WHITE PAPER

EXPANDING OPPORTUNITIES IN B2-FORMAT DIGITAL

EARLY ACCURIOJET KM-1 CUSTOMERS PROVIDE INSIGHT

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Executive Summary

A new B2-format digital print product, the Konica Minolta AccurioJet KM-1, has entered the market and offers some important features built on its press-like design and UV inkjet technology. These features give it some compelling advantages versus competitive products. Two early users, Rehms Druck and PLS, also provide insight on the growing B2-format digital print opportunity.

Key Findings

- **Market growth:** The B2-format digital print market has experienced significant growth since 2011, and InfoTrends expects this growth to continue for many years.

- **Substrates:** Substrates are the key to effectively producing virtually any print application. UV inkjet technology can print effectively on a wide range of substrates without any pre-conditioning of the paper.

- **Drying:** Aqueous inkjet technologies require extensive drying through heat and blown air to evaporate the water in the inks. A benefit of UV inkjet technology is that it dries immediately upon curing. This eliminates any imperfections or waviness that can be caused by heaters or dryers.

- **Resolution:** Reproduction of small text, particularly when it is dropped out of a tint or solid color, can test the limits of many digital printing products. Devices offering 1,200 x 1,200 dot per inch (dpi) resolution are well-positioned to address these challenges.

- **Service/reliability:** Over the past decade or so, inkjet technologies have challenged toner-based technologies in terms of their reliability and uptime. Inkjet technologies are relatively easy to service, and this makes self-service maintenance models an attractive possibility.

- **Color management:** The broad color gamut of many digital print products requires close attention to color management standards to ensure matching output across multiple print technologies.

Recommendations

- **New competition:** A number of new products have been introduced to the B2-format digital print market, so print service providers have an ever-expanding range of choices in this growing market.

- **The details matter:** Service providers know that the ability to print on specific substrates or meet quality requirements is vital to supporting client needs. This underscores the importance of testing any device that you are evaluating with substrates and job types that push the limits of the technology.

- **Justify the investment:** A B2-format production color digital printer is a significant investment, and it must be matched to your needs and plans for return on investment.

- **Finishing infrastructure:** Converting digitally printed sheets to completed applications requires finishing technology that can be quickly set up for a range of job types.

Introduction

The rapid pace of technological innovations for cut-sheet and continuous-feed inkjet devices, new inks and substrates, and an array of market applications are capturing the attention of print service providers of all sizes. With so many advancements, print service providers are asking when—not if—they should be making the inkjet investment. Service providers are also seeking strategies that enable them to optimize their investments.

Early users of Konica Minolta's B2-format UV-inkjet AccurioJet KM-1 are an excellent source of information on how the device can serve a range of digital print applications and help expand business opportunities for growth. Two German print service providers, Rehms Druck and PLS, have firsthand experience with the AccurioJet KM-1. In this sponsored white paper, InfoTrends provides an overview of the B2-format and inkjet digital printing opportunity, describes the AccurioJet KM-1, and reports on feedback from these production sites.

The Emergence of B2-format Digital Print

Although the first product placements of B2-format digital printing products began in 2011, the market is still in its early stages. As of the beginning of 2016, there were only two main providers of cut-sheet B2-format digital print solutions. The range of offerings has recently expanded with the market entry of Konica Minolta's AccurioJet KM-1.

Some definitions will be helpful at the start. The B2 standard is 500 by 707 millimeters (19.7" by 27.8"), and is commonly referred to by printers in some geographies as 4-up or 29-inch.

**Table 1: The B1. B2, and B3 Formats**

Name	Size (mm)	Size (inches)	Terminology
B1	707 x 1,000	27.8 x 39.4	8-up, 40-inch
B2	500 x 707	19.7 x 27.8	4-up, 29-inch
B3	353 x 500	13.9 x 19.7	2-up, A3+

Few of the B2-format digital print products match the B2 format exactly. For example, the maximum paper size of the AccurioJet KM-1 (585 by 750 mm) is larger than the actual B2-format standard. Most production cut-sheet digital print today is in B3-format, or somewhere near it. No products currently exist in B1-format, but some are expected to join the market very soon (though probably with a greater focus on folding carton packaging rather than commercial print applications).

InfoTrends estimates that about 200 B2-format digital print devices were placed worldwide in 2016. A total of about 500 units have been placed since 2011. That installed base is expected to achieve double-digit growth rates through at least 2021.

Figure 1: Global Color B2-Format Digital Print Placements (2011-2016)
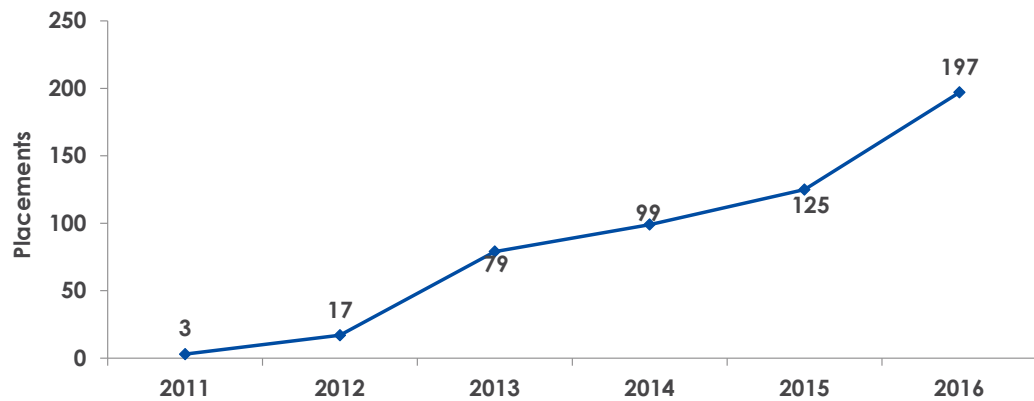
The reasons for this growth are as follows:

- **Format:** Cut-sheet digital print has been format-constrained due to the relatively small size of a B3-format sheet. This limits the ability to produce applications like wrap-around book covers, multi-panel brochures, point-of-purchase signage, pocket folders, and many folding carton packages.

- **Productivity:** B2-format creates the possibility for higher levels of productivity through multi-up impositions of applications like business cards, greeting cards, or book pages. In addition, B2 also enables 6-up letter and A4 page impositions.

- **Comfort level:** Many commercial printers are more comfortable with the sheet-size and finishing requirements associated with B2 format.

When these factors are coupled with the many advantages of digital printing (e.g., cost-effective short runs, quick turnarounds, personalization, just-in-time manufacturing), it is easy to see why the market has responded positively to B2-format digital print.

The Inkjet Advantage

In addition to the advantages of B2-format digital print, let's walk through some of the implications for inkjet technology. InfoTrends' analysts routinely interview inkjet users to identify the critical strategies that they are following to accelerate the path to profitability. During these interviews, companies that invested in inkjet are asked to provide their perspective on digital inkjet technology in terms of where it is now, where it's going, how it will likely impact the market of the future, and how they are making it profitable for their organizations. These inkjet users largely believe that high-speed inkjet is transforming color printing. Inkjet offers all the advantages of digital printing—personalization, electronic collation, just-in-time manufacturing, workflow automation, fast speeds, and high productivity—as well as the ability to affordably produce higher-volume short run and personalized applications. It is creating limitless opportunities for direct mail, marketing collateral, books, publications, and more. Color

consistency, reliability, productivity, and quality have improved, and these improvements are directly linked to new processes, inks, heads, coatings, and substrate options.

Pages Will Move to Inkjet

Each year, InfoTrends forecasts growth in digital pages. Global digital production color volumes totaled about 454 billion impressions in 2015 and are expected to approach 895 billion by 2020, with inkjet representing 60% of total digital color volume at that time. Cut-sheet electrophotographic digital color is also growing at a healthy rate.

Figure 2: Digital Print Volume Continues to Grow
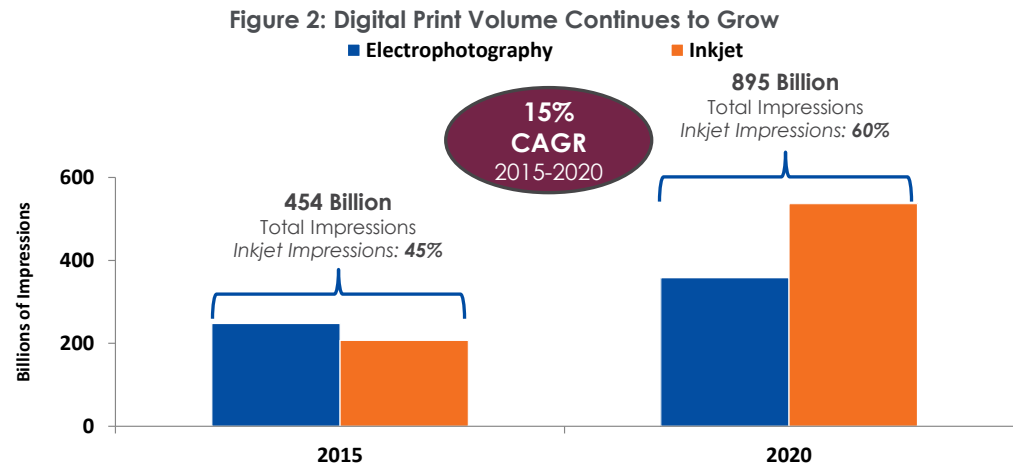
Source: *Global Production Printing & Copying Market Forecast: 2015-2020*, InfoTrends 2016

The dramatic growth that inkjet is enjoying can be attributed to a combination of factors:

- Continued innovations in roll-fed technology and the introduction of cut-sheet inkjet technology

- New applications

- A drive for more customized communications

- The cost-effective migration of offset volume to digital color based on significant improvements in speed, substrates, quality, and cost

About the Konica Minolta AccurioJet KM-1

Described by Konica Minolta as a "29-inch sheet-fed UV Inkjet Press," the AccurioJet KM-1 brings an important new twist to the B2-format digital print market—UV inks that have an innate ability to handle a broad range of substrates without pre-treatment of the substrate. The inks of the AccurioJet KM-1 dry instantly when exposed to an LED UV array. The device benefits from offset-inspired paper movement, including the feed and delivery units. The unit also provides automatic duplexing.

Figure 3: The Konica Minolta AccurioJet KM-1

The AccurioJet KM-1 can print up to 3,000 simplex sheets per hour with inkjet heads capable of generating1,200 x 1,200 dpi resolution. It supports a maximum sheet size of 585 by 750 millimeters (23.03 by 29.53 inches) and papers up to 0.6 mm (23.6 points) thick.

**Table 2: Specifications for Konica Minolta's AccurioJet KM-1**

Specification	AccurioJet KM-1
Description	4-color, 29-inch, sheet-fed digital printer
Resolution (dpi)	1,200 x 1,200
Ink	UV-curing
Printing speed	Simplex printing: 3,000 sheets/hour Duplex printing: 1,500 sheets/hour
Maximum paper size	585 by 750 mm / 23.03 by 29.53 inches
Maximum printing size	575 by 735 mm / 22.64 by 28.94 inches
Paper feed capacity	900 mm / 35.43 inches
Paper delivery capacity	680 mm / 26.77 inches
Paper thickness	Simplex printing: 0.06 to 0.6mm / 2.3 to 23.6 pts. Duplex printing: 0.06 to 0.45mm / 2.3 to 17.7 pts.
Device dimensions (W x D x H)	5,369 by 2,947 by 2,325 mm 17.6 by 9.7 by 7.6 feet
Device weight (main body)	Approximately 8,100 kg / 17,820 lbs.

A key advantage of the AccurioJet KM-1 is that it builds upon UV inkjet technology, which Konica Minolta has adapted to provide a wide color gamut with a finish unlike other UV inks, which often have an unnatural glossiness. The inks have also been formulated to be laid down

in a thin pigment layer. Although this is somewhat thicker than offset inks, particularly in black text and solid colors, the early users have not found it to be objectionable. The color consistency and broad color gamut are the primary benefit. In fact, the Figure below illustrates how much larger the AccurioJet KM-1's color gamut is as measured against the Japancolor standard.

Figure 4: Color Gamut of the AccurioJet KM-1 Compared to Japancolor
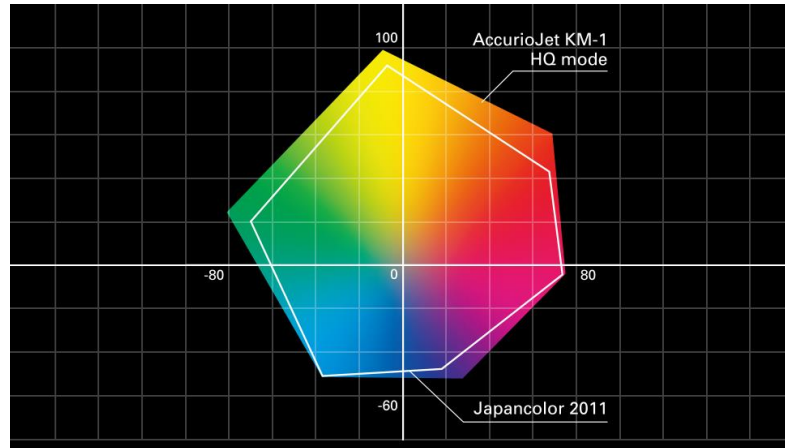
Building on the 1,200 x 1,200 dpi resolution of the inkjet heads, Konica Minolta adds edge processing technology that facilitates the production of small text sizes and fine line artwork. This is also important in designs where type drops out of a tint or solid background.

Figure 5: The Impact of High Resolution with Edge Processing
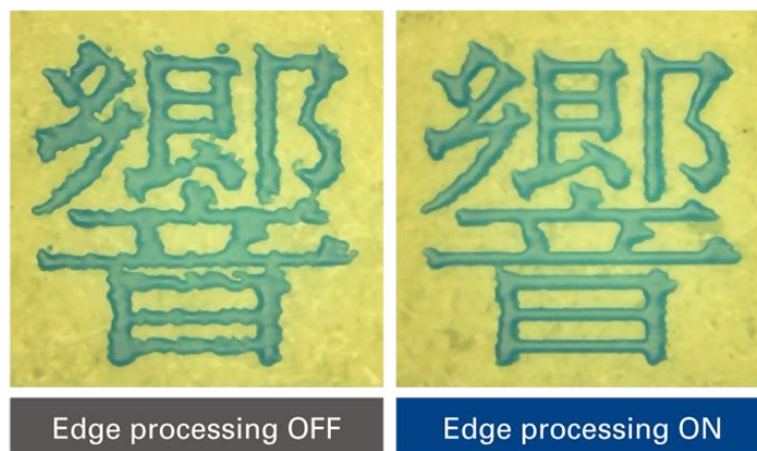
High levels of imaging quality are supported by an in-line sensor that detects any misfires by inkjet nozzles and works to correct them automatically.

Although a solid technology infrastructure is a requirement, the true test comes when the users take a device to its limits. The next section of this document covers the experiences of two such users, namely Rehms Druck and PLS.

Investing for Business Success

While production inkjet is a fast-growing segment of the market, simply investing in a press is not enough to drive business results. To build a print business that delivers sustained growth, service providers need a smart and strategic plan. As described in the KM user profiles, some key strategies that will help you drive business and increase operational efficiency alongside your inkjet investment.

The Right Application Mix

Production inkjet is application-driven. Each year, InfoTrends publishes an application forecast that projects the growth in digital page volume for specific applications. InfoTrends believes that overall digital print volumes in the Western Europe will increase by 3.6% through 2021, but some applications are expected to surpass that growth rate quite noticeably. By a wide margin, the application with the biggest gain in pages is books. Other applications—direct mail, magazines, catalogs, and brochures—are also expected to show very high gains. There are also many new and emerging opportunities in corrugated and folding carton package printing. If any of these applications represent a substantial portion of your overall print volume, it may be time to explore inkjet as an alternative.

Figure 6: Fastest-Growing Applications by Absolute Page Volume Growth
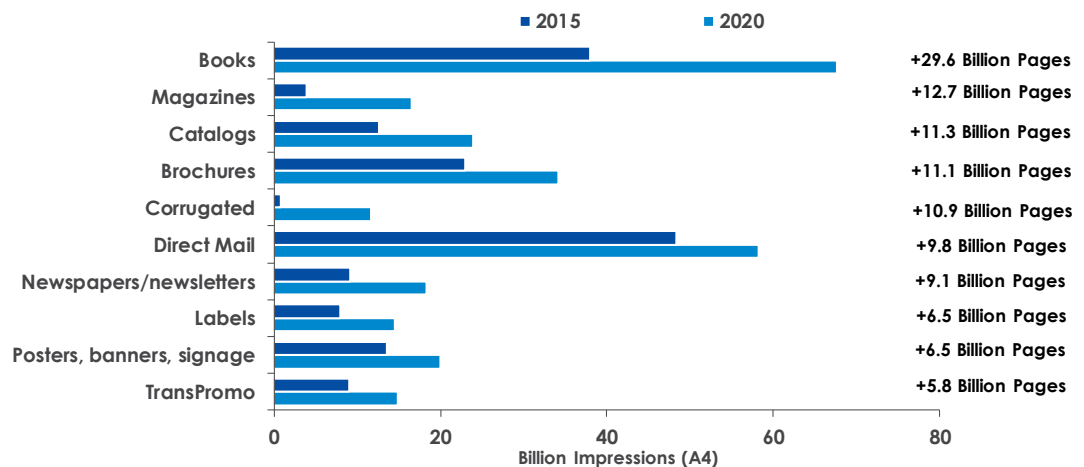
Source: *Western Europe Digital Production Printing Application Forecast: 2015-2020,* InfoTrends 2016

Value-Added Services: Data Front and Center

The real value of inkjet comes from doing things that can't be done with other print technologies, like producing more affordable high-value personalization, shorter runs, and versioning. To capitalize on this opportunity, print service providers must increase their data skills. Customer analytics and insights are the starting point for a customer engagement strategy that drives relevant, personalized, and data-driven content composition. Service providers will need to support the delivery of content via multiple channels that may include print as well as a variety of digital communications. Customer responses must be measured and fed back into

the business' database to serve as input for subsequent cycles of communications during the next step of the customer journey.
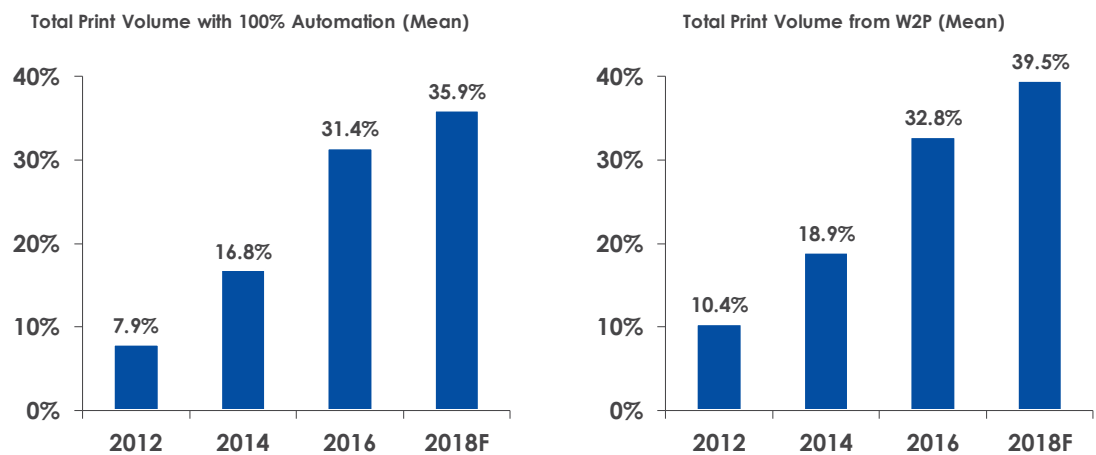
Getting the Workflow Right

Workflow processes are at the heart of successful production inkjet implementation. By taking as many steps out of the process and eliminating as many manual touches as possible, service providers can become more cost-efficient, improve margins, shorten production time, and deliver value-added solutions. Inkjet users identified the following key considerations that prospective buyers should evaluate during the decision-making process:

- The ability to deal with an array of data input sources in an automated manner to support the high-speed capabilities of an inkjet press

- Prepress capabilities, including an investment in color management education

- End-to-end print management to optimize the job flow across all devices, as well as integration with post-processing operations

- Fundamental data services including data cleansing, postal optimization, and data conversion

According to InfoTrends' research, most PSPs are focused on reducing costs and improving efficiency. Since 2012, there has been a doubling effect—the total volume of work that is produced in a 100% automated workflow has basically doubled every two years. The same is true for jobs that originate online. InfoTrends and respondents alike expect this value to accelerate at a slower pace over the next two years, likely reaching levels in the range of 40% - 50% of total print volume.

Figure 7: Increases in Automation and W2P: 2012-2018

Total Print Volume with 100% Automation (Mean)

Year	Value
2012	7.9%
2014	16.8%
2016	31.4%
2018F	35.9%

Total Print Volume from W2P (Mean)

Year	Value
2012	10.4%
2014	18.9%
2016	32.8%
2018F	39.5%

N = 241 in 2012, 253 in 2014, 252 in 2016 & 2018
Source: InfoTrends' Forecast Data

In addition, the embrace of extended applications for digital (including packaging) is creating the emergence of new workflow models, such as the notion of "web-to-package."

A Solid Business Model

An investment in inkjet requires a solid business plan. The most successful users carefully analyzed the business opportunity and identified ample volume to justify the investment *before* they purchased inkjet equipment. Areas of opportunity included:

- Displacement of short-run web offset work

- Displacement of offset pre-print and monochrome digital imprinting

- Displacement of cut-sheet black & white and color equipment

- Migration of longer run cut-sheet variable data work to inkjet

- Displacement of roll-fed black & white toner devices

- New application opportunities (e.g., testing materials for nursing programs, election ballots, revitalized non-profit direct mail campaigns, new services for bill/statement offerings)

Cost savings is another important component of the investment analysis. Key benefits reported by companies that implemented inkjet include:

- Single-step printing versus laser printing on preprinted offset shells

- No plate changes

- Reduced labor

- No pre-printed shells/ inventory

- Waste reduction

- A wide variety of materials (e.g., cards, letters, labels)

- Lower postal costs

- Moving to a completely digital workflow

One final step that inkjet users took was engaging their customers to get their perspective on the acceptability of the output for specific applications. This gave them confidence that customers would follow if they made the investment.

AccurioJet KM-1 Customer Profiles

Rehms Druck: Flexibility Is Key

Rehms Druck is a 100-year-old commercial printer based in northwest Germany not far from Dortmund and Munster. About 100 employees support the company's prepress, print, finishing, and direct marketing services. Its print services are offered through a combination of eight-up color offset presses and a range of black & white and color digital printers. With the arrival of the Konica Minolta AccurioJet KM-1, Rehms Druck retired its small format offset press, deciding to leverage digital print for its 2-up and 4-up work.

Figure 8: The Rehms Druck Facility

Rehms Druck serves customers of all sizes, including quite a few larger corporations. Given its location close to the Dutch border, 10% of the company's revenue comes from The Netherlands. Customer applications are split almost equally between general commercial print, packaging print, and direct mail. Rehms Druck prides itself on being a "one stop shop," offering a full range of applications from commercial print to packaging to mailing. The biggest change in customer demand that the company has seen is a requirement for faster turnaround. Rehms Druck is expanding its digital print infrastructure to help meet this customer need.

Figure 9: Direct Mail at Rehms Druck

Source: Rehms Druck

In addition to providing quick turnaround and operating as efficiently as possible, Rehms Druck works to accommodate all customer requests. This means that flexibility is very important, whether it is for short-run personalized print, multiple language versions of a document, or long runs up to 10 million impressions.

Investing in the AccurioJet KM-1

When Rehms Druck investigated its options for a new digital print investment, there were three important drivers that the device had to support:

- Fast make-ready and quick drying time compared to traditional offset

- The ability to support three customer applications (general commercial print, packaging, and direct marketing)

- Cost-effectiveness for short runs

As the company investigated further, the following quality and function issues also ranked highly:

- **Color gamut:** For Rehms Druck, broad color gamut is required to support accurate process color reproduction of corporate spot colors.

- **Automatic duplexing:** Although two-sided printing is a typical feature of most B3-format digital printers, not all B2-format digital printers support this.

- **Press design:** Rehms Druck operators were comfortable with a press design similar to an offset press.

- **Offset-like quality:** The company's customers require quality levels comparable to offset lithography.

- **Consistency:** Rehms Druck has some quality-conscious customers that are especially likely to notice variations within a press run. As a result, consistency is important.

In Practice at Rehms Druck: The AccurioJet KM-1

When the device was installed and production began, Rehms Druck saw new opportunities arise beyond just quick turnaround and efficient short runs (typically around 1,000 impressions). Although the AccurioJet KM-1 had been brought in to serve existing customers and markets, the company found that the arrival of the device created the opportunity for the following new applications:

- Printing on plastic sheets up to 500 gsm for loyalty or voucher cards

- High-quality full color personalization for high-end direct mail using data mining

- Art prints in short runs on fine art paper

The AccurioJet KM-1 also performed very well in terms of color consistency over long press runs. The press also upped overall print quality and resolution. Rehms Druck was especially thrilled by the device's ability to drop out small text from a full color solid. Furthermore, although substrate flexibility was not the main reason for the purchase, it turned out to be a valuable aspect since customers require the same papers for projects that require offset and digital components. The ability to print on substrates for envelopes, folding cartons (up to 500 gsm), and labels has also been extremely valuable.

Figure 10: The AccuriJet KM-1 Installed at Rehms Druck

The installation of the AccurioJet KM-1 went very smoothly, and the machine was up and running as promised in only five days. Rehms Druck has also been pleased with the support it has received from Konica Minolta. This included operator training and custom color management adaptations that Rehms Druck required for accurately matching its customers' spot colors.

Prepress workflow was not a big issue. The device integrated easily with the shop's Kodak Prinergy workflow. Postpress workflow has required a bit more focus to take advantage of the short-run and quick turnaround capabilities of the AccurioJet KM-1.

The AccurioJet KM-1 has turned out to have very low maintenance requirements and high levels of uptime. In the months since its installation, Rehms Druck has had only a handful of technician calls. The company believes that this inkjet device is much easier to maintain than

other digital platforms. Two shifts can be run with confidence. Rehms Druck cites the offset-like paper transport as another reason for high reliability. Operators are comfortable with the device and can perform key self-maintenance tasks.

In conclusion, Rehms Druck has been very impressed with the device's performance and how it has created the potential for new opportunities beyond what was originally envisioned. B2-format digital in the form of the AccurioJet KM-1 has earned the respect of Rehms Druck's customers and its shop floor operators.

PLS: Environmentally-Friendly Digital Print

PLS (Print Logistic Solutions) is the European subsidiary of OvernightPrints, which has many sites worldwide. OvernightPrints employs 400 people, and 70 of these are based in Europe. PLS has two sites not far from each other in east central Germany, one in Dresden and the other in Markkleeberg (where PLS has its production facility).

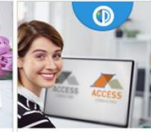**Figure 11: PLS Print Logistic Services GmbH Logo**

PLS believes that it is one of the biggest waterless sheet-fed offset printers in the world. The company also holds expertise in UV offset printing. One of PLS's devices for short runs is the KBA 74 Karat, a direct imaging offset press first brought to the market in 2000. Although these devices continue to be very efficient for short runs and have a quick make-ready (with a minimal number of waste sheets, five or so), they are an aging technology. PLS was seeking a fully digital replacement to complement its B3-format electrophotographic printers, which the company uses for extremely short runs.

Through its web store, PLS supports a wide range of print products for business-to-consumer (B2C) and business-to-business (B2B) customers. The split between these two segments is about 50/50, but the target customers typically represent small businesses with fewer than 10 employees. The required run lengths are low, generally from one to 1,000. The online business started with business cards and has expanded to a wide range of other applications. The focus is now on office/business communications, but other products are available as well.

Figure 12: Products and Services from the OvernightPrints Online Store

Source:
www.overnightprints.co.uk

OvernightPrints customers have a few critical requirements:

- Quick turnaround

- Short runs

- High-quality substrates (especially for business cards)

- A desire to work with an environmentally friendly company (Note: Solar panels on the roof of PLS's production facility provide 60% of the company's energy needs.)

Although PLS's 74 Karats were meeting these needs, the product is no longer being manufactured. The company therefore decided to explore other avenues. With full digital print becoming available in B2-format, PLS had additional products to choose from.

The Investment Decision

Although PLS did not count out automated offset press technology when it considered possible technological investments, the company ultimately decided that the amount of waste associated even with today's offset was not efficient for its short run requirements.

B2-format digital print products under consideration included two types of inkjet ink technologies (water-based and UV) and one toner-based technology (liquid electrophotography). In fact, OvernightPrints' U.S. locations had experience with other B2-

format digital print devices. PLS found the water-based inkjet offering to be too slow and noticed that the sheets tended to curl. In addition, that device did not have an automatic duplexing feature. With the liquid electrophotographic product, the imaging resolution was too low for PLS's requirements. The company was also not completely comfortable with the product's uptime and service requirements.

The decision to acquire the AccurioJet KM-1 came down to the following factors:

- **Built to last:** The device's solid construction convinced PLS that it would be long-lasting.

- **Serviceability:** PLS liked the device's offset-like design with operator replaceable parts and the ability to self-service some aspects.

- **Reliability:** PLS was convinced that UV inkjet would offer a higher level of uptime.

- **Paper range:** UV inkjet technology contributes to the device's ability to print on a wide range of substrates.

- **Resolution:** The device is capable of imaging at 1,200 x 1,200 dpi, maintaining the company's high quality standards.

- **Paper path:** The ability to eject waste sheets to a top tray was a desirable feature, and some competitive devices did not offer this.

- **Consistency:** The device's consistent output is important for an online printer supporting a global customer base that may order the same item multiple times or from different print sites.

- **Instant drying:** The device's UV ink is dry upon leaving the machine.

Operation of the AccurioJet KM-1 at PLS

In the year since PLS has purchased the AccurioJet KM-1, the company has been using it for run lengths ranging from 250 to 500 sheets. The firm has found that the crossover point with its 74 Karats is about 350 sheets, and the company expects this to move higher over time as it becomes more familiar with the AccurioJet KM-1. Versus its conventional offset presses the crossover point is around 600 sheets (this too is expected to move higher). The AccurioJet KM-1 is operating effectively and running at full capacity.

The ability to print on a wide range of substrates is an important factor in favor of the AccurioJet KM-1 since PLS is already able to print many different substrates on its UV offset presses. On the AccurioJet KM-1, the company frequently uses heavily textured paper, art paper, thick stocks (up to 350 gsm), and label papers. PLS has also been experimenting some with plastic substrates.

Folding carton packaging is one of the new markets that PLS is exploring with the KM-1. Although this application is still in testing mode with stocks up to 350 gsm, the company is

confident that it will be able to print on much heavier weight substrates in the future. The idea is to meet customer needs for very short run package printing and proofing.

PLS has found support for the AccurioJet KM-1 to be very good—better than what it typically sees from offset press vendors. Konica Minolta helped to integrate the AccurioJet KM-1 into PLS's workflow. This is of utmost important in an online shop where files are sent from order-taking to production. Konica Minolta also supported adapting the device's color management to PLS's house standard. (Shops like PLS generally have a house color management standard that is based on the press with the smallest color space in the shop.) The broad gamut of the AccurioJet KM-1 had to be trimmed to match the company's standard. Overall, PLS found the Konica Minolta engineers to be good at problem-solving and very customer-oriented. In addition, the response time of service engineers was good and the technicians were highly skilled.

PLS has found that the AccurioJet KM-1 fits very well into its online model through a range of features that address a demanding environment in which customers want short runs, quick turnaround, and consistent reliable output.

InfoTrends' Opinion

Remaining profitable in the inkjet market involves more than simply purchasing a cutting-edge inkjet press. Business owners and in-plant managers must be strategic and thoughtful in their actions. The pathway to profitability involves the right combination of applications, service offerings, workflow, business justification, and education. Service providers of all sizes need to keep their eye on inkjet technology and ensure that they have considered all critical factors that will help drive business results.

Early users have found much to like in the performance of the AccurioJet KM-1. Broad substrate range, reliability, and application flexibility help contribute to that enthusiasm. Also important is how B2-format digital devices like the AccurioJet KM-1 are bringing the advantages of digital print into new environments. In short, the value of cost-effective short runs, quick turnarounds, personalization, and just-in-time manufacturing are now available in B2-format. High-quality print output across many substrates (with no requirement for pre-treatment) is a model that will appeal to many print service providers who also appreciate an offset-like design in a familiar format. The AccurioJet KM-1 is a welcome addition to the B2-format digital print market segment!

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