

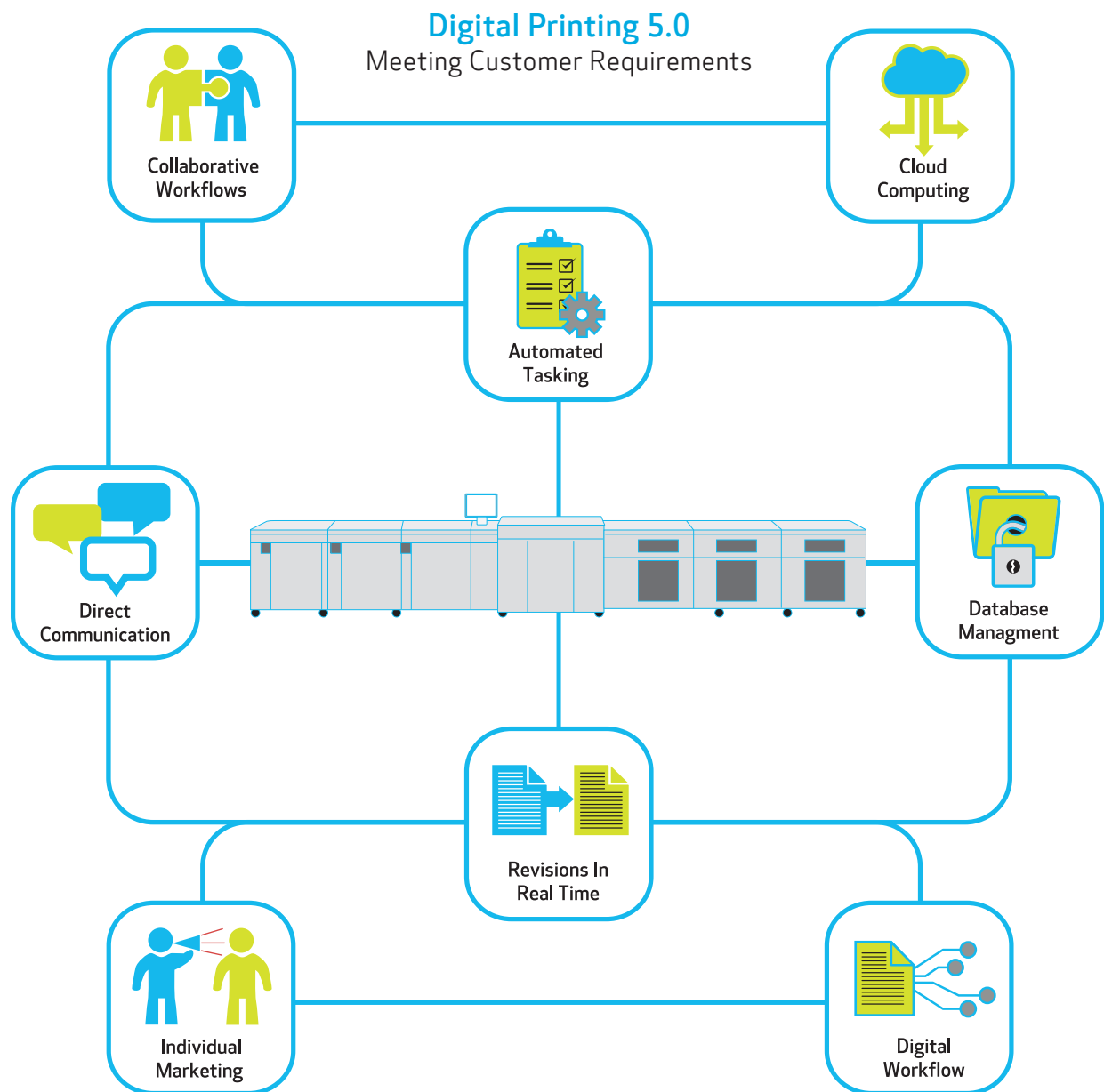
DIGITAL PRINTING 5.0 WHERE ARE WE NOW?



A NAPCO Research Study and White Paper
Sponsored by Canon U. S. A., Inc.

Where Are We Now?

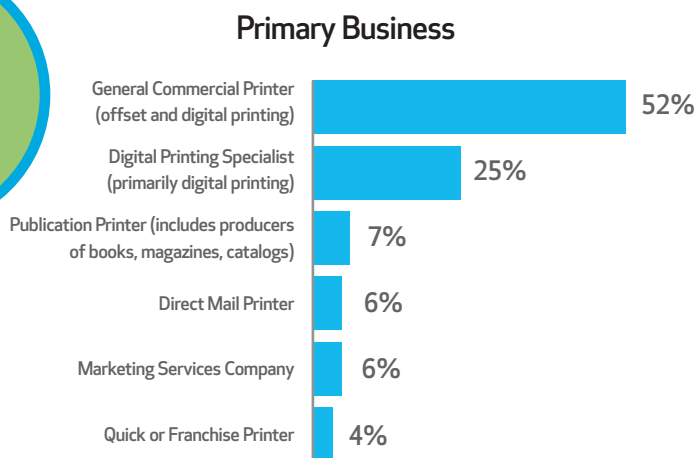
As the term “Industry 4.0” generates cache as the fourth industrial revolution, the printing industry, too, is entering a new phase described as **Digital Printing 5.0**, where digital presses are meeting more customer requirements, workflows are becoming more collaborative, communication and revisions are happening in real time, marketing messages are being directed to the individual rather than the group, and tasks are becoming consolidated and automated. Advances in printing processes, database management, digital workflows, and cloud computing are having profound, structural implications for the printing and packaging industries.



Digital color printing devices have come a long way since their market debut in the mid-1990s. Technological innovations on many fronts have led to faster speeds, longer run-length capabilities, larger formats, wider color gamuts, and the ability to create eye-catching special effects that enable pieces to stand out, get noticed, and drive business results.

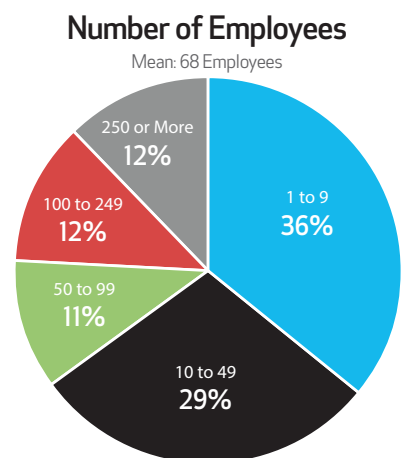
A new NAPCO Research* study and white paper, sponsored by Canon U. S. A., Inc., offers insights on how print service providers (PSPs) are leveraging digital printing to boost efficiency, better serve customers, and output print products once considered not possible on digital devices. The study, *Digital Printing 5.0*, surveyed 233 commercial printers and 174 in-plants to uncover key and evolving trends that are advancing the use of digital printing. Figures 1 and 2 describe the types of printers participating in this study.

Figure 1
Commercial Printer Respondent Base



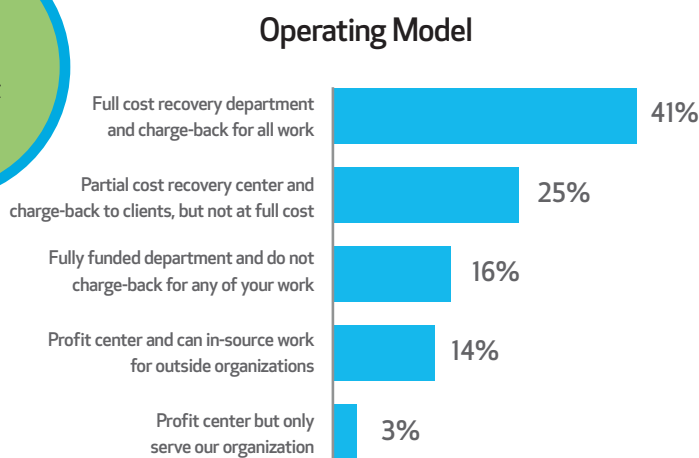
Q. Which category best describes your company's business? Single response.
N = 233 Commercial Printers

Source: *Digital Printing 5.0* NAPCO Research 2019



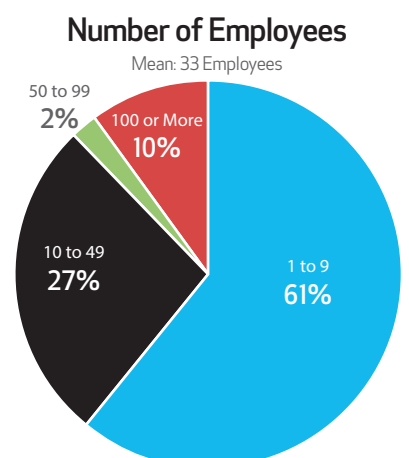
Q. How many employees work at your company or in-plant?
N = 233 Commercial Printers

Figure 2
In-Plant Respondent Base



Q. Which of the following describes your in-plant operation?
N = 174 In-Plants

Source: *Digital Printing 5.0* NAPCO Research 2019



Q. How many employees work at your company or in-plant?
N = 174 In-Plants

*A unit of NAPCO Media, the parent company of Printing Impressions and In-Plant Impressions.

Successful Firms Embrace Technology

The overarching theme of Digital Printing 5.0 is that successful printing firms are embracing advanced technologies. They're not only investing in digital production devices but also the automated, streamlined workflows necessary to deliver advanced capabilities, including high-value print embellishment, variable-data printing, and expanded finishing. They also want to ensure higher productivity and efficiency. These print providers understand that a successful operation depends on delighting customers at every turn, applying the latest industry innovations to production, and staying agile to adapt to industry trends and disruptions.

Adoption of digital printing is a reality that every print shop needs to embrace, as evidenced by this study's survey results: 100% of the commercial printers and 89% of the in-plant printers surveyed are using digital cut-sheet production color devices. The technology shift from offset lithography to digital is intensifying: only 76% of the commercial printer and 40% of the in-plant respondents reported that they're using traditional, sheet-fed offset equipment.

The strength of investment in digital printing is linked to overarching customer demands for shrinking turnaround deadlines, shorter print runs to reduce obsolescence, and increasing job frequency—coupled with ongoing improvements in production technology. Digital printing use continues to grow because it allows print providers to improve services and offer customers new 1:1 opportunities across print segments. The ability to affordably print more versions or materials personalized to individual recipients is increasingly important in strengthening print in today's digital media landscape.

Another factor driving investment and innovation in digital printing technology is the opportunity to offer customers new product applications and substrates, such as signage and displays, textiles, glass and plastics, promotional items, home décor, and much more.

The Continuing Growth of Digital Printing

According to IBISWorld's report "Digital Printing Industry in the U.S.," over the past five years, the digital printing industry has grown by 3.6% to reach revenues of \$11 billion in 2019. In the same time frame, the number of digital printing businesses has grown by 5.5% and the number of employees has grown by 4.8%.

The growth in digital printing is linked to an array of technological innovations, resulting in faster speeds, longer run capabilities, larger formats, improved and expanded ink sets, greater substrate flexibility, more digital finishing options, wider color gamuts, and the ability to create eye-catching, special effects that enable pieces to stand out and drive business results. In addition, advances in workflow automation and equipment calibration are enabling more streamlined operations and better color management.

Digital Press Adoption Triggers

Printers are installing both inkjet and toner-based digital printing devices to improve cost efficiency, streamline shorter-run print production workflows, and implement variable-data custom applications. Helping to drive the upswing in demand for direct mail is digital printing's variable-data capabilities and the growth of big data. Of course, direct mail printers are also taking full advantage of all the inherent cost and production efficiencies.

Production inkjet web printing is making market headway, with many of the latest models boasting the ability to print sheet-fed quality on off-the-shelf offset paper, without any special coatings or pretreatments. Inkjet web output can serve as a complement to offset work; for example, a digital press can print shorter-run books while an offset press can produce long-run additions. Meanwhile, more companies are rolling out sheet-fed, production inkjet devices—with increasingly larger-format sheet sizes or inline finishing solutions, allowing for “white-paper-in-and-finished-product-out” capabilities—and anticipation is high about their impact on the market.

Book printers are responding to the improvements in inkjet, implementing the technology to better serve the higher-end of the short-run color market and very short-run monochrome market.

Packaging printers are also embracing digital inkjet and toner, and digital printers are adding short-run packaging to their cadre of services. Trends in packaging are right in digital printing's sweet spot: just-in-time delivery to reduce inventory; very small runs for prototype development; and, of course, variable-data printing to support countless versions based on demographics, region, language, and more.

According to a Smithers Pira's “The Future of Digital Printing to 2024” study, electrophotography is the major contributor to the digital market. However, inkjet is the sector that's growing more rapidly and, it's anticipated that by 2024, inkjet will account for 56% of the value and 53% of the digital print volume worldwide.

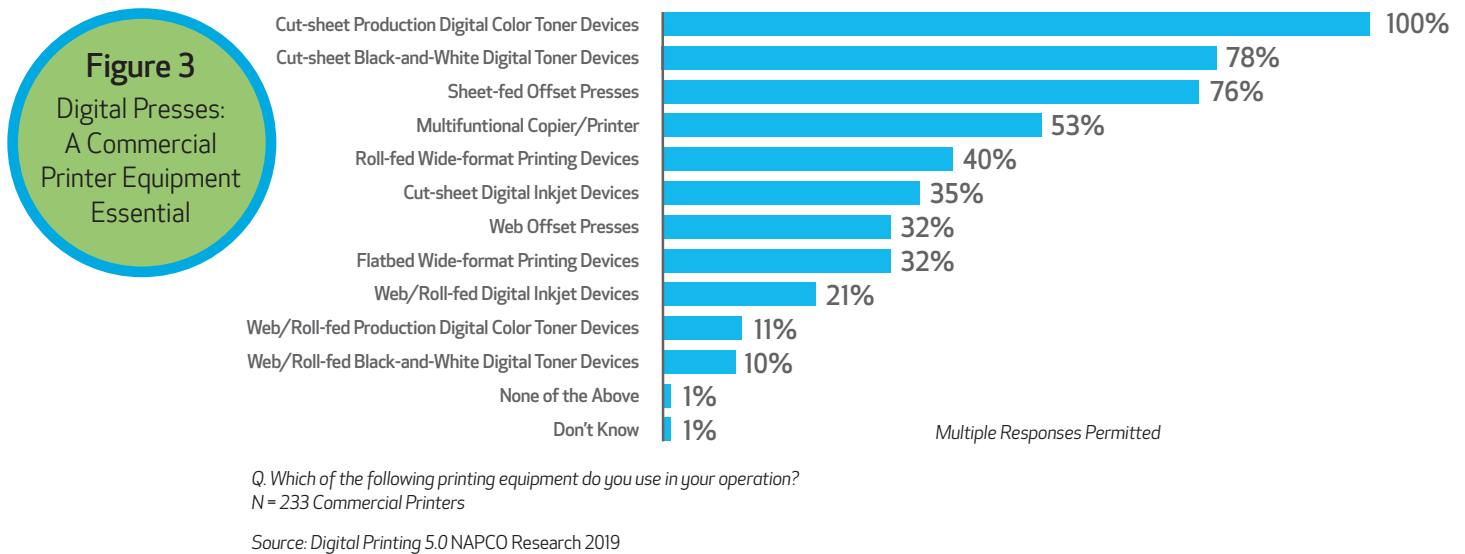
A presentation by Marco Boer of IT Strategies at the 2019 Inkjet Summit revealed that, while overall retail revenues for print are in decline (primarily due to a decline in offset demand), expenditures of inkjet output grew about 67% between 2008 and 2018—and continue to grow. Inkjet's rise in popularity, Boer reported, is largely the result of improved print heads and innovative ink sets that don't require pre-treated paper.

Still, proponents of toner printing attest to the technology's quality and speed, which continue to improve. These improvements have resulted in a reduced price per page, even for longer print runs that are historically reserved for offset printing. And with designers, consumers, and brands all clamoring for personalization, it's worth noting that toner digital printing is also able to deliver high levels of customization for customers.

Printing Equipment Ownership

Owning different production devices gives printers flexibility to take on jobs with varying substrate requirements, run lengths, and project types. NAPCO Research's survey of commercial and in-plant printers found that organizations are using both digital and offset printing to deliver a variety of products to their customers.

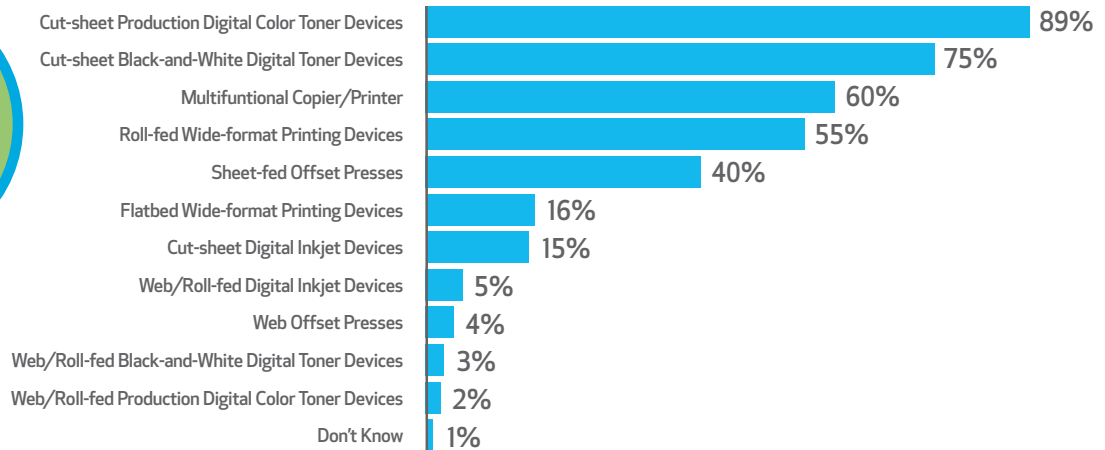
All commercial printer survey respondents reported owning at least one digital cut-sheet production color toner device, while 35% own some type of cut-sheet color inkjet device (Figure 3). This finding points to the value digital printing offers and its place as an economic mainstay. For many print service providers (PSPs), digital printing was once considered an emerging technology and a secondary source of revenue; this is not the case today.



While PSPs are investing in digital printing devices, they still operate offset presses: 76% own sheet-fed printing equipment while 32% own web offset presses. While making in-roads, roll-fed, wide-format printers are in use at only 40% of respondents' shops; wide-format, flatbed printers are in 32% of shops.

In-plants were one of the first print segments to embrace digital production printing. According to the survey response, 89% of respondents reported owning at least one digital cut-sheet production color toner device and 75% own a monochrome toner device. Inkjet has not (yet) made headway into the in-plant market; only 15% of the respondents own a sheet-fed production inkjet device, and 5% own a web/roll-fed production inkjet press. (Figure 4).

Figure 4
In-Plants
Powered by
Digital Devices

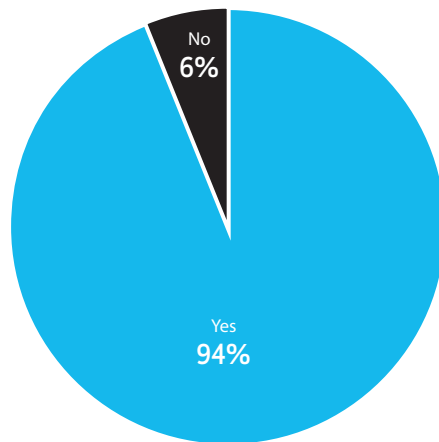


Q. Which of the following printing equipment do you use in your operation?
N = 157 In-Plants

Source: Digital Printing 5.0 NAPCO Research 2019

Digital color printing, in general, is widely accepted within in-plant shops. Asked if the quality of the in-plant's digital color printing capabilities were accepted by all departments in their parent organization, a resounding 94% of respondents answered in the affirmative (Figure 5).

Figure 5
Acceptance of
Digital Color Printing
in In-Plant Parent
Organizations



Q. Is the quality of your digital color printing capabilities accepted by all departments in your organization?
N = 174 In-Plants

Source: Digital Printing 5.0 NAPCO Research 2019

Workflow Automation Maximizes Benefits of Digital 5.0

As important as digital printing technology is to the future of a print shop's success, automation is equally critical. To realize the full benefits of digital printing, an optimized, automated workflow is mandatory to ensure that all the parts of the operation are performing at peak efficiency. An unwavering commitment to an efficient, streamlined operation, fed by automated processes, is paramount to a print shop's profitability.

Automation can be as simple as a system that handles basic prepress functions such as uploading images and files to the server (such as preflighting) or as intricate as a cloud-based platform that automates the entire workflow.

Using connectivity and automated processes to streamline workflow can impact the entire print production process—from monitoring print operations to producing personalized and/or versioned print communications using digital technology to applying special effects using digital embellishments. Cloud-based solutions allow for remote monitoring of the workflow, from the PSP's—or the customer's—desktop computer or mobile phone. And today's advanced web-to-print solutions also require an automated workflow that's connected to a cloud-based platform.

Automation not only speeds throughput, but it also reduces labor costs (and the ongoing difficulty among printers to find and retain a skilled workforce) and promotes accuracy. Every manual touchpoint adds labor cost to the project as well as the possibility of human error.

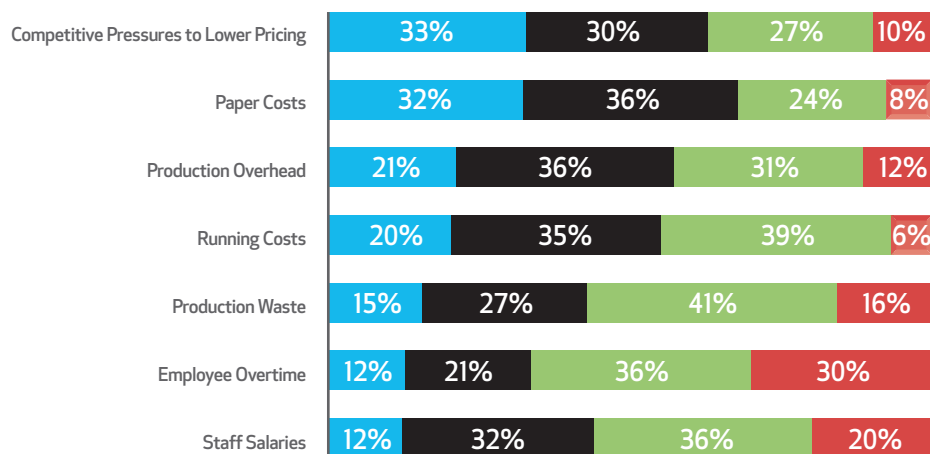
Many print jobs today have highly complex imaging requirements, such as an expanded color set and/or intricate variable-data specifications. The printing of these jobs may only take a few hours while data management and file prep can take triple the time.

High-Growth Firms are More Automated

Figure 6 shows factors influencing the profitability of print-for-pay providers. Respondents' top concern is the competitive pressure to lower pricing. Other key profitability factors that benefit from automation are lower production overhead and running costs. Key factors in improving profitability are keeping productivity high and material waste levels and labor costs low, which means PSPs need to up their game in the area of automation.

Figure 6
Factors Influencing Commercial Printer Profitability

- High Impact
- Moderate Impact
- Slight Impact
- Impact

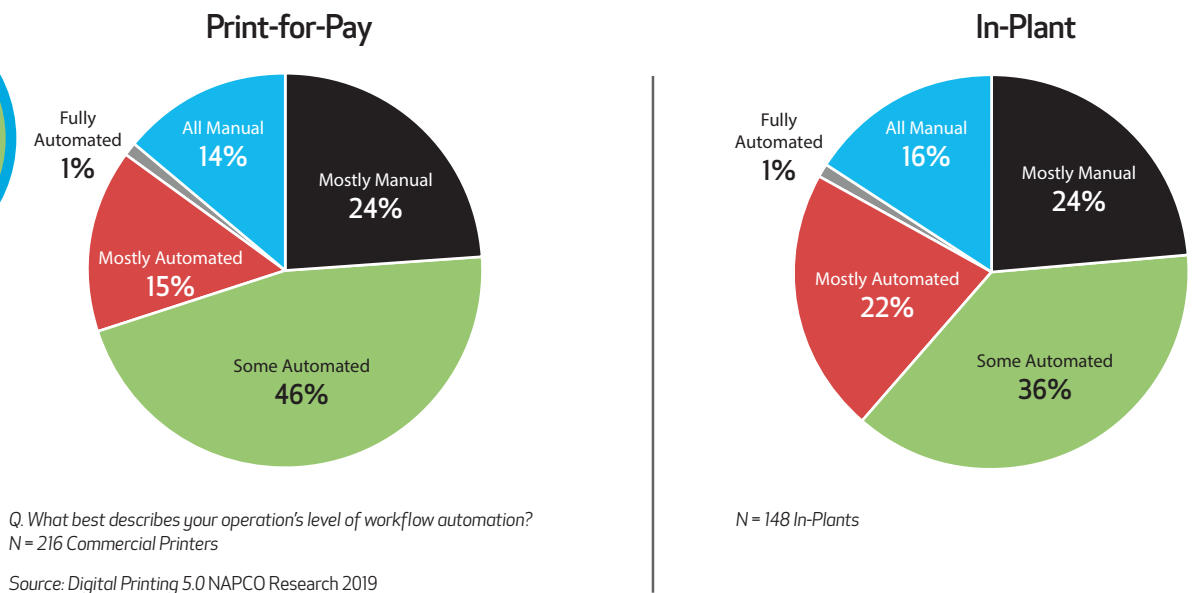


Q. Please rate the impact each of the following has on improving profitability?
N = 233 Commercial Printers

Source: Digital Printing 5.0 NAPCO Research 2019

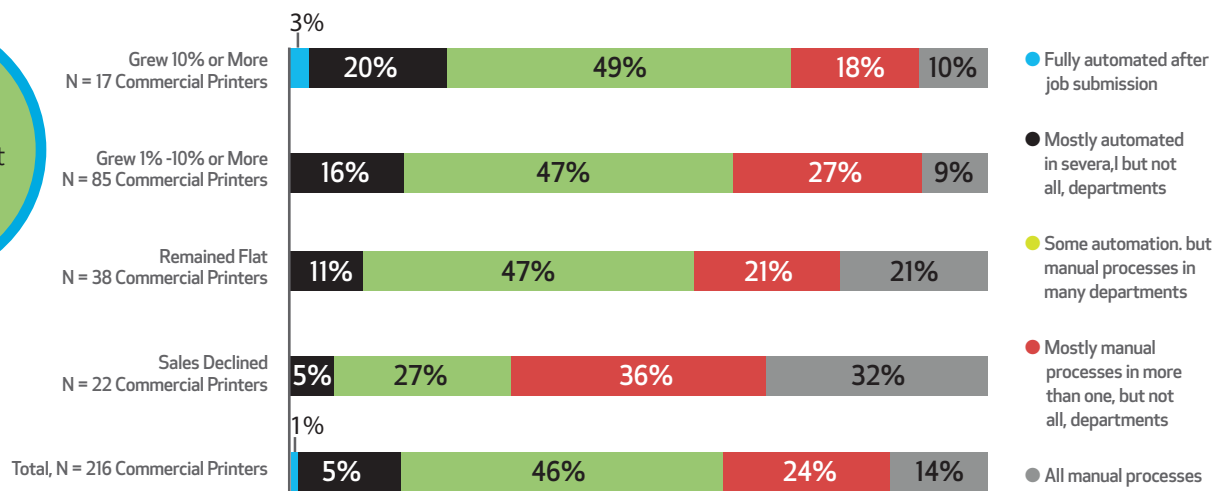
Workflow automation is a primary goal of many printing operations, but achieving it is often elusive. According to print-for-pay survey respondents, only one percent of firms reported being fully automated (Figure 7), and 15% described themselves as being mostly automated, while 46% use some automation. Noteworthy, 14% indicated they still use all-manual processes. In-plants reported slightly higher levels of automation. Like their commercial counterparts, only one percent of in-plants reported being fully automated, and 22% described themselves as being mostly automated, while 36% use some automation. Similarly, 16% of in-plants responded that they still use all manual processes.

Figure 7
Level of Automation



Diving deeper into the responses to this question revealed that the print providers reporting double-digit sales growth reported higher levels of automation (Figure 8). Of those survey respondents that reported sales growth of 10% or more, 3% were fully automated and 20% were mostly automated but not in all departments. These high-sales-growth respondents

Figure 8
High-Growth Commercial Print Firms are More Automated



reported higher degrees of automation than the other respondents. Firms that grew between 1 - 10% also reported higher degrees of automation than those with flat or declining sales, with 16% indicating they were mostly automated. Of the firms that reported their sales were flat, only 11% were mostly automated. And of the establishments where sales declined, only 5% said they were mostly automated.

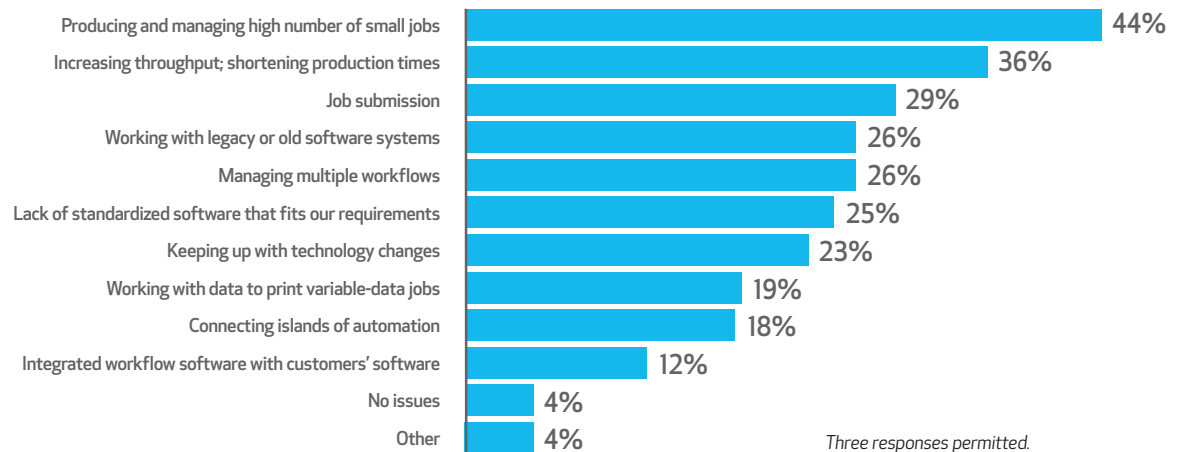
On the flip side, inside the higher-growth firms, only 10% employed all-manual processes. Among firms that grew between 1 - 10%, 9% used all-manual processes. For those where sales remained flat, 21% engaged all manual processes, and where sales declined, 32% of firms used all-manual processes.

In-plants, too, reported benefits from automation. Of those in-plant respondents that reported an increase of budget or revenue of 10% or more, 3% indicated they were fully automated and 17% were mostly automated.

An automated, streamlined workflow solves many challenges experienced by commercial printers and in-plant operations. The survey asked respondents to identify their organizations' top three workflow challenges; the answers all reflect the need for a streamlined workflow.

The top challenge reported by print-for-pay survey respondents (Figure 9) was producing and managing a high number of small jobs (44%), followed by increasing throughput and shortening production times (36%), job submission (29%), working with legacy or old software systems (26%), and managing multiple workflows (26%). Only 4% reported they were experiencing no workflow challenges.

Figure 9
Top Commercial Printer Workflow Challenges

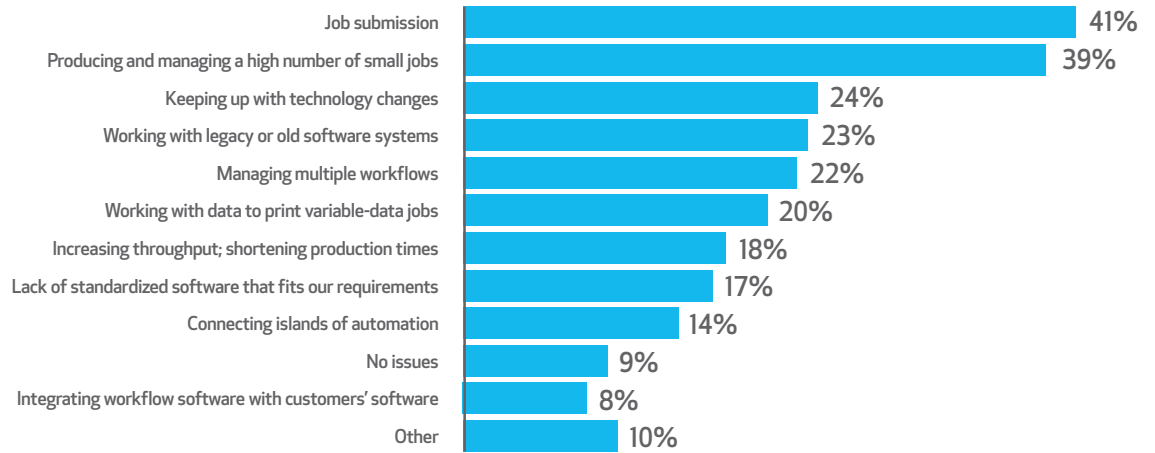


Q. Overall, what are your top three biggest pain points or inefficiencies in your current workflow?
N = 216 Commercial Printers

Source: Digital Printing 5.0 NAPCO Research 2019

In-plants' cited job submission (41%), followed by producing and managing a high number of small jobs (39%), and keeping up with technology changes (24%) as their top workflow challenges (Figure 10).

Figure 10
Top In-Plant
Workflow
Challenges

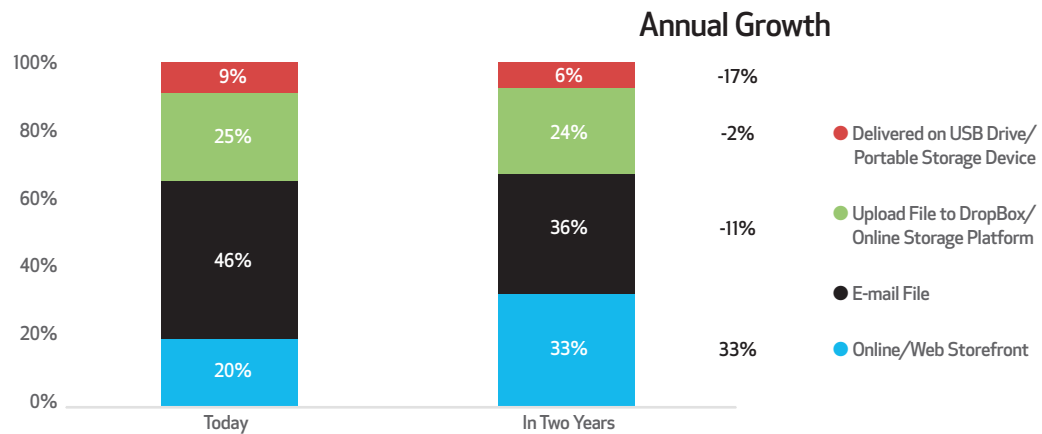


Q. Which of the following printing equipment do you use in your operation?
N = 157 In-Plants

Source: Digital Printing 5.0 NAPCO Research 2019

Beyond solving workflow challenges, automation can improve the job submission process. When asked the breakdown of how digital printing job orders are submitted today versus how PSPs expect them to be delivered in two years (Figure 11), respondents project an annual decline in files being emailed (-11%) and delivered on a USB drive or portable storage device (-17%). On the other hand, respondents expect their use of online or web-based storefronts (e-commerce) to increase 33% annually over the next two years.

Figure 11
Commercial
Printer Job
Submission
Trends

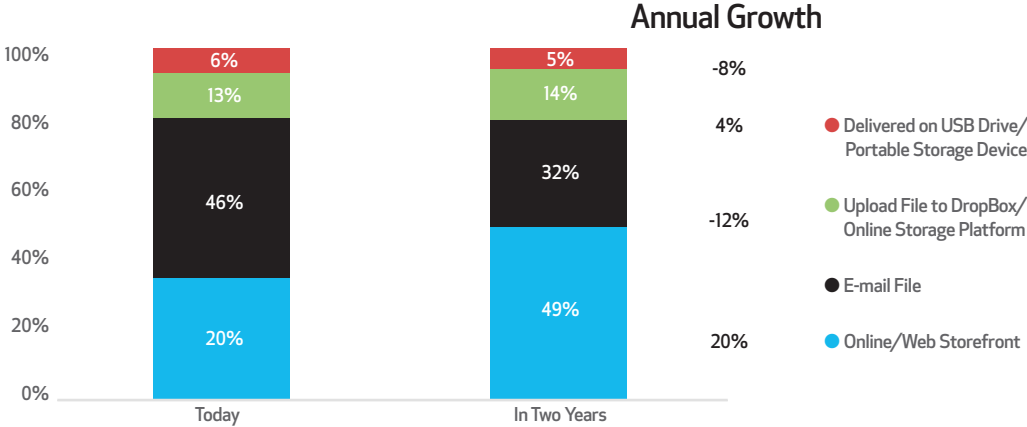


Q. Of your digital printing work, what is the breakdown of how job orders are submitted today and what you expect it will be in two years?
N = 216 Commercial Printers

Source: Digital Printing 5.0 NAPCO Research 2019

In-plant respondents also expect a decline in files being emailed (-12%) or delivered on a USB drive or portable storage device (-8%) (Figure 12). However, respondents do believe their use of an online or web storefront (e-commerce) will increase 20% annually over the next two years as well as files being uploaded to an online storage platform such as Dropbox (4%).

Figure 12
In-Plant
Job Submission
Trends



Q. Of your digital printing work, what is the breakdown of how job orders are submitted today and what you expect it will be in two years?
N = 157 In-Plants

Source: Digital Printing 5.0 NAPCO Research 2019

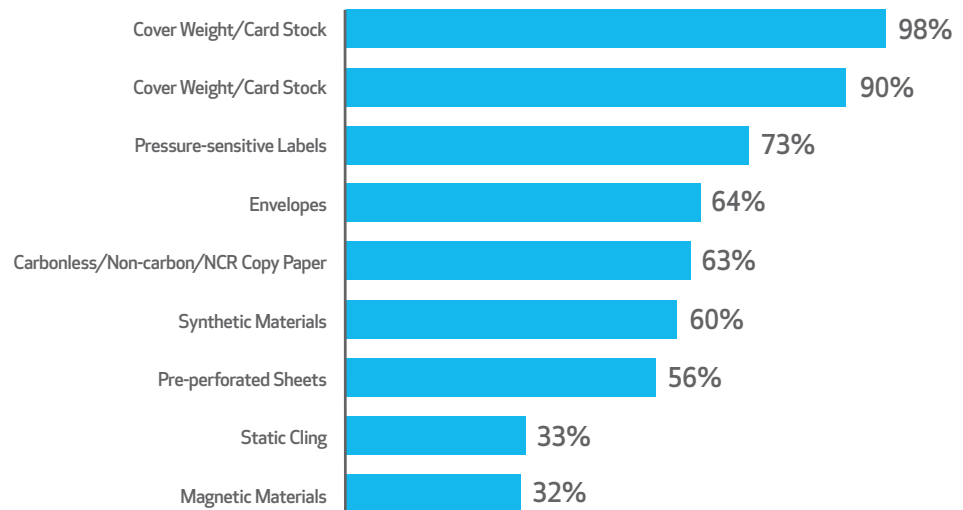
As more jobs are being submitted through online/web storefronts, it’s critical that these platforms are integrated with the production workflow solutions. Automation is the key!

More Substrates, More Opportunities

The increase in the variety of substrates that can be printed on digital presses is also helping to drive digital print demand; depending on the system, the device can now print on synthetics media, envelopes, and canvas, as examples, along with various papers and card/board stocks.

Commercial printers are leveraging the expanded range of substrates available for use on their digital printing devices (Figure 13). Ninety percent have used cover weight/card stock, 73% pressure-sensitive labels, 64% envelopes, and 60% synthetic materials.

Figure 13
Special Substrates
Commercial Printers
Use on Digital
Presses

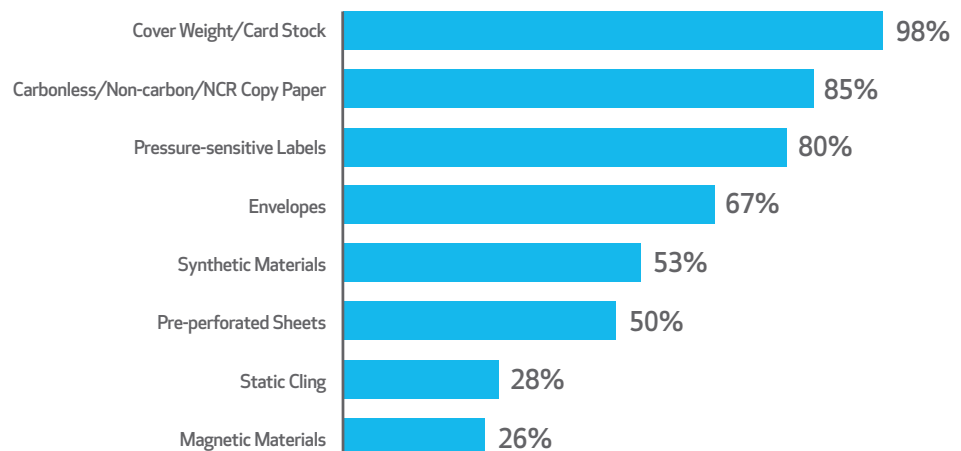


Q. Do you print any of the following special substrates on your digital printing devices?
N = 184 Commercial Printers

Source: Digital Printing 5.0 NAPCO Research 2019

Looking at the in-plant respondents, 98% have run cover weight/card stock, 80% pressure-sensitive labels, 53% synthetic materials, 28% static cling, and 26% magnetic materials (Figure 14).

Figure 14
Special
Substrates
In-Plants Use on
Digital Presses



Q. Do you print any of the following special substrates on your digital printing devices?
N = 123 In-Plants

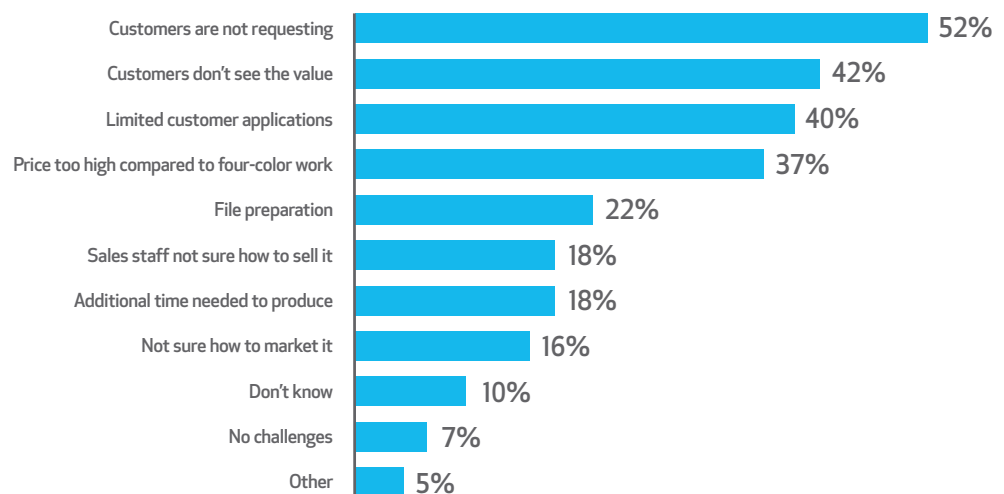
Source: Digital Printing 5.0 NAPCO Research 2019

Value-Added Services and Special Effects

Digital printing is perfectly suited to offer the value-add techniques and processes that print buyers covet, with unique finishing options like foiling, die-cutting, embossing, textures, special coatings, and overprinting. Respondents reported offering many finishing options for digitally printed work. Folding, saddle-stitching, hole-punching, collating, and booklet-making are popular services offered to digital printing customers. In-plants had higher propensity to finish digitally printed products in-line than did print-for-pay respondents.

Asked if their operation offered any of the following special effects and/or techniques on their digital printing, 46% replied they offered spot colors, such as custom-mixed or PANTONE® PMS colors. Applying clear flood coatings is also popular (42%). And commercial printers reported on the challenges in growing the demand and utilization of these printed applications, with 52% reporting that customers aren't requesting these special effects and 42% customers don't see the value (Figure 15).

Figure 15
Challenges in Selling Expanded Printing Capabilities



Q. If you offer expanded printing capabilities, what challenges do you have in growing adoption or utilization?
N = 175 Commercial Printers

Source: Digital Printing 5.0 NAPCO Research 2019

Printing enhancements and special effects on digital printing devices are still an opportunity for commercial printers and they reported that they're charging more for print enhancements.

In-plants, too, are producing jobs with special effects on digital printing output. Asked if their operation offered any of the following special effects and/or techniques on their digital printing, 43% replied they offered spot colors, such as custom-mixed or PANTONE® colors, which tracks what commercial shops are offering. But in-plants are not as active in applying other special effects, such as clear flood coatings (18%), specialty colors such as white metallic or fluorescent (21%), or spot clear coating (21%); only 16% are using an extended color gamut, 14% MICR, and 5% textured effects such as embossing.

Conclusion

Digital printing is now an integral part of commercial and in-plant printers' printing production technology. The conversation management needs to have now is not whether to invest in digital printing, but rather which device is best-suited for their company's growth plan. However, investing in digital printing—and not investing in a software or cloud-based platform to automate production workflow—puts the brakes on a company's growth potential. Both are necessary to bring a printing business forward and help ensure its future success.

About Digital Printing 5.0

Digital Printing 5.0 is a series of thought-leadership content pieces based on a NAPCO Research survey of commercial and in-house printing that was sponsored by Canon.

1. Where Are We Now?
2. Beyond the Press:
Defining the Infrastructure
for Operational Success
3. Optimizing Color Across
Print Platforms
4. The Rise of the Digital Print
Enhancement Opportunity
5. Best Practices in
Digital Finishing



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