

Océ VarioPrint i300 = Flexibility and Growth

It's not often a product comes along that defies classification, but instantly finds a home among a wide range of constituencies. The Océ VarioPrint i300 from Canon Solutions America is such a product. It's a sheet-fed production color inkjet press, about twice as productive as similar class digital color toner presses. It is suited for book printing to transaction statement printing, including the availability of MICR inks for check printing. Among its most appealing features is a development path to allow the i300 to print on common offset substrates; the range of qualified papers is expanding daily.

Figure 1 Océ VarioPrint i300 from Canon Solutions America



Source: Canon Solutions America, 2017

Inkjet Technology

Inkjet printing technology has been used to print documents for over four decades. It is most commonly thought of a technology that is used in consumer inkjet printing systems, but its versatility goes well beyond consumers printing at home. Walk into a supermarket, and there is at least a 33% chance that the posters and the end of the aisle displays are printed with inkjet technology. Nearly all wood simulated ceramic tile planks available at major home building supply retailers are printed with inkjet. The fastest growing use of inkjet printing technology is in fast fashion, where many European based retailers are printing athletic sportswear and dresses with inkjet printers. And since 2008, color inkjet technology has been commonly used to print on roll-fed paper to produce books, direct mail, and transaction statements at speeds ranging from 3-10X greater than

previously available on roll-fed monochrome toner printers. There is no better testament to inkjet technology's value and credibility than the amount of money is spent annually worldwide to buy inkjet printers and inkjet ink. It is now equal to all the expenditures spent on buying offset presses, offset ink, and offset plates.

The majority of the inkjet expenditures are still derived from consumer inkjet printing. Consumer inkjet printers have reached their pinnacle in terms of output quality and convenience, and consumer print volumes are under pressure from displacement by mobile communication alternatives. Hence the research and development investments in inkjet are shifting rapidly to production inkjet and industrial (non-document) applications.

The initial core development focus has been on increasing the productivity of inkjet, bridging the gap between toner and offset. To increase productivity, inkjet technology design moved from a serial (where the printheads scan back and forth) to a single-pass printhead design (where many more printheads are stitched into a single array that span across the entire print width of the paper). The net effect is a dramatic increase in the number of nozzles (from ~1,000 in serial printers to well over 30,000 in the Océ VarioPrint i300), enabling the jetting more many more ink droplets at a time.

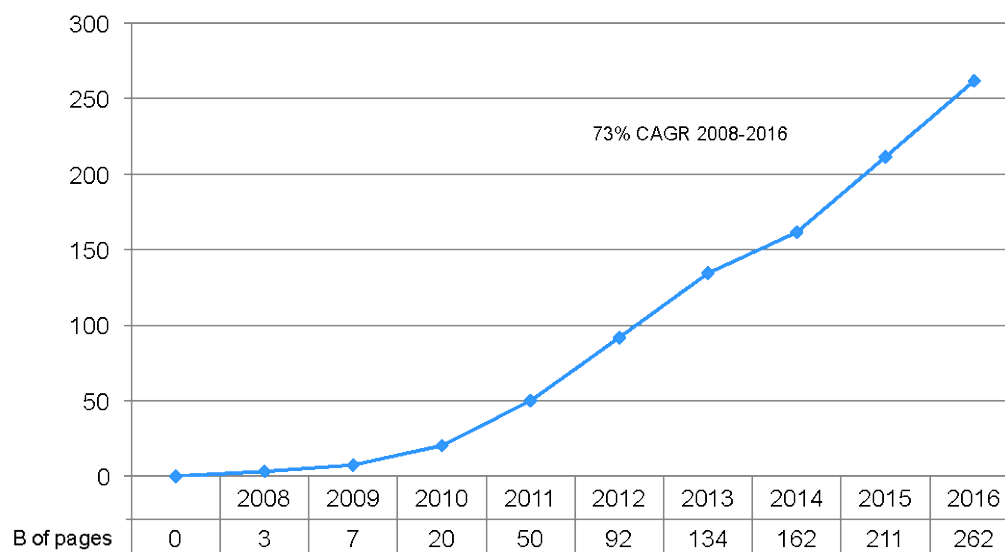
The risk in single-pass inkjet technology is nozzle failure, since the droplets from a missing nozzle cannot be printed on the reverse pass as is commonly done on serial printers. To compensate for inactive nozzles in a single-pass printer, production printers feature nozzle failure detection systems that automatically activate adjacent nozzles to effectively over-compensate by firing bigger droplets. This hides any potential banding (a blank stripe down the page) problems until the printer stops for regular maintenance and the missing nozzle can be recovered through standard maintenance/purging cycles. This technique has worked so well that no one questions the viability of single-pass inkjet printers. Indeed, the benefits of associated lower running cost of inkjet due to increased productivity and simpler maintenance fewer moving parts (compared to toner printers) has caused inkjet printed pages to grow at rates not seen since the early days of modern offset presses in the 1950s.

IT Strategies has been tracking the development of single-pass inkjet printers since the late 1990s. Since the commercial introduction of the first single-pass production printers in 2008 inkjet page volumes have grown a compounded 73% annually from 2008 to 2016, reaching over 260 billion actual pages printed worldwide in 2016 (see figure 2).

Amazing as that might seem, it represents but a small part of all other offset and toner pages printed.

The limitation to growing inkjet pages even faster, and capturing volume from both offset and some toner printers, is hampered by: roll-fed workflow; ability to print on bond, IJ treated, and coated offset stocks on a single device; and the higher volume hurdles on return-on-investment for roll-fed inkjet printers. These are all the limitations that the Océ VarioPrint i300 has sought to remove.

Figure 2 Historical Roll-fed production inkjet page volume growth, billions of pages worldwide



Note: Page = 1 equivalent letter-size simplex images

Source: IT Strategies, Inc.

Océ VarioPrint i300 Workflow Versatility

Generations of print providers have competed on the ability to provide custom printed output, whether it is print job run length, substrate, or finished format. As job run lengths decrease, and the frequency of orders increases, customization becomes the enemy of automation and efficiency. Roll-fed inkjet printers have played a key part in automating relatively consistent jobs, such as book printing for runs of 1,000-3,000 books, direct mail solicitation letters, and high-volume transaction statements. What roll-fed printers have not been able to do is to serve the customization part, the ability to

quickly switch substrates, the ability to cost effectively produce very short run-lengths, such as a book of one, re-prints or reminder transaction statements.

Digiforce, a digital book printer in The Netherlands, acquired an i300 in 2016 to help their shop with the increasing demand for variation in print jobs. According to Roeland Lamme, Director of Digiforce: “Our IT wizards have automated the administrative and set-up process of book printing, and the Océ VarioPrint i300 allows us to print a combination of monochrome and color pages at a very competitive price even for a quantity as few as a single copy.”

Ability to Print on Bond, IJ treated, and Offset Stock

One of the most desirable features of the Océ VarioPrint i300 is its ability to print on a range of substrates. While its substrate flexibility is not yet as great as offset presses which have had decades to perfect their performance on a wide range of papers, within less than 12 months Canon Solutions America has qualified over 400 substrates that it has certified can be printed on the i300. Qualification involves the creation of color profiles and settings in the printer that optimize ink coverage and drying depending on the substrates surface tension and the ability to absorb fluids. Canon Solutions America has invested over \$2.5 million in paper laboratories around the world to speed up the number of substrates qualified, which grows daily.

The key benefit of the Océ VarioPrint i300 is the ability to meet customer’s needs for different substrates without significant operator involvement. For example, 80% of most print providers jobs are on “standardized” substrates, such as bond and inkjet optimized paper. But it is the remaining 20% that throws a curve ball in the operations of the shop. That includes some offset grade stocks. To optimize print quality and ink performance on those stocks, the i300 lays down pre-coat primer, which Canon Solutions America calls ColorGrip. This pre-coat is dynamically jetted ahead of and only where the inkjet ink is to be jetted. The additives in this pre-coat fluid allow the water content in the inks to draw down into the paper, allowing the ink colorants sufficient time to dry without enlarging their dot sizes (which would create a undesirable “puddle-like” effect).

By mitigating the need to invest or own dedicated printers for specific substrates, print providers can take on new types of jobs that historically would have been risky to take on.

Return on investment

Return on investment can be measured in different ways, in fixed and variable costs. The easy part to measure is hardware amortization cost, which is a fixed cost. With significantly lower acquisition cost than roll-fed inkjet printers, the Océ VarioPrint i300 is in reach of a broader market since most users can make a good return on investment on the i300 when printing as little as one million pages per month.

More difficult to measure is the effect of variable costs. Ink costs tend to be lower than toner cost, in part because of the ability to print higher monthly print volumes on the i300 than equivalent toner-based systems. But other tangible benefits include savings on maintenance costs. ScanLaser B.V., a Dutch book manufacturer which specializes in personalized vehicle manuals (only the options that are ordered with the vehicle are shown in the owner's manual, reducing manufacturer telephone support cost and customer post-purchase dissatisfaction) replaced two digital color presses with a single Océ VarioPrint i300.

According to Sander Jansen, CEO of ScanLaser at the time of the Océ VarioPrint i300 acquisition: "Scanlaser gained extra capacity while lowering the total cost of ownership for the existing production portfolio, even with our preference for a higher quality/cost of paper."

But there are significant other "hidden" benefits. One "hidden" benefit that affects return-on-investment is the ability to attract new types of jobs and customers with the Océ VarioPrint i300. Anthony Mills, the CIO of Arna Marketing describes it best. According to Mr. Mills: "When we first bought the i300, customers continued to want black and white statements from us. When they saw us able to add a bit of color to the statements at a very modest price, it changed the conversation from just cost to what else can you do for us with color."

Another "hidden" benefit is uptime. In the first year of production, the early adopters of the Océ VarioPrint i300 cite 95+% uptime. This not only allows them to amortize their hardware investment over more pages, but it also allows them to free capacity on other devices they may have in their plant. This gives the print provider opportunity to sell jobs on those other devices. The reduction in downtime has enabled Arna Marketing to successfully meet their customers increasing expectation for 1-2 day turnaround time.

Fit of Océ VarioPrint i300

Given the variety of choices in printing equipment, it is difficult to believe that until the Océ VarioPrint i300 there was no other product like it in its price/performance range. It is more productive than most similar sheet-size toner printers, both monochrome and color. It is more expensive to acquire than toner printers, but it is able to produce significantly higher volumes thereby lowering the amortization cost of the hardware price per page. It offers flexibility in paper, unlike roll-fed/continuous feed printers. And its output quality, depending on the quality of the substrate, can be near-offset like.

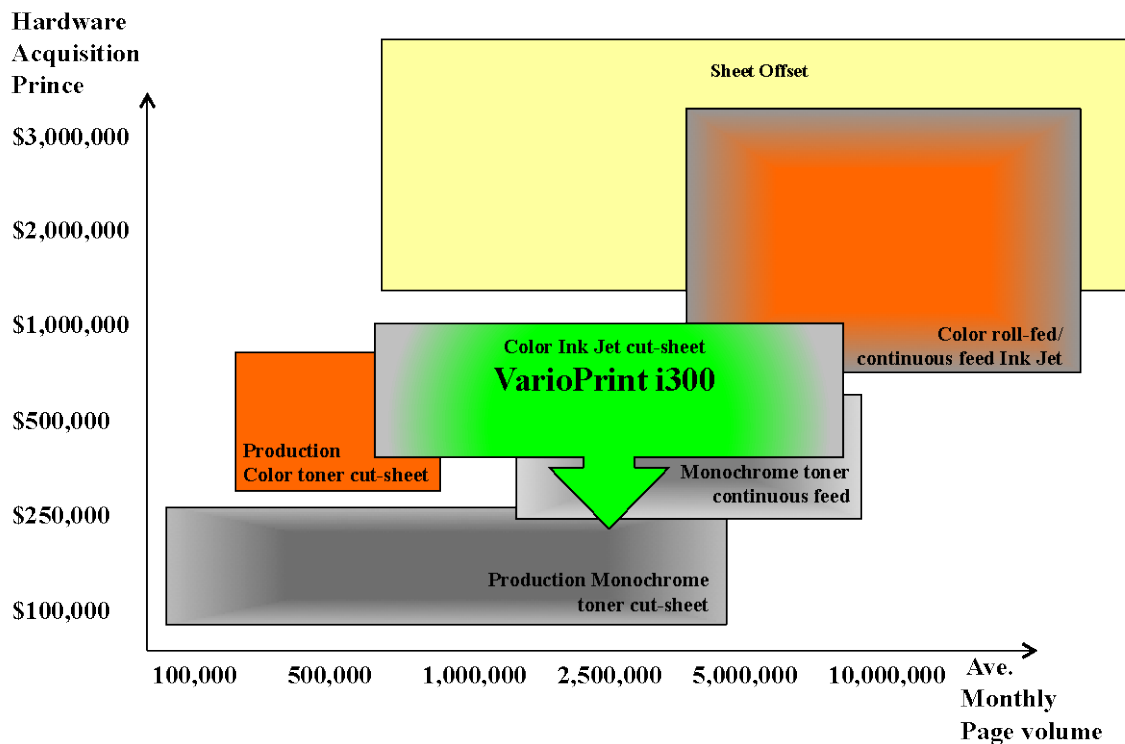
None of these things is as important as what users are able to do with the Océ VarioPrint i300. It is a tool, a tool that is used to:

- Replace mono-toner imprinting on pre-printed shells
- Print color at near monochrome toner cost
- Replace some offset print
- Replace some production color toner cut-sheet
- Open up high-volume production color with frequent paper changes

While it is still early in the life cycle of the Océ VarioPrint i300, IT Strategies estimates about ~40% of customers are buying the i300 to augment their existing roll-fed production printer operations, whether to smooth out the peaks and valleys in monthly seasonal demand or as flexible re-print printers.

Another ~40% are using the Océ VarioPrint i300 to create more cost effective color output than color toner devices. There is no debate that the output quality between color toner and inkjet printers (including the i300) is different. By nature of its physical process toner sits on top of the paper, where as inkjet ink is absorbed to some degree into the paper. This causes differences in light refraction. Whether one type of output is preferred over another is in the eye of the beholder. What i300 customers are finding is that the only decision that matters is a binary one: is it sellable or not. In many instances the lower running cost of the i300 is the deciding factor.

Figure 3 The product fit of the Océ VarioPrint i300



Source: IT Strategies, Inc.

There is one other big differentiator for the Océ VarioPrint i300 compared to other classes of printing devices: Investment protection. Unlike toner or offset presses, the core-imaging engine –comprised of the printheads – is replaceable and upgradable. This is true for roll-fed as well as cut-sheet inkjet presses. But there is one other aspect that differentiates the i300: substrate compatibility expansion. As noted before, the i300 doesn't print on every substrate. But the range of substrates it is expected to print on in the future, though a combination of Canon and Océ's investment in pre-coating and ink chemistry as well as software, will continue to expand, making ones investment today in the i300 even more versatile in the future.

Bottom Line

When IT Strategies asked the early adopters what their biggest surprise was after having operated the Océ VarioPrint i300 for several months the answer wasn't what we expected. It wasn't flexibility. It wasn't the ability to generate new customers. It wasn't better than expected output quality. All of those factors were cited, but it wasn't the biggest surprise. The biggest surprise: productivity.

According to Anthony Mills, the CIO of Arna Marketing: “Time is money. We didn’t believe how productive it was until it was installed. We know it was rated to print at 294 duplex pages per minute, but what we didn’t expect was the other factors that contributed to productivity. Ripping time is down to 10 minutes on jobs that used to take 3 hours. Uptime is 95%, allowing us to take on more volume than we’d planned. We produced a record 9 million pages during our peak month last year on the Océ VarioPrint i300.”

There was one other factor that surprised owners: the cultural effect it has on their business. All of a sudden, they hadn’t just bought another piece of hardware. They’d bought a piece of equipment that allowed them to re-think their business. Their customers, salespeople, and designers pushed them to try new applications, applications that couldn’t be economically and efficiently produced previously.

In the end what the Océ VarioPrint i300 really brought to them was new business models. It offered an opportunity to re-learn how to sell value rather than lowest cost, re-learn how to most effectively process jobs, finish those jobs, and deliver those jobs in micro-run orders with fewer manual touch points than ever before.



It’s not often a product comes along that defies classification. The flexibility provided by the Océ VarioPrint i300 is stimulating renewed growth, excitement, and a sense of confidence in the future of print.

About I.T. Strategies

I.T. Strategies, Inc. is a 25-year old research consultancy dedicated to serving digital color printing equipment and supplies manufacturers. The company delivers intelligent data, analysis, strategy and implementation practices to vendors in the digital printing industry around the world on applications ranging from 3D printing to wide-format graphics poster printing, centering on inkjet technology development.