



The Role of Inkjet Printing in Powering Industry 4.0 in Book Publishing



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INTRODUCTION

As book manufacturing enters Industry 4.0 – the fourth major industrial revolution, brought about by artificial intelligence (AI), big data, mobile devices, Industrial Internet of Things (IoT), machine learning, automation and more – improving print productivity and production agility is more important than ever.

Digital printing technology continues to transform book manufacturing by offering print providers and publishers new options to improve efficiency and profitability. While book printers have been producing books on digital presses for some time, innovations in inkjet printing are moving more work from offset to digital, improving productivity, and offering new opportunities for products and services.

Production inkjet devices are a key driver for moving book pages from offset to digital printing presses. These ultra-high-speed digital presses have redefined the economics of printing books on demand in larger quantities, without sacrifices in quality. According to IT Strategies, more than 10% of all book pages are now printed on production inkjet presses, a percentage that will continue to grow at double-digit rates for the foreseeable future.

ABOUT THIS RESEARCH

This research study, conducted by NAPCO Research (a unit of NAPCO Media LLC, the publisher of *Book Business*) and commissioned by Book Manufacturers' Institute (BMI), focuses on how book printers are transitioning to inkjet printing. Research objectives include:

- Identify how book printers are researching, adopting, and deploying inkjet equipment
- Define key inkjet investment drivers
- Pinpoint the opportunities inkjet is delivering to book printers
- Gauge book publishers' awareness of digital printing
- Define key benefits book publishers are gaining from digital printing

METHODOLOGY

The findings in the research report are based on original survey research and the following NAPCO Research reports: *Production Inkjet Printing: Consideration, Deployment and End Results* and *How Book Publishers Use Digital Print to Sell Books More Profitably*.

A research survey was sent to readers of the NAPCO publication Book Business. To qualify for the survey, respondents' primary business needed to be printing. A key research goal was to obtain a minimum of 40 book manufacturer survey respondents; a total of 68 book printers participated in the survey. Figure 1 below offers a profile of respondents.

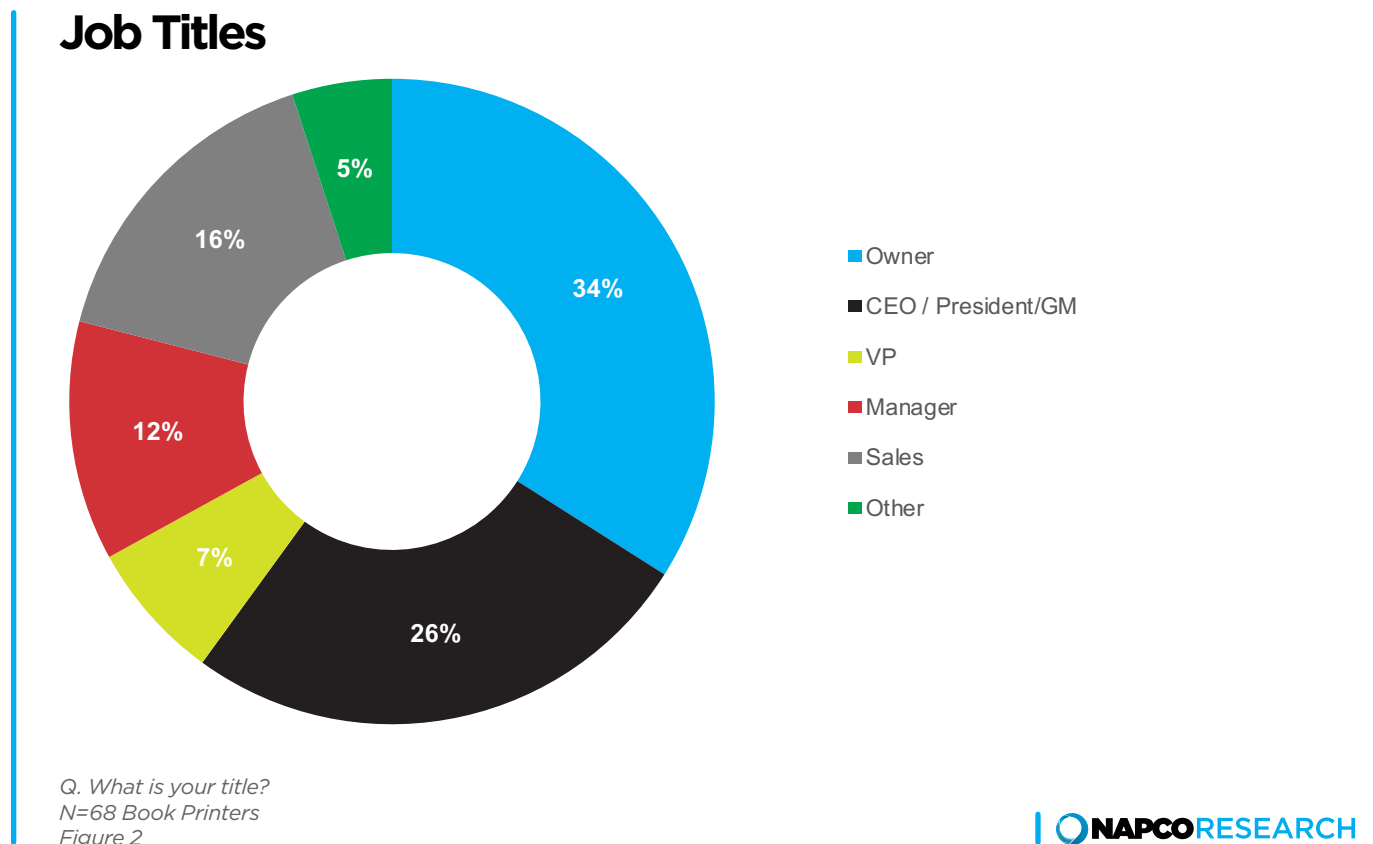
Respondent Profiles

PRIMARY BUSINESS	NUMBER	PERCENT
General commercial printer (offset & digital printing)	39	57%
Book printer	21	31%
Digital printing specialist (primarily digital printing)	7	10%
Quick or franchise printer	1	1%
Total	68	100%

Figure 1

RESPONDENTS' JOB TITLES

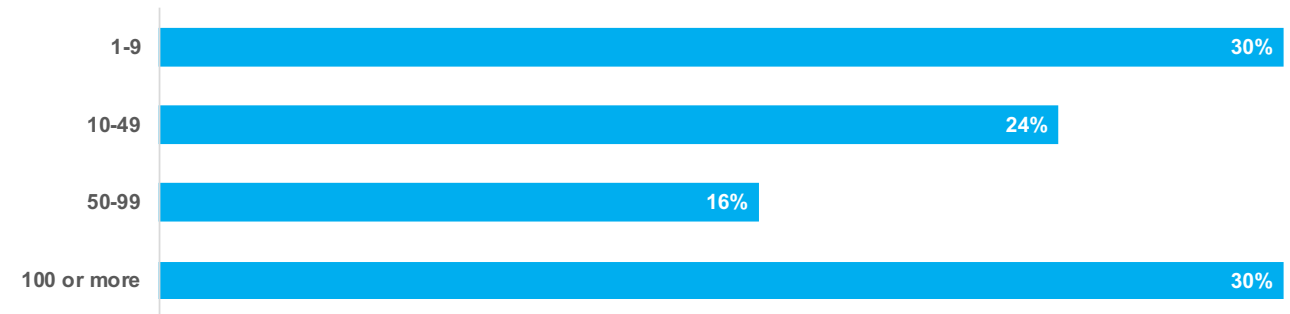
Most of the survey respondents hold executive and managerial positions within their organizations. The majority of respondents (67%) are owners, general managers or executives (Figure 2).



SIZE OF COMPANIES

Respondents came from companies of various sizes.

Number of Employees



Q. How many employees work at your company?
N=68 Book Printers
Figure 3

NAPCO RESEARCH

KEY FINDINGS

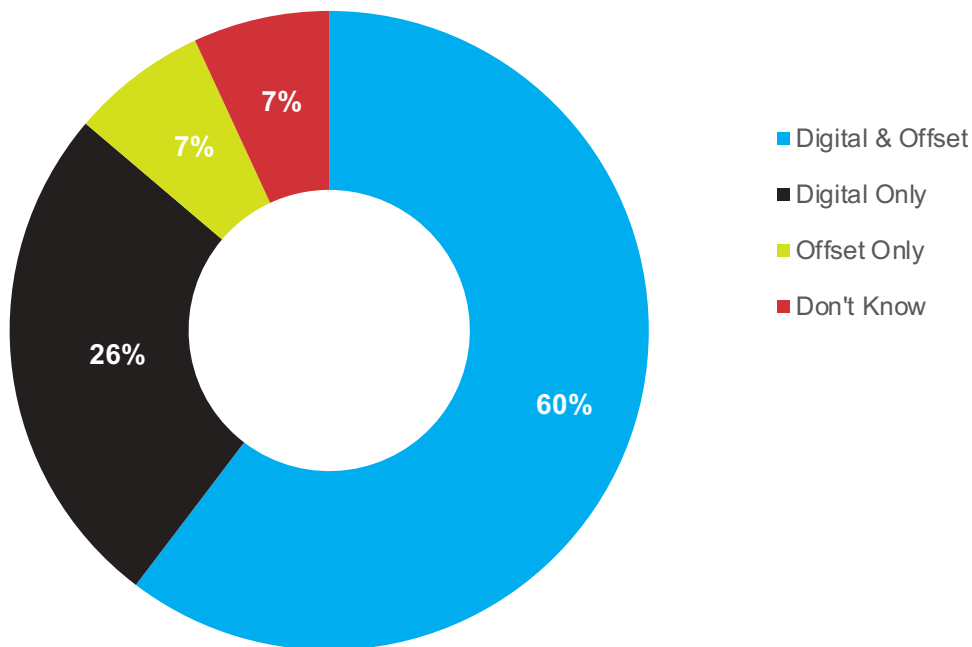
- According to the recent NAPCO Research report *How Book Publishers Use Digital Printing to Sell Books More Profitably*, book publishers are broadly adopting digital printing as 86% of respondents report producing books on digital devices and 68% expect the volume of books produced digitally to increase.
- The top reasons publishers use digital printing are to reduce costs associated with warehousing and book returns (77%) and printing short-run titles that offset couldn't print economically (74%). Overall, publishers see digital printing as a way to reduce production costs and better manage inventories.
- Over half of book printers report that digital printing is enabling their customers to increase sales by producing short runs of backlist and out-of-print titles on demand and affordably printing four-color trade books.
- While cut-sheet digital toner is the top process used to print books today, over the next two years respondents expect to print more books via inkjet presses, either cut-sheet or continuous feed.
- More than half of survey respondents either purchased or planned to purchase an inkjet press. The top reasons printers purchased inkjet presses or are considering purchasing them are to improve productivity and accommodate demand for shorter runs.
- Close to one-third of survey respondents print books on digital inkjet devices, while 21% plan to purchase an inkjet press in the next 24 months to print books.
- 45% of respondents did not print books on production inkjet presses and had no plans to invest in these devices because there is no demand from their customers (49%) and the equipment they have meets their needs (49%).

- When asked to rank the importance of key investment considerations for investing in production inkjet, book printers report that cost, quality, and OEM support were the most important factors.
- Book printers that either purchased or planned to purchase inkjet presses find a cost of ownership analysis (62%), speaking with industry peers that made the investment (59%), and attending vendor (55%) and industry events (48%) highly valuable resources for evaluating investment.
- Survey respondents indicate run length (81%) is the most important factor when deciding between printing a book on an offset or a digital press.
- Respondents that print books on inkjet presses report changing sales strategies to support their technology investment. Over half of survey respondents (57%) report embracing a consultative sales approach and training sales reps to sell inkjet printing to book publishers.

BOOK PUBLISHERS UNDERSTAND THE BENEFITS OF DIGITAL

Before reporting the results of the book printer survey, it's important to qualify the overarching trends in book publishing that are driving demand for digital printing. According to the recent NAPCO Research report *How Book Publishers Use Digital Printing to Sell Books More Profitably*, book publishers are broadly adopting digital printing as 86% of respondents reported producing books on digital devices (Figure 4) and 68% of respondents expect the volume of books produced digitally to grow.

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

Figure 4

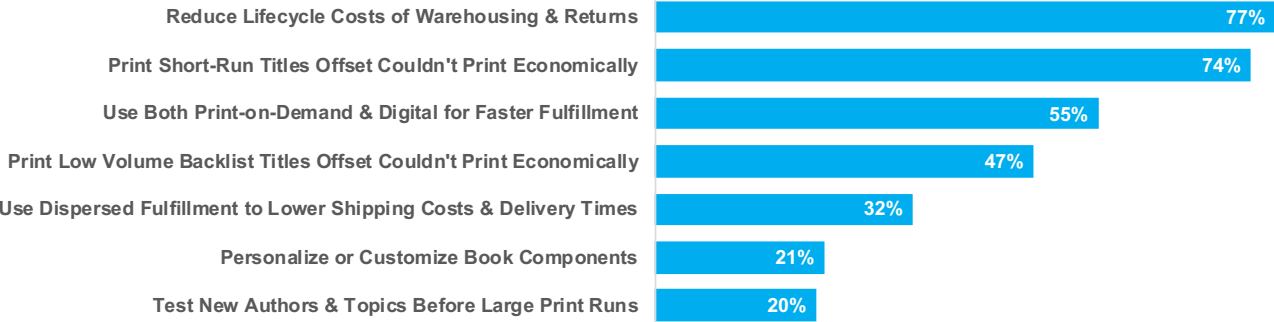
KEY BENEFITS OF DIGITAL BOOK PRINTING

Digital printing solves many operational challenges faced by book publishers and is an attractive option because it offers publishers the following key benefits:

- Reduces risk as publishers can monitor demand and order only what is required to eliminate warehousing and return costs.
- On-demand production enables publishers to react to market demand for printed books.
- Improves bottom-line business results. By following the demand curve more closely and minimizing warehousing and return costs, publishers can have greater inventory turnover and improved profitability.
- Shifts the business model to sell, then print. Publishers no longer need to guess at the number of copies needed, and publishers have more flexibility in producing self-published work and out-of-print content.

Book publishers participating in *How Book Publishers Use Digital Printing to Sell Books More Profitably* indicate that digital printing addresses two of their longstanding challenges: reducing book returns and enabling short-run production of titles. The top reasons they use digital printing (Figure 5) are reducing lifecycle costs of warehousing and returns (77%) and printing short-run titles that offset couldn't print economically (74%). Overall, publishers see digital printing as a way to reduce production costs and better manage inventories.

Key Benefits of Digital Book Printing



Q. What are the primary drivers for why you use digital printing?
 N=150 Book Publishers
 Source: How Book Publishers Use Digital Printing to Sell Books More Profitably,
 NAPCO Research 2018
 Figure 5



In addition, book publisher respondents report that two of the primary cost-saving benefits digital printing offers are reducing warehousing costs (68%) and up-front inventory costs (62%). Capital not locked up in up-front printing and warehousing typically means publishers can expend more resources on tasks that offer a return on investment, such as new acquisitions or marketing.

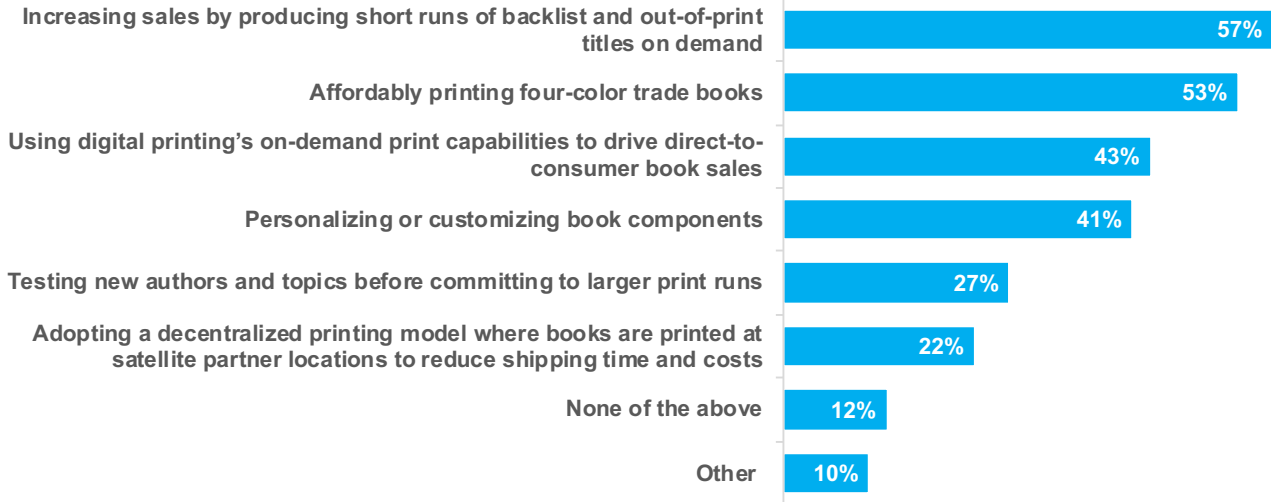
Also, digital printing publishers report experiencing savings in cost-per-unit/book printed (46%), shipping (33%), and returns (30%).



DIGITAL PRINTING GROWING PUBLISHER REVENUES

Digital printing is helping book publishers grow their revenues. Over half of book printers participating in the current survey report that digital printing is enabling their customers to increase sales by producing short runs of backlist and out-of-print titles on demand and affordably printing four-color trade books (Figure 6). Other key revenue drivers are using digital's on-demand print capabilities to increase direct-to-consumer book sales and personalizing customers' book components.

Ways Digital Printing is Growing Publishers Revenue



Q. In which of the following ways are your book publishing customers using digital printing to grow revenue?
N=49 Book Printers
Figure 6

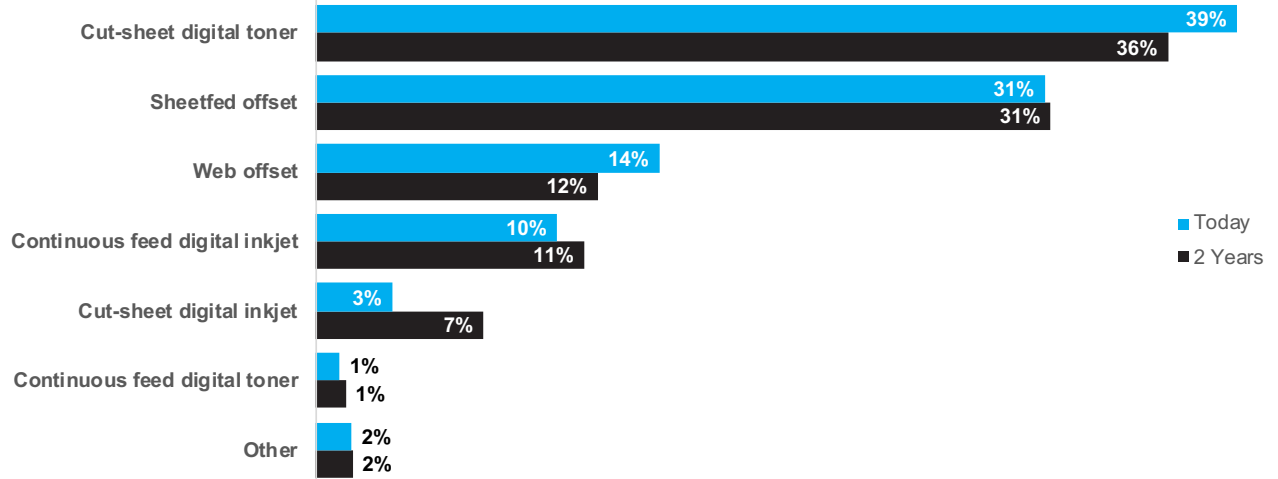


METHODS USED FOR PRINTING BOOKS

The survey asked book printers to quantify the various printing methods used to print books. The top method used today and expected to be used in the next two years was cut-sheet digital toner (Figure 7). This finding points to the inroads that digital printing has made in book printing. Close to one-third report printing books via sheetfed offset and expect that to hold steady. Respondents expect to print more books via inkjet presses, either cut-sheet or continuous feed, over the next two years.



Printing Methods Used to Produce Books



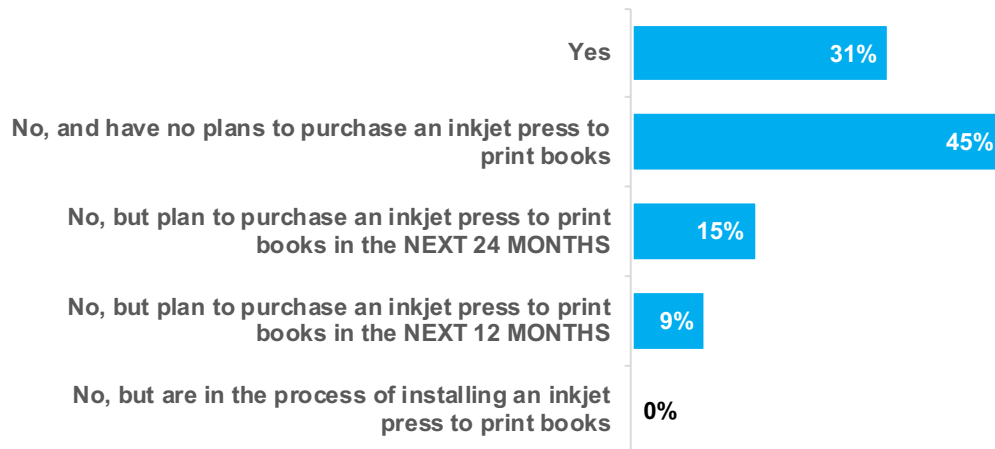
Q. Of the books you print TODAY/in TWO Years, what percentage are/do you expect to be produced via the following printing methods?
 N=60 Book Printers
 Figure 7



PRODUCTION INKJET INVESTMENT TRENDS

More than half of survey respondents either purchased or planned to purchase an inkjet press. Close to one-third of survey respondents print books on digital inkjet devices, while 24% plan to purchase an inkjet press in the next 24 months to print books (Figure 8). 45% of respondents did not print books on production inkjet presses and had no plans to invest in these devices.

Printing Books on Inkjet Presses



Q. Do you print books on production inkjet presses (not wide-format printing equipment)?
 N=65 Book printers
 Figure 8

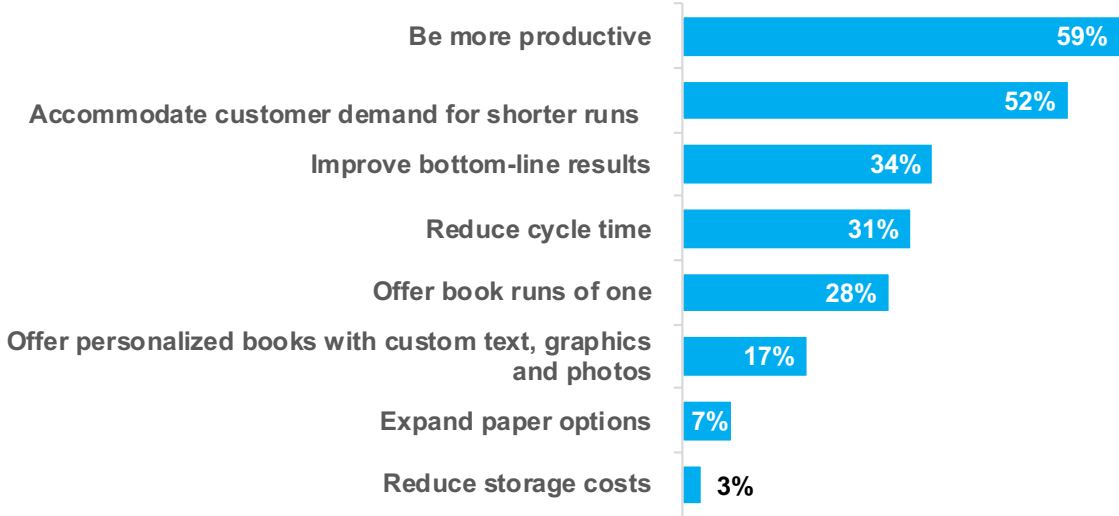


REASONS FOR INKJET INVESTMENT

The top reasons book printers purchased or are considering purchasing inkjet presses are to improve productivity and accommodate demand for shorter runs (Figure 9). No other digital printing technology is as productive as inkjet. Book printers are looking for ways to improve productivity, and digital print technologies provide a cost-effective means for shorter production runs. Compared to toner devices, production inkjet operates at much higher speeds.

At the same time, high-speed inkjet continues to expand production run capabilities. Image quality continues to improve, and the ability to print on more types of paper offers publishers more options. Some inkjet presses print salable product as the device ramps, so that paper at the beginning of the print run is not wasted.

Top Reasons Respondents Added or are Considering an Inkjet Press for Book Printing



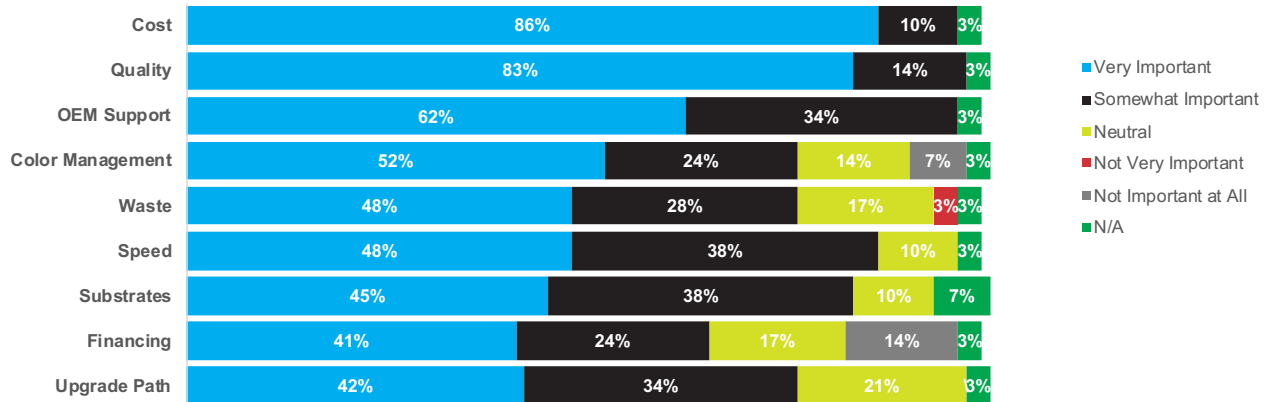
Q. What are the top THREE reasons you either purchased or are considering purchasing an inkjet press for book printing?
N=29 Book Printers that either purchased or are considering investing in an inkjet press to print books
Figure 9



High-speed inkjet devices are shattering book printers' challenges in finding a digital printing technology option capable of achieving the quality, speed, flexibility, and affordability of offset printing. When asked to rank the importance of key investment considerations for investing in production inkjet, cost, quality, and OEM support were the most important factors (Figure 10).



Investment Decision Factors



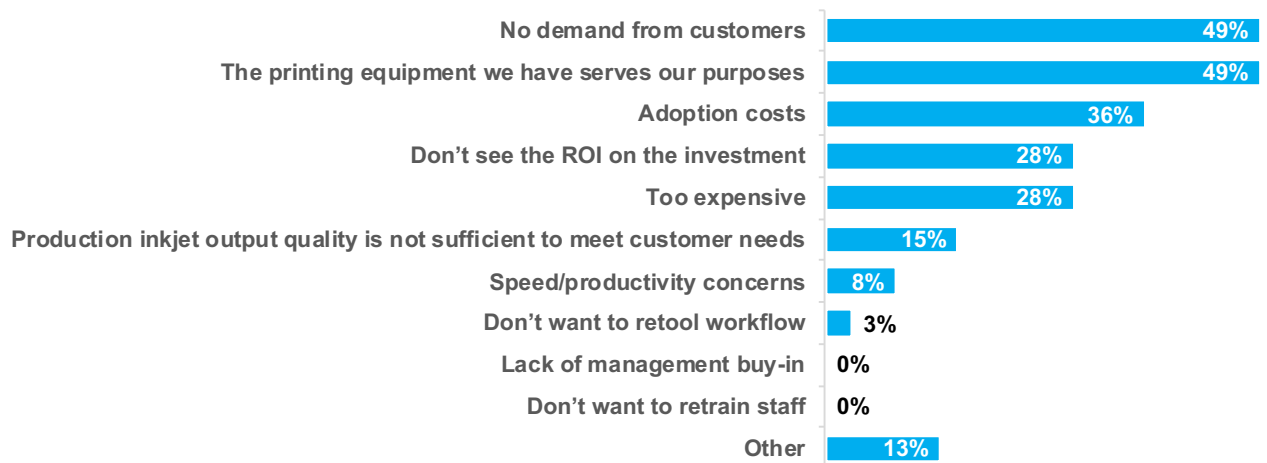
Q. When thinking about investment in production inkjet, please rank the importance of the following concerns.
 N=29 Book Printers Book printers that either purchased or plan to purchase an inkjet press to print books
 Figure 10



REASONS FOR NOT INVESTING IN INKJET TO PRINT BOOKS

Respondents that don't print books on production inkjet devices and have no plans to invest in them report the top reasons they don't are no demand from customers (49%) and the equipment they have meets their needs (49%) (Figure 11). A little over one-third of respondents indicate adoption cost is a key investment obstacle.

Inkjet Investment Barriers



Q. Why haven't you invested in production inkjet devices to print books?
 N=39 Book printers that haven't invested in production inkjet devices to print books
 Figure 11



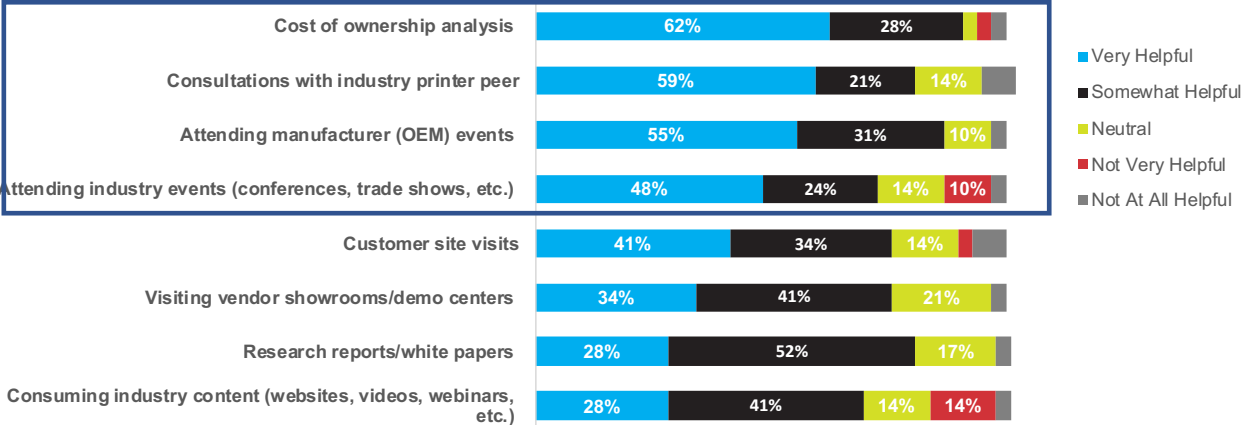
Other factors preventing investment, as noted by respondents in an open-ended question, include:

- Facility is too small
- Inability to print on all substrates
- Prior generations of inkjet equipment did not meet quality needs
- Ambiguity in accurately estimating/calculating ink mileage/consumption rates/costs

EVALUATING THE INKJET OPPORTUNITY

Respondents were asked to rank how helpful various activities were in researching investment in production inkjet equipment. Book printers that either purchased or planned to purchase inkjet presses find a cost of ownership analysis, speaking with industry peers that made the investment, and attending vendor and industry events to be highly valuable resources for evaluating investment (Figure 12).

Researching the Production Inkjet Opportunity



Q. How valuable were/are the following in researching production inkjet equipment?
 N=29 Book Printers that either purchased or plan to purchase an inkjet press to print books
 Figure 12



A total cost of ownership (TCO) analysis is an important consideration for any press investment. Key considerations for selecting the right inkjet technology include understanding labor costs, setup, changeover times, workflow, potential system downtime, and work mix — both current and anticipated. Providers report that an in-depth return on investment (ROI) model should include:

- All of the OEM’s charges associated with the press, including a full explanation of the service contract and consumable charges
- Cost comparisons at different volume levels

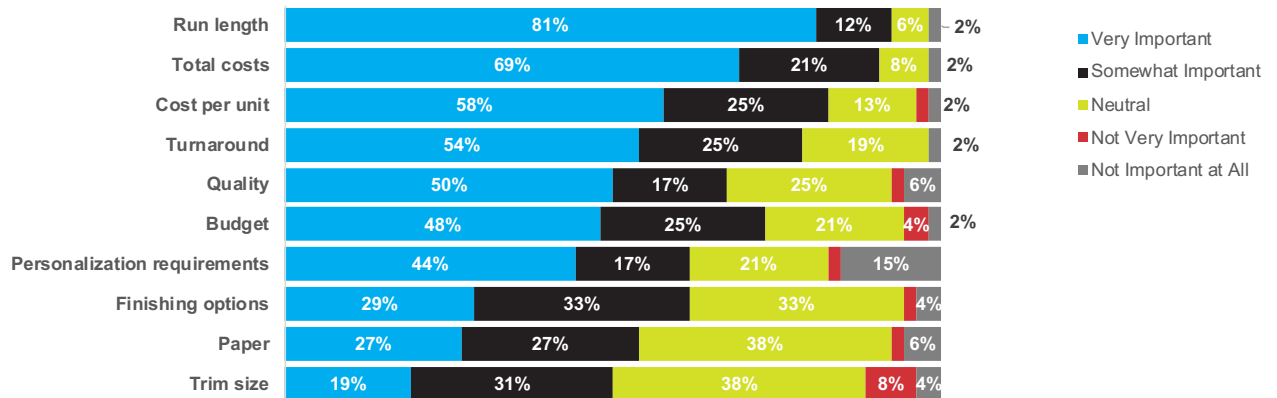
- Indirect costs
- Waste ink
- Inkjet head replacement
- Power consumption

Speaking with other companies that have made the investment in inkjet, either in person or at manufacturer/industry events, offers valuable insights into the investment decision. These types of information exchanges offer real-world experience sharing that enables better decision making.

THE OFFSET VS. DIGITAL DECISION

Book printers typically offer publishers a variety of methods to produce books. An ongoing industry decision is determining the key factors that dictate printing a book on an offset versus a digital press. Survey respondents indicate that run length is the most important factor, as offset processes are typically used for longer runs and digital for shorter runs (Figure 13). A key benefit of digital printing is its ability to affordably print short-run work. Offset printing requires creating printing plates and consumes more materials in setup compared to digital, making the initial cost much higher and impractical for printing smaller quantities. Other important factors include speed, personalization requirements, and quality.

Key Decision Factors in Offset Vs. Digital Process Selection



Q. What are the key decision factors in deciding between printing a book on an offset vs. a digital press?
 N=52 Book Printers
 Figure 13



SELLING INKJET CAPABILITIES TO BOOK PUBLISHERS

Respondents that print books on inkjet presses report changing sales strategies to support their technology investment. Over half of survey respondents report embracing a consultative sales approach and training sales reps to sell inkjet printing to publishers (Figure 14). These top two responses indicated a shift in selling strategies and a recognition of the importance of training reps on how to sell a new printing technology. Other key actions focus on customer outreach activities such as attending customer events, holding events to demonstrate capabilities and educate customers, and exhibiting at events customer attend.

Actions Taken to Sell Inkjet



Q. Which of the following actions did your operation take to sell inkjet capabilities to book publishers?
 N=14 Book printers that print books on an inkjet press
 Figure 14



CONCLUSIONS

Publishers have eyed digital printing as a way to better manage inventories and reduce production costs. The challenge for book manufacturers has been finding digital printing technology options that are capable of achieving the quality, speed, flexibility, and affordability of offset printing. These challenges are meeting their match as high-speed inkjet printing technology delivers the ability to turn jobs around at unparalleled speed, without sacrificing quality.

Technology advancements at all points in book manufacturing are enabling digital printing to accommodate longer-run production historically dominated by offset printing and, in the process, promise a boom in the number of pages produced by digital printers.

Many publishers recognize that digital printing offers them a flexible solution to provide what they need, when they need it, where they need it, and in the quantity required. Book printers are expanding their digital printing capabilities to include inkjet and are investing in the sales skills of their staff to better serve the needs of publishers.

Production inkjet web printing is capturing book printers' attention as many of the latest press models boast the ability to print sheetfed quality on off-the-shelf offset paper, without any special coatings or pretreatments. Meanwhile, more equipment vendors are rolling out sheetfed production inkjet devices with increasingly large format sheet sizes and inline finishing solutions allowing for "white paper in, finished product out" capabilities.

Book printers are responding to the improvements in inkjet and implementing the technology to better serve customers with improved productivity, automation, and profitability.



WHO WE ARE



The Book Manufacturers' Institute is a not-for profit trade organization that supports book manufacturing leaders in their work to drive the promotion, efficiency, and growth of book markets for readers and educators in North America.

Since 1933, BMI has provided tremendous value to its member companies and others associated with the book manufacturing industry. BMI member companies range from full-service book manufacturers to those specializing in the digital print market, specialty binderies, component printers, packagers, equipment manufacturers, and suppliers of a variety of materials and services.



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.

