

The future of UV inkjet

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A little longer than 80 days perhaps, but UV-cure inkjet is circumnavigating the globe at its own accelerating pace. But what are its fortunes in different geographies, asks Pira International, and where will investment best be backed up by adoption?

In 2005, UV inkjet had commanded a tiny share of the overall global print market - just 0.08 per cent. It had a slightly higher proportion of the emerging Latin American and Eastern European regions. However, over the five years to 2010, UV inkjet will account for 0.91 per cent of the whole print and packaging market, as the overall share of inkjet increases from 3.2 per cent to a fraction over 4.4 per cent.

Market distribution UV inkjet printing is distributed around the world, the leaders being North America and Europe (each accounting for approximately a 35 per cent share), with Asia lagging. North America has maintained, and will continue to maintain, its share, reflecting the capability of domestic individual print suppliers to develop innovative high-value applications.

The fastest-growing regions are the emerging markets of Eastern Europe and Asia, though it is important to remember that the pattern of growth is not the same for each country and region. For instance, the UK has witnessed a rapid rise, and has a strong position as an early adopter of UV-cure inkjet technology. This is due to the fact that it is home to many of the manufacturers, and that its production capabilities match the requirements of the UK market for PoS and outdoor signage, corrugated packaging and displays.

UK growth will continue, but at a somewhat slower pace than the US, which initially adopted UV-cure inkjet technology more slowly than the UK but is now catching up and has surpassed it.

Elsewhere, large numbers of printing operations in several European countries have adopted UV-cure technology, while others are only beginning to adopt. Western Europe is losing share to the emerging markets of Eastern Europe. Asia is growing quickly as the early UV inkjet adopters are being caught up, with Japan and China leading the way over the period.

Market development

The development of UV inkjet printing is spread around the world. Ink makers in the UK, Belgium, Japan and the US are producing inks for use with the latest machines, in some cases working with the equipment suppliers to develop new solutions. The leading head developers are in the UK (Xaar) and US (Spectra, Dimatix), with licensees in Japan and elsewhere. System integrators are developing bespoke solutions worldwide, while machine and system manufacturers are widely spread. The most dynamic sector is China, where many suppliers have specialist manufacturing capability, taking advantage of the low labour costs. Europe

While Germany is the largest printing market in Western Europe, and Siemens was one of the early developers of inkjet technology, it is the UK that leads the UV inkjet printing sector. The projected growth rate for UV in the UK, however, is lower than other markets as those markets begin to catch up.

In the UK, leading ink and equipment developers such as Sericol, Lyson, Coates (part of Sun Chemical), and the Cambridge centre of heads and equipment are very important to the development of UV inkjet. Much of the original development of inkjet printing came from the Cambridge Technology Partnership during the 1970s and the Cambridge area still houses Domino, Xaar, Inca Digital, Xennia, Willett, Linx, Elmjet and Conductive Inkjet Technologies.

Two of the major UV systems developers are also located in the UK: Integration Technologies and Nordson, while several UK supplier companies aggressively marketed digital products throughout England. Inca Digital kept its beta and early adoption sites close to home, giving English graphics companies a head start with their technology, with Bezier acting as the first installation for the new FastJet system.

Durst has its headquarters in the German-speaking part of northern Italy. It also has a production facility in Austria. Durst has developed laser photo imaging with its Lambda and Epsilon printers and wide-format inkjet with its Rho series.

The Italian silk industry is located in and around Como, Italy. This industry experienced difficulties in competing with Korean silk manufacturers. It was also seeking a way to print short-run high-value silk scarves and ties. Its high-quality standards prevented it from adopting earlier iterations of inkjet technology, but the high resolution of the Mimaki TX printers won rapid acceptance in Como. Italy has also developed advanced textile inkjet printers with the Robustelli Monna Lisa and the Reggiani DReAM. Italy has superseded Japan as the centre of digital textile printing.

Spain largely mirrors Italy in industrial development and is forecast to enjoy the highest growth rates for UV inkjet printing across Europe with Spanish PoS companies in particular adopting digital printing. Direct digital printing of tiles began in Spain with the Kerajet printer. This press enabled companies to print tiles without repeat patterns showing and to imitate other surfaces with precision.

France developed a centre for digital printing and a master's degree in digital print engineering at the Valence campus of the Institut National de Grenoble. Imaje is also located near Valence and is developing a single-pass textile printer in addition to its marking and coding business. The first digital t-shirt printing business operated near Valence, and began in 1993.

Germany houses 3P Textiles near Munich, a world leader in manufacturing coated textiles for inkjet printing. The Benelux countries house digital industry leaders Agfa (Dotrix), Océ, Barco, Nur and Stork. Belgium and the Netherlands are known for their pioneering adoption of digital printing technologies. Zimmer developed digital inkjet for carpet printing in 1976 at two locations in Austria, and has continued to develop inkjet processes for textile printing. It introduced the Flatjet Chromatex press at Itma in the third quarter of 2003.

Zünd manufactures its precision plotterprinters in Switzerland, while Lüscher developed its digital computer-to-screen and computer-to-plate technology along with the world's largest UV-cure flatbed technology. Eastern EuropeBudapest, Hungary, is the birthplace of the Flatjet print heads that Zimmer uses with its Chromatex digital printer. Without question, Eastern Europe is following Western Europe in adopting digital printing. The fastest-growing region comprises the developing economies of central and Eastern Europe. A new entrant to the field is Turkey - EMA joined the list of UV inkjet exhibitors at Fespa 2005. Many of the countries of Eastern Europe are growing at higher rates than several of the economies in the EU region. They have been adopting digital printing for wide-format applications and have begun to acquire UV-cure inkjet solutions. The pace of adoption in Eastern Europe will increase between 2005 and 2010.

Eastern Europeans have adopted Korean and Chinese wide-format printers. Grapo, an OEM in the Czech Republic, produces a line of UV-cure digital printers using Xaar print heads. A development group in Budapest has invented a digitally controlled miniature print system that is similar to inkjet and can dispense a wide range of liquids, including UV-cure inks.

While Israel is not technically in Europe, there are very close links as Israeli companies have developed significant digital printing technologies in partnership with European customers and integrators. Scitex, Scitex Vision, Matan, Nur and Scanvec Amiable have gained a major role in the development of digital printing technology.

North America

US print providers have been slower to adopt digital solutions than Europe because the driving forces encouraging adoption were less compelling in the US owing to its larger market with a common language. Canadian print providers embraced digital printing earlier than US printers, in part, because of the country's language diversity and mixed markets.

Early digital wide-format graphics printers included electrostatic from Xerox and later Raster Graphics. Encad and later Laser Master offered early inkjet systems.

The reprographic houses, photo labs, exhibit houses and service bureaux adopted wide-format earlier than the larger sign and screen-printing sectors. Gerber Scientific opened the sign-making market to vinyl cutting and narrow-format thermal transfer printing. Roland competed with Gerber for the sign market by introducing its thermal transfer plotter.

HP, with over \$80 billion (€62.23 billion) in annual sales, and as the leading provider in the professional and office markets, occupies a key leadership position in the world of digital printing. HP's acquisition of Indigo extends its position in the commercial and large office printing markets, as well as taking a position for industrial digital printing. Its takeover of Scitex Vision and agreement with Seiko Instruments declare its intention to play a major role in wide- and superwide-format solvent and UV-cure inkjet markets. VUTEK, Colorspan and Encad are leading OEMs that manufacture wide-format equipment in the US.

Gandinnovations manufactures in Canada. VUTEK, Colorspan and Gandinnovations have established themselves as major suppliers of UV-cure inkjet solutions for wide-format applications. Spectra, Trident, VideoJet, PicoJet, HP, Lexmark and IJT-OTT manufacture print heads in the US. Asia

The inkjet printing market in Asia is predicted to grow faster than the other major regions of Europe and North America, led by the fast-growing Chinese market. UV will be a small segment of the inkjet printing market as the country concentrates on longer runs and volume production for domestic and export markets.

The region is particularly cost-sensitive and will continue to use solvent-based systems, as there is little environmental pressure to reduce VOC emissions. China

As one of the fastest-growing world economies, China has become the third-largest economy after the US and the EU. China is the most populous nation on the planet and has enthusiastically joined the world of inkjet printing. It has avoided older technologies, such as electrostatic, and has advanced to building grand- and wide-format inkjet printers for its sign and visual communication needs.

Inkjet printing in China has blossomed with the graphic nature of the Chinese written language. Most of the output from the burgeoning Chinese printer manufacturing industry will remain in China. The country is fast becoming a major source of coated media and inkjet ink, available at much lower prices than the western equivalents, although the quality often is not up to developed nation standards.

Chinese manufacturers of digital printing products have partnered with established companies in developed countries to ease entry into those markets. China has begun to enforce copyright, patent and trademark protections as part of its participation in the World Trade Organization (WTO).

Chinese companies have aggressively adopted solvent-based inkjet technology, and are manufacturing inkjet print equipment for the Chinese market. Chinese inkjet manufacturers are also attempting to enter the UV-cure inkjet arena with varying degrees of success. Those companies that have formed alliances with established partners, for example Runjiang Group with DuPont, gain the advantage of advanced technology, brand identity and established channels to developed markets, while offering lower labour costs for assembly and engineering.

While China has become the major consumer of solvent-based inkjet printing systems produced in China, and will likely become the major consumer of its UV-cure products, it has yet to produce significant numbers of UV-cure printers. However, by early 2006 China had begun to supply about 200 UV-cure units, more than half of which were destined for North America, Europe and Japan.

Chinese inkjet manufacturers have developed market channels for solvent-based systems in a number of areas including South America and Asia. These companies will probably supply their UV-cure printers through these channels as they develop their UV-cure offerings.

Chinese business is competitive, with its own particular culture. Tales of local companies counterfeiting, as well as renegotiating, contracts abound, and these include inkjet equipment and materials. The early Chinese model involved producing competitive equipment at some 50 per cent of the price to obtain maximum share of the market and dominate manufacturing with the benefits of low cost.

This has occurred in inkjet equipment with local copies of western engines now joined by contract manufacturing. Several brand owners have incurred problems with quality issues, e.g. no parts list and poor quality control. Printers in China accept problems with their equipment and materials. They use a great deal of ingenuity and the culture is to solve problems, make do and mend with lower-cost, lower-quality solutions. This has limited the export market for their machines to other emerging Asian economies, Latin America and Eastern Europe.

The success of China in manufacturing many products for all sectors has provided another problem for the export of branded technology - there are significant shipping delays that increase the lead-time noticeably. It was a combination of technical and shipping delays that led to the latest DuPont machine suffering launch delays. Japanese companies in Japan have developed primary inkjet technology along with those in the US and England. Japanese companies such as Canon, Epson, Sharp, Panasonic, Brother, Konica-Minolta, Hitachi and Ricoh continue to contribute to the advancement of primary inkjet technology. Japanese ink and chemical producers supply much of the chemistry that flows through inkjet print heads. The Japanese company Dai Nippon owns the largest ink manufacturing operations globally. Its Coates, Sun Chemical and SunJet companies, with their ink production facilities located in the UK and US, supply about 39 per cent of the UV-cure inkjet inks consumed globally.

Toyo, another Japanese UV-cure inkjet supplier is also supplying inks for some UVcure inkjet applications. Japanese equipment manufacturers such as Mimaki, Mutoh, Roland and Ichinose build and sell many tens of thousands of inkjet printers annually. Mimaki and Mutoh offer UV-cure inkjet systems and Roland is developing one. Mimaki has sold about 100 of its UV-cure printing systems in Japan. Mutoh has partnered with Agfa and Xaar to produce its Cobra 100 and Agfa Anapura 100 flatbed UV-cure inkjet greyscale printers.

A number of South Korean companies manufacture UV-cure equipment. The owners of Korean inkjet printer producer DGI established a separate company for the production and sale of UV-cure inkjet equipment, called Dilli Precision. Korean company Hypernics developed two UV-cure inkjet devices using Konica-Minolta PIJ print heads. The Creon Azero printer is the largest of the two Hypernics units. The Dilli Precision printers have had limited success, while the Hypernics devices have yet to find a market.

Taiwanese equipment manufacturer Eastech Digital introduced two UV-cure printing systems, offering each in 64in and 87in print width models. Its Scutum series uses Spectra SM-128 print heads, while its Octra series uses Epson PIJ print heads. It also offers both systems in standard and lower cost light versions. Eastech has focused its marketing efforts in south-east Asia, primarily in Taiwan, Hong Kong and China.

India will become the most populous nation in about 2025. It has the largest middle class in the world and prints more textiles than any other country. Indian and global corporations are training their staff as computer and digital systems technicians to supply computer customer service for the English-speaking world. Indian software programmers are producing some of the most sophisticated computer code.

Xaar opened its Indian office - the first by an industrial inkjet print head manufacturer on the Indian subcontinent - in 2004, near New Delhi. The Indian subcontinent presents an immense opportunity for inkjet technology, and Xaar believes it will be a very exciting market in the next phase of the inkjet industry's global development.

There are nearly a quarter of a million conventional printing presses in India, 70 per cent of which are operated by small family-owned businesses. These small and medium-sized enterprises are also purchasers of both wide format and other digital printers. With the value of output in the printing industry in India exceeding e6 billion and the specialist graphics, billboards and packaging sectors having a combined output value of e2 billion, it is clear there is a tremendous amount of potential.

Asian OEMs will grow from producing about 20.3 per cent of all UV-cure inkjet systems in 2005 to about 27.4 per cent in 2010.

Others

The Latin American market is well positioned in UV inkjet. Much of the output is exported into North American markets. Companies in South America are acquiring digital printing and UV-cure inkjet printers for graphic arts application.

Chinese manufacturers have had some success in penetrating the South American market as the print companies are attracted by the low prices. The region will lag behind the more developed economies in the use of UV inkjet as there are fewer environmental pressures to reduce the use of solvents in these markets.

Takeaways

- UV inkjet distribution is scattered all over the world, with most of it split between the US and Europe, but over the coming years emerging markets, mainly in Asia and Eastern Europe, will spearhead take-up of the technology.
- The UK is the largest market for UV inkjet technology and a hotbed of innovation thanks to the Cambridge cluster and other companies, but Germany, France, Italy and Spain have all burgeoning competent digital and inkjet technology industries.
- In Eastern Europe, Budapest is the capital of head innovation and Turkey is one to watch.
- North America has been slow to adopt digital and inkjet technology, compared with Europe, and the sign and screen printing sectors took longer than commercial to use wide-format.
- Driven by China, Asia is predicted to grow faster than both Europe and North America. China has bypassed electrostatic and older technologies in favour of inkjet.
- Although Chinese companies have enthusiastically adopted solvent-based systems some producers are already developing UV equipment.
- Japan dominates in the area of inks and Dai Nippon, through its extensive base of global subsidiaries, supplies almost 40 per cent of UV inks sold globally.
- Korea is emerging as a centre for UV-cure systems, and in Taiwan Eastech Digital has already launched two UV printers.
- Though it will be a few years before India reaches its full potential print head developer Xaar reckons it could be the most dynamic market for digital and inkjet technology, due to its commitment and investment in computing, software and digital technology.
- Latin America is well positioned to export low-cost products and packaging to North America and there is evidence that some companies are already using inkjet and UV systems in graphic arts, though the region is not compelled to adopt UV, as its solvent regulations are not as stringent.