



**Winning the Analog  
to Digital Transition  
with a Powerful DFE**



# Winning the Analog to Digital Transition **with a Powerful DFE**

Packaging printers and converters transitioning from analog to digital production must maintain control and oversight of the key processes essential to their success. As package printers continue to adopt digital printing processes, software is becoming an essential differentiating factor. With important process steps including prepress and RIP, color management, quality control, imposition, and ink management all essential in a digital packaging workflow, investing in tools that can assist in these areas is an important consideration for printers.

In this report, the latest data from NAPCO Research (a division of NAPCO Media and PRINTING United Alliance) will highlight the main drivers behind the analog to digital transition occurring in the packaging market, and why a digital front end (DFE) is a vital component enabling business transformation for printers and converters.

All digital print equipment requires a digital front end-based Raster Image Processor (RIP) to process files for printing. With 30 years of digital to analog transition in the graphic arts industry, DFE technology now manages everything from file preparation, color management, and workflow automation to integration with inspection systems, finishing equipment, business systems, and more. Today's DFEs not only drive digital printers – they're also essential for helping printers achieve higher operational efficiency, output quality, and automation.

At AutoMate Label Solutions, investing in a Fiery DFE has helped achieve consistent color on the label jobs it produces on its hybrid press.

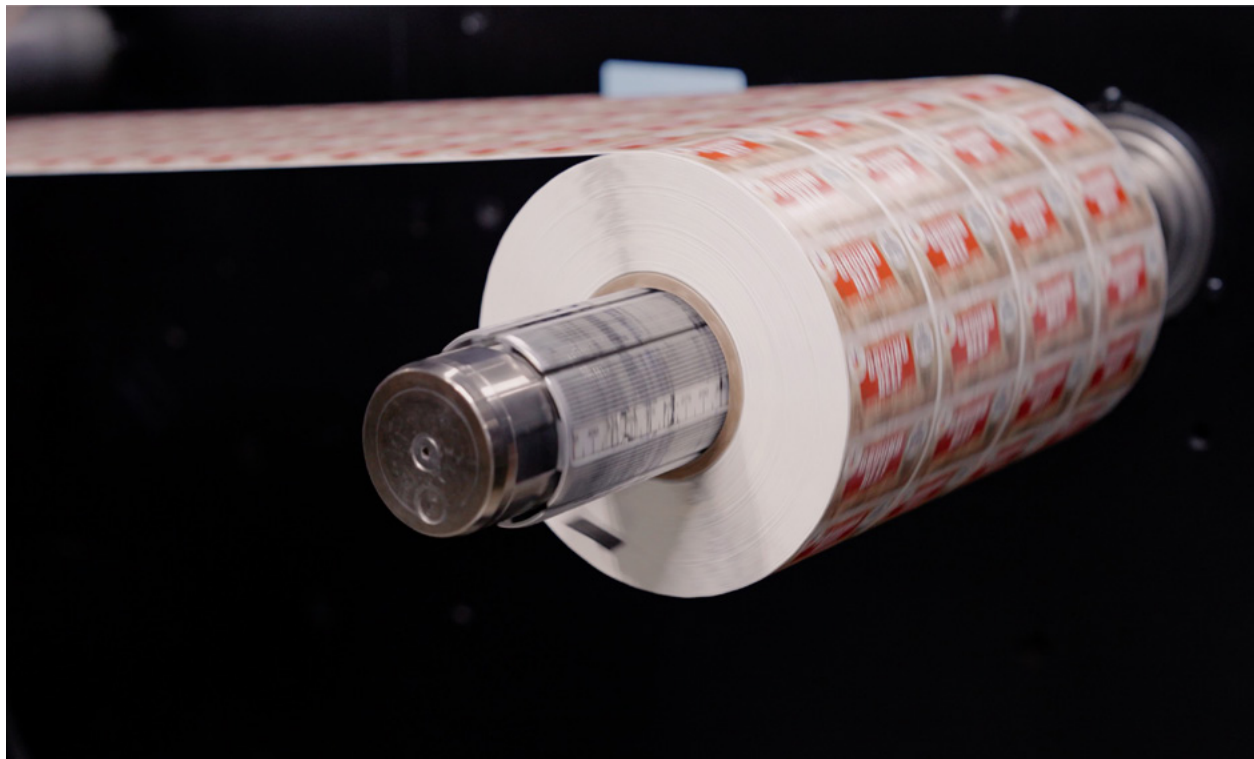


IMAGE COURTESY OF FIERY.

# ANALYZING PACKAGING'S DIGITIZATION AND DRIVERS

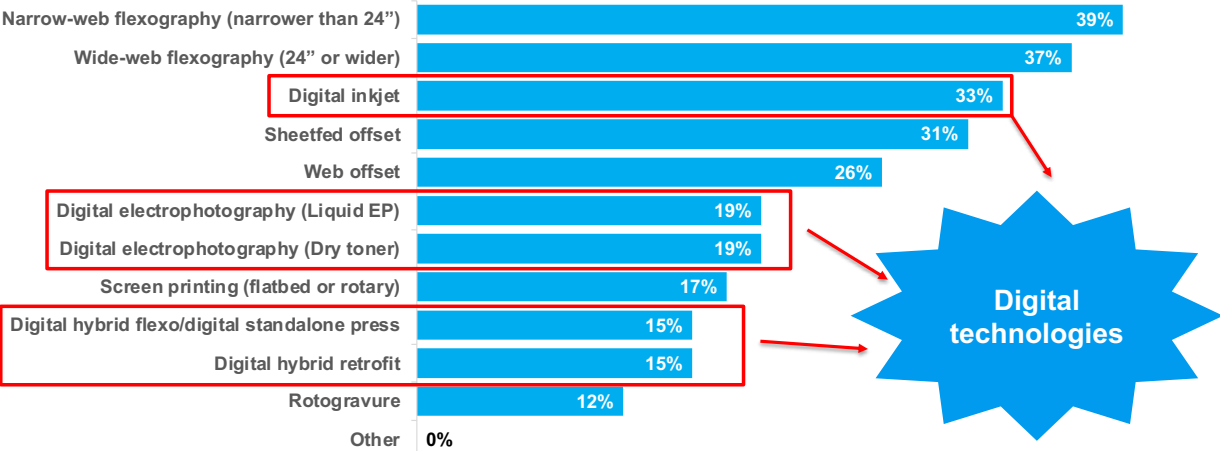
When digital printing and production technologies were first introduced, their impact was largely limited to commercial printing segments. In the label and packaging realm, the benefits of these technologies were not immediately as applicable, as these segments largely relied on long-run, high-volume production, which is better suited to conventional technologies such as flexographic and offset printing.

However, a gradual shift has occurred. Brand owners, driven by a variety of changes in consumer behavior and retailer priorities, began exploring ways to expand their product lines, reduce their packaging volume, and make more personal connections to the people buying their products. As these trends expanded through the packaging value chain, the rise of digital printing and production platforms arrived at just the right time to help satisfy these changing needs.

While adoption rates vary across different packaging segments, it is evident that printers and converters view digital printing as an important component of their businesses' futures. For example, according to NAPCO Research's 2023 report *Digital Packaging: Opportunities to Thrive*, digital adoption was reported by many package printer survey respondents. Specifically, 33% are utilizing inkjet in label and packaging production (Figure 1), while liquid electrophotography and dry toner electrophotography were utilized by 19% of respondents each. Additionally, hybrid solutions that implement conventional and digital printing technologies have garnered attention, with 15% of respondents having implemented a standalone hybrid digital and flexographic press, and 15% stating they have implemented a digital hybrid retrofit unit onto a conventional press.

**Figure 1: Print Technologies Used by Package Printers**

**Q. Which of the following printing technologies does your company use in house to print labels and/or packaging? Select all that apply?**



n = 104 Package printers  
Source: NAPCO Research, 2023, *Digital Packaging: Opportunities to Thrive*



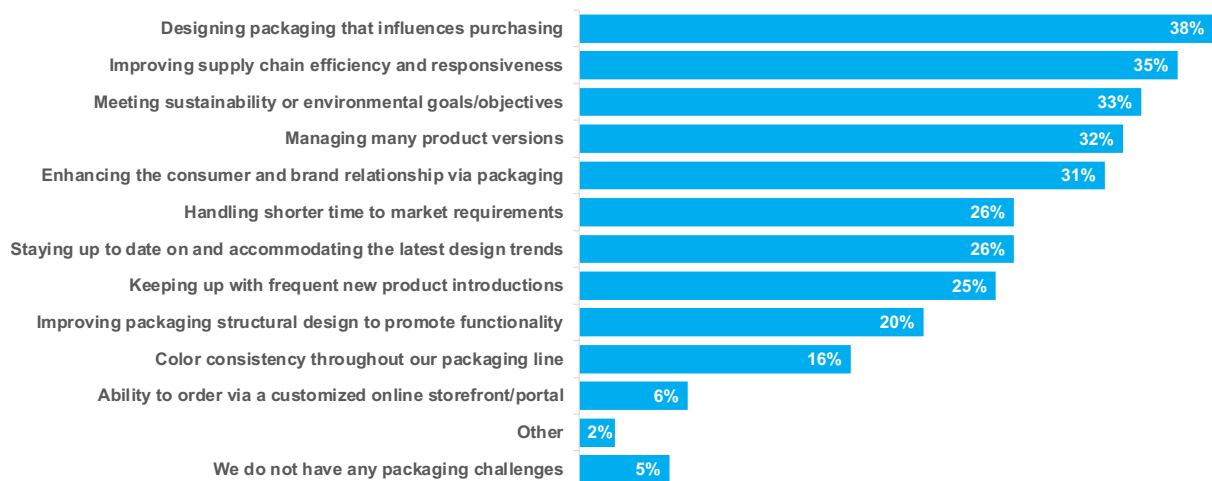
Though digital package printing output still trails conventional processes such as flexography, those that have adopted it have benefited from its strength as a complementary technology, best suited for its distinct advantages, and freeing up conventional technologies to operate in the long-run, high-volume areas where they perform best.

But the heart of this rapid growth in digital is that its value proposition aligns with brand owners' top packaging priorities. In *Digital Packaging: Opportunities to Thrive*, brand owners were also surveyed to gain an understanding of their challenges, priorities, and perspectives on digital printing.

When asked to indicate their top five packaging challenges, brand owners highlighted several issues that can be addressed by digital printing. For example, the top packaging challenge that brand owners report (Figure 2) is designing packaging that influences purchasing (38%), a challenge that digital printing can assist with, given its ability to accommodate versioning, personalization, and limited-edition packages that catch consumers' eyes. Meanwhile, efficiency challenges were also reported, including improving supply chain efficiency and responsiveness (35%), managing many product versions (32%), and handling shorter time to market requirements (26%). These challenges, much like those related to attracting consumers and assisting sales, can be met via digital's quick turnarounds, fast makereadies, and ability to cost-effectively produce short runs.

## Figure 2: Brand Owners' Top Packaging Challenges

Q. What are your company's top packaging challenges? Select up to 5



n = 93 Brand owners

Source: NAPCO Research, 2023, *Digital Packaging: Opportunities to Thrive*



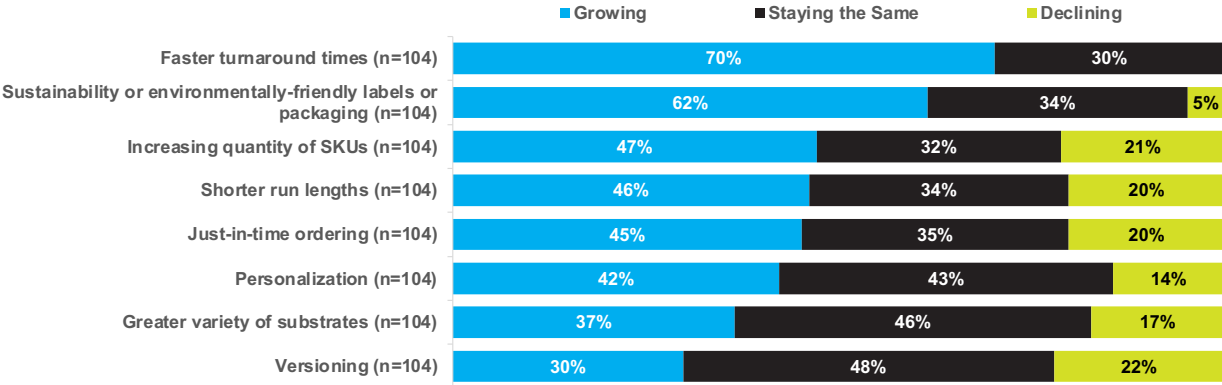
# THE DFE: A CORE DIGITAL PRINT ENABLER

While digital and conventional printing processes are poised to remain complementary technologies across the package printing segments, printers and converters are expected to continue their adoption of digital printing to satisfy their customers' evolving needs. In surveying package printers for the *Digital Packaging: Opportunities to Thrive* study, respondents reported increased demand from customers for many of the top advantages digital provides. For example, 70% of respondents indicated that demand for faster turnaround times was increasing, 62% stated demand for sustainability or environmentally friendly packaging was on the rise, and increases in SKU quantities, shorter runs, just-in-time ordering, and personalization were all cited by more than 40% of respondents. (Figure 3).

Another challenge converters face when transitioning to digital is the ability to maintain high press productivity standards when faced with the exponential increase in file volume, quantity, and size, as a result of introducing shorter runs and personalized prints. For example, Fiery Impress, a software-based DFE designed for industrial inkjet printing, which earned the 2024 PRINTING United Alliance Pinnacle Award in the RIP Software category, includes Fiery's Intelligent HyperRIP™ technology that optimizes job processing to either process multiple short jobs simultaneously, or split a larger job into multiple parts. Intelligent HyperRIP maximizes press performance and uptime in a streaming workflow by continuously feeding jobs directly to a press's printhead electronics, which reduces downtime spent waiting for files to process.

**Figure 3: Brand Demands Align with Digital's Advantages**

**Q. What are your company's top packaging challenges? Select up to 5**



n = 104 Package printers  
 Source: NAPCO Research, 2023, *Digital Packaging: Opportunities to Thrive*



As brand owners continue to push package printers with demands that correlate to digital printing, the installation of a DFE is important in meeting the challenges that can emerge when transitioning from analog to digital technology. These challenges, which span color management, print quality, workflow optimization, and finishing integration — though daunting — can be eased with the implementation of a digital front end.

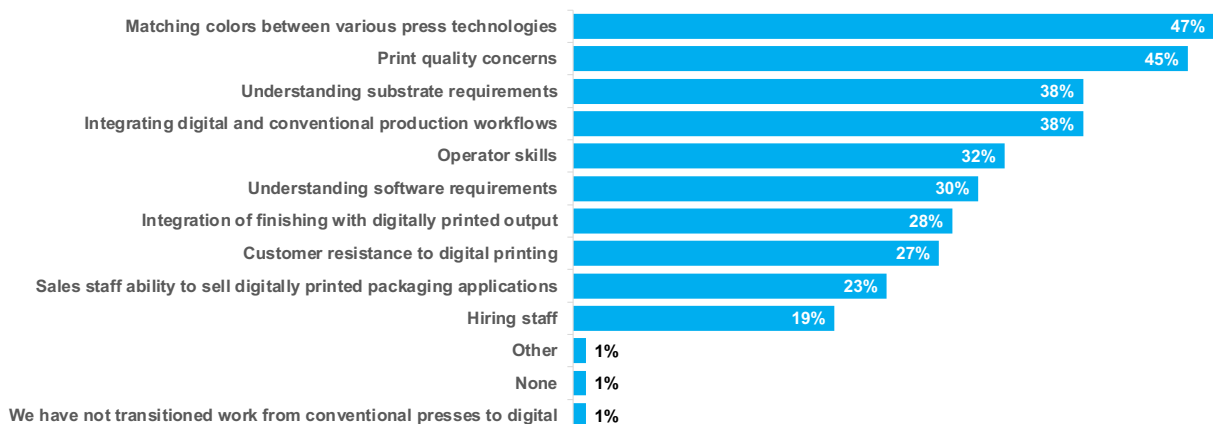
For example, at AutoMate Label Solutions, a label printer with locations in Burlington, North Carolina; Houston, Texas; and Minden, Nevada, the implementation of a Fiery Impress DFE has helped the company in its transition to a hybrid workflow. Having previously been entirely flexo, AutoMate incorporated digital printing with the addition of a Colordyne 3800 UV inkjet engine, which it mounted to a 17” Mark Andy P5 flexo press. In addition to helping the company mitigate the challenges of transitioning to digital despite not having any prior experience with the technology, Plant Manager Mike Coplin says Fiery Impress has also helped AutoMate save time and reduce waste.

“You don’t have to set up individual print stations,” he says. “Your file is loaded up in the Fiery and we RIP it, we print it, and we’ve got complete and total registration and we’re on color instantly. We don’t have the initial setup of running hundreds of feet of material through the machine before we have everything in register and be able to check colors on the backend.”

In *Digital Packaging: Opportunities to Thrive*, nearly all respondents (99%) reported transitioning at least some of their work from conventional platforms to digital. This demonstrates that this transition is moving forward across the industry, but is leading to some difficulties among printers and converters. (Figure 4).

## Figure 4: Converter Challenges in Transitioning Work to Digital

**Q. What are the top obstacles, if any, your organization experienced in transitioning label and packaging work from conventional presses to digital printing devices? Select all that apply**



n = 104 Package printers

Source: NAPCO Research, 2023, *Digital Packaging: Opportunities to Thrive*

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**Matching colors between various press technologies:** Color matching was the top challenge reported by survey respondents (47%) and is an essential component of packaging. Brand colors are inextricably correlated to a brand's identity, and when it comes to packaging, there is little room for error. When making the transition from analog to digital, ensuring that there is no color shift in a customer's packaging is made easier with a digital front end.

For example, Fiery Impress provides tools like Fiery Color Profiler Suite, Fiery Spot Pro and Fiery ImageViewer that help users easily meet industry standards and customize colors to meet brand owner specifications, while simultaneously reducing waste and errors. Operators can:

- Edit and optimize spot colors to meet brand specifications
- View raster previews, adjust image alignment on a sheet, make late-stage color adjustments, and generate color-accurate soft proofs
- Integrated preflight and file inspection tools
- Integrated tools for profile creation, management, optimization, and verification, color matching across multiple presses, and calibration to standards such as G7.

All these features reside in the familiar Fiery Command WorkStation job management interface, guaranteeing ease of use and maximum efficiency with a streamlined workflow.

In some cases, users want to integrate a new digital or hybrid press into an existing analog workflow while maintaining unified color management. Esko and Fiery's partnership simplifies this integration with a co-developed, customer-customizable color workflow. Fiery Impress seamlessly fits into an Esko prepress and color workflow, unifying color management across all print technologies in a plant.

**Delivering Better Ink Drop Control and Screening:** Just behind color matching, print quality concerns are a top obstacle among package printers making the analog to digital transition (45%). In the early days of digital printing in packaging, its output quality was not as strong as conventional technologies such as flexography or offset. However, as advancements have been made in digital, whether electrophotography or inkjet, print quality now matches, and in some cases even exceeds, conventional. While digital press advancements have helped package printers make strong leaps in output quality, DFEs are a key component in this area as well. Fiery Impress, for example, provides advanced screening technology and missing nozzle and density compensation that ensures printers and their customers that they are getting the most out of their inkjet presses.

"We do a lot of protein labels for the meat packaging industry and these labels have a short shelf life," Coplin says. "But when you walk into the grocery store and you see the meat you usually buy, [brands] want it to look the same across the board. In the actual image areas of those labels, digital looks head and shoulders above what we could do flexo, with smaller dots and crisper, clearer images."



### Streamlining Hybrid Workflow Integration:

Among the top challenges that package printers report in the analog to digital transition is how to best integrate both conventional and digital print workflows in a hybrid environment (38%). Because digital and conventional printing are best viewed as complementary technologies, most printers and converters making the digital transition will have both technologies on their shop floor. This can mean different workflows necessitating different prepress, production, and finishing processes. Or, in the case of the Esko and Fiery partnership, printers and converters can maintain a unified prepress and color workflow across all their print technologies.

With a DFE, package printers can simplify and streamline their digital workflow and can also best manage their hybrid assets, including flexo presses modified with an inkjet retrofit unit. Leveraging the best of both worlds in conventional and digital printing can be highly beneficial in serving all of a brand's various needs, and with an industrial-level DFE like Fiery Impress at the helm, managing a hybrid environment becomes much simpler.

## COLOR CONSISTENCY AND PRINT QUALITY: NON-NEGOTIABLES IN PACKAGING

Print quality, color consistency, and overall visual appeal are, of course, desirable in every segment of print. But in labels and packaging, the importance of print quality and color is paramount, as these print applications serve as the primary vehicles of communication between a brand and consumers. With so much competition on shelf, and so little time to catch consumers' attention, brands whose packaging quality does not stack up to the competition are likely to be eschewed by consumers in favor of products in packaging that is more aesthetically pleasing.

## Opportunities Abound Across Packaging Segments

As digital printing and production technologies proliferate across the industry, it is important to understand that the various packaging segments are at different stages of adoption and development.

### Labels: The Digital Packaging Leader

- The label segment has experienced the highest output percentage via digital printing.
- Per NAPCO Research's 2022 report Trends and Expectations in Label Printing and Production:
  - 30% of respondents have invested in inkjet
  - 26% invested in liquid EP
  - 22% invested in dry toner

### Folding Cartons: An Early Digital Adopter and Convergence Target

- Along with labels, the folding carton segment was one of the first packaging industries to adopt digital.
- The sheetfed production process is familiar to commercial printers, which presents convergence opportunities.
- Existing sheetfed digital equipment can often accommodate cartonboard.
- Per NAPCO Research's 2021 report Convergence in Print: A Shift to the New Normal, 37% of commercial printers surveyed had added folding carton production or were considering it.

### Flexible Packaging: An Emerging Digital Opportunity

- Flexible packaging is a fast-growing segment but is in its early stages of digital production technology adoption.
- Wide-web flexography and sophisticated finishing processes have made convergence into flexible packaging a challenge, but digital solutions are emerging and lowering entry barriers.
- Liquid EP is the primary digital technology utilized in flexible packaging printing, but both dry toner and inkjet solutions have emerged.

### Corrugated: Increased Opportunities with the Rise of E-Commerce

- Primarily driven by the rise of e-commerce, full-color corrugated packaging is becoming intriguing to brand owners.
- Full-color inkjet solutions spanning both preprint and postprint corrugated have hit the market.
- Digital printing in combination with consumer data derived via e-commerce channels opens the door to personalized and customized corrugated packaging, enhancing the brand and consumer relationship.



On the color consistency side, brand colors are strongly correlated to that brand's identity and consumers' ability to immediately recognize it on shelf. If a brand's color appears to be off on a label or package, a consumer may think that the product could be compromised, or if the print quality is substandard, consumers could correlate it to the brand's overall approach to its business. Brand owners surveyed in *Digital Packaging: Opportunities to Thrive* expressed the importance of packaging as part of their marketing mix, with 97% stating that they agree packaging is a key marketing tool for their company. (40% stated they strongly agreed with the statement.) With packaging such a priority for brand owners, printers and converters should not leave color and quality up to chance.

In addition to the color management advantages that a DFE provides, quality control capabilities inherent in tools such as Fiery Impress help to ensure brand owners' satisfaction. A patent-pending spot color checkup provides a report of how well spot colors can be produced at any given time on a specific press. With Fiery ColorGuard, users can convert the spot color checkup into a verification schedule to ensure spot colors are always printing to brand owner standards.

It's also important to select a DFE that includes missing nozzle and density compensation capabilities, like Fiery Impress. When paired with an inspection system, Fiery Impress can optimize the use of the printheads to detect and eliminate print defects.

"I can tell you that there's a couple of programs that we've converted over to running digital that we ran flexo for years," Coplin says. "You can see the print quality is better. The dots are smaller, and everything is crisper and cleaner. The colors are more consistent. You can see an overall quality difference from what we used to do that we converted over ... The most important thing for the customer is color consistency."

## CONCLUSION

As digital printing's speed and quality improvements have enabled brand owners to achieve faster turnarounds, shorter runs, and increased versions, the analog to digital transition will continue to spread throughout the packaging industry. Though the transition is necessary for success, as with the implementation of any new technology, package printers can expect to face some challenges in adoption.

However, with the implementation of innovative digital front end technologies like those from Fiery, who has been driving the analog to digital transformation for more than 30 years, adopting digital technologies in print can be quicker, easier, and deliver business benefits fast. With a powerful DFE, printers can decrease makeready times, ensure consistent color, maximize quality, and manage hybrid workflows, allowing them to maximize the best attributes of both conventional and digital printing.

With brand owners catching on to the advantages that digital printing can bring to their labels and packaging, printers and converters that lag in adopting the technology will be left behind. Investment in the right tools to maximize the analog to digital transition is imperative and should include a cutting-edge digital front end that can manage the modern packaging workflow.

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# WHO WE ARE

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Fiery, LLC is the leading provider of digital front ends (DFEs) and workflow solutions for the growing industrial and graphic arts print industries. With a customer base that includes over 2 million DFEs sold globally, the company offers innovative software and cloud-based technologies that deliver fast performance, stunning color, and exceptional print quality across a broad range of production printing devices.

Fiery DFEs are installed in a diverse range of industry segments, including commercial print, packaging, signs and display graphics, ceramics, building materials, textiles and other specialty applications. With over 30 years of excellent support and service, Fiery has built an unmatched community of customers, dealers, and partners.

For more information, visit <https://www.fiery.com>

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# WHO WE ARE

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## **NAPCO**RESEARCH

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.

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- Product features and functionality
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