



Delivering New Levels of
Value with **Continuous-
Feed Inkjet Printing**

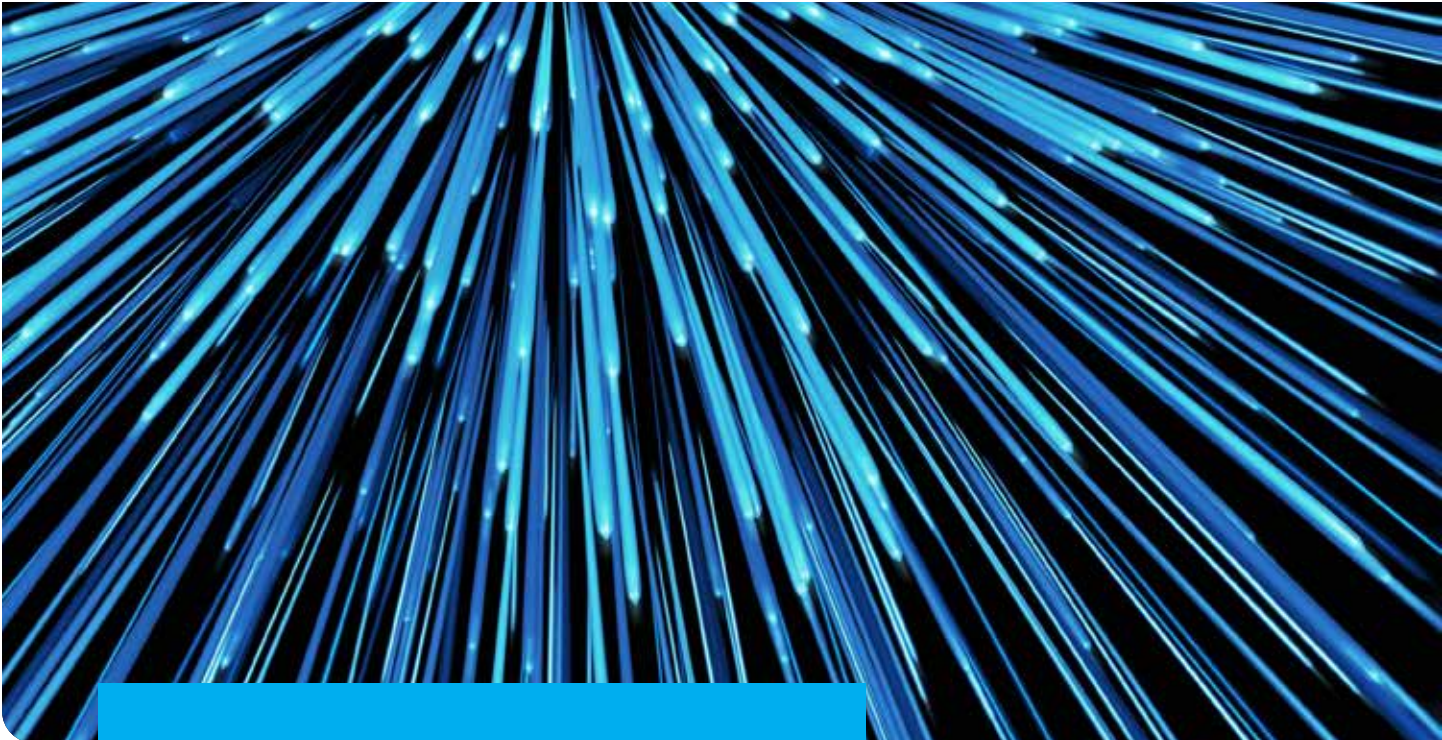


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Delivering New Levels of Value with Continuous-Feed Inkjet Printing

INTRODUCTION

Continuous-feed inkjet printing technology has evolved to the point where it not only can produce content at speeds that rival web offset printing, but the image quality and range of compatible substrates of certain press models now enable a much broader range of applications. The initial value of continuous-feed inkjet was realized with transactional printing applications like bills and statements due to the need for high-speed, variable-data printing on uncoated paper with light ink coverage and low-image quality requirements. Similar parameters also applied to some direct mail and book printing during the same time frame. Over the last few years, new continuous-feed inkjet presses have expanded their capabilities to printing on standard offset coated text and cover stocks, as well as improving image quality through higher image resolution, variable-drop application, and improved halftone rendering. A variety of breakthroughs from most major vendors of continuous-feed inkjet have elevated the quality and reduced the price points for a broader range of applications. This paper will discuss the current state of these capabilities, the applications they enable on these presses, print customer requirements for these applications, and recommendations for print service providers to embrace continuous-feed inkjet technology.

The Current State of Continuous-Feed Inkjet

There are multiple factors that enable new applications on continuous-feed inkjet. Table 1 provides an overview of these features as well as some points related to certain applications and related processes. It's important to understand these in greater detail in order to determine which applications are feasible on these devices.



Table 1: Continuous-Feed Features and Specifications Enabling New Applications

FEATURE	SPECIFICATION	APPLICATIONS ENABLED
Printing on Coated Paper	Ability to print on standard offset coated papers, as well as other specially treated coated and uncoated stocks	<ul style="list-style-type: none"> • Marketing brochures/collateral • Catalogs • Books • Magazines • Direct mail postcards, flyers, leaflets
Resolution	1200 x 1200 dpi	<ul style="list-style-type: none"> • Marketing brochures/collateral • Direct mail postcards • Magazines • Catalogs
Printing on Cover/Card Stock	Up to 350gsm	<ul style="list-style-type: none"> • Marketing brochures/collateral • Direct mail postcards • Book/booklet/catalog covers
Maximum Image Width	42" or greater	<ul style="list-style-type: none"> • Oversized brochures • Book/booklet covers • Direct mail postcards • Books/magazines
Maximum Image Length	72" or greater	<ul style="list-style-type: none"> • Oversized brochures • Book/booklet covers • Direct mail postcards • Book/magazine signatures

Possibly the most important factor in expanding the range of applications is that of printing on coated paper. Coated paper is required for most brochures and other marketing collateral, as well as folded direct mailers, postcards, catalogs, calendars, magazines, book covers, and some forms of direct mail, like brochures, must be printed on matte, satin, or glossy coated paper. This breakthrough, along with enhanced image resolution, provide for a wide range of new applications possible on continuous-feed inkjet presses.



Imaging resolution is an important factor in rendering sharp images, smooth screens and gradations, and emulating Pantone colors. A resolution of 1200 x 1200 dpi typically will provide for favorable results regarding these factors. However, this is not the only feature that has an impact on image quality. Applying a variable dot size can also enhance the image. Applications that benefit from enhanced resolution include marketing collateral, direct mail postcards, catalogs, magazines, book covers, and books.

Expansion into new applications is pushed further with the ability to print on a wide range of stocks – from as low as 40gsm for certain book and publication pages – up to 350gsm used for some types of book covers and direct mail postcards.

Finally, imaging areas between 42" wide by 72" long or more are especially useful in book printing, where certain page signatures used in existing web offset book printing environments can use these same imposition formats to match the existing finishing workflows for shorter book runs. These expanded imaging areas also enable other over-sized formats used for marketing collateral, book covers, direct mail, and catalogs.

The most important factor in expanding the range of applications produced on continuous-feed inkjet presses is the ability to print coated paper.

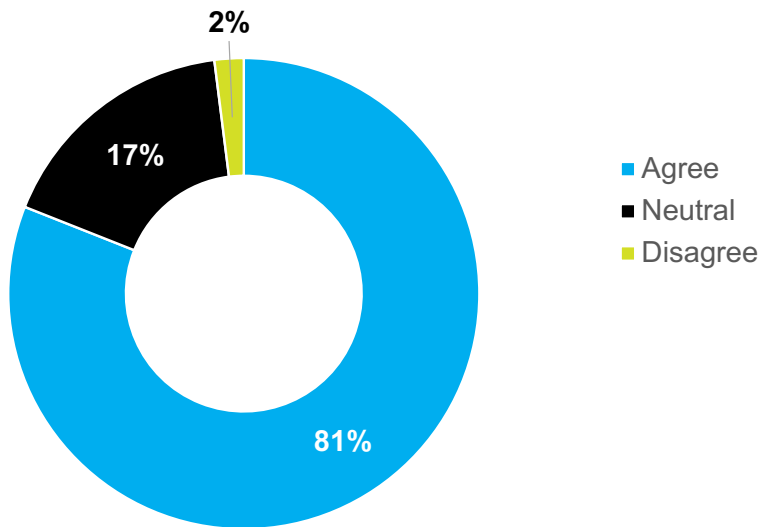
Understanding Customer Requirements

There are certain commonalities among print customers in that the print output needs to meet their standards for image quality, timeliness, data accuracy, and cost. These requirements vary by the type and purpose of the print application, vertical industry, personalization/customization requirements, and other details related to job specifications and parameters like paper type, quantity, finishing, etc.

Due to this varied nature of requirements, successful print service providers (PSPs) have built expertise in the print applications they support – whether they specialize only on certain applications like book printing or direct mail, or are more diverse general commercial printers who have expertise on a wide variety of applications. This expertise is essential for PSPs to grow their business as print customers rely heavily on their knowledge of printing processes and technology, and often weigh this when selecting service providers. According to a recent NAPCO Research study, PSPs with double-digital sales growth are expanding services (Figure 1).



Figure 1: Growing PSPs Are Expanding Print Applications



Q. Indicate your level of agreement: Our company is expanding the range of print applications offered to customers.
n=46 Print Providers Reporting Double-Digit Sales Growth
Source: NAPCO Research 2018



Successful PSPs have built application expertise through understanding their customers' requirements related to image quality, substrates, and finishing. PSPs that are considering investing in continuous-feed inkjet technology need to understand that not only can the technology address these customer requirements in the context of shorter print runs, but also how it can offer new capabilities and opportunities by incorporating personalized and/or customized content. Understanding the mechanics and logistics of various print applications, as well as their intent and purpose, gives the print service provider valuable credibility. The following sections will highlight these capabilities and opportunities as they relate to publishing, direct mail, and marketing applications.

Book and Magazine Publishing Gaining Short-Run Benefits

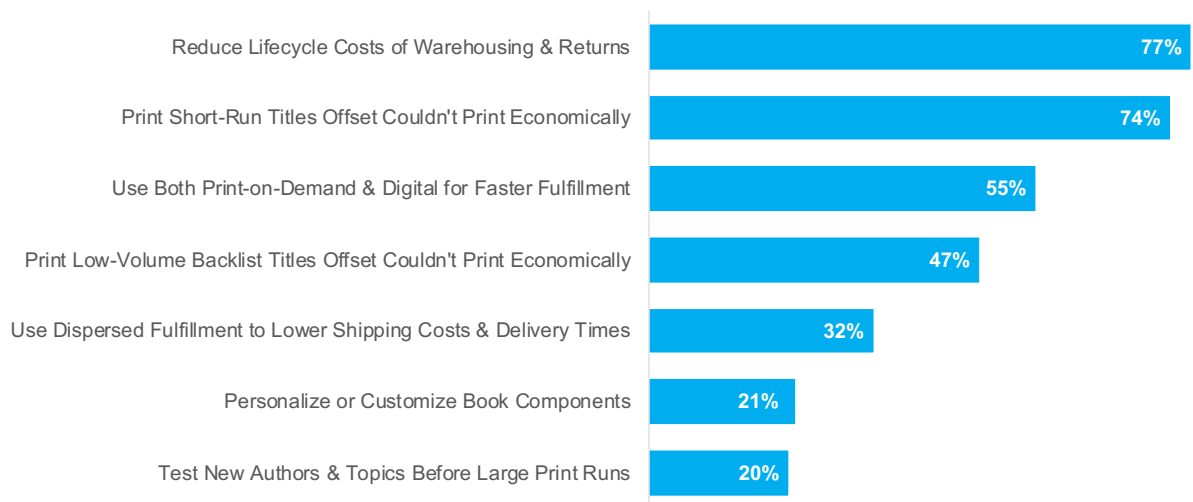
Books and magazines are two major print applications within the realm of publishing. While newspapers are technically another application to consider, they tend to be more specialized and less commonly produced among commercial printers.



BOOKS

Digital printing offers a number of benefits to book publishers and printers. The top two reasons publishers participating in a NAPCO Research survey (Figure 2) print books on digital devices are to 'reduce lifecycle costs of book warehousing and returns', and 'a more economical method of printing short-runs of books than offset printing'. These have been drivers of digital book printing since digital color presses were first adopted by the industry. Initially, sheetfed digital color toner presses were the only digital printing devices that could print acceptable print quality on the required stocks. The drawback, however, was these presses were only able to print very short runs of books. In the educational textbook market, a short run can be 2,000 books of 350 pages in length which equates to 700,000 letter-sized impressions. A run of this size is substantial on a high-volume sheetfed digital color press, with that volume equal roughly to the total volume produced on such devices in an entire month. Because of this, digital color A3 format sheetfed presses are limited in terms of the run-lengths that are even possible without even considering economic feasibility — for example, paper costs associated with sheets is substantially higher than rolls. In addition, a run-length of this size would take a high-volume A3 format digital color sheetfed press four days of nearly continual production just to do the printing. A PSP would need to have multiple presses to print the job digitally.

Figure 2: Key Benefits of Digital Book Printing



Q. What are the primary drivers for why you use digital printing?

n=150 Book Publishers that Print Digital

Source: How Book Publishers Use Digital Printing to Sell Books More Profitably, NAPCO Research 2018

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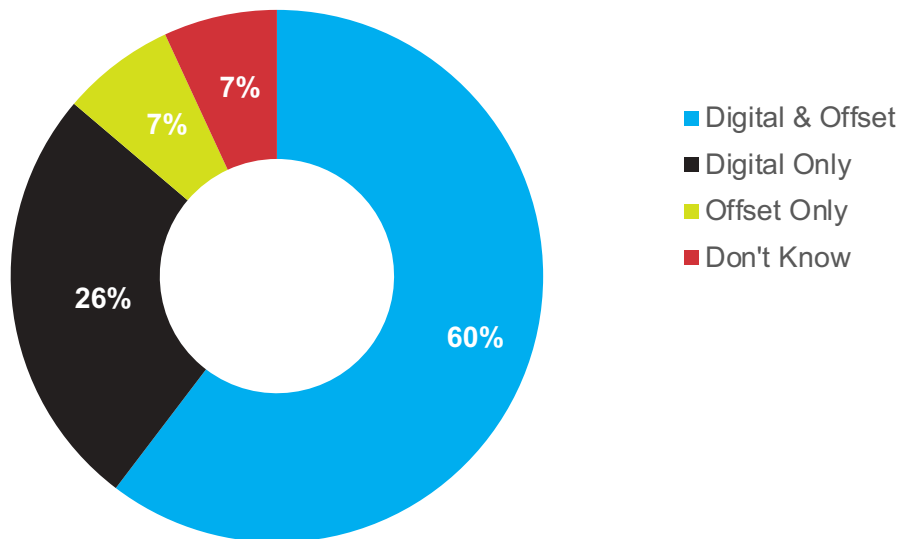
With the advent of continuous-feed inkjet presses, run-lengths of this size can be produced in a matter of hours rather than days. For example, such a press that can print 3,000 impressions a minute can produce 700,000 impressions in four hours. In addition, these presses are also capable of producing longer run-lengths while remaining economically feasible.

Initially, sheetfed digital color toner presses were the only digital printing devices that could print acceptable print quality for book publishers but run length capabilities were limited. Inkjet removes this barrier.

These presses, with their improved image quality and broader range of substrates, can produce output that meets publishers' requirements for most types of books. Textbooks have requirements related to the thickness, opaqueness, and grade of paper, as well as the finishing durability (which is often hardcover case-binding). Continuous-feed inkjet presses are now able to meet these standards while still being productive and economically feasible. A NAPCO Research study finds that digital printing is not only a common format for book printing, but it's also the exclusive method of book printing in many cases and its use is growing (Figure 3).

Overall, the study found that a majority of book publishers (86%) now accept digital printing as a standard process to produce books.

Figure 3: Book Publishers' Book Printing Methods



Q. How are you currently printing books?
n=174 Book Publishers

Source: How Book Publishers Use Digital Printing to Sell Books More Profitably, NAPCO Research 2018

NAPCORESEARCH

While digital printing is a commonly used method, as reported by 174 book publishers surveyed in 2018, book printer respondents expect to see significant growth of book production on continuous-feed inkjet devices (Table 2), displacing volume printed on both offset and digital toner devices. The top drivers behind this, according to the survey (Figure 4), are the need to be more productive and to meet increasing demand for shorter runs.

Table 2: Growth in Book Printing Methods

CUT-SHEET TONER	SHEETFEED OFFSET	WEB OFFSET	CONTINUOUS-FEED INKJET
-8%	0%	-14%	10%

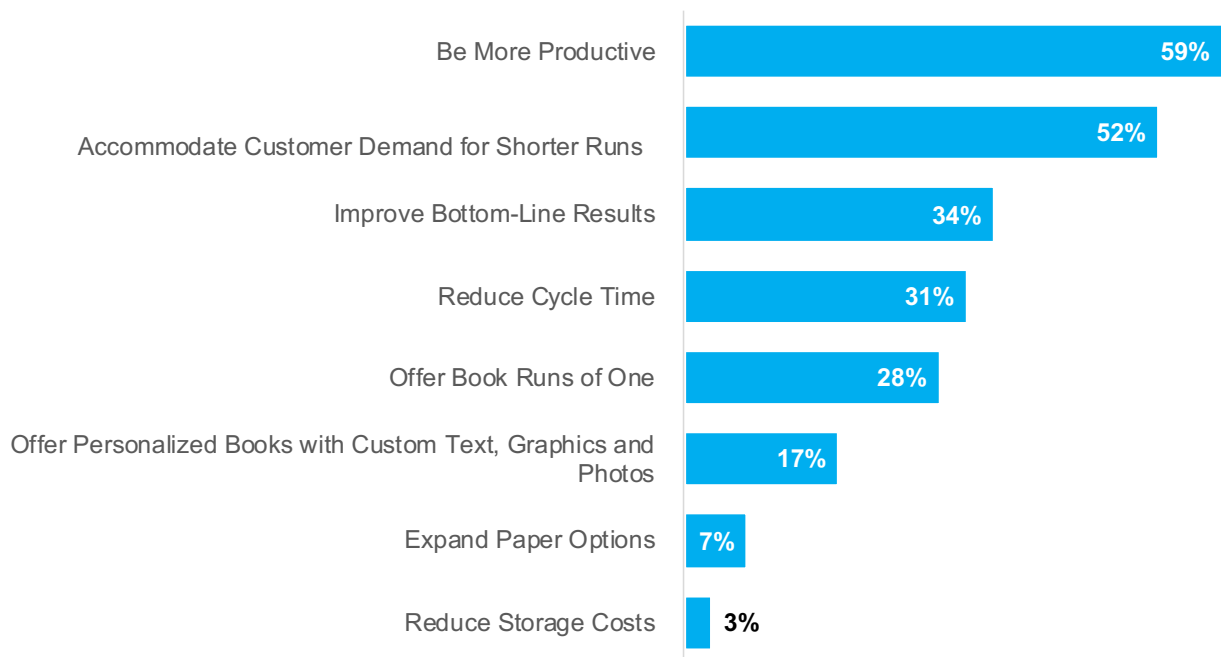
Q. Of the books you print TODAY/in TWO Years, what percentage are/do you expect to be produced via the following printing methods?

n=60 Book Printers

Source: *The Role of Inkjet Printing in Powering Industry 4.0 in Book Publishing*, BMI/NAPCO Research 2019



Figure 4: Top Reasons to Add or Consider Inkjet for Book Printing



Q. What are the top THREE reasons you either purchased or are considering purchasing an inkjet press for book printing?

n=29 Book Printers that either purchased or are considering investing in an inkjet press to print books

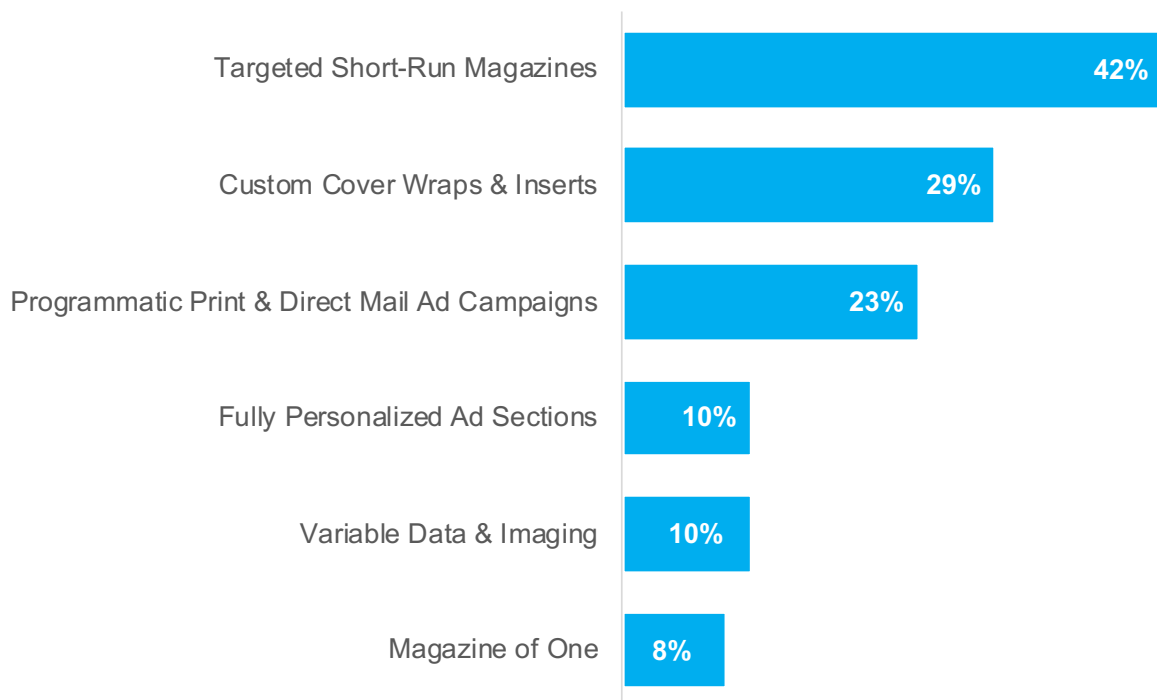
Source: *The Role of Inkjet Printing in Powering Industry 4.0 in Book Publishing*, BMI/NAPCO Research 2019



MAGAZINES

The demand for short-runs and more targeted content is driving the adoption of digital printing for magazines. Similar to books, short-runs on magazines are still substantial print-runs but are very suitable for continuous-feed inkjet presses. The nature of a magazine is to cater to a specific area of interest which lends itself to the ability to customize and even personalize content. In addition, there is also a greater need for rich color graphics and imagery. As Figure 5 indicates, magazine publishers participating in a NAPCO Research survey report using digital printing to enable all of these elements. High-resolution continuous-feed inkjet presses can address all of these requirements in addition to delivering a cost-effective printing method for both short-runs and longer runs with greater customization. While the other factors in Figure 5 related to personalization and customization are not used as commonly, they are worth mentioning as they represent areas of opportunity enabled through digital printing.

Figure 5: Reasons Magazine Publishers Leverage Digital Printing



*Q. In which of the following ways is your company utilizing digital printing?
n=78 Magazine Publishers with Print Publications
Source: How Magazine Publishers are Using Digital Printing to Enhance
Print Products, NAPCO Research 2018*

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Inkjet Improving Direct Mail Relevance

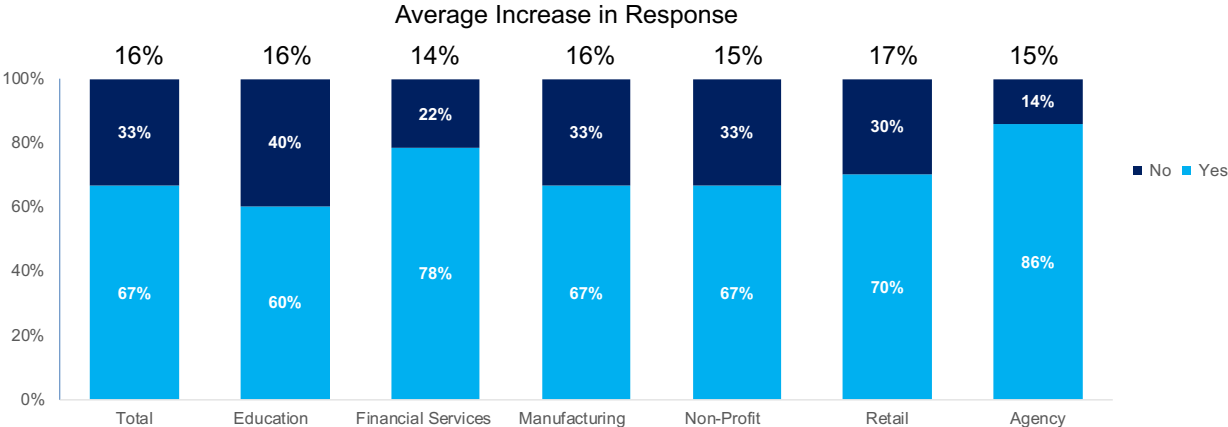
While direct mail can fall under the header of marketing, there is an entire industry built around direct mail, as well as a substantial share of print volume dedicated to these applications. This is a large market with roughly 83 million direct mail pieces mailed and \$42 billion spent on direct mail marketing in 2017, according to the DMA 2018 Statistical Fact Book and Winterberry Group.

Some of the most common direct mail applications are letters, postcards, and folded-mailers. Other items such as brochures and catalogs can be included in this category and these are addressed later in this document.

Inkjet enables more efficient personalization of direct mail, a key tool in improving recipient response and marketing effectiveness.

A key element to a marketing message is personalization. A targeted, personalized message will capture the attention of the recipient and is further strengthened by the relevance of the message to the recipient. According to a NAPCO Research survey of marketers that influence commercial print purchasing (Figure 6), two-thirds of respondents believe that personalization increases response, especially in agencies, financial services, and retail industries. When asked to report the average increase in response from personalization, respondents across all market segments surveyed reported double-digit increases.

Figure 6: Personalization Increases Responses

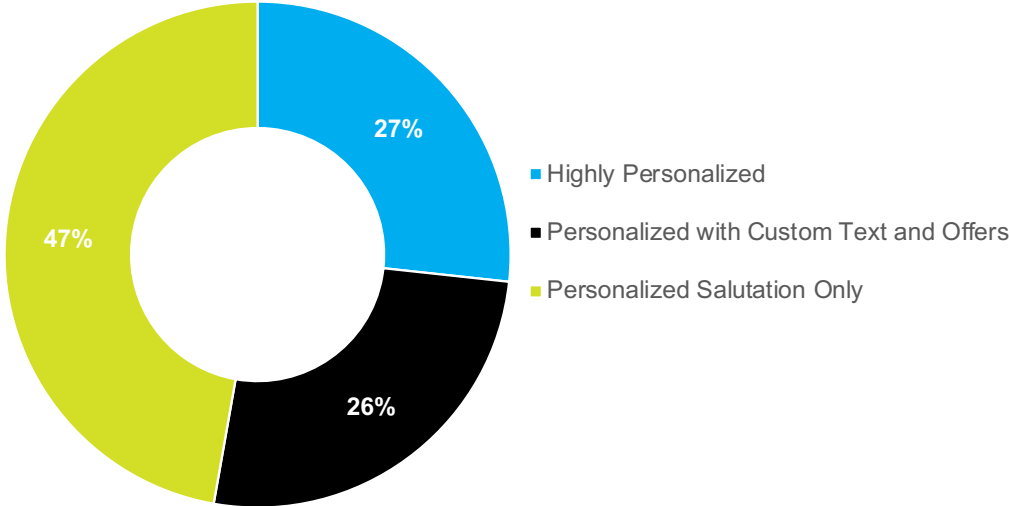


Q. Are you seeing an increase in response from personalized printed marketing campaigns?
n=755 Marketers that Influence Commercial Print Purchasing
Source: NAPCO Research 2019



For the marketers taking the survey that have embraced personalization, just over half of them (53%) either employ highly personalized messages (27%) or use personalization with custom text and offers (26%) (Figure 7).

Figure 7: Marketers Embracing Personalization



Q. What percentage of your personalized communications fall into the following categories?
n=1,072 Marketers that Influence Commercial Print Purchasing
Source: NAPCO Research 2019



Personalization is only one aspect of marketing effectiveness, whereas the relevance of the offer may not require a high degree of personalization in order for the recipient to act, e.g. a reminder sent to a homeowner to perform a seasonal service.

Up until recently, continuous-feed inkjet presses had only been able to address letters and some self-mailers due to their limitation of printing on mostly uncoated text-weight paper and only 600 dpi resolution. Today, continuous-feed inkjet presses have the ability to print on a wide range of coated papers and heavy card/cover stock as well as the ability to cost effectively produce highly personalized, full-color direct mail postcards in very high volumes. This is a major improvement from a few years ago where the technology was limited to very few options on coated paper as well as it being unable to print on heavy stocks. With the addition of 1200 dpi resolution and UV and aqueous coatings offered on some continuous-feed inkjet presses, applications with heavy ink coverage are also possible.



Inkjet Enabling Up-to-Date and Personalized Marketing Materials

The printing of marketing collateral has long been a core service for general commercial printers. These applications typically have heavy ink coverage, can use a range of coated paper stocks, and require a greater degree of image quality than lighter coverage applications like books and direct mail. These factors have led these applications to be printed on digital or offset sheetfed presses. Today's, continuous-feed inkjet presses print images on coated paper that meet marketers' quality requirements for producing collateral work.

BROCHURES, SELL-SHEETS, AND FLYERS

There is a wide range of brochure formats ranging from a single 8.5" x 11" flat or folded sheet, to a multi-page saddle-stitch booklet, to an oversized folded 3-panel with a flat size of 25.5" x 11". Often a large, unusual size allows the piece to stand out more. Regardless of format, brochures often have high-resolution images, require excellent image quality, and typically have heavy ink coverage.

Add in variable data or high customization, along with a large format or multiple pages, and a run-length greater than 5,000 or more pieces and this now becomes more favorable on a continuous-feed inkjet press versus other technologies.

CATALOGS

Catalogs are very similar to magazines in their format, paper types, ink coverage, page counts, and run-lengths. They can often be mailed to a prospective customer, so are considered as a form of direct mail.

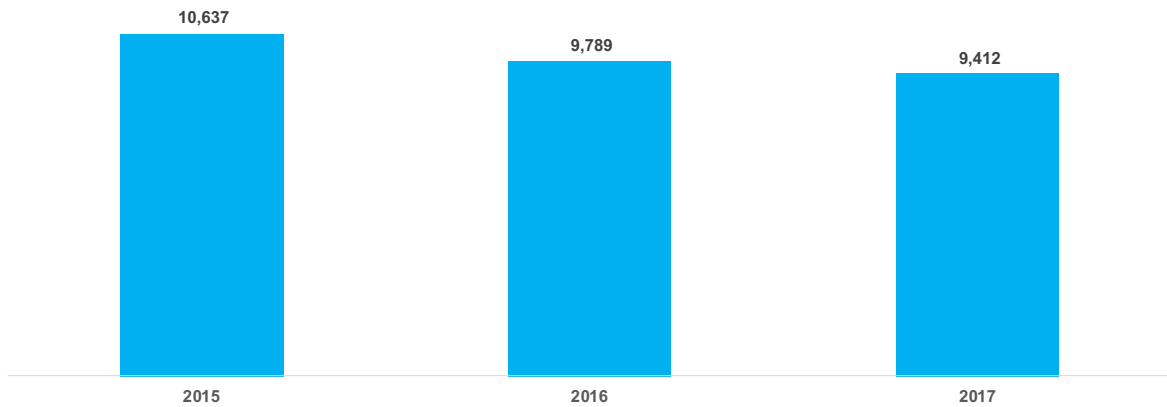
Content obsolescence is a key attribute that makes digital printing so appealing for catalogs. Also, the ability to customize and personalize content to an individual customer is only possible using digital printing technology. When considering the size of these print runs, catalogs with minimal personalization are only feasible on continuous-feed inkjet presses or on a web offset press with an inline jetting module.

According to the Direct Marketers Association's 2018 Statistical Fact Book, the most recently available data suggests that the number of catalogs that have been distributed to U.S. consumers has declined steadily (Figure 8). Despite this decline, which is expected to continue moving forward, this trend is very favorable to continuous-feed inkjet printing whereas run-lengths will decline to the point where printing catalogs on web offset presses are no longer economically feasible. In addition, inkjet meets catalog publishers' needs to increase speed to market, produce more relevant content, and incorporate interactive elements (e.g. QR codes, augmented reality) to better engage customers. Continuous-feed inkjet printing offers benefits that enhance the value and relevance of printed catalogs.



Figure 8: Catalogs Mailed Per Year 2015-2017

Catalogs Mailed per Year (2015-2017)
(In Millions)



Note: These figures are extrapolated from the USPS Revenue, Pieces, and Weight report. Before 2007, 18% of all Standard Mail (A) is catalogs. 85% of all Bound Printed Matter Mail is catalogs. In 2008, there was a change in service categories of mail. Now catalogs represent 90% of Standard Mail carrier route, 60% of Standard Mail flats, and 10% of Bounded Material flats.

Source: The Data & Marketing Association/USPS Revenue, Pieces, and Weight Report for Fiscal Year 2017



RECOMMENDATIONS FOR PRINT SERVICE PROVIDERS

Print service providers planning to invest in continuous-feed inkjet should assess the following considerations:

- The need for new equipment
- Your firm's financial state
- Expected print volume
- Return on investment (ROI)
- Operations and sales staff adaptability
- Customer interest in and/or demand for new applications and application growth
- How the investment will meet new market trends and demands (e.g. faster turnaround time, personalization)
- Risks of not investing
- Which device and vendor will best suit your needs?

We'll now discuss these points in more detail.



Current Equipment Assessment

Understanding revenue and profitability by printing process — e.g., offset versus digital, web versus sheetfed, or inkjet versus toner — is especially critical in determining what type of technology to invest in. Evaluate the importance of the following factors to determine requirements:

- Image quality
- Substrate compatibility
- Potential order volume
- Run lengths
- Labor associated with prepress and press operations
- Demand for new inline features such as UV and/or aqueous coatings
- Turnaround times
- Need for personalization

Financial Assessment

Before any investment is made, PSPs need a firm grasp of their current and future financial state.

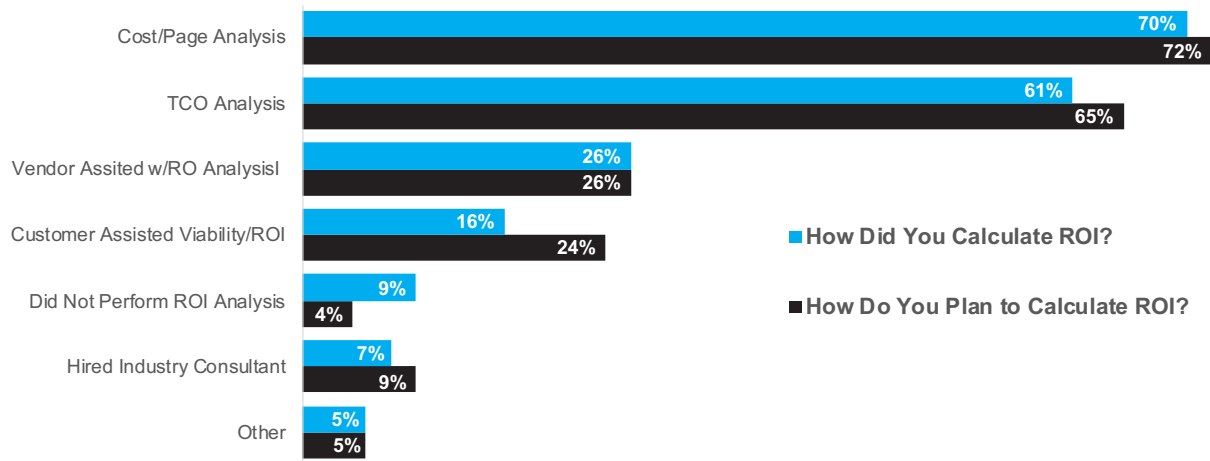
It's important to understand the following:

- Debt burden
- Credit rating (if borrowing or leasing)
- Revenue (e.g., where will clients come from, what is the plan for growth)
- Profitability

This should all drive an expectation on ROI. According to a NAPCO Research survey of print providers that either adopted or were considering adding inkjet, respondents have solid expectations on ROI and methods of calculating or measuring it. The top method to calculate ROI was by conducting a cost per page analysis, followed by conducting a total cost of ownership (TCO) analysis (Figure 9). In either case, understanding all of the costs is at the heart of determining an ROI target.



Figure 9: ROI Calculation Method



Q. For your previous production inkjet purchase, how, if at all, did you calculate Return on Investment (ROI)?

n=245 Print Service Providers

Q. For your planned production inkjet purchase, how, if at all, do you plan to calculate Return on Investment (ROI)?

n=217 Print Service Providers

Source: Production Inkjet Printing Adoption Benefits and Challenges, NAPCO Research 2017



Operator Skillset Assessment

Another important factor in determining which device will work best in your environment is determining how well your production staff will adopt the technology. These steps will help you understand your current staff's ability and also determine future staffing requirements:

- Identify which staff will likely operate such a device
- Understand the usability of the device and any related workflow software. If your environment is already highly automated with a variety of digital printing technologies, then this may be obvious. However, environments heavy with offset equipment and a light digital printing footprint should focus heavily on this area.
- Determine operator aptitude using the following metrics
 - o Experience running different types of presses
 - o Ability to learn how to use new hardware and software
 - o Overall efficiency and work habits

These are all important factors but can also be mitigated and/or augmented with a solution that is user friendly, requires fewer steps, and with a vendor that provides ample training resources to address current and future needs.



New Business Potential

As you discuss the potential adoption of a new technology and the new capabilities it offers, customers may indicate areas where they see new opportunities in working with you. However, make sure you investigate the potential of new business by adopting continuous-feed inkjet if the customer doesn't mention anything. As customers learn about the advantages of this technology, they will likely inquire about its ability to achieve certain things that were unavailable previously. For example, a direct mail customer may require personalized images on a high-volume piece that is currently printed on a web offset press, or a book publisher may be interested in quick turnaround, short-runs that are not feasible on offset presses.

Once you determine some interest, it's also important to get a sense as to what level of premium they would accept on these new capabilities.

Sales Staff Assessment

The final step in the self-assessment process is to evaluate your sales staff's ability to sell continuous-feed inkjet by understanding the following items:

- The basic difference in technology and benefits of new technology.
- The trade-offs and/or pros and cons between continuous-feed inkjet and other printing processes.
- The reasons continuous-feed inkjet is a viable option for certain types of work and enables the ability to bid on new work.

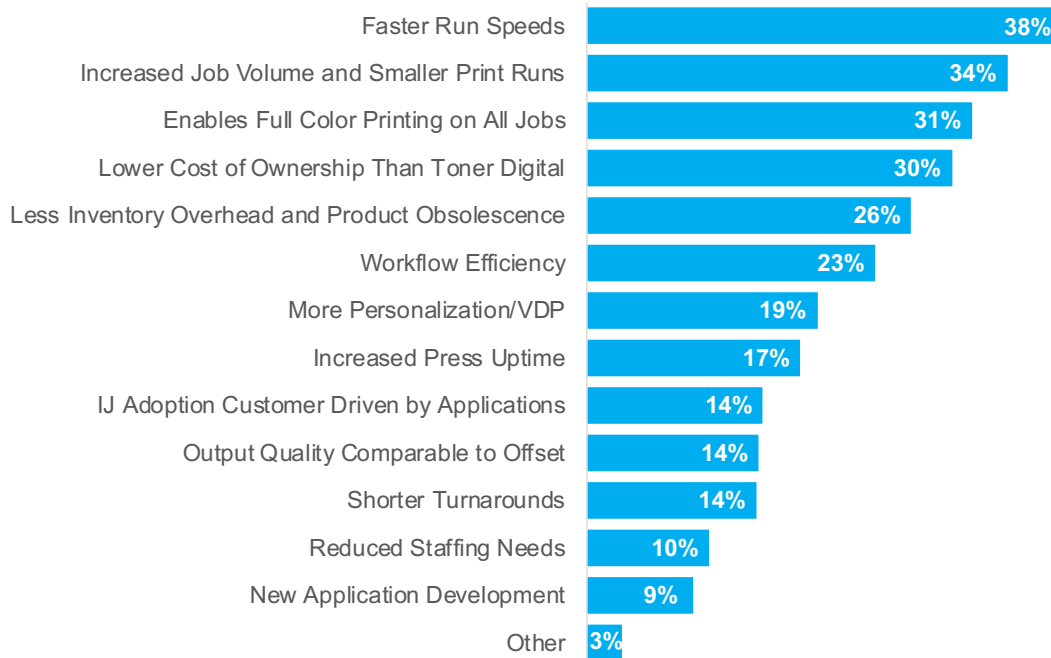
Of course, there will be a variety of outcomes for different types of salespeople, but this assessment is necessary to determine the amount of training that is needed.

Inkjet Technology and Vendor Assessment

An essential underlying consideration that addresses all of these factors is an equipment vendors ability to deliver a product and suite of solutions that ensures customer success. The technology itself is critical, and certain aspects of it weigh more heavily in the decision process than others. When asked about the key factors in their decision to choose an inkjet press, the top answers from respondents to a NAPCO Research survey were related to hardware performance and operational efficiency (see Figure 10).



Figure 10: Inkjet Decision Factors



Q. What are the key drivers of your decision to consider production inkjet? (choose top 3)
 n=344 Print Service Providers
 Source: Production Inkjet Printing Adoption Benefits and Challenges,
 NAPCO Research 2017



Before investing in continuous-feed inkjet it is important to assess operational needs, ability to finance the investment, operating and sales staff skills, and vendor offerings.

Another essential investment consideration is the level of service and software support offered by a vendor. As you learn about your operation's readiness to invest and adopt continuous-feed inkjet, consider how the vendor you choose will address any areas that need attention. Key components to evaluate in terms of vendor support beyond the press include onboarding/ramp-up period, operator training, sales training, ongoing operator support, and parts and supplies delivery.



CONCLUSION

Continuous-feed inkjet technology is now capable of high-resolution printing on a wide range of paper grades and weights, at quality levels acceptable for most applications, enabling it to produce a wide variety of applications. While certain printing methods such as digital color electrophotographic (i.e. toner) sheetfed machines remain appropriate for shorter run-lengths and applications, and offset presses make more sense for longer static runs, continuous-feed inkjet presses can now address many print applications with the ability to print on a wide range of coated and heavy substrates up to 350 gsm, 1200 dpi resolution, web widths up to 42" wide, and the option to apply UV or aqueous coatings.

Continuous-feed inkjet presses are now an attractive solution for applications such as books, folded mailers, magazines, catalogs, brochures, and direct mail postcards that require high-resolution print quality and a wide range of substrates at competitive costs and levels of productivity.

Commercial printers as well as direct mail and publishing printing specialists should invest in continuous-feed inkjet because it is a cost-effective and viable platform that enables new applications and capabilities. Investment in continuous-feed inkjet is critical for service providers to stay relevant and develop new application-based business models that support short turnaround times and relevant data, while still maintaining superior image quality and competitive pricing.



WHO WE ARE

NAPCORESEARCH

NAPCO Research crafts custom data-centric solutions that leverage our highly engaged audiences across the markets in which we operate, our industry subject matter experts and in-house research expertise. We partner with our clients to identify their unique business problem and create solutions that enable deeply informed decision-making.

NAPCO Research can help with:

- Business goal prioritization
- Opportunity discovery
- Market segmentation
- Landscape insight
- User needs and wants
- Product features and functionality
- Content marketing strategy
- Sales strategy and tactics
- Market conditions
- Benchmarking
- Industry trends
- Brand awareness

Contact research@napco.com to talk with our analysts to find out how we can help you with your research needs.



WHO WE ARE



Whether you're a print service provider, marketing or creative professional, HP PageWide Web Presses provide an unprecedented opportunity to satisfy a broad range of customer requirements for direct mail, publishing, transactional and general commercial printing applications. HP PageWide Web Presses combine high productivity with uncompromising quality, deliver vivid colors with outstanding results across a broad range of substrates, including offset coated and uncoated media, and ultimately offer overall versatility enabling you to meet growing customer demands, gain more clients, differentiate and grow your business.

