a result of advertising revenues moving to the Internet, still often under the banner of the magazine publisher. A recent trend has been the introduction of a number of weekly titles aimed predominantly at young women. This has resulted in a high growth rate of titles, and increase in overall readership, with many in this group reportedly reading several publications per week.

Advertising

Global advertising expenditure is expected to reach $743.37bn in 2006, growth of 6%/an. But on-line advertising expenditure is expected to rise 22% in 2006, a rise from 15% growth the previous year. Global *magazine* advertising revenue is predicted to be $51.55 billion in 2006, as a result of an average annual compound growth rate of 3.2% over the 2002-2006 period. The Internet is expected to have a 5% market share of advertising expenditure by 2007. (Source: ZenithOptimedia) It is clear that there is currently a strong growth of advertising in e-media compared to magazines, and while the market share of e-media advertising is still small, over a number of years the strong growth will have an impact on relative market shares.

In B2B markets, ad spending is predicted to increase from $69bn in 2001 to $88 billion in 2006. (Source: PricewaterhouseCoopers: Global Entertainment and Media Outlook 2002-2006 report.) However, an increasing proportion of this is purely for e-media use. Whereas it was the case that advertising was sold for the print product and the Internet was either free or a marginal cost extra, the situation is now reversing. Advertising is being sold for the Internet, and the print version comes second. Hence the already quite sharp decline in B2B *printed* products.

On a more positive note, advertising in magazines and on TV are seen as complimentary to each other. It is now well demonstrated by many FIPP studies that at a given level of expenditure, greatest effect is achieved by using both media rather than all one or the other. Several publishers also view the printed magazine and its web equivalent in a similar fashion – each promoting the other so that overall readership grows.

2.2 Magazine trends

General trends	• Continuing polarisation of generalist and specialist titles - more products serving narrow market interests (in consumer field) • Growth in ad hoc specialist-topic extra editions building on brand of main title • more subscription and controlled circulation readership • loss of advertising revenue to other media • growth in Eastern European markets
Technology drivers	• digital photography • digital workflows including DAM, leading to final PDF pages produced in-house resulting in reduced timescales and costs • Internet and especially broadband provide enhanced user experience
Other drivers	• lack of readership profiles • copyright concerns • environmental concerns – total materials waste in the supply chain about 30% • The Internet – encourages direct publisher/consumer interaction leading to increased sales of print product in some cases, but increased migration of advertising revenues away from print product • B2B making substantial use of Internet for classified advertising and reader services
Potential for electronic substitution	• Print product is a highly successful format for reader and advertiser, hence retarding change • STM (Scientific, Technical, Medical) is prime user of electronic media • Young people (tomorrow's adults) are in-tune with e-media and it may well remain their preference in adult life
Indicated overall product trend	• Magazines will become increasingly niche, with smaller circulations • Magazines will become prestige high cost items (equivalent to coffee table books) • An increase in number of titles (resulting in overall increase in circulation)

Table 1 Trends affecting magazines

2.3 The Supply chain

The supply chain for magazines is in many ways similar to that of other fast moving manufactured products for consumers, involving distribution companies, high street retailers and supermarkets, although a proportion of magazines are delivered by post (about 12% in the UK).

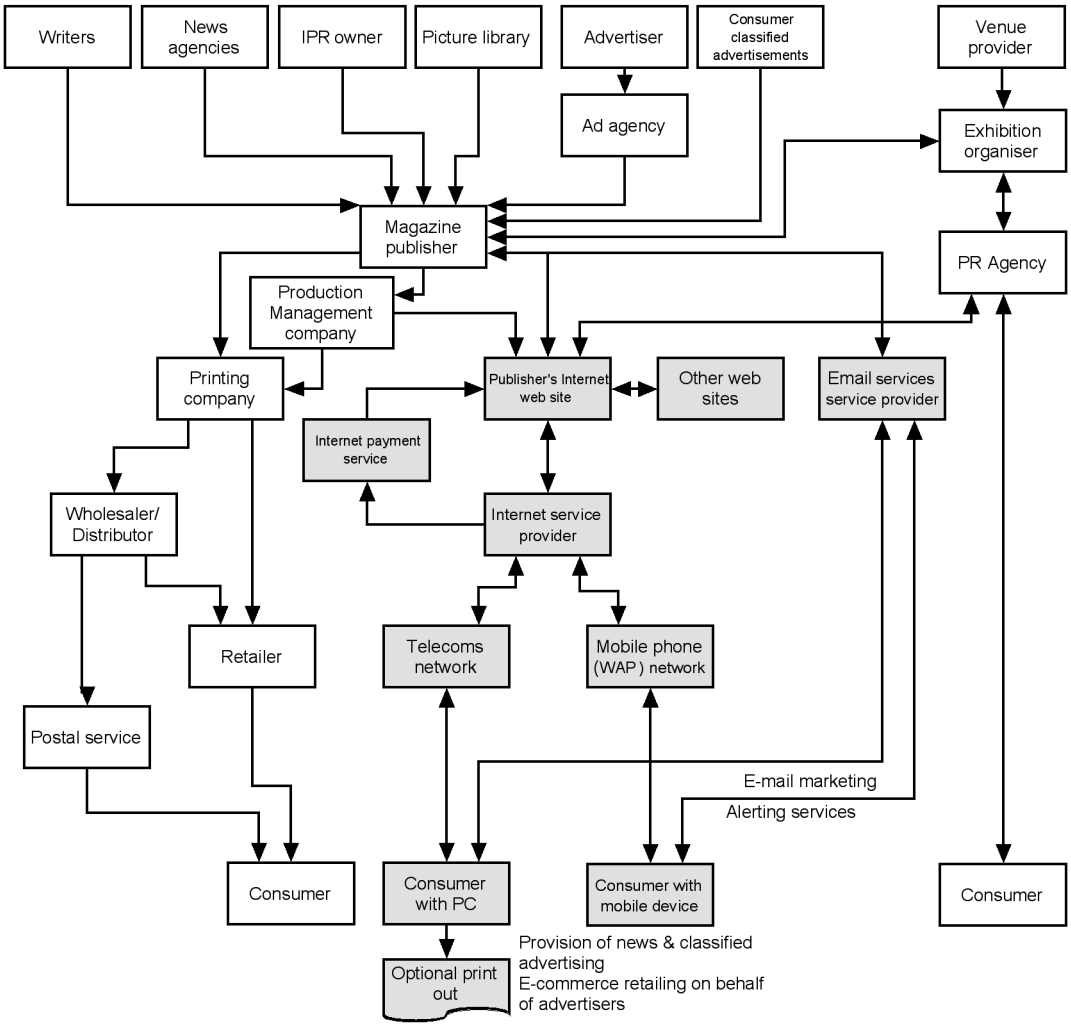
Typical supply chain trends for magazines are:

- The introduction of new channels, each presenting the traditional opportunity of attracting consumers and defining a readership with content, and delivering paid-for advertising, while keeping with established brands and familiar markets
- Growth of subscription based services, notably with businesses
- Partnership developments with digital media services

- The opportunity for getting closer to readers by creating interaction and obtaining feedback from them, so as to build customer profile databases for the benefit of the magazine and its advertisers. The printed magazine is viewed as an essential tool for promoting the web and the latter in turn provides the feedback.
- To build on the strengths of the different channels, create interaction and cross-linking between them, so making them mutually supportive, each promoting the other
- Diversification into new lines of business, for example, selling own-brand products or acting as an e-tailer for the goods and services of advertisers. Some magazines are seen more as direct mail items, promoting the products and services from the publisher.

The supply chain diagram shows the introduction of a production management company (i.e. a print management company but possibly with a broader range of activities) between the publisher and printer.

Fig 1 Magazine supply chain (Source: Pira International)



2.4 Production technology

Pre-press

Magazine production has been at the leading edge of using workflow management systems. This has contributed to reduction in timescales and the introduction of CTP. Most magazine publishers have in-house editorial/design teams making up pages which are either sent directly to the printer or sent via a repro house. The incorporation of advertisements is still a significant reason for continuing to use a repro house.

Software advances are increasingly automating the page assembly process, especially for less artistic layouts such as used in B2B publications. Advertising management systems have for several years managed ads appearing in both print and on the web, and increasingly the automated conversion of editorial matter between media is also possible although not widely used at present.

Printing, finishing and distribution

The majority of magazines are printed by heat-set web litho or gravure. However, many magazines, especially in the B2B sector have small circulations and are printed sheet-fed litho. A number of magazines, especially weeklies, have the character of a weekly newspaper and are printed cold-set.

The main trend in production has been the introduction of increased levels of automation on web machines such that changeover times can now be well under 30 mins with start up waste levels at about 800 copies on the latest models. But there is a large installed base of older machines which will be in use for some years and which do not have a performance approaching these levels. A benchmarking study in 2004 for Vision in Print found that make-ready times were typically 55 minutes and could be up to 3 hours.

In the UK with nearly 90% of sales through retailers, the distribution and retail process is an important aspect of the supply chain. Standard practice is to oversupply the retailers to ensure that, as far as possible, every potential sale actually materialises. But this leads to some 20-30% of magazines remaining unsold and being returned. Distributors are responsible for collecting (and counting) all unsold magazines. In view of this much thought and experimentation has taken place on a sales replenishment system. e.g. send 75% of expected sales to a retailer at the beginning of the month, and track sales against the expected sales decay curve. When an out-of-stock situation at a retailer is predicted, then a top up batch of magazines is sent, say 15 copies. Since deliveries are made daily to most retailers these deliveries can be made without great additional cost.

However, sales replenishment only works (if at all) with high volume magazines

(where total sales are such that it is worth sending top ups of 15 copies etc., and where timescales allow – i.e. it doesn't work for weeklies, which is unfortunate since the recent number of new weekly titles has resulted in a large increase in waste levels.

Cover mounts have a high cost. They force much manual handling, firstly to put the cover mount on, then piles do not stack well so more handling is necessary, and its more difficult for the retailer as well. Its also more awkward to handle the returns. Cover mounts also impede recyclability unless removed.

2.5 SWOT of magazines

It is often instructive to consider the functions or purpose of a print product and then examine how well it performs those functions. This can show whether a print product is susceptible to threat from alternative media. The workshop group suggested the following functions/purposes for magazines:

To:

- make money
- advertise products and services
- promote magazine/publisher's brand
- build a community of consumers
- foster positive relationships with consumers
- provide entertainment
- provide information
- provide escapism for readers
- feed particular interests
- educate
- inspire and influence

While the printed product may perform these functions well, it must also be said that e-media can too. Functions which depend on the physical form of a magazine are clearly a strength but others are possibly better addressed by other media. Many people will say they like the browse characteristics of a magazine, its high quality graphics, the ability to write on it (puzzles etc.) and these are all good points. But a printed magazine is less good in other areas and the challenge for print is to develop means of enhancing these, at present, weaker functions.

The workshop discussions revealed that the functions related to building community and relationships are now seen as critical for the future. Magazine publishers have always been a little distant from their readers, but in the competitive climate that now exists, good content is not enough to maintain readers' loyalty, but a relationship might be. E-media, because perhaps of their close-to-real-time interactive functionality are better at this than print.

Clearly in looking to the future, a separation must be made between the magazine as a publishing concept and the printed magazine. The former may continue to thrive (in fact publishers are optimistic about their future) while the printed product may decline. Certainly a current weakness of magazines is the cost of production and distribution (especially compared against web publishing), and this is perhaps the biggest challenge to be faced.

3 Direct Mail – current status and development trends

3.1 Overview

Direct mail is one print product from the broad class of promotional print items, but also one medium amongst the several used by the Direct Marketing Industry. During the 90s it experienced phenomenal growth although this has slowed somewhat in the UK recently. However in other parts of Europe, especially Central and Eastern Europe, the prospects for growth are high.

In the UK:

- 78% of direct mail is to consumers, 22% to business (2003)
- Direct mail volumes have increased by 139% between 1990 and 2003
- In the same period, expenditure increased 165%
- It is estimated that direct mail generates over £26 billion of income for consumer advertisers each year
- Of the £26 billion, £9.5 billion is spent on clothes, £4 billion on books, and £1.8 billion on electrical goods.
  (Source: The Letterbox Factfile)

Direct mail is a broad category – there are specialist direct marketing companies, print management companies, specialist direct mail printers and so on, but at the other end of the scale, many (often small) general printers will undertake relatively small and technically unsophisticated direct mail promotions for local businesses.

Direct mail can be defined as:

- a printed product, addressed and delivered to a definite individual who matches some selection criteria, with the purpose of stimulating some action that leads to a sale or potential sale, or that provides profile data for subsequent use, or may simply provide the recipient with information.

  There are some grey areas however, such as flyers sent to “The Occupier”. These use a selection criteria, but its rather broad.

There are several categories of direct mail, the main ones at present being:

- Personalised letter plus flyers, simple to complex, as used by, for example, Reader’s Digest, Consumer Association, financial services, and many smaller companies promoting products or services.

- Personalised catalogue or brochure, used by car sales, electronics, computing and general mail order companies, especially clothing.

- Customised content brochure, not widely used but some car sales, holidays etc.

A CAP Ventures study on digital variable printing and direct mail stated that personalised printing offers a 36% increase in response rates over non-personalised direct mail. The average order size is nearly 25% larger, response times are one third faster, and result in a nearly 48% rate of repeat orders. Adding colour to a personalised direct mail campaign increases response rates even more. Direct marketing is a growth business as the following tables illustrate.

	2000	2000	2005	CAGR 00-05 %
Germany	22733	25591	36886	10.16
UK	16530	17671	24312	8.02
France	13969	15711	21614	9.12
Italy	11611	13098	18951	10.3
Netherlands	4808	5517	8003	10.73
Switzerland	4801	5098	5898	4.2
Spain	4065	4563	6703	10.52
Belgium	3588	4044	5895	10.44
Sweden	3132	3574	5347	11.29
Austria	2408	2706	3840	9.78
Norway	2389	2599	3274	6.51
Finland	1797	2088	3242	12.53
Denmark	1799	2026	2942	10.34
Ireland	1408	1744	3309	18.64
Portugal	474	545	858	12.6
Greece	435	506	797	12.87

Table 2 Direct marketing expenditures ($US millions)

Source: Direct Marketing Association (US)

An alternative source provides slightly different figures.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
France	8.8	9.4	10.2	10.7	11.9	12.8	13.8	14.9	14.4
Germany	19.0	20.6	22.4	23.1	23.8	24.7	25.5	27.0	28.2
UK	10.4	10.4	11.4	12.4	13.4	14.4	15.4	16.4	17.4

Table 3 Direct marketing expenditure (Euros, billions)
Source: Euromonitor (2003)

So while direct marketing is growing, a key issue for the future of printed direct mail is the extent of the impact of electronic systems. This has been overplayed in the past, and the expected impact of WAP (Internet on mobile phones), for example, has failed to materialise. But this might not be so much because the premise was faulty, just that the technical implementation was not really ready. It is worth pointing out that iMode in Japan has been very much more successful than WAP has in Europe.

Many organisations are building successful marketing campaigns using refined email techniques. They focus on “opt-in” customers with a declared interest in a particular product or service. Such campaigns include the ability to track and fine-tune the message in almost real time, and provide customer response times in hours rather than days. Eventually it appears that many successful marketing campaigns will include both email and print components, along with an effective web-presence. It really does appear that the combined effect is more than that of the sum of the parts.

Direct mail depends strongly on digital print and more particularly variable digital print capability. Variable digital print can result in a reduction in print volumes because

- It enables and encourages better targeting of recipients
- It enables and encourages better selection of content. An example is provided by Whirlpool which had a 200 page catalogue which it used to mail out. It has reduced the main catalogue mailing by 15-20% by using a 16 page mailer, the mailer being sent to prospects generated by a customer service representative during the catalogue request call. The mailer was specifically tailored to the appliances that the prospect had talked about and reflected their interest in a particular model, style and colour.

3.2 Trends

Table 4 Trends and drivers of change influencing direct mail

General trends	• more colour, special effects, selected substrates • shorter production runs, printed more often • personalisation and more customisation of content • Direct mail remains successful but rate of growth decreases
Technology drivers	• digital print and associated software developments enable personalisation and customisation of content to be achieved more easily • CTP and automated make-ready presses reduce minimum viable run lengths • Customer relationship management systems encourage growth of customer profile databases • Email and web marketing • Increasing sophistication and accessibility of e-media providing strong competition to direct mail
Other drivers	• mail and distribution costs • environmental concerns • Anti-spam software and legislation curtails email marketing to opt-in recipients only, thus encouraging printed direct mail • Growing evidence of the effectiveness of print as a promotional medium especially when used in conjunction with electronic media
Potential for electronic substitution	• print has good user interface characteristics • quality of direct mail pack, brochure or catalogue implies quality of product/services being promoted • tangible • advertising is intrusive on web pages • e-mail marketing provides quick and measurable response • several user benefits to electronic versions but all are considered more intrusive and less acceptable to most consumers than direct mail

It has become increasingly possible for marketing departments to produce their own artwork for printed promotional materials, and this, together with simple but sophisticated mail merge software enables them to do their own printing at the desktop which has the advantages of:

- Printing on demand (i.e. no stock)
- Always up to date
- Personalised and customised to the needs of the immediate customer

However, desktop production has some downsides such as

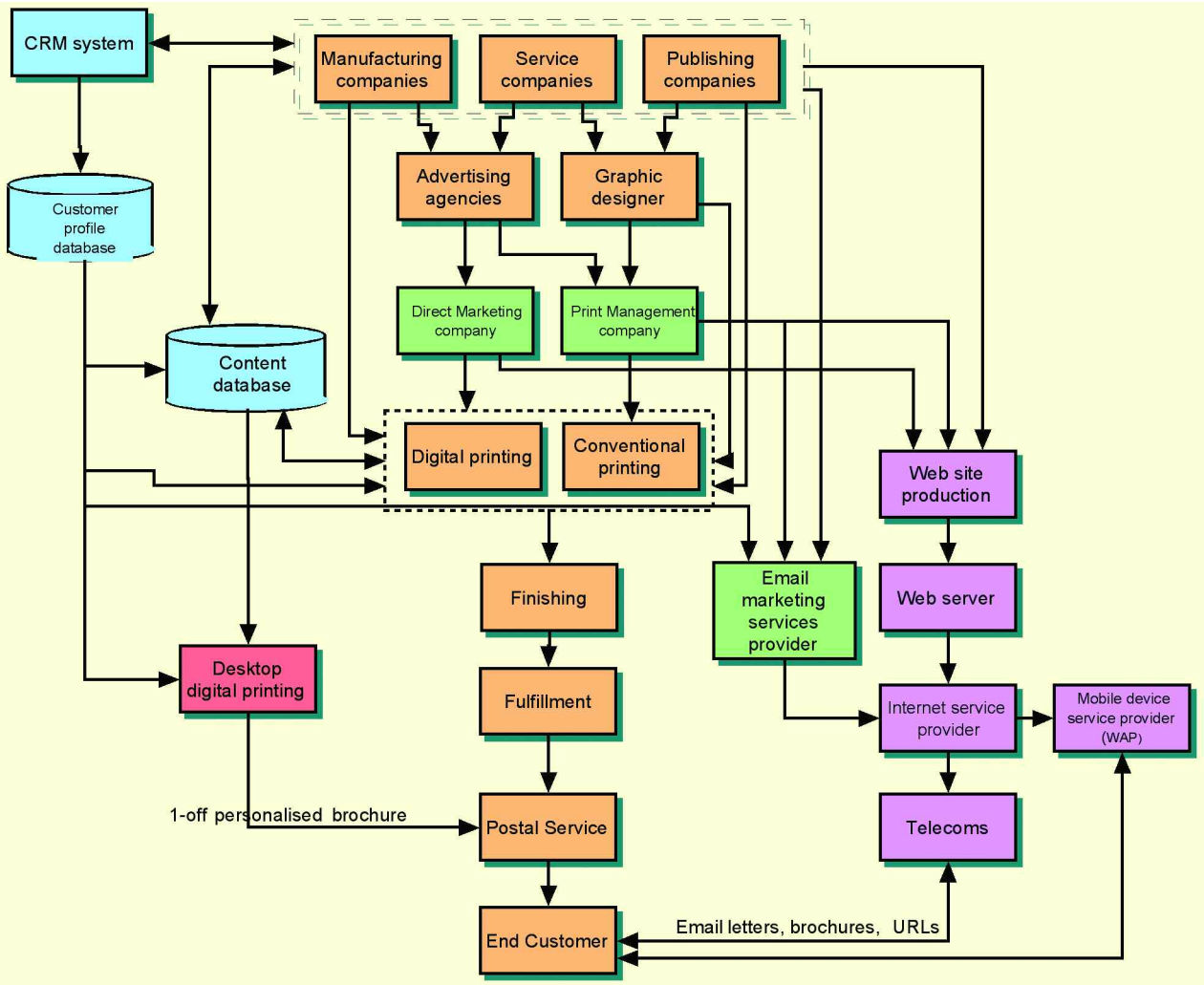
- Need for good in-house IT system and software
- limited format and substrates
- some loss of quality
- slow if reasonable quantities are required
- lack of discipline over design
- limited or no finishing capability

These weaknesses are being used by printing companies, so that:

- Print and repro companies can and are taking on the role of managing content databases. This then fits in well with the use of CRM systems, and together with digital print systems has lead to the concept of a CRM driven workflow.
- Digital print and DI print technology are becoming more popular to provide fast on-demand production of traditional print quality materials but with the added bonus of personalisation and customisation
- The print company takes on fulfilment. Many companies are now doing this.

3.3 The supply chain

Figure 2 Direct mail supply chain (Source: Pira International)



The supply chain has undergone considerable change in recent years and more can be expected. Specialist Direct marketing companies have grown up which take on the role of designing and placing campaigns, optimising media and distribution purchasing and so on. (Advertising agencies used to do this but hardly do now.) Also, a few specialist print management companies have developed -

their role overlaps that of the Direct marketing companies to some extent but perhaps focuses more on production. Because of the complexity of purchasing across media, the range of distribution options (of which there will be more in the near future, see section 6.1) and the range of production options, there is much scope for more specialist agencies to develop.

3.4 Production technology

Pre-press

The production of direct mail relies on the existence of a database of at least names and addresses, but hopefully more. Names and addresses only enables only a blanket type of direct mail, but with additional information one can be more selective. This can result in what is still a simple personalised item but sent to a more select group, or, if the additional data is sufficiently good, a fully customised product in which the whole or part of the textual content and graphics are selected based on the information to hand.

Simple personalisation can of course be carried out by programs as simple as a word processor. But generating customised content products usually requires something more complex although again, simple versions can be produced using desktop publishing software. More complex customisation requires dedicated software (e.g. Pageflex) or increasingly plug-ins to desktop publishing programs (e.g. XMPie as a plug-in to Adobe InDesign).

This leads to a system architecture similar to that in the following diagram. However, in this case an extra dimension has been added to make direct mail part of a multi-media promotional activity, since this is now proven to be the most cost effective way of achieving a customer response. Consequently pre-press systems now have to be multi-media in nature and we can only expect this to be reinforced by future developments.

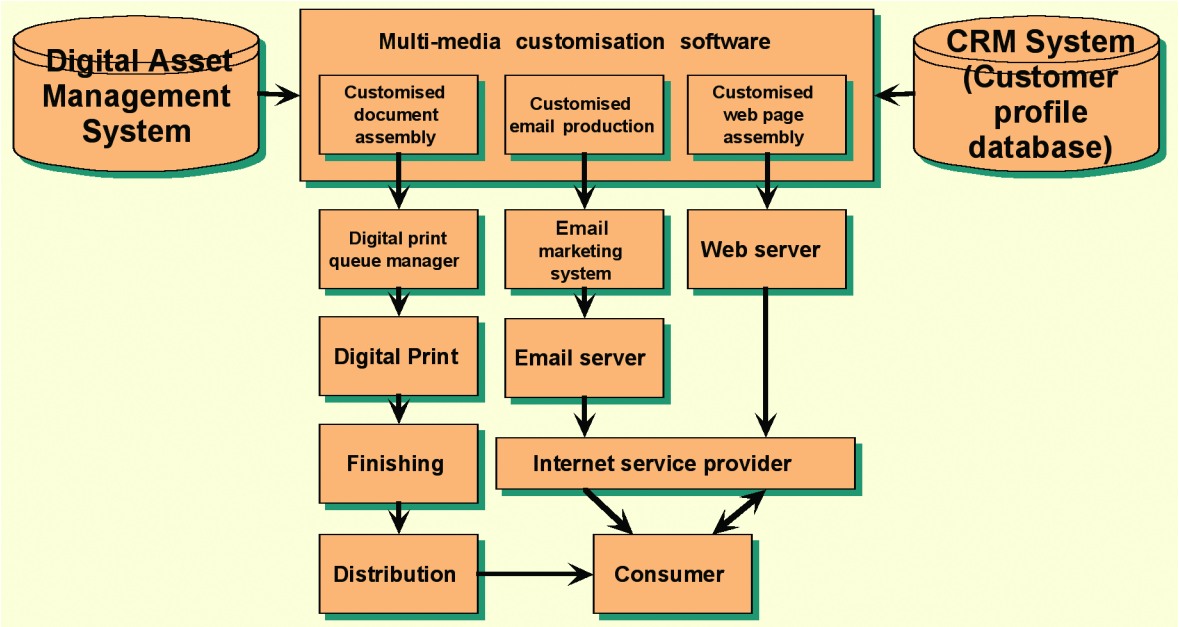


Figure 3 Conceptual system architecture for customised customer communication (Source: Pira International)

Printing and finishing

Printing is typically done by litho printing (sheet or web) supplemented by digital print. Where simple monochrome personalisation is all that is required, the digital print has often been inkjet (largely because of its speed). Where higher print quality and/or full colour is required, toner based systems are used. But these are relatively slow and we can expect to see inkjet being used much more widely in the future.

A significant challenge for printed direct mail is making it sufficiently interesting that the recipient will open it and read it. This is where finishing processes can really make a difference (and where printing companies can offer something that DIY direct mailers cannot achieve). Machines such as the Heidelberg Flexomailer can produce a huge range of folded, glued, die-cut, perforated, and assembled products at high speed in one in-line operation. Printed direct mail items produced in this way really stand out from the crowd.

3.5 SWOT

The definition of direct mail given earlier suggests its purposes as:

- Stimulating an action which leads to a sale or potential sale
- Collecting profile data for subsequent use
- Providing information to the recipient

The workgroup identified the following strengths and weaknesses of direct mail in relation to these functions as:

Strengths

- Requires no action from recipient to achieve delivery – it is a “push” medium
- Regarded as the least intrusive of the direct marketing techniques
- Tangible - can make good impression of brand, quality of product
- Can present much detailed info and high quality graphics
- Good for establishing initial contact

Weaknesses

- Needs to create enough curiosity to get recipient to open it
- Requires customer database
- Perception of being environmentally unfriendly
- Can’t complete sales transaction
- One time hit may succeed or fail in seconds
- Slowish response

Direct mail clearly faces competition from email marketing and other forms of direct marketing. However, the workgroup regarded the strengths of direct mail as highly valued and unique and therefore were confident that its use would continue and grow. In any case direct mail is viewed as a useful tool in conjunction with e-media forms of direct marketing, so is complementary rather than competitive.

4 Technology change viewed from the present

The technology mapping process involves looking 10-15 years ahead. This has difficulties, since there are fundamentally two types of change that occur over this period of time:

- incremental or evolutionary change. We are all familiar with this, and its effects can be predicted to a reasonable degree by extrapolation of current trends.
- Step change – a new technology or development that challenges established norms, enables new ways of doing things, may radically alter supply chain structures, bring about a step change in performance levels, or introduce a change in lifestyle. Change of this nature can come 'out of the blue' and is clearly difficult to predict. However, as some following examples will illustrate such changes are often based on technology developments from some 10 years previously. With hindsight this can be seen but spotting these developments ahead of time is far more difficult, and even more difficult is to recognise the implications. Some examples are:
- Lasers
- Postscript
- Integrated circuits
- MP3 files

Furthermore we can have what might be termed foundation technology such as ICs or even semi-conductors, or task specific technology such as closed loop vision print inspection systems, and of course many stages in between.

But there is also a sense in which at least some technology developments occur as a result of a recognised need. In this study we need to try and bring all these types of development into play as follows:

Consider what incremental changes in technology will take place over 10-15 years that will change the marketplace environment within which printed products operate and are used, and what the impact of this will be

Consider what technology developments are currently embryonic but could bring about a step change in the marketplace environment, hence, for example, radically changing consumer demands.

In the light of that marketplace environment of 10-15 years time, what will print products, and the businesses that publish or use them, look like then.

Finally, what technology developments are necessary to enable these 'new-look' print products to be created, manufactured, and distributed.

A number of technology areas are discussed below to provide a taster for some of what might be possible in the coming years.

4.1 Computing

Computer technology is a good example of Incremental change. Moore's 'Law' has proved (astonishingly) good at predicting the development of personal computers (and other forms of computing) over three decades or more as the

following graph (this one originally drawn in 1997) shows.

From this graph we can see that today's typical PC has a specification of:

- 4GHz clock speed
- 1 Gb RAM memory
- 200 Gb Disc storage

And that by 2015 this will have changed to

- 50 GHz clock speed (approximately 12x increase)
- 70 Gb RAM memory (70x increase)
- 30 Tb disc storage (150x increase)

In broad terms this will amount to say a 15x increase in performance plus a huge increase in storage capacity. But this can also translate to a dramatic cost reduction for a given level of performance which will result in all sorts of new uses for computers.

This extent of development is unlikely to be achieved by simple extrapolation of today's microprocessor technology. However, microprocessor chips with multiple processors are now available – these maintain the clock speed at "modest" levels in each individual CPU, but given suitable operating systems and applications can work in parallel, and hence all contribute to a given task, or perform multiple tasks simultaneously. It so happens that many tasks involved in printing and publishing (image processing etc.) lend themselves to this parallel processing approach so will benefit hugely.

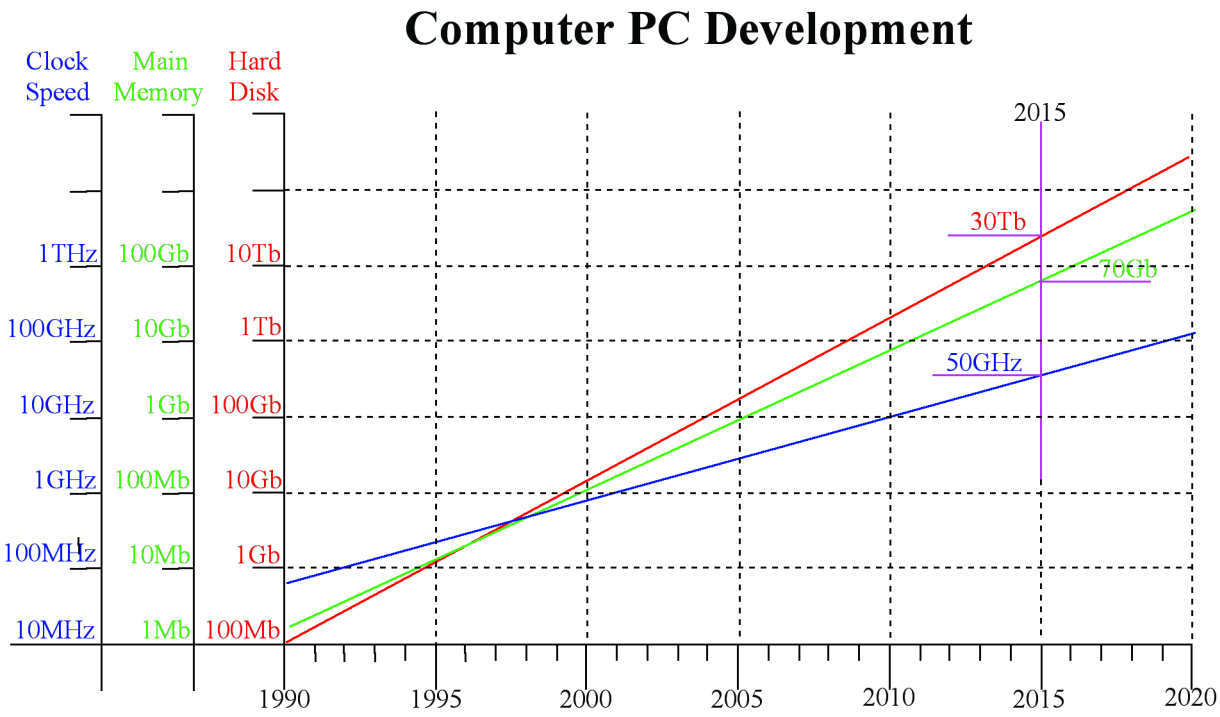


Fig 4 Personal computer development (Source: Pira International)

4.2 The Internet

The principle use of the hardwired telephone network will be to provide the infrastructure for the Internet and associated data transmissions. We can expect speeds to be 100 times faster than today (or considerably more!) which radically alters how one thinks about the Internet and how it will be used. For example, it is quite likely that it will be possible to download a complete film at DVD quality in a minute or so. Voice over Internet will be a standard method of business communication commonly accompanied by video of perfectly good quality. Virtual conferences and exhibitions, remote medical diagnosis and working at home will be commonplace (note that there are strong financial pressures behind each of these examples). Virtual reality systems will also be widely available, used in entertainment, games, and training simulators. It is in this type of environment that printed products will have to compete.

Wireless-Fidelity (Wi-Fi) devices and networks promise to provide the foundation for easy access to the Internet in many locations. Wi-Fi networks can be found in coffee shops, public parks, hotels, airports and homes, and access is growing rapidly. Rapid growth is expected in the next 5 years. As Wi-Fi points become more pervasive, the Internet reach will become wider. As a result, organisations and individuals will access and interact with information anytime anywhere with a wide range of different devices. Starbucks in the US has installed access points that enable anyone entering the coffee shop to seamlessly integrate their existing Internet access device and connect immediately. This approach is also amenable to interactive advertisers who are interested in location based or geo-targeted advertising to promote timely and actionable offers.

4.3 Mobile technology

Even now there are 1.8 billion mobile communication devices in the world - that is to say, 1 in 4 of the world's population has such a device. It's also many times the number of installed PCs in the world, never mind those having Internet access. (Currently 250 million mobile devices are Internet enabled.) So THE method of communicating electronically with the largest number of people (and especially young people) will be through their mobile devices.

We will all have a unique personal identifier for all forms of communications (phone, email, post etc) so that we are accessible wherever we happen to be. This will also facilitate secure payment for goods and services either ordered remotely, or at our local position using bio-sensing devices built into our mobile devices which confirm our identity.

Mobile technology using dedicated communications networks and/or Wi-Fi networks (devices will intelligently choose the most appropriate) will be much lower cost than today and combined with the much lower cost of computing technology

will therefore be built into many other devices for a wide variety of purposes. For example, pharmaceutical packaging could monitor when pills are taken and this information be transmitted and monitored remotely to ensure drugs are being taken to schedule.
Location based services will be a significant use of mobile devices. This is embryonic today partly because mobile phones can only be located within fairly large cells, typically 100s of metres across. But the mobile phone of the future will be GPS capable, enabling location to be identified within a couple of metres. All mobile phones in Japan will have built in GPS from 2007 by law.

IPCMedia views mobile as a new but increasingly important channel for IPC brands (Tim Brooks, IPCIgnite). Conde Nast has signed a deal to supply magazine content to 02 customers. This will feature selected content from Vogue, Easy Living, GQ and Glamour.

4.4 Printed electronics

Today's printed electronic devices are simple, often passive, and produced relatively slowly. But in 10-15 years time this is likely to all be different, with complete circuits being produced at the same rate as the printing of packaging, magazines or direct mail items. The result will be greatly enhanced functionality of printed products, which for packaging might include:

- Cosmetics which glow (i.e. are self-luminescent to enhance visual appeal) as one approaches
- Food (e.g. history/condition monitoring)
- Pharmaceutical (e.g. consumption schedule monitoring)
- Medical (e.g. diagnostic systems)

and could incorporate transducers, simple display systems, sound triggered response, speech synthesis, as well as communications technology. Similar capability could be built into magazine and direct mail products, fundamentally changing the nature of them.
Printed electronics is one way of providing printed materials with interactivity and communication capability. But 2D bar codes already provide another very low cost way of doing this. A 2D code is a two dimensional matrix containing dark light squares.

This 2D bar code has been copied from the Finnish PrintAccess project. Details can be found from the web page of the project (http://www.printaccess.org).

Figure 5 2D Bar code (Source: See box)

Various forms and dimensions exist, but all are reasonably small (similar to a typical bar code), and printed using standard printing techniques. Two current examples are:

- In conjunction with UPCODE software in a mobile phone (free download), the phone's camera can read the code, then connect to the web etc. (http://www.upc.fi/)
- Another version from Datasound GmbH consists of 9-10 million dots about 30 microns in diameter, and carries 50kB of data. This can store PDF files, images, 30 seconds of sound etc.

4.5 E-paper

E-paper is a form of electronic display consisting of a thin, flexible carrier which does not consume power to maintain the image. It only requires power while the image is being changed. It works by reflected light and provides a reading experience similar to ordinary paper and has rather higher resolution than today's computer screens. There are several types of e-paper being developed by companies such as BASF, Canon, Dainippon Ink, HP, Ricoh, Fuji Xerox, Fujitsu, Philips, Mitsubishi, Siemens, Sony and Xerox. The first applications are already around. The technology has been used in the US for some while in department stores for overhead promotional signage which is only changed say, once or twice a day. More recently Sony has launched the Librie E-book reader. However, in several year's time e-paper technologies are expected to be used in print market applications such as books, newspapers, magazines and office communications. (CAP Ventures)

4.6 Digital print

Digital print will work at speeds of some of today's conventional printing systems albeit probably still at higher cost for bulk quantities. But mass customisation will be the norm and hence the scope of application of digital print will be wide. It will be the process of choice for the mass of general commercial printers, be integrated into packaging lines, be a major production process for books, and even be used for some newspapers. It seems likely that at least part of some magazines will also be digitally printed. At present toner printing systems are the predominant digital print technology. However, this looks as if it may be reaching a plateau of capability, leaving the way clear for inkjet to improve. By 2015 it is expected that inkjet will be of equivalent print quality, much faster, and much cheaper than toner printing systems.

4.7 Automation and implications

Automation of a wide variety of tasks and functions on sheet-fed litho presses has taken place. This is spreading to web-offset machines and also to finishing equipment. As JDF becomes more widely used then the full potential of this automation will be realised, making a substantial impact on changeover times from

one job to the next, especially where substantial reconfiguration is necessary between jobs.

Automation has also been applied to press control systems. Closed loop control of web tension, register and colour density is now commonplace on web machines, and closed loop colour measurement and web inspection are available. It has taken longer to automate the press start up sequence – this really requiring an expert systems approach, but this is now developing. Interestingly, however, as was demonstrated by the Vision in Print benchmarking study of 2004/5, the manning levels of web machines remain typically at 4-5 people. Labour cost is a major proportion of cost in the print process, and consequently a substantial reduction in manning can be expected, and indeed is probably required.

Automation has also been applied to prepress. Workflow management systems have developed well. The next stages of development would appear to be integration with MIS (or EIS) systems (including full implementation of JDF), and the implementation of "project management" functionality. At a more detailed level, the page assembly process will become more automated (there are some interesting developments related to newspapers that are likely to be transferable into magazines), and software will generally become more pre-media in nature than pre-press. That is, it will facilitate the easy transfer of content across and between media, with transparent conversion processes if necessary. As part of this we can expect DAM functionality to become a standard component of operating systems.

5 Future vision of magazines

5.1 The publishing environment

The publishing workgroup reported that publishers are very bullish about the future. As pointed out earlier, magazines are currently a very successful print product, well liked by advertisers and consumers, and experiencing healthy growth trends, which can be expected to continue for some years. But the workgroup also pointed to some trends suggesting that the long term future of printed magazines will not be so secure. It was felt that in many cases the current business model for printed magazines will not be sustained. In some cases, especially B2B magazines, advertising is migrating to e-media and hence publishers must severely cut costs – using the Internet enables them to eliminate paper, printing and distribution costs, hence is a very attractive proposition. For some publications this is expected to lead to publishers ceasing to print before consumer demand dies. It was also stated that publishers are not investing in the future of the printed product – but they are, heavily, in the future of e-media products. (This is true in terms of developing the magazine product, but publishers are certainly investing in the creation of new titles.) As a consequence of these trends, the publishers' workgroup thought that the market for printed magazines will be perhaps 40% of current values in 10-15 years time.

These trends will impact some types of magazine sooner than others, e.g.

- TV listings – printed version ceased within 5 years
- Business to business magazines – printed versions in serious decline within 5 years or sooner
- Fashion magazines – the printed version will become a niche product
- Coffee table magazines will continue
  (It was pointed out that "youth" and "music" titles already have an on-line readership many times that of the printed version)

In 2015 the typical consumer will be on-line all the time and anywhere, multi-tasking, have numerous digital gadgets e.g. PSPs (Play Station Portable) and will make their own choices of content. The publishers viewed giving the reader the ability to make choices an important issue for the future.

To state the obvious, today's 15 year old will be a 30 year old adult in 15 years time. Today's 15 year old does everything on-line. Today's typical teenager comes home from school, plugs her memory stick into the laptop, starts music playing, logs onto MSN to see how her friends are doing, opens up work she's been doing during the day, researches additional material on the Internet, prepares homework, and submits it by email. For today's teenager it's already a digital on-line world. By 2015 that will be true for us all.

It is tempting to think that this only appeals to the young. But technology is becoming easier – even for the elderly – and a screen might be easier to read by partially sighted people than paper.

The Business model

The publishing workgroup was of the view that the current business model for magazines cannot be sustained, although not all publishers are of this view by any means. For some titles, advertising is migrating to e-media because it is more cost effective. Consequently publishers must cut costs – using the Internet enables them to eliminate paper, printing and distribution costs, hence is an attractive option. The elimination of paper and production costs means the publisher does not need as much advertising and sales revenue but can still make more profit. But other publishers are pushing for higher quality publications (higher quality paper etc.) even if this does mean higher production costs. And yet others (which might include some of the recently introduced weeklies) are pursuing what might be regarded as a more cheap and cheerful approach.

However, many publishers have become accustomed to continuous price reductions from their suppliers over many years and will still be expecting this to continue, although it is becoming more and more difficult to deliver. Where serious cost reduction is required and cannot be obtained the printed magazine of the future will become a high price, prestige, leisure item serving a specialist market and produced in fairly small quantities as a by-product of publishing an electronically delivered version.

B2B magazines have already experienced a very strong move of advertising to the web. In some cases it is advertising on the web which is now sold with the printed version being secondary. This is a marked reversal of the situation just 2-3 years ago.

B2B is about selling valuable information and bringing buyers and sellers together. (and it could be said that this is what consumer magazines also do). The existing B2B business model will continue but with more focus on locating and selling high value information. Site licence subscription models are also expected to develop more strongly.

In general, a more flexible package is likely to be associated with subscriptions. The subscription will provide dual paper/online access giving an enhanced version for subscribers with real added value compared with that available for the impulse buyer of the printed product. Subscriptions will more commonly be to the publisher rather than a single title. This will permit a change of title part way through a subscription period or even a mix and match approach from several titles.

Magazines are increasingly a form of direct mail – they deliver advertising to a

target audience. In this role

- They may be loss leaders to promote other more profitable products
- They have mass appeal and can be useful as a mechanism for finding out what people want – i.e. market research

Consumer magazines are about developing the magazine brand, which is then used in a multi-platform multi-product mode.

Distribution

The big issue with distribution is that of returns. In the UK, with about 88% of sales taking place through retailers, the publisher has traditionally over-supplied to ensure that every potential sale can be fulfilled. But this leads to many unsolds, hence returns, typically 20-30%. Returns are a real cost and the current distribution model is only sustainable providing actual sales remain at a high level. This is because distributors only get paid on the basis of actual magazine sales. So the more returns there are the more work they have to do (collecting and scanning all the returns) but there is no associated revenue for them. (It takes 3 secs on average to scan a magazine – but is made much worse by cover mounts and poly wrapping.) This approach is necessary since many newsagents do not have e-pos systems so tracking sales and stock levels through a month is not possible.

It is worth noting that if sales volumes go down, the distribution cost/copy goes up since the overheads of the distribution system have to be spread over fewer magazines, and returns as a proportion of delivered magazines increases.

The magazine distributor of the future might be a distributor of electronic publications on behalf of many magazine publishers. This is similar in principle to the situation now existing with the digital printing of books. The model created by NewspaperDirect which enables electronic distribution of 250 newspapers from 55 countries is also possibly relevant. This provides a reader experience on-screen which is nevertheless very similar to reading the printed product. However, the point of interest is that NewspaperDircct is acting as an e-media distributor for many publishers.

5.2 Nature of the product

A number of key themes have emerged from the technology mapping process:

- Giving readers choice – this operates at a number of different levels – choice of media, choice of publication from a given publisher, choice of content, selectivity – the ability to pick and mix, ability to search etc. For some magazine products it will mean customisation of content for all or part of a publication. Underlying this concept of choice is the notion that publishers will need to become “closer” to their readers, and this will require a far higher proportion of readers to be subscribers than is currently the case in the UK.
- Many magazines will become prestige items (more like a coffee-table book).

They will be produced to very high quality, be relatively expensive and be produced in relatively small quantities compared with current batch sizes. The vision is that the mass of readers will read on-line, and that is where the advertising revenues will be spent.

- The magazine product will routinely be a dual-media product. Part of the reason for this will be to give readers the ability to access editorial and advertising content of a very specialist nature. Coupled with this will be the ability to search an archive, a process that, because of the volumes of information available, will be AI (artificial intelligence) assisted and depend strongly on metadata associated with the information. The implication for publishers is that a good DAM will be an essential feature of their publication process.
- In 10-15 years time recyclability will be a routine part of life. As a consequence, magazines will be printed on lightweight high quality recycled and recyclable paper. The current (largely false) opinion that recycled papers are of low quality will be overcome, with all papers having a substantial proportion of their fibre content recycled.

Other more specific points are listed below.

Physical nature of the product

- Magazines will be printed on lightweight, high quality coated recycled and recyclable paper
- Magazines will be produced in a wide variety of formats (i.e. different page sizes)
- Binding should employ a glueless or easily recyclable binding method
- Magazines will have enhanced visual and/or tactile appeal (colours, feel, smell, reactive in some way) to exploit their physical characteristics to the maximum. They will be prestige products.
- There will be a blurring of definition between magazines and direct mail, especially customer magazines. Some direct mail items are now having "editorial content" added to them to enhance interest, so becoming magazine-like in nature.
- High print quality will be a key attribute – the resolution, gloss, image quality in general cannot be matched by e-media (although it could be argued that e-media can present an image of equal quality but with different attributes)
- Magazines will Incorporate a low cost means of making the magazine interactive (e.g. 2D bar codes). In very limited case printed electronics may be used but this will be rare.

Editorial content

- The content of magazines will be, at least in part, customised
- The printed magazine will include machine readable links to web sites, AI (artificial intelligence) assisted searches of archive, and facilitate links of readers with each other.
- The editorial process of magazines is changing and will continue to change. The role of prioritising information is becoming less important with e-media where the reader can pick and choose "randomly". However, editorial may provide expert knowledge in a subject domain and is an important reason why a

consumer may purchase a given title. User selection of content that they read is seen as vital for the future, both in print and on-line. The publishing process will come to include the act of managing a consumer community – they all become contributors too, sharing content. " Increased interaction will be more important than increased circulation" – Burda.

- Magazines will include pay-as-go features – e.g. the ability to download or order high resolution (maybe large format) images

Advertising content

- The advertising content of magazines will be, at least in part, customised
- In some magazines the archived advertising content will be of equal status and accessibility to the current content. To facilitate this, intelligent (AI assisted) search features will be provided, based on advanced metadata concepts.
- Magazines become a form of (acceptable) direct mail
- Advertisements will incorporate a mechanism for measuring response to advertisements in the magazine – this will require some incentive to encourage the reader to participate.
- Some advertisements will incorporate a mechanism for interactive ordering of advertised goods/services

5.3 Technology solutions required to deliver the product

The tables below have across the top of their columns the business and market drivers identified by the workshop groups supplemented by other sources of information. For each set of business and market drivers, the tables then show how the publisher might respond, and in particular what the implications are for the print product in terms of the features required.

These required features of the printed product have then be compiled into a further table where the enabling technology to deliver these features has been briefly described. Two key themes emerge from this process:

- The need to reduce units costs of production by 50%
- The need to deliver a customised product

The technology associated with delivering these two themes is then illustrated in a diagram – the so called technology map.

Table 5 Business and market drivers for magazines

Business & Market Drivers	Migration of advertising revenues to e-media	Ability to measure response from advertising	Mechanism for interactive ordering of advertised products	Broking of sellers and buyers
Publisher response	Huge cut in cost of production required – i.e. >50%	PIN numbers in advertisements	Incorporate links to mobile devices or web site	Develop on-line system to provide real time contact options
Product features required in printed magazine to respond to B&M drivers	Links between printed magazine and e-media to be strengthened	Printed image which triggers connection with local WiFi or mobile device (e.g. 2D bar code) Printed image which uniquely identifies reader and advert (e.g. PIN or bar code)		Use printed publication to promote publisher's brand and web site/e-media services

Business & Market Drivers	Need to address niche markets, provide relevant content, customise product, allow user selection of content	Give readers interaction facilities to encourage building communities of loyal customers.	Democratisation enabled by technology – everyone can publish	Instant gratification culture – "I want it now"
Publisher response	Increase proportion of readers on subscription Revise editorial approach to generate specialist content	Design interactive features into the printed product Exploit mobile device technology Encourage reader contributions	Promote brand to give authority and credibility to publication Act as portal for small independent publishers	Adopt e-media Increase frequency of publication Print-on-demand Abandon concept of an edition – continuous publication
Product features required in printed magazine to respond to B&M drivers	Customised editorial and advertising content, either by section or page or article Customised covers for advertisers	Printed image which triggers connection with local WiFi or mobile device (e.g. 2D bar code) Printed image which uniquely identifies reader and advert (e.g. PIN or bar code)	Small editions, possibly published for local market High frequency, weekly	POD production as and when necessary

Business & Market Drivers	Maximisation of value of content (re-package, re-sell to different market sectors, different delivery channels)	Security of content (copyright protection)	Consumer needs for information in the context of "information overload"	Product differentiation on the retailer's shelf
Publisher response	Automation of pre-press, editorial and advertising systems Implementation of 2-way conversion between print and web	Make all text in both e-media and print non-copiable and/or encrypted	Provide on-line archive of both editorial & advertising content.	Cover design Application of non-standard page formats
Product features required in printed magazine to respond to B&M drivers	Several forms of publication derived from content Mix and match selected content from several publications to suit reader's interests	Watermarked images and text Anti-copying features	Promote availability of archive in printed publication Attach URN to all items in printed magazine	Variety of page sizes/product shapes Special effects cover designs to make eye-catching Enhanced visual and/or tactile appeal – colour, feel, smell, reactive in some way
Business & Market Drivers	Youth and music readership enjoy richer experience from e-media products	Youth culture is digital	Increased choice and access to competitive delivery channels.	Strong consumer attachment to look/feel/ browse characteristics of printed product
Publisher response	Develop web based products/services Use printed magazine to provide high quality, permanent imaging: historical record, archive publication Use printed publication to promote publisher's brand and web site/e-media services		Use all available channels to maximise use of content and advertising revenue possibilities	Design magazine as a "coffee table" product
Product features required in printed magazine to respond to B&M drivers	Printed magazine becomes high quality, prestige item		Printed magazine provides links to alternative delivery channels	Printed magazine becomes high quality, prestige item

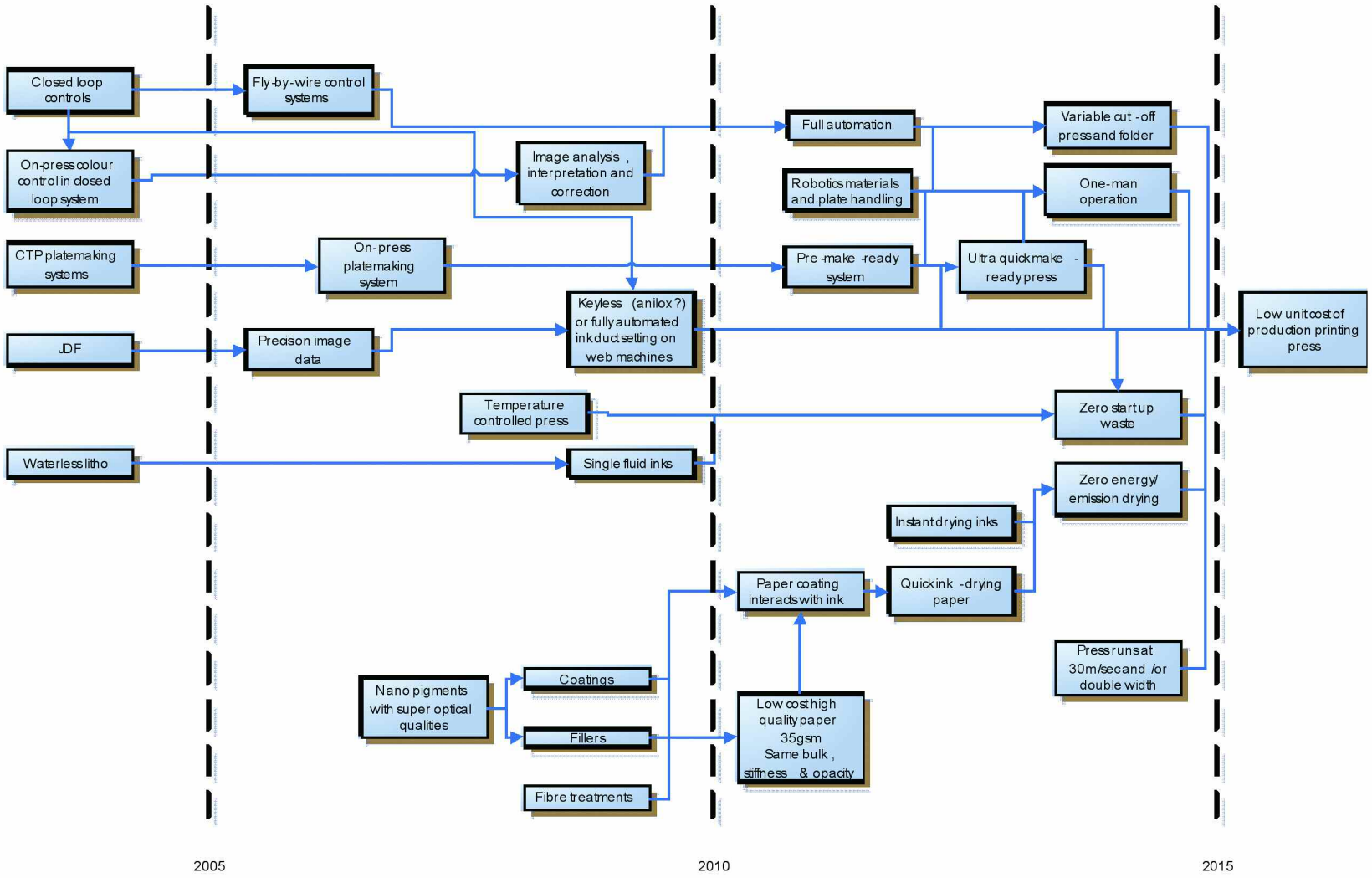
Business & Market Drivers	Environmental concerns	The need to reduce waste in the supply chain	Postal rates increase	Supermarket impact on distribution
Publisher response	Use recycled materials Ensure recyclability of magazine	Increase proportion of sales bought on subscription Implement sales based replenishment in retailers for high volume publications Print to order	Specify product to minimise postal charges Avoid cover mounts	
Product features required in printed magazine to respond to B&M drivers	Use lightweight, high quality, coated recycled paper Recyclable product, paper, inks, binding method Zero waste in production	Print on demand Distributed production	Light weight paper Consumer selection of sections of interest	

Table 6 Technology required to enable product features

Product features	Enabling technologies
Production cost reduction of <50% in smallish quantities	• Pre-press automation, template based page assembly, JDFvX, integration of worklow management systems with MIS and EIS, soft proofing • Re-think press design, one-man press operation through automation, closed loop controls, fly-by-wire expert system control systems, robotics and image analysis • Low grammage paper (<35gm) with same bulk, stiffness and opacity as now • Self-drying inks (to eliminate energy cost/use and environmental issues of solvent emission) • Fully auto setting finishing systems
Zero waste production	• Re-think press design • Single fluid inks to eliminate ink/water balance issues on press start-up • Digital print
Customise content by section	• Selective binding • Digital printing • Any suitable small batch printing process
Customise content by page or article	• Automated page assembly software • Digital (POD?) printing systems with in-line finishing

Product features	Enabling technologies
Variable page size	• Variable cut-off presses • Variable folder • Self-adjusting finishing systems • Web digital print systems
Very high quality production	• Sheet-fed litho printing • High resolution digital printing
Lightweight, high quality, recycled paper with high bulk:weight ratio, good opacity and low cost(!)	• Nanotechnology-based fillers • Fibre enhancing treatments
Totally recyclable product	• Glueless binding method • Easily de-inked ink
Print on demand	• High quality, reasonably fast digital print system with in-line finishing • Possibly used as distributed production system to service sales based replenishment operation
Stand out from the crowd on the newsstand	• Special colours • Holographic or other techniques • Senses presence of reader and reacts in some way
Publication at high frequency and with short lead times (25% of today)	• Soft proofing systems • JDFvX • End-to-end digital workflow in pre-press • Distributed production
Links to customised web pages or mobile communications device with secure ID system	• 2D bar code or equivalent image – needs to be non-copiable
Printed image which uniquely identifies reader and advert and facilitates establishment of on-line interaction	
Maximisation of use of content	• XML • Metadata
Access to on-line archive	• Digital asset management system • Good user interface • Extensive use of multi-media metadata (MPEG7?) • AI assisted search facilities
Non-copiable images and text	• Watermarking • Encryption

Fig 6 Technology Map for Web Printing Press for low unit cost printed products



Pre-press

For B2B printed magazines, insomuch as these continue to exist, the content will be derived from e-media version content by an automatic process, using a template-based page assembly system. For consumer magazines where the layout is more fluid and artistic this approach is harder, but even now there are some significant developments in automating aspects of the make up of newspaper pages, and these will ultimately transfer into magazine systems. Similarly, there will be automated systems for advertisement design – indeed these already exist although some would be critical of the resulting advertisement.

For the consumer to pick 'n' mix editorial content (maybe from several magazines from a given publisher) into a single printed publication will require the publisher to operate a good DAM (digital asset management) system. Many, of course, already do, and this requirement does not really call for any technological development, just the development of suitable software to manage the reader's requirements and route these appropriately to the printing system. There clearly are some interesting issues in establishing exactly how this should be done.

Whatever the future of the printed magazine product it does seem likely that there will be a continuing demand for both print and e-media versions – with e-media including at least the Internet, but most likely also mobile devices of a form yet to be invented. This will lead to more complexity in the pre-media process, which if it is to be managed effectively must be as automated as possible. To this end, JDF (in whatever version it has reached by 2015) will be a critical specification in the sense that it enables much automation. Other pre-press standards will also be needed and their use will be essential. Consequently there will be much integration between workflow management systems and MIS (or EIS) systems, and this integration will encompass publisher, printer, distributor and any other players in the supply chain.

Driven by editorial needs for topicality, and advertising needs to maximise the sales opportunity in the face of competition from e-media, overall pre-media timescales will be a quarter of those today. To achieve this will require publishers' editorial and advertising staff to work to a ""get-it-right-first-time" principle, which will be aided by the use of "expert system" software to prevent and correct errors. By 2015 it is likely that most of the editorial processes associated with a magazine will be carried out remotely, especially since a 24/7 approach to working (so as to achieve the turnround time) will be required – it therefore will not be necessary for them to travel daily to the publisher's office. Video conferencing will be used in a regular fashion to maintain contact, and all content will be stored on the publisher's DAM and accessed remotely for editing purposes. Much of the technology to achieve this exists today, but it probably needs to work less intrusively and at higher speeds than routinely available now.

Print production

The two key issues related to print production are:

- Reducing unit cost of production by 50%
- Producing a customised content product

The second of these can obviously be done, although too slowly and at too high a cost at present. There are some concerns that EU Data protection laws are a barrier to greater use of selectivity or content selection.

Achieving a 50% reduction in unit cost is more challenging but there is much that can be considered. Some suggestions are:

- Use single fluid inks – without being precise about what such inks might be, any single fluid ink will remove the need to obtain and control ink/water balance which is vital if start up waste is to be reduced to close to zero. This might involve "waterless" litho but there are other possibilities. This would be a step towards both zero waste and reducing make-ready to the absolute minimum. Future inks are more likely to be vegetable oil based as mineral oils become more costly. The application of nanotechnology may also be beneficial to the development of inks – nano scale materials are known to have very different properties to bulk materials and this might lead to pigments and other components of the ink having new and useful characteristics.
- Use low grammage (e.g. 35gm) paper with the same bulk, stiffness and opacity as now. Since paper is sold by weight such an approach might radically reduce the cost of paper. However, this is a substantial technical challenge. Again the use of nanotechnology to manufacture new types of coating or filler materials might lead to some useful advance.
- Operate presses with only one man by using JDF driven automation, robotics and closed loop control systems throughout the press. Labour is a major cost element, with web presses tending to be operated by 4-5 people regardless of the size or age of the press. A rethink of manning levels, or a greater flexibility to manning levels could have a substantial impact on overall costs.
- The folder on a web press currently takes up a large proportion of make-ready time, and is also a speed limiting factor. The faster a press is to run the more precisely "tuned" the folder has to be – thus extending make-ready time and waste generated during the make-ready process. To achieve rapid one-man setup requires total automation of the setting of the folder. Current developments are moving in this direction.
- Doubling the speed of the press to 30m/sec. There are considerable engineering issues to be overcome to make this feasible.
- Output might also be doubled by doubling the press width. This is likely to be possible but at some considerable increase in the cost of the machine.
- Design a more compact press so as to reduce the footprint by 50% (go up rather than along). This might be facilitated by using keyless (anilox) inking systems to remove ink keys, and most inking rollers which would result in a

more compact, lower cost press (with improved startup characteristics).

- Employ self drying inks (no or much reduced energy input required). On-press dryers consume lots of energy (and are an environmental issue – exhaust gases have to be cleaned up). It should be noted that this is not a new idea – some inkjet inks have dried and become insoluble by interacting with the paper coating.
- If presses become faster and/or wider and/or operated by fewer people, automation and closed loop control systems will be essential to achieve and maintain quality, otherwise things will be happening too fast for the press operator to keep up with. It is worth mentioning that achieving high quality in all aspects of the print product (including especially the accuracy and consistency of folding) is essential to avoid high waste generation in binding.
- Publishers would like to have greater freedom of page size and shape for their publications. While variable folders exist it is much more difficult to make a variable cut-off web-offset press. But there are some interesting approaches to this used on packaging printing presses, and the use of much simplified inking systems (and possibly waterless systems) might make this a practical possibility. (The MAN Roland Dicoweb press already goes some way towards this.)

The above list demonstrates that there is much that can be considered in an attempt to radically reduce unit cost of production. It also demonstrates that achieving this will only be achieved by partnerships, at least between press, ink, plate, and paper manufacturers – developments in just one area will not of themselves produce the required results.

Distribution

Cutting distribution costs by 50% is challenging. Faced with this, it is clear that a serious reduction in supply chain waste is necessary (even if not a complete answer). Hence a drive to subscriptions is essential (for other reasons as well, discussed earlier) and a sales based replenishment system is required for the retailer impulse purchases. But this is only feasible for higher sales volume magazines, and if sales of the printed product reduce markedly then might not be that feasible at all. In this case a print-on-demand approach might prove to be the only feasible production method. This does not necessarily mean a digital printing system, but it most likely does mean something other than the web-offset presses of today.

Technology required for Customised Content Magazine Production System

Based on acceptable production timescales for a production run of say 50,000 copies, a suitable digital press specification might be

- 900mm web width
- Web speed of 5m/sec
- 600 dpi and/or modulated dot size to give perceived resolution equivalent to 1200 dpi.
- Perfecting

This would print a 4 A4 page width, so 8 pages every 300mm of web. A 200 page magazine would then take 1.5 seconds to print. The entire run of 50,000 would take 21 hours. Since a web offset press would produce 50,000 copies in an hour or two, 21 hours seems excessively long. Of course more than one machine could be used, and we could argue that it would not be necessary to print all 50,000 in one go. Even so, 21 hours seems too long. Therefore, unless a marked improvement in the above specification can be achieved, it will not be sensible to print the entire contents of the magazine digitally. A better approach will be a hybrid system where most of the magazine is printed web offset (or equivalent), and a digitally printed section is printed as part of the binding process or at least printed at the same speed as the binding process. If binding was carried out at 15,000 per hour the above specification would allow a digitally printed section of 32 pages/copy of the magazine.

6 Future vision of direct mail

6.1 The direct mail environment

In 2015-2020, direct mail will face much more competition as an advertising medium than it does now. It will be one medium in the mix of media used for direct marketing, and those other media will all be technically sophisticated and being used in a communications environment providing interactivity and much visual stimulation. But direct mail has certain powerful attributes that now separate it from the crowd and will continue to do so to a large extent. Direct mail

- Demonstrably works best when used in conjunction with other media
- Is a "push" medium – and the least intrusive of all the media used for direct marketing
- Is physical and tangible and conveys quality in a way that other media cannot

For direct mail, distribution and postal costs are a key issue – but new services and pricing models, largely based around zonal pricing, will appear shortly which will make a large impact on the costs of delivering a substantial proportion of direct mail.

Our working group commented on the "commodity" nature of the direct mail marketplace at present. Amongst suppliers, profitability is low in general, and hence consolidation will occur, resulting in fewer specialist suppliers at the end of the day. However, in the meantime the increasing complexity of the market will lead to more suppliers, each with particular specialisms, and more small general printers will gain a direct mail ability for small local companies and thus more companies will be involved.

The direct mail market is becoming more complex and as it does so, so the added value that a specialist agency or print management company can offer increases. Such specialists will provide expertise in data processing, determining the most cost effective mailing patterns, modes of distribution, and so on.

From our workgroup discussions two major and opposite trends emerged relating to volumes of direct mail.

- A reduction in the size of mailings as they become more carefully and accurately targeted. This tends to apply to companies that have been using direct mail for some while and have a mature process.
- An increase in the size of mailings. The use of direct mail by charities and travel companies has, for example, grown about 25% per annum for the last four years. But this is because, for many of these companies it is a new marketing method that they are moving into. The travel business for example, has in the last few years moved from sales being dominated by high street travel agents, to the majority of the business being driven by direct mail and the Internet. So in these sectors direct mail is still new, companies are getting used to it, they discover it works and its use is growing.

A major development in the next few years will be that of the Mail Media Market – that is how TNT and DHL will develop as competitors to the Royal Mail. The key issue is zonal pricing. It is clearly less costly to deliver to urban addresses than rural ones, and this will be reflected in zonal prices rather than the one price for all of the present system. 70% of addresses are in urban areas. A possible outcome of this is that rural areas may become neglected for direct mail unless the products appeal specifically to the rural market while urban addresses will receive even more direct mail. But this introduction of competition will bring much more than just a restructuring of prices. Many different patterns of delivery will become available (also at different prices) based on timing of delivery, weight, size of product, frequency, total volumes involved, location, and time of year (direct mail has a strong peak and trough character to it).

6.2 Nature of the product

Table 7 Categories of direct mail

There will be four main categories of direct mail as described in the table.

	Description	Future Production
Simple	This will be typified by relatively high volume mailings of a fairly simple type: standard flyers and simple brochures with a personalised letter.	In modest volumes (i.e. a few thousand) will be printed in-house by Direct Marketing companies or other specialist service providers who will design sales message, distribute via print (and web, email, SMS), and company marketing departments using standard office printers. Higher volumes will be produced by print companies using high speed digital print equipment. However, for the print company this class of Direct Mail will be a commodity item with low added value, hence unattractive.
Complex	This will be typified by (sometimes) lower volume mailings of a much more complex type. These will be more personalised, will contain several printed items in various non-standard formats and may contain one or more printed items with customised content matched to the individual. Various devices will be incorporated to provide interaction and communication. Small gifts may also be included.	Will be printed by commercial printers where the need for data processing services to produce customised content, large format printers, specialist processes to provide enhanced functionality, and the ability to provide finishing processes make these Direct Mail products high added value.
Catalogue	Typically an 8-32 (or perhaps up to 96) page full colour catalogue in a plastic wrapper personally addressed but more complex packages too. Volumes in total will be much less than now. In some case content will be selected to match individual – there will be growth in cross media integration – a customer may use a web site to state preferences and select areas of interest so as to receive a customised catalogue. A variant will be the magalog – a cross between a magazine and a catalogue – i.e. the inclusion of "editorial content" (also customised) to encourage opening and reading of the Direct Mail package, and to drive traffic to websites and other order mechanisms.	Will be produced by commercial printers, using conventional print systems supplemented by high speed digital print systems to provide selected content in some cases – e.g. special offers will be highly targeted.
Integrated	Used with existing customers, adding direct-mail-like customised messaging into documents that would be sent to the customer anyway (such as utility bills, annual statements). Postage is the most expensive component of direct mail and hence the more that can be combined in one mailing the better.	Will be in-house printed by utilities and corporations, using high speed digital printing systems. However the majority of utility bills will be delivered on-line, hence the opportunity for inclusion of direct mail will be limited.

Future features of Direct Mail

- Direct Mail will continue to be a "push" medium and complement company websites and email marketing
- Mass mailings will continue – it's the only way to reach most people – its "democratic"
- B2B Direct Mail will have moved almost entirely onto the web (i.e. some 30% of current total volumes will be lost to print)
- Some Direct Mail products will be directly trackable and their response measurable. That is when delivered, when opened, what action occurred, the value of sale etc. (At present, an array of somewhat indirect measures is used, e.g. coupon redemption, plus sales of product, plus monitoring interaction via phone, competitions etc. Tracking results through to sales is not actually that widely done, sometimes because direct mail promotion might be done by the marketing department, while sales processing is done by another department, and the two do not get reconciled.) Direct mail products will routinely incorporate PIN codes, possibly encoded as bar codes. RFID technology will be used to detect when a customer enters a store with a coupon so enabling them to be given the 5-star treatment.
- Direct Mail products will exploit physical characteristics such as touch, feel, smell, sound, animated graphics – i.e. appeal to ALL the senses
- Direct mail products will become more attractive and more complex to differentiate themselves from each other and other printed matter. Paper type, special inks and varnishes and a wide range of finishing techniques will contribute to this.
- Direct Mail products will have customised content – not just a name and address, but up to 100% of the content dynamically selected to match interests of the recipient. The progressive implementation of CRM systems will help drive this. There will be a proportion of "editorial content" (see below) in some products which may also be selected. Growth in direct mail, and especially customised content direct mail has always been retarded by lack of suitable databases. But in the last 2-5 years this has started to change although much of the travel industry still uses old DOS-based systems. It does however take time to gain confidence in new databases, so there is much inertia.
- Direct Mail products will have a communication ability, partly to facilitate tracking and measurability, but also to provide a response mechanism so that sales transactions may be completed then and there, or a topical message may be transmitted/received as the package is opened. They will also have interactive features (such as sound, visual effects) such that the package responds in some way to being opened etc. – the purpose being to encourage curiosity and involvement with the product. A component of this will be simple display screens to enhance the above effects.

  Interaction is seen as being critical to the fostering of an emotional relationship with the brand and will remain at the heart of direct mail concepts, and hence customised interactive features will be the next stage of customisation of the

direct mail product.

It must be said that views expressed by the workgroup were divided on the value of such communication, and interaction facilities. They are seen as potentially costly, and may in fact prove more annoying than effective (although not if the "device" could be removed and subsequently used elsewhere for the benefit of the recipient). There is a view that great graphic design and brilliant printed image quality will achieve greater response than electronic "gimmickery". (This whole subject has to be considered in the light of expected developments in the printing of electronics which will reduce the cost dramatically compared with current technology.)

- Direct Mail products will incorporate 2D bar codes to provide "interconnectivity" to the Internet through mobile devices. This will provide a simple low cost method of obtaining feedback and completing a sales transaction. As an alternative, mini-CDs are also being trialled in the US. It is also expected that printed electronics will be used (via Bluetooth, ZigBee or other short range communication methods) to provide connection to the Internet via mobile devices when higher levels of interactivity are required.
- Some Direct Mail products will become magalogues – a cross between magazines and catalogues, or between magazines and directories, which may even be sold on subscription. (Some magazines are already thought of as Direct Mail products by their publishers!) There will be a general blurring with other products to enhance acceptability of direct mail.
- Software advances will make direct mail easier to do at lower cost, so lowering the barriers to entry and enabling a wide range of companies and organisations to use it.
- It is already the case that the envelope is key in creating a compulsion on the part of the recipient to open the package. However, often the text and graphics on the envelope have created a false expectation. This is now proving counterproductive and it is expected that in the future envelopes will clearly show the source of the direct mail (indeed may be compelled to do so) and state why the recipient should open it. The envelope will remain a critical component in the success of a direct mail pack, and provides an opportunity for really creative graphic design and compelling effects to be used.
- Direct Mail products will be printed exclusively on recycled paper and will themselves be easily recyclable. Workgroup views differed on this point, stating that there will always be customers for direct mail who want top quality. However, in 10-15 years time recycled papers of all grades will be the norm, and they will be of high quality. Recyclability of the direct mail item itself depends somewhat on what else is mixed with the paper, for example, windowed envelopes, plastic cards, any electronic devices.
- Direct Mail products will be delivered by post, but in many cases will be piggy backed on other delivery services as well

Technology solutions required to deliver the product

The tables below have across the top of their columns the business and market drivers identified by the workshop groups supplemented by other sources of information. For each set of business and market drivers, the tables then show examples of the IT systems infrastructure required, and in particular what the implications are for the print product in terms of the features required.

These required features of the printed product have then been compiled into a further table where the enabling technology to deliver these features is briefly described. Three key themes emerge from this process:

- The need to produce a product with customised content selected to the interests of the individual recipient
- The need to provide interaction, and possibly some form of communication ability with a view to tracking and measuring, or enabling immediate completion of a sales transaction, or providing greater opportunity to build customer relationships, or simply to make a more interesting product
- The need to produce a product that exploits its physical attributes to the maximum, in terms of colour, shape, material etc.

The technology associated with delivering these three themes is illustrated in a diagram – the so called technology map.

Table 8 Business and market drivers for direct mail

Business & Market Drivers	**Tighter targeting to achieve improved RoI**	**Enhanced effectiveness through higher relevance of content to achieve improved RoI**	**Cost reduction**	**Ability to track and measure response quickly and accurately**
IT system features required in direct mail pre-media system	Improved quality of database data	Database content to incorporate profile data Digital asset management systems	Simple software systems for generating customised products.	Real-time communications and IT systems infrastructure to monitor feedback
Product features required in Direct mail product to respond to B&M drivers	Personalised	Customised content selected in accordance with profile data		PIN codes/bar codes 2D bar codes RFID Built in electronic comms system

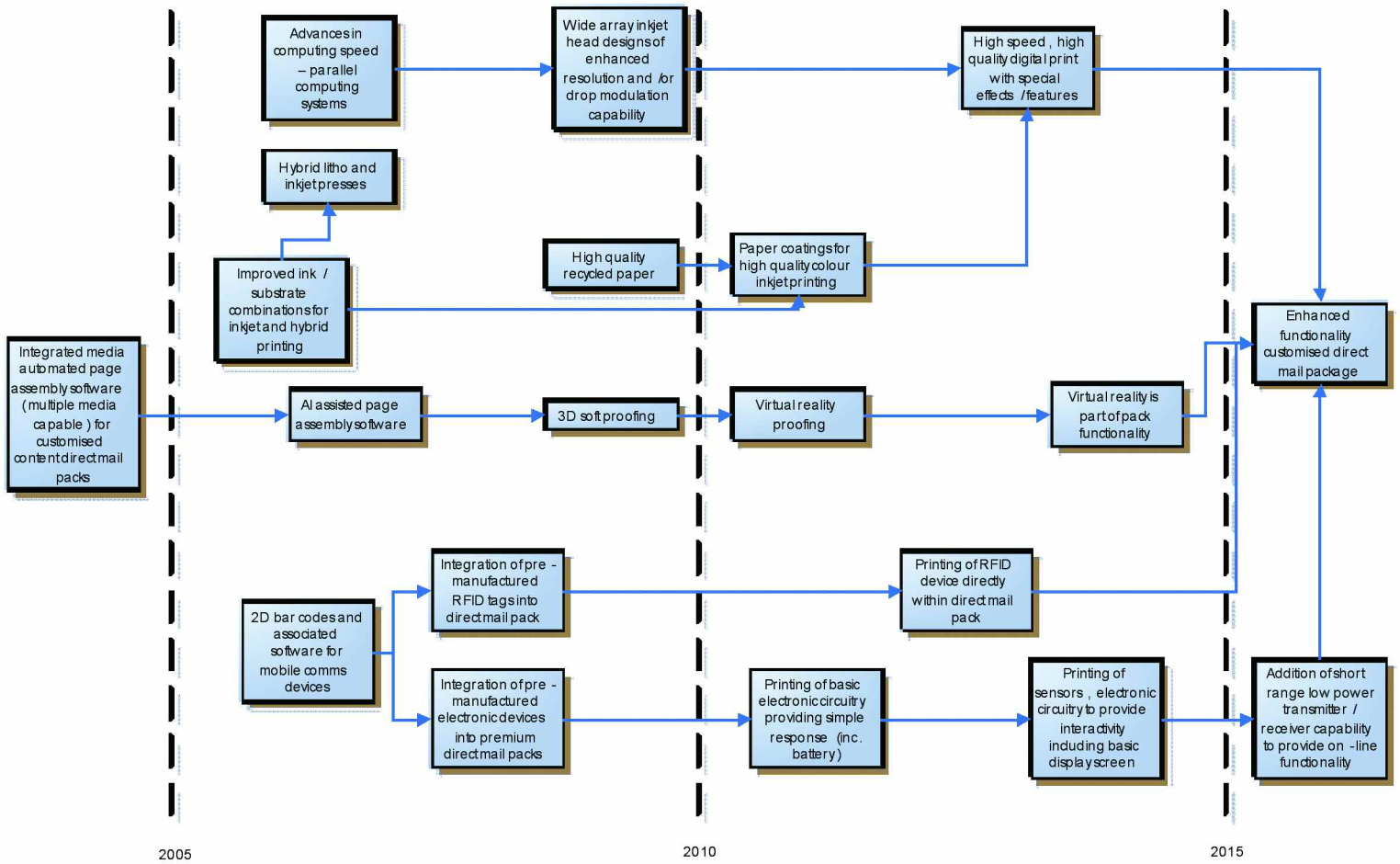
Business & Market Drivers	Need to build relationships with consumers	Need to enhance effectiveness of total direct marketing activity	Enhanced interest and curiosity value to ensure capturing consumer's attention	Need to provide means to complete sales transaction
IT system features required in direct mail pre-media system	IT system to support interactivity	Software for generating multiple media, and managing distribution and response		Real-time sales order processing system linked to direct mail product
Product features required in Direct mail product to respond to B&M drivers	Any form of response mechanism Electronic capability to provide interaction and possible communication ability Display screen technology Customised interactive systems	Direct mail product includes links to company web site via: -2D bar code -electronic systems Common branding, artwork and design concepts across media	Clever design "origami" – paper engineering Inclusion of relevant editorial content Interactive features	2D bar codes encoded to log onto to company website via mobile phone/PDA etc. Built in electronic communications

Business & Market Drivers	Need to differentiate the direct mail product from others and other print products	Need to ensure acceptability of direct mail product by consumers		
IT system features required in direct mail pre-media system		Opt-in management systems		
Product features required in Direct mail product to respond to B&M drivers	Exploit complexity Use enhanced quality print systems Use special colours, inks, unusual shapes, materials.	Use recycled materials Use materials which are recyclable Use magalog concept to enhance information/ entertainment value Include functionality useful to recipient Integrate direct mail product with other delivered items		

Table 9 Technology required to enable product features

Product features	Enabling technologies
Personalisation	Digital print
Customisation of content, also enabling magalog, optionally in customised form	AI assisted automatic page assembly software Digital print and hybrid (digital plus litho) presses
Interactivity Including customised interaction	2D bar codes combined with suitable software to run on mobile devices (phone or PDA etc.) Printed electronics (sensors, conductive inks, suitable printing technology, circuit development) Display "screens" (e.g. e-paper, or equivalent technology) Suitable paper substrates including special coatings or films onto which electronic circuits can be printed Short range low power (consumption and emission) transmitters/receivers (e.g. Zigbee)
Communications	
PIN codes Bar codes 2D bar codes	Digital print
RFID	Probably requires printed electronics to be cost viable
Complex and interesting design and construction	AI assisted makeup of pages to escape formality of template design systems 3D soft proofing systems (possibly virtual reality systems) Automated finishing equipment
Co-ordinated design, graphics, branding as other direct marketing products for same target individual	Integrated pre-media systems
Ultra-high quality printing	6-colour digital print, spot varnish, texture printing and special effects (such as appeal to all senses including taste & smell)
High quality recycled paper, also recyclable	Recycled paper technology

Fig 7 Technology map for production of enhanced email products



Pre-press

Pre-press systems for direct mail (and it must be said for certain other print products such as magazines) will become pre-media systems – treating and processing text and graphics for print equally and in parallel with that for other media. Much of the conversion between the media will be automatic. A very few software products already have a degree of this functionality.

The generation of documents with customised content (in whatever media) requires merging data from a customer information database with text and images from a digital asset management system (or equivalent) under the control of a program applying some logic and maybe carrying out calculations on the fly, the results of which can be included in the output. Current systems are template based, which produces reasonable results but with a somewhat constrained layout which typically looks as if text and images have all been placed in rectangular areas. To overcome this and provide more fluidity into the automated page assembly process, artificial intelligence systems will be used. These it should be noted are still rule based systems, but apply a far more complex logical process. No systems of this type are currently known to exist although there are some examples of page layout systems for newspapers which exhibit some of the behaviour required.

As printed direct mail becomes more complex (physically and functionally) so a printed proof becomes more inadequate. Some form of prototyping system is required to simulate the end product. This is best accomplished by 3D soft proofing systems. These exist for packaging applications, allowing a pack to be constructed, rotated and viewed from all angles on the screen. But a direct mail pack with interactive features will require more, so that the interactive features can also be simulated. Ultimately this will lead to a kind of virtual reality system in which the direct mail pack can be opened and examined almost as if real.

Print production

Promotional print is one of the main products of the general commercial print trade, predominantly printed by sheet fed litho. Heat set litho web and gravure are commonly used for printing catalogues, and coldset web for directories. In looking to the future the most significant expectation is a reduction in sheet fed litho being made up by an increase in sheet and web fed digital printing. Although sheetfed litho can viably produce remarkably small batches of print now, this expected move to digital suggests producing a higher proportion of promotional print on an on-demand basis, a likely consequence of which is that less print will actually be produced in total, although its sales value may well be higher.

The demand for customised direct mail products drives a demand for digital print. At present the tendency is to think primarily of toner based processes for this on grounds of print quality, while inkjet is used primarily for simple addressing and

personalisation. However, toner printing systems are slow and the prospects for significant increase in speed not high. However, inkjet has much greater development prospects. In the view of the project workgroup the minimum specification needed for a suitable machine for direct mail is:

- Printing in 4 colours
- Perfecting
- >400 dpi physical resolution
- 120 m/min printing speed
- 450mm web width

This is not far off achievable now, except the image quality is not generally regarded as good enough, and inkjet quality is very dependent on the paper quality.

Printing electronics is embryonic at present, but development is being driven by packaging applications (including RFID) and the manufacture of low cost display screens. There is little doubt that there will be transference of this technology into mainstream print for direct mail and possibly other applications. Printing electronics is essentially a process of printing conductive polymers in a highly controlled and precise fashion. It can be done by all the major print processes, except probably litho (since the ink film is too thin), and inkjet.

If direct mail is to have electronic communications ability, then a power source, electronics and working to some agreed standards is necessary. It is possible to print batteries, and the new ZigBee communications standard illustrates developments in communications. (ZigBee has been developed principally for control applications – modest range, low data rate, and very low power consumption, and low cost.) In 10-15 years time, the incorporation of this type of technology into a direct mail package appears very feasible.

Finishing

Finishing for direct mail is a specialist and demanding process (or rather a mix of processes). Specialist machinery is available (often custom designed from standard modules) which combines folding, gluing, die-cutting, perforating, envelope making, card tipping etc into a single in-line process. Setting up and operating such machinery is a highly skilled task, to which automation can be applied but with limitations. Certainly in an effort to make direct mail products inherently more interesting to the recipient, complexity will increase. Laser die-cutting, although very expensive at present, is likely to be suitably adapted because of its flexibility. Inkjet systems for precision gluing will become more widely used, as will cold foil blocking, possibly using inkjet application of glue.

7 Conclusions

Magazines

- The current business model for magazines will be challenged over the next 10-15 years for many magazines which will result in a decline in the number of printed titles, and the sales of each title. Hence overall volumes of printed magazines will eventually fall.
- Publishers are not investing in the future of the printed magazine product at anything like the rate that they are in the future of e-media products, although they are investing in new titles.
- The lifetime of printed magazines can be extended by substantial (i.e. >50%) reduction in production and paper costs. There are also several matters that publishers can attend to which will reduce their in-house costs, reduce timescales and enable improvements in efficiency downstream.
- Magazines as a publishing concept distributed by e-media and print are expected to remain very successful. A typical magazine will be a dual-media product.
- Printed magazines will become high value, high priced, prestige items, serving specialist markets and interests, and be produced in lower volumes than now. Part of both the editorial and advertising content will be customised to the individual reader.
- Business to business magazines will become predominantly e-media products
- The only really satisfactory solution to supply chain waste in the magazine sector is to achieve a very high level of subscriptions (and hence effectively print to order), and there are increasing incentives for publishers which should encourage this, despite the recognised difficulties. Sales based replenishment at retailers is a commendable initiative but not viable as a long term solution especially if sales of individual titles reduce. (The magazine distributor of the future may take on the role of printing “top-up” quantities of magazines on a POD basis, a role which might be compared with current POD book business models.)

Direct mail

- Direct mail is expected to remain as a key product in relation to direct marketing since it is regarded as the least intrusive of direct marketing methods, and has unique characteristics critical to its role.
- Business to Business direct mail will move almost entirely to the web
- Direct mail products will have their functionality (for tracking, measuring response, interaction and communication) substantially enhanced over the next decade.
- Direct mail products will become highly customised in terms of the content they contain, the content being selected as being relevant to the recipient.
- Direct mail products will become more attractive and more complex, employing special papers, inks and a wide range of sophisticated finishing techniques.

- Some direct mail products will become magalogs – that is they will incorporate relevant editorial content

General

- The future environment for print products will be one within which e-media are commonplace and with which a major proportion of the adult population feels completely comfortable. Computer and (mobile) communications technology will be low cost and access to the Internet will be available more or less everywhere. To continue to attract readers/consumers and advertising revenues, print will need to focus on and develop its unique attributes.
- Both for printed magazines and direct mail products, partnerships will be vital between suppliers in order to optimise a total process as opposed to single elements within it, for example, ink, paper, press will need to be developed together to bring real cost reduction in web printing.
- Similarly, in both product sectors, print companies will need to work much more closely with their customers to gain efficiencies, and be able to use production processes creatively for customer benefit
- Digital printing will be an important (but certainly not the only) printing technique for both magazines and direct mail in 2015 and onwards.

7.1 Implications for suppliers

Pre-press

- Pre-press systems will have become pre-media systems, with equal capabilities to generate print and other forms of output. Internal systems architecture may well have to change to facilitate this.
- There is a need for greater automation of the page assembly process and other copy preparation tasks (for magazines and direct mail), to improve efficiency, reduce timescales and eliminate the possibility of downstream errors. The use of AI techniques will assist this, and enable the avoidance of the rather constrained layouts which tend to result from today's template based systems.

Presses

- While the heatset web offset press has been the key production tool for printing magazines, this will need substantial change to address the cost reduction targets publishers are suggesting, at the reduced batch sizes. (It is worth noting that there are examples of monochrome books being printed and folded on web presses in batch sizes of 1000 copies with changeover times between jobs of under 5 minutes, so improvement should be possible.)
- Suppliers should examine the possibility of developing retro-fit control devices to presses to improve production efficiencies given that many web-offset presses will still be expected to have a productive life of several years.
- The 8/10 unit sheet-fed perfector may become more widely used for magazine production as batch sizes reduce, quality demands increase, more flexibility of page size is required, and demands to eliminate paper waste strengthen.

- Digital print (probably inkjet) will be needed to deliver the customisation of content expected in both magazines and direct mail. Increases in speed and image quality are required in comparison with today's models but appear feasible.
- The printing of electronics is being developed rapidly for many applications including the printing of packaging. This will be of benefit to the production of magazines and direct mail. Considerable R&D is required to establish how best to incorporate this technology into magazines and direct mail.

Ink

- The development of "single fluid inks" or any approach that eliminates the ink/water balance problem of litho is seen as essential to substantial reduction in waste generation at press start up.
- The application of nanotechnology to the manufacture of pigments or other components of the ink should be examined as a means of providing inks with novel characteristics.
- Energy costs related to ink drying are significant, and drying speed is one constraining factor in press speeds. There would be considerable advantage in producing an ink that requires no or very little energy to dry. This might, for example, be achieved by some chemical interaction between ink and paper coating.
- There is a need to develop inkjet inks that work well on a wider range of standard litho papers. Many inkjet inks are solvent or water based, or UV curing, but relatively few are oil based, and maybe it is this category that requires more development.

Finishing

- The current trend of automating the setup adjustments for finishing equipment needs to be continued, partly to gain production efficiencies, but also to de-skill the process as far as possible since such experience is in short supply (especially for direct mail applications).
- Digital print (probably inkjet) will play a significant part in printed magazine production in the future, for customised sections in magazines. There are several ways in which this might be incorporated into a production concept, but a strong possibility would be to integrate digital print with finishing resulting in a new type of hybrid process.

Paper

- Press, paper and ink developments need to be undertaken jointly to optimise the overall process.
- For both magazines and direct mail there will be a growing demand for lightweight papers with similar bulk and opacity to those currently used. It is anticipated that application of nanotechnology to the production of fillers and coatings for papers might enable some marked change in performance

characteristics.

- For the printing of electronics, papers with special surfaces or coatings will be required (alternatively it might be possible to print a coating in just the area required – which probably requires joint development with an ink supplier).
- Ultimately the majority of papers used will have a reasonably high recycled content, but this needs to be achieved without sacrificing print and other qualities. Remarkable progress has already been made with coated recycled papers, which really demonstrates the potential for further development.

7.2 Implications for printers

Magazines

- Considerable care will be required with future press investments given the 10 year payback which is common with heatset web-offset machines. The current trend to higher pagination presses is understandable in relation to the next 5 years or so, but may be questionable beyond that. Press designs that focus on minimising make-ready, waste and provide format flexibility may be preferred.
- In 10-15 years time production volumes will be reducing which could contribute to excess capacity and the inevitable consequences.
- Every effort should be made to optimise the work environment so as to minimise downtime and boost productivity. Most web printers would already claim to have done this, but the evidence of the Vision in Print International Benchmarking Study in 2005 illustrated that there was still huge room for improvement.
- Automation should be used wherever possible, especially in the often overlooked area of materials handling.
- Magazine printers should develop expertise with lightweight and recycled papers
- Magazine printers should prepare for the introduction of digital printing in say, 3-5 years time along with allied systems in pre-press and finishing to deliver customised products

Direct Mail and general printers

- Printers will need to develop different production lines to cater efficiently for the different types of direct mail (high volume commoditised vs. low volume targeted and customised). These require different types of production equipment and training.
- In the future, finishing will play an even greater role in the production of direct mail items. Innovative methods will be used more, and will be critical in making direct mail products that stand out from the crowd. It will be finishing that differentiates a professional printer's product from the DIY product, and that differentiates one printer from another.
- Specialist direct mail printers already use digital print extensively, but the use of this technology will become essential for all general printers who wish to be in this market. Critical to success will be the use of good pre-press software.

- Direct mail products will need to have increasing functionality which may be provided initially by 2D bar codes and in the longer term the inclusion of electronic devices. In the short term, electronic systems and RFID tags will be incorporated as pre-prepared “labels”, but in the longer term will be printed direct. Direct mail producers should be planning now for the incorporation of this type of technology into their products, particularly noting developments in packaging printing and production which are currently driving the development in this area.

British Printing Industries Federation (BPIF)
Farringdon Point, 29-35 Farringdon Road, London EC1M 3JF
t 0870 240 4085
www.britishprint.com

Canon UK
Woodhatch, Reigate, Surrey, RH2 8BF
t 01737 220 000
www.canon.co.uk

Pira International
Cleeve Road, Leatherhead, Surrey KT22 7RU
t 01372 802 000
www.piranet.com

Department of Trade and Industry
Response Centre, 1 Victoria Street, London SW1H 0ET
t 020 7215 5000
www.dti.gov.uk