New Technology Briefing

Digital Printing

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Abstract

This paper briefly covers the development of digital printing technologies and outlines in general terms the types of systems available. It also looks at the potential applications for digital printing in marketing communications. Current cost comparisons against conventional printing are provided, together with what is hoped is a balanced view (amid the hype) of the practicalities of this fast-developing technology.

Introduction

Two key issues have influenced the development of printing technology over the last decade: the need for more targeted communications; and shorter lead times and lower costs from design to print.

Targeted communications

It is well known that personalised communications deliver higher response rates than non-personalised. Laser printers have been used to personalise mailings for many years. Laser-printing technology for direct mail applications, though proven, only offers personalised text in one or two colours. The base stationery has to be pre-printed by some other process before it is passed through the laser printer.

The ultimate concept is one-to-one marketing. This requires us to reach an individual customer with a personalised message that results in an order for a customised product or service that is manufactured just in time, delivered overnight, paid for in advance and which leads to repeat orders.

This quest is fast becoming a reality with digital printing technology, albeit at a price. However, with some users claiming response rates of between 10 and 20 per cent, it is worth a closer examination.

Reduction in lead time

All manufacturers these days are preoccupied with a concept called 'just-in-time' delivery. It matters little whether they produce cars, cornflakes, cola or colour printing.

Future trends in most markets suggest that fewer copies will be printed; but more often, with more variations, printing as late as possible and more cost effectively.

This is most certainly the case with direct marketing, where databases are being segmented as the ever-increasing information on consumer purchasing habits and lifestyle information is collected and stored. Databases are now regarded as a major corporate asset.

One-to-one marketing

'Just-in-time' production

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Faster route to market

Some companies, particularly FMCG, want to react quickly when competitors launch a new initiative. This requires printers to be more flexible and to be prepared to offer quicker job turnarounds.

Printing-press manufacturers have responded to the shift in marketing from a 'stack it high and sell it cheap' strategy to the more targeted approach. They have developed their products accordingly. The key development in these emerging printing technologies has been the gradual conversion to digital methods of working.

A brief history

The word 'digital' is now becoming part of our everyday language. This, alas, has very little to do with the printing industry: an industry for the most part that is inward looking and views marketing as an expensive indulgence that will never catch on!

People's awareness of digital technology has much more to do with the marketing activities taking place in the high street. Retailers and global manufacturers have now placed the word permanently in our vocabulary. Consumers are now being tempted with digital phones, music systems, cameras and televisions.

First introduction of digital technologies

As far as printed communications are concerned, digital technologies were first introduced in the early 1990s. One of the first digital colour presses was the Indigo E-Print 1000, launched in 1993. There are now seven or more manufacturers of digital printing presses, some of which have up to five models in their range. Drupa 2000, the world's largest printing exhibition, will see the launch of even more models. The worldwide supply of digital printing machines since 1994 reflects the growth in the marketplace (Table 1).

Table 1: Worldwide supply of digital printing presses

1994	1995	1996	1997	1998
295	674	1,782	6,135	9,487

Source: *Digital Printing Report*, Digital Printing Council

To put these figures into perspective, the global demand for printing presses as a whole is around £4.7bn per year. Digital printing presses account for approximately 3 per cent of this figure.

The digitisation of printed communications

What is digitisation?

Over the last two decades most organisations have invested in some form of desktop computers and/or publishing equipment. These systems now allow users to send electronic files to other parts of their organisation or to printers. Today most printers receive well over 50 per cent of their jobs in electronic form.

Traditionally photographic or drawn images had to be converted to 'dots on film' if they were to be subsequently machine printed on to paper or other substrate. Digital technology enables images to be stored as digital files ('dots on disk') rather than film. Photographic images can be electronically scanned or downloaded on to computer from digital

Data manipulation and transmission

cameras or photo CDs. Other images are created on the computer using various software packages. Once the data are loaded on to a computer they can be manipulated. After correction or modification they can then be transmitted to a printing machine in another room, or even in another country if an ISDN line is used. In experienced hands this technology has the potential to provide a much quicker and cheaper route to market than the more traditional film-based methods.

How a printer then converts the data into images on paper or other substrate depends entirely on what the communication is to be used for. Different machines have been developed for different types of printed products.

Digital printing presses

What is digital printing?

It would be quite wrong to view digital printing as a generic process. To be specific, digital printing is any printing completed via digital files. Digital printing machines can have very different methods of applying images to paper. Manufacturers each have their own view on the technological way forward.

Some are based on a process technology called xerography. Xerographic printing uses an electrostatic image that attracts powder toner. The toner is then transferred to the paper by electrostatic or direct physical means.

Types of digital presses

Others use a development of this process and use electrostatic inks rather than toner. The imaging cylinder is exposed with a laser beam, so establishing an image that attracts the liquid ink. The image is then transferred to a 'printing' cylinder and from there directly to the paper. The image is created from digital data that have been transferred from a computer. For each subsequent copy the imaging cylinder has to be 're-exposed' by the laser.

The computer can be programmed to create a different image for each copy to be printed. It could be argued that this notion is not new, since laser printers have for many years offered this facility for personalised text.

The fundamental difference with this new technology is that it can also combine pictures and words. Some presses are designed to print in one colour only, others can print up to six colours.

Manufacturers of 'commercial' printing presses (litho) have also developed digital printing presses. For the most part these are designed for shorter print runs with quicker changeovers from job to job, as opposed to handling variable data for each copy printed.

To use or not to use digital printing ... that is the question!

Why should a process with the potential to provide direct marketers with true one-to-one communications be largely ignored?

What the papers say

Recent trade magazines, such as *British Printer*, *Precision Marketing* and *Printing World*, have been full of comments from the cool ('Will anyone pay for photography and design and only print 100 copies?') to the damning ('The concept has been described as an

Immature technology

aspirin in search of a headache'). At best the digital printing industry is an immature one, where those offering the service are still feeling their way forward in terms of cost and potential market applications.

The questions direct marketers should ask are:

- why use digital printing?
- how much does it cost?

Why use digital printing?

One to one

Total personalisation

There are clear benefits in producing direct mail pieces with words and pictures that are relevant to the recipient only. However, few companies are likely to have a database that is individualised to such an extent. Even if it were, there are certain practical problems to consider.

The creative costs for producing totally individual communications are likely to prove prohibitive unless a very high-ticket item is being sold. Each mail-pack would have to be checked and effectively signed off prior to printing. Consumers who largely tolerate mistakes in unsolicited direct mail would have quite a different reaction to a 'one-to-one' communication with inaccurate information. The cost and time implications of data preparation would also need to be considered.

Test marketing

Creative testing

There could be a case for using digital printing for testing different creative ideas. Quantities of 1,000 or less could be printed and mailed in order to establish which creative approach to adopt for the roll out. However, if it were simply a question of testing different propositions then digital printing would not show any particular cost advantages.

Fulfilment packs

In a two-stage campaign where fulfilment packs are mailed in response to on-the-page advertising, DRTV or inserts, digital printing may offer some advantages.

As digital printing offers print on demand in very small quantities it may be possible to print fulfilment packs at short notice when response levels to the advertising are known. The packs could be printed and mailed as necessary, so avoiding potential wastage.

Unique mailings

For large-ticket items such as cars, totally unique mailings could be beneficial. If a consumer has shown interest in a specific model and colour/trim combination it is possible to print a single brochure for that particular customer. On the other hand, it is most unlikely that a catalogue of 'hand-picked' products targeted at one person would ever cover its costs, whereas to a group of 500 it may well do.

As in all aspects of direct marketing, a cost/benefit analysis should be carefully undertaken to avoid using technology just because it is there!

How much does it cost?

This is a difficult question to answer with any degree of accuracy.

Respected organisations in both the UK and the USA have produced

Table 2: Xerox spreadsheet costing model US\$

Number of sets	Offset			Xeikon (DCP-32D)			Indigo (E-Print)		
	Total cost	Cost per page	Cost per set	Total cost	Cost per page	Cost per set	Total cost	Cost per page	Cost per set
1	996	62.28	996.48	131	8.19	131.12	133	8.28	132.52
5	998	12.47	199.54	140	1.75	27.98	145	1.82	29.06
10	999	6.25	99.92	151	0.94	15.09	161	1.01	16.12
20	1,002	3.13	50.11	173	0.54	8.64	193	0.60	9.66
50	1,011	1.26	20.23	239	0.30	4.77	289	0.36	5.78
100	1,027	0.64	10.27	349	0.22	3.49	448	0.28	4.48
200	1,047	0.33	5.29	568	0.18	2.84	767	0.24	3.84
500	1,149	0.14	2.30	1,227	0.15	2.45	1,724	0.22	3.35
1,000	1,302	0.08	1.30	2,325	0.15	2.33	3,319	0.21	3.32
2,000	1,608	0.05	0.80	4,522	0.14	2.26	6,508	0.20	3.25
3,000	1,914	0.04	0.64	6,718	0.14	2.24	9,698	0.20	3.23
5,000	2,526	0.03	0.51	11,111	0.14	2.22	16,077	0.20	3.22
10,000	4,056	0.03	0.41	22,093	0.14	2.21	32,025	0.20	3.20

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various 'costing models' in an attempt to clarify at what point digital printing becomes more cost effective than commercial printing.

In certain markets 'time is money', in others 'money is money'. To some organisations the possibility of walking into a print shop with a disk at breakfast and walking out at lunchtime with 500 copies in full colour is of particular importance. To those who want to print 1,000 copies in 1,000 different versions, it is 'the only technology in town'. For the majority of direct marketers, however, Table 2 may be of interest.

A UK-based printing group used a financial model to compare the same product produced in two different plants with digital printing (Figure 1).

Comparing both the UK and US models, it would appear that somewhere between 500 and 1,000 copies is where conventional litho printing begins to show the lowest costs.

Figure 1: Sample cost comparison: digital versus litho (A4 8pp)

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Cost comparisons

Quick turnaround

Costs of digital against conventional litho

Future trends

In the USA three major developments are providing a greater level of acceptance of the technology from both printers and marketers:

- a wider variety of machines and suppliers;
- increased awareness among marketers of the personalisation capabilities of digital equipment;
- the strategic combination of traditional printing with digital printing.

Growth forecasts

By 2001 the total print market in the USA is forecast to reach \$135bn, of which digital printing will account for \$35bn. The annual growth of digital printing from 1997 to the projections for 2001 will be five times the growth rate of conventional print.¹ It cannot be assumed that such growth will be replicated throughout Europe. The USA is a far more mature market in terms of personalised communications.

It has always been the fixed costs, such as design, origination and job set-up, that have reduced the viability of full-colour print runs in very small quantities.

What we will see in Europe are further major reductions in the cost of transferring the creative thought on to paper. The speed of this process will continue to improve. Shorter runs will become more cost effective to produce, so reprints and just-in-time supply will be more viable to mainstream direct marketers.

Increased demand for paper-based communications

Figure 2: New media and paper consumption
Source: MAN-Roland GmbH, 2000

When we look back to the early 1950s, developments in electronic media have complemented paper-based information, never replaced it. It is forecast that the penetration of the Internet will create yet another significant increase in demand for printed communications.

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