

High-Speed Color Digital Printing Generates New Business Opportunities

Printing and publishing markets are going through a period of significant change. Examples of these changes are shown later in this paper. Successful companies in the printing and publishing markets are the ones that can see the opportunities such changes will bring and who act accordingly to profit from these changes. To succeed one cannot ignore the changes, and those companies that do not act to profit from the changes will suffer and possibly go out of business. In assessing and acting upon these changes companies have to identify the key role the Internet will play in the future in the way all forms of business are carried out.

The HP Inkjet Web Press is the type of product that will allow forward thinking enterprising printers, publishers and print service providers to build profitable Internet enabled businesses to exploit these new business opportunities.

This paper will look at the major changes happening in the printing and publishing markets and identify where technology such as the HP Inkjet Web Press will have a major impact in generating new business opportunities in these markets. The following paragraphs outline some of these areas of opportunity.

One factor to consider when looking at the use of high-speed color digital printing is that customers should consider its benefits in areas other than just cost of print. For example while such digital printing may

sometimes cost more on a per piece basis, one must also consider other elements that generate major advantages. These include reductions in inventory with subsequent savings in capital, losses through spoilage, and significant advantages in time to market. The production time for a completed printed production using an integrated digital printing systems like the HP Inkjet Web Press, can often save a huge amount of time, and such time-savings can often offer major financial advantages to customers.

In the case of book printing this press will have the performance, cost structures and quality to allow book publishers to change their business models and reduce their commitments to offset printing for many first print editions of books. With average print runs for books now being of less than 5,000 copies, the HP Inkjet Web Press can change the whole production structure for book publishers. It will also allow for the reprinting of books that have become digital through scanning of old editions. It will also be a significant press for the production of educational books at a time and place when they are needed. This press will allow publishers to release capital tied up in book inventory, by printing far shorter runs in the first place without the penalty of higher unit printing costs.

Newspaper publishers and printers will be able to develop new models for printing new short run localized titles with personalization, as well as being able to implement micro zoning of

editorial and advertising to be combined with conventional offset printed editions, where the offset and digital sections would be combined into single publications in the mail room.

The market for direct mail printing has already been revolutionized by existing sheet fed digital printing presses and advanced personalization software. The higher performance and functionality of the HP Inkjet Web Press will extend these new personalized direct mail markets through the press's very high performance and functionality.

High-speed continuous feed color presses will change the market for transactional and other financial printing. At present most financial printing is done in monochrome, often using pre-printed offset shells, where just the monochrome data is printed. We will see a major move to print such financial data in color. In order to enhance the value of transaction printing we are seeing a move, often referred to as transpromo, where relevant marketing material is printed on to the transactional document. This often makes use of data mining to ascertain the buying habits of the recipient of the document, and this allows the marketing messages to be specifically target at the recipient of the document.

In all the above cases these new business models need not just be for the printed copies. In the sheet fed digital printing market there has been a rise in the use of digital printing in multiple media marketing approaches. This is where media such as text

messaging, email, Internet pages with PURLs, and digital printing are combined together. With the HP Inkjet Web Press such multiple medias can operate together to assist in building new business models. For example it is possible to provide linking from the printed page to a personalized web site to develop special offers with one to one marketing approaches. Such technologies have never been offered in book, magazine or newspaper publishing and printing before, so this can be another tool to assist users to develop profitable new business approaches.

HP is not alone in developing high-speed continuous feed digital color presses. There are a number of other suppliers using other technologies including continuous inkjet, piezo drop on demand inkjet and xerographic printing. HP with the Inkjet Web Pres is alone in using thermal inkjet drop on demand technology that has been implemented under the HP Scalable Printing Architecture programme. The benefits of this are that HP benefits from the economies of mass manufacturing in utilizing proven technology that has been developed to operate in a wide variety of different markets. This and other HP technologies, over which HP has both ownership and total control, have been used to create a press that is unique in what it offers over the offerings from HP's competitors. This is also the only 30-inch width continuous feed inkjet press currently demonstrable. Among the benefits of the press are the following items:

- The HP Scalable Printing Architecture print heads

provide a 29-inch width for imaging. These provide the four colors, plus the bonding agent. Tandem print bars each with seven print heads print 600 x 600 dpi pixels at a resolution of 1,200 dpi across the web and 600 dpi down the web. To provide the across the web resolution eight nozzles address each 1/600-inch dot-row. This provides nozzle redundancy in the event of any blocked nozzle, as well nozzle load sharing allowing for extended life of a print head. No competitive color press has such nozzle redundancy and any blocked nozzle on these devices may show as a print artefact.

- If the inline process monitor on the press detects any weak or missing nozzles it can automatically utilize alternative nozzles for the weak or missing ones. If a print head needs to be replaced, the inline process monitor will detect this. Changing the printhead is an operator task taking around two minutes.
- The imaging resolution of 600 pixels per inch with three levels per primary color at full imaging speed of 400 ft/min, provides the highest quality of all continuous feed digital color systems. Other systems either work at one level in full speed mode or slow down for multiple levels.
- HP provides very high levels of image processing power to keep the Inkjet Web Press running at full speed whatever

the work being printed. This image processing architecture breaks the image up into multiple print swaths and these swaths (or slices) span the web providing overlaps between swaths for seamless image stitching. The image processing hardware and software runs in parallel for each slice from the DFE and RIP to the printhead control.

- The RIP architecture for the press is scalable and there are multiple RIPs controlled by a digital front end (DFE). The number of RIPs installed matches the complexity of the print job: fewer are needed for monochrome text documents, more for full-color pages with 100% variable content.
- HP provides a full range of matched inks and substrates for the press. The water-based inks have very low VOC emissions with no ozone or hazardous air pollutants. The inks work together with the HP bonding agent and when compared to Euroscale Uncoated substrate the gamut gives both a better black optical density and a larger color gamut than offset printing.
- The HP bonding agent technology is unique and competitors on their presses offer no equivalent technology at this time. It is applied to the substrate only where ink is to be applied. It works by chemically reacting with the HP pigment inks and immobilizes pigments near the

paper surface. This controls ink penetration; dot spread; reduces strike through; improves print optical density; reduces feathering; and improves image durability.

- HP's Paper Enhancement technology is a surface treatment for higher quality printing. This is optimized to work with HP's pigmented inks to provide what is perceived to be offset comparable quality on uncoated papers.
- For highest quality printing the HP coated media are designed to work with HP pigment inks for outstanding quality at full press speed (400 fpm).

The HP Inkjet Web Press is the first of a family of products that can be created using the same technological approaches. We are already seeing the HP Scalable Printing Architecture being used on the desktop in a SOHO environment, in the enterprise as a department multifunction printer (MFP), in the display and signage market as a 100 inch plus width printer using the new HP Latex inks, and in the production color printing area with the HP Inkjet Web Press. None of HP's competitors can offer such a proven technology. One can envisage that under the ongoing Scalable Printing Architecture programme we will see new inks and substrates being developed, and in time, further generations of the print head to give even higher performance and quality.

While I have called the HP Inkjet Web Press the 'transition press' perhaps I should have called HP's Scalable

Printing Architecture the 'transition technology.'

Changing Markets

Today we are seeing a really major change in the markets. It has been quoted that today's disruption is at least comparable to the changes that happened with the industrial revolution. This disruption is brought about by the impact of the Internet linked with the impact of the credit crunch. The disruption is causing established markets to collapse and to be replaced by entirely new markets. It is causing successful companies within the industry to fundamentally change their approach to business. The traditional business value channels are collapsing and new value channels are taking over.

The following are some examples of what is happening in the market today.

- Much of the newspaper industry is almost in meltdown. Advertising revenues that keep newspapers going are collapsing as advertisers switch their advertising predominantly to online media. In addition to the drop in advertising we are also seeing major falls in newspapers' circulation as readers switch to getting news from other forms of media.
- Printing companies are going out of business at a much higher rate than has been seen for many years. This is being seen as demand for conventional printed material drops as print buyers look at alternative approaches to

printing, while at the same time looking to cut prices for printing as excess printing capacity chases the reduced volume of print.

- Print is being seen as an industry of the past and one that is ecologically unfriendly. Many of print's customers are perceiving that online media is a better solution for getting their messages to the market.
- Book publishing is seeing new challenges from E-readers such as the Kindle and the Sony Reader. These devices are targeted to have the same impact on book publishing as Apple's iPod had on the music industry with the hope that book readers will switch to downloading books rather than buying printed books. Book publishers are suffering from major inventory costs and are looking at electronic approaches and to digital printing to change this situation.
- There is a major capture operation of almost all books that are both in print and out of print. Companies like Google are scanning as many books as they can to make their content available in a searchable form through Google Book Search. The world's libraries are scanning all their content to allow research of old editions to be done electronically without disturbing the libraries' rare books. This will mean that the total book content of the world will be available in certain forms in a

searchable structure. Such content will also be re-printable using digital printing.

- The rise of personal publishing, where small organisations or individuals can publish without the requirements of having to go through a publisher. Online technologies allow for creation of content and pagination into finished formats with digital printing of the book in quantities as low as one copy.
- Direct mail has changed from a mass distribution approach to a targeted and personalised approach as users refuse to accept junk mail. The impact of 'do not call' telephone lists preventing major telephone marketing has pushed personalised direct mail.

Living with the Internet

The challenge for printing is how to live and prosper in the Internet age. Print is adapting to work with the Internet and to use Internet technology to open up new areas for printing. This is particularly being seen with digital printing as it opens up totally new printing applications such as photobooks and web to print ordering of printed materials. Successful printers today have used the Internet to make the use of print a more accessible and more personalized experience.

The use of the Internet is being seen in the development of full digital workflows. Such workflows have developed significantly to integrate the Internet. Digital workflows used to be

just the technology to automate the print factory operation to move work through the different processes, but today they are being used to integrate the customers, and through to the final recipient of the product.

Developing Content in New Ways

Content creation for publishing and printing has undergone a massive change with Internet technologies. In previous publishing generations content creation required complex and expensive systems. The Internet has generated new forms of publishing. These new publishing technologies originated for online publishing but are now opening up new publishing opportunities for personalized niche printed publications. The potential for this to link up with new forms of digital printing is likely to create a huge number of new specialized publications.

Linked Media Campaigns

The use of the Internet and digital printing with personalization has opened up new forms of using multiple media in an integrated approach to generate new forms of marketing campaigns. This uses text messaging, email, PURLs (personalized URLs for one-time personally created web sites), content tracking and digital printing for building very targeted and fully managed marketing campaigns.

Changing Distribution Systems

One of the key aspects for the future of publishing and printing is the manner in which distribution of the product takes place. The traditional distribution approach has been to

print, warehouse and then distribute. The majority of most book publishers' capital is tied up in slow selling inventory. In newspapers the distribution costs are very high and current approaches make targeting and zoning of newspapers to satisfy local requirement for advertising and content very difficult and expensive. Today companies in all industries are looking at utilizing the Internet to change their distribution models. In this there is real opportunity to change many forms of printing and publishing to adopt the distribute and print model and to eliminate holding print inventory, and high-speed digital printing is one of the keys to make this happen.

Personalizing the Magazine

One of the most interesting magazine developments in the past years has been the rise of the corporate magazine. Corporate organizations have reduced their advertising spend for conventional magazines and many have instead moved to production of their own magazines that they distribute through their own channels. As these magazines are distributed to known people there is the possibility with digital printing to personalize these and target them specifically for individuals or groups. This could even open up a new business classification called MagPromo.

Changing the Newspaper Model with Digital Printing

Newspapers have been trying out limited changes in their distribution models for many years, but these have always been restricted by the offset or flexo printing models. Targeting of a

newspaper or creating special zoned editorial or advertising sections has been hindered by the minimum run lengths that are feasible with high-speed newspaper offset or flexo presses. There is a limited amount of digital newspaper printing being done in certain parts of the world. This started up with the Océ Digital Newspaper Network for printing very short runs of specific international newspapers in certain centers. The key for the future of newspapers can be seen moving in two areas with the adoption of digital color presses. The first is as totally digital printing operations for printing a variety of short run newspapers, and the second is as a complementary press to the main offset press to print localized and personalized editorial and advertising newspaper sections to be incorporated automatically in the mail room with the main paper.

Changing Transactional Printing to Transpromo Printing

One of the most recent trends that is largely being brought about by the availability of high-speed continuous feed digital color presses is to integrate the transactional and marketing documents in what is termed transpromo printing. This is to use data mining to assess the buying trends of the recipient of the transactional document, and then to include very targeted advertising material printed as a part of the document. At the present time the vast majority of the transactional printing is in monochrome with printing on offset printed shells. The move to transpromo will push this market to adopt color printing. This is still a new

trend but is one that is predicted to have a major growth.

The Impact for HP Inkjet High Speed Production Solutions

In a paper I wrote for HP IHPS in May last year I called the HP Inkjet Web Press a transition press. I called it this as I felt that it was the first digital printing product that would transition into the offset printing space in terms of what it could do and how it would move digital printing into many of the key application for offset printing. The reasons for this were the format with a 30-inch width web, the operational speed, the purchase and running costs that made the press competitive against offset in run lengths where offset was highly profitable, and the facility to run all digital applications with run lengths as low as one copy.

I made this statement at the time other vendors were also introducing continuous feed digital color presses, but I felt the HP Inkjet Web Press was significantly different to the other presses that made it stand out as being the 'transition press.' It was the only press that looked into the core areas where offset was profitable and the 30-inch width web allowed it to handle a much greater variety of work. The print quality was better than other new presses for a number of reasons. These included the following:

- ◆ The use of the bonding agent to ensure better image quality without ink show through, eliminating the requirement for special inkjet papers for uncoated stocks

- ◆ The 1,200 x 600 dpi printing resolution produces 3-level, 600dpi pixels for better half-tone quality at full press speed.
- ◆ The multiple printhead nozzles per printed pixel approach providing higher quality printing and greater reliability than other approaches.
- ◆ The built in quality control that checks for density variations in printed color bars outside the page areas.
- ◆ The potential of printing on a range of special coated substrates for inkjet printing, and on uncoated substrates through the use of HP's Paper Enhancement technology.

Extending Digital Printing into Key Offset Markets

Digital color printing currently exists in the sheet fed area where it replicates commercial offset quality for short run printing, and into the transactional markets where the quality is more like newspaper quality printing on uncoated substrates. The HP Inkjet Web Press has the capability of entering into the commercial offset space but with the performance and running costs of the transactional presses. This can significantly change a number of printing markets because it adds the benefits of digital printing such as run lengths as low as one copy, personalization, and web to print operating, with low running costs.

Going Green

The HP Inkjet Web Press reduces the environmental impact of printing with water-based, pigment inks that have

very low volatile organic compound emissions, do not contain Hazardous Air Pollutants, and do not produce ozone during the printing process.

In the area of paper recycling, the printed output from the HP Inkjet Web Press is to my understanding the only continuous feed inkjet color press that meets the Ingede Method 11 standards for deinking, and is acceptable for paper recycling. Again to my understanding at this time the output from all competitive continuous feed color inkjet presses has not been found to be successfully deinkable, and therefore is not suited for paper recycling.

All these factors mean that the HP Inkjet Web Press makes a positive contribution to environmental issues in print production and supports a safe print shop environment.

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