**Lowering Entry Barriers
in Digital Printing for Packaging**
Revolutionizing Food Packaging with Inkjet

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Lowering Entry Barriers in Digital Printing for Packaging

Revolutionizing Food Packaging with Inkjet

Food and beverage producers are among the largest users of labels and packaging. By most estimates, food products account for half of consumer packaging. Market demand for digital printing is growing as brand owners seek to meet customer demands for more variety, expanded product information, and re-imagined containers aligned with changing lifestyles.

Digital printing appeals to brand owners because it lets them expand product package variety to appeal to more consumers while they reduce time to market, lower their costs, and slash material waste. Printing labels and packaging on digital presses offers brand owners of food products new options for enhancing the effectiveness of their product labels, corrugated packaging, folding cartons, and flexible packaging.

Advances in inkjet printing technology, inks, and substrates are increasing print speeds, enhancing image quality, expanding substrate options, and lowering entry barriers for companies looking to offer packaging products to food and beverage producers. These ongoing inkjet advances potentially unlock new product opportunities, spark wider use of inkjet, and revolutionize brand owners' options for labels and packaging.

Table of Contents:

RESEARCH FINDS INKJET IS REDUCING BARRIERS TO PACKAGE PRINTING

In an effort to document current market and technology trends that are reducing entry barriers to digital printing of packaging, NAPCO Research (a unit of NAPCO Media LLC, the parent company of *Printing Impressions, Packaging Impressions,* and *In-Plant Impressions*) conducted survey research that captured close to 300 responses from organizations that print labels and packaging. Of these, 166 serve the food and beverage market, the focus of this research report. The research study on inkjet printing's influence on the food packaging market is part of a three-part report series sponsored by Memjet.

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Survey Respondent Profiles

Of the 166 survey participants that serve the food and beverage market, 50% described their primary business as a commercial printer, 24% a package printer or converter, 5% an in-plant print shop, and 21% a digital printing specialist (Figure 1). Survey respondents' companies varied in size and fall into four main groups as follows:

1. 29% reporting 9 or fewer employees

2. 16% having 10 to 19 employees

3. 35% employing 20 to 99 employees

4. 20% with more than 100 employees

Figure 1: Survey Respondent Profiles

Primary Business

Digital printing specialist
21%

In-Plant print shop
5%

Commercial printer
50%

Package printer and/or converter
24%
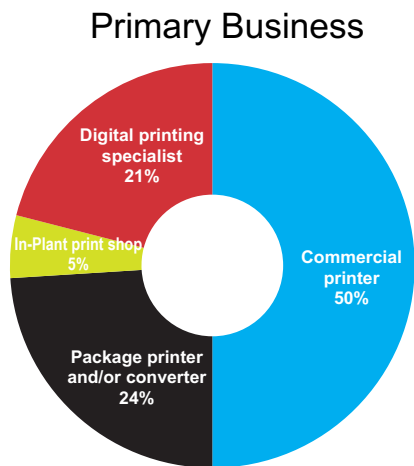
Q. Which category best describes your company's PRIMARY business
n= 166 Package printers/converters that serve the food and beverage market

Number of Employees

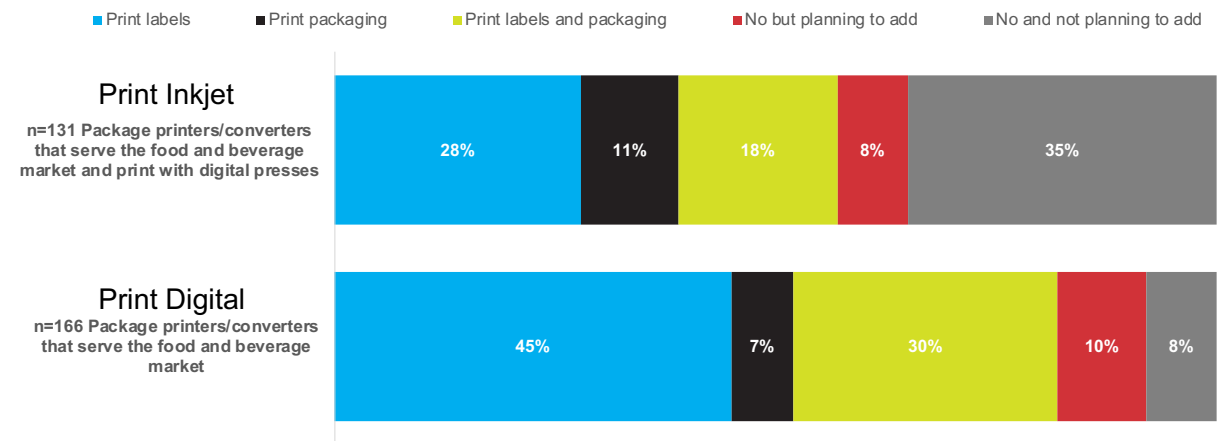|	
100 or more	20%
20 to 99	35%
10 to 19	16%
1 to 9	29%
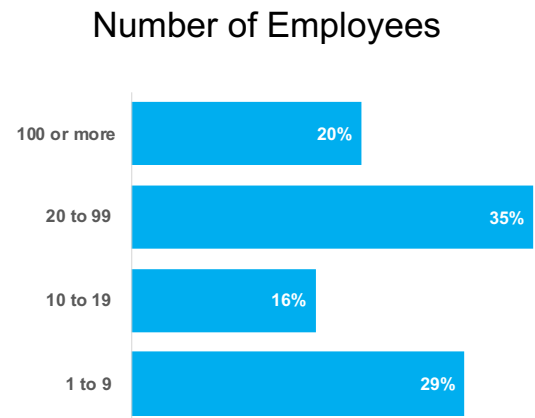
Q. How many employees work at your company or in-plant?
n=166 Package printers/converters that serve the food and beverage market

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These 166 respondents serving the food and beverage market were asked if they printed labels and/or packaging on digital printing devices, and more specifically on inkjet presses. Over half of respondents reported printing labels and/or packaging on digital presses, and 10% were planning to add it in the next 12 to 24 months (Figure 2). Of those respondents that printed labels and packaging on digital presses, over half printed them on inkjet presses (57%), with 46% printing labels and 28% printing packaging. In addition, 8% planned to add inkjet in the next 12 to 24 months for printing labels and/or packaging.

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Figure 2: Printing Labels and Packaging on Digital Presses

Legend: ■ Print labels ■ Print packaging ■ Print labels and packaging ■ No but planning to add ■ No and not planning to add

Print Inkjet
n=131 Package printers/converters that serve the food and beverage market and print with digital presses

| 28% | 11% | 18% | 8% | 35% |

Print Digital
n=166 Package printers/converters that serve the food and beverage market

| 45% | 7% | 30% | 10% | 8% |

Q. Do you print labels and/or packaging products on digital printing devices?
Q. Do you print labels and/or packaging applications on digital inkjet presses (presses used for printing graphics and text, not just non-graphical elements)?

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FOOD & BEVERAGE PACKAGING EXPANDED USE OF DIGITAL PRINTING

In the food and beverage market, labels and packaging can be as important as the product itself. Packaging must protect, contain, and market the product, while complying with rigorous health, safety, and sustainability regulations. According to NAPCO Research's 2019 study *Digital Packaging Printing: The Time is Now!*, 73% of food and beverage brand owners surveyed report that packaging is a key marketing tool for their product, and 70% prefer to work with printers/converters that offer digital printing.

Brand owners participating in that previous NAPCO Research study report that shelf competition, lifestyle shifts, regulations, and product safety are key packaging influencers that play directly to digital printing's strengths. Digital printing's ability to produce versioned food and beverage packaging and labels more effectively than conventional printing lets brand owners offer more compelling versions that stand out on crowded retail shelves. Variable-data printing of expiration dates, barcodes, and batch numbers also enable food producers to track products and offer buyers essential information on product freshness.

A critical consideration for product safety in the food and beverage market is making sure substances that can harm consumers do not migrate from the packaging into the food product. Packaging that touches the actual food product must be food safe and adhere to U.S. Food and Drug Administration (FDA) regulations. (Click here for a more detailed explanation of ink migration and food contact materials safety in a recent Memjet report.) Serving this market requires understanding key regulations from the FDA regarding food labeling and packaging, including its Good Manufacturing Practice (GMP) standards for product safety.
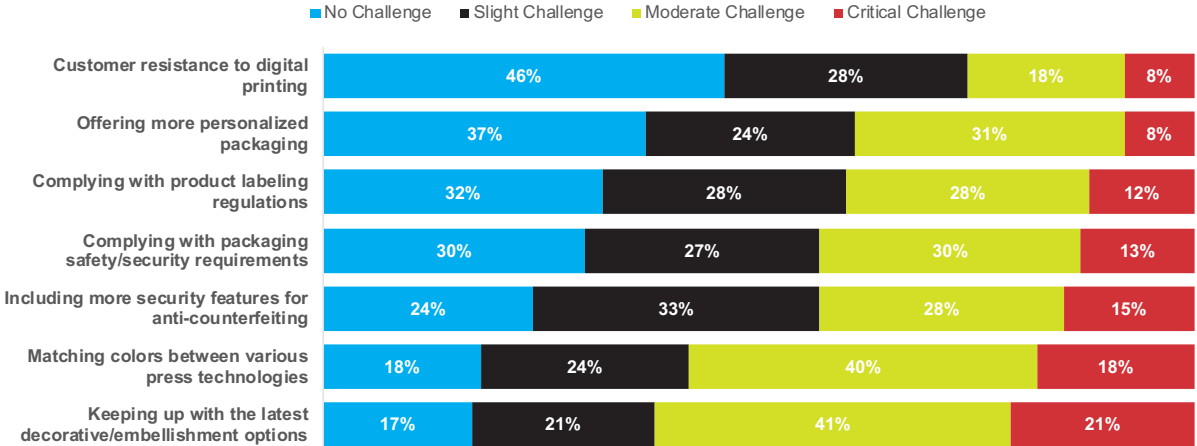
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As print providers and food manufacturers strive to ensure the safety of food labels and packaging, demand is growing for water-based, low-migration inkjet solutions that minimize the impact on food and human health. Aqueous-based pigment inks that offer high-quality output, durability on a wide range of substrates, and ingredients approved by regulatory bodies are making inroads into label printing, and are emerging in flexible packaging, folding cartons, and corrugated packaging as well.

Minimal Challenges in Meeting Needs of Food and Beverage Customers

Survey respondents serving the food and beverage market were asked to rank the level of challenge in meeting customers' various packaging objectives. The answers to this question reveal that food and beverage producers accept digital printing and are using it to produce more personalized and versioned packaging (Figure 3). Respondents also reported that complying with product labeling and packaging safety/security regulations presented minimal challenges, as over half ranked these objectives as presenting no or slight challenges. This finding does not mean regulations are not important, but rather that those serving the market are well versed in understanding and meeting them.

Areas where respondents serving food and beverage markets reported challenges were in matching colors between various press technologies and keeping up with the latest decorative/ embellishment options.

Figure 3: Digital Supports Providers in Overcoming Customer Challenges

■No Challenge ■Slight Challenge ■Moderate Challenge ■Critical Challenge

	No Challenge	Slight Challenge	Moderate Challenge	Critical Challenge
Customer resistance to digital printing	46%	28%	18%	8%
Offering more personalized packaging	37%	24%	31%	8%
Complying with product labeling regulations	32%	28%	28%	12%
Complying with packaging safety/security requirements	30%	27%	30%	13%
Including more security features for anti-counterfeiting	24%	33%	28%	15%
Matching colors between various press technologies	18%	24%	40%	18%
Keeping up with the latest decorative/embellishment options	17%	21%	41%	21%

Q. Please rank your level of challenge in meeting the following packaging objectives for your customers in the FOOD AND BEVERAGE industry.
n=131 Package printers/converters that serve the food and beverage market and print on digital presses

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Customer Demands Driving Use of Inkjet Printing

Consumer preferences and behaviors are key influencers in food and beverage producers' packaging decisions. Food and beverage packaging and labels serve many purposes including capturing consumer attention, containing the product, enhancing customer experiences, supporting lifestyle preferences, conveying essential product information, ensuring product safety, and offering a variety of product choices.
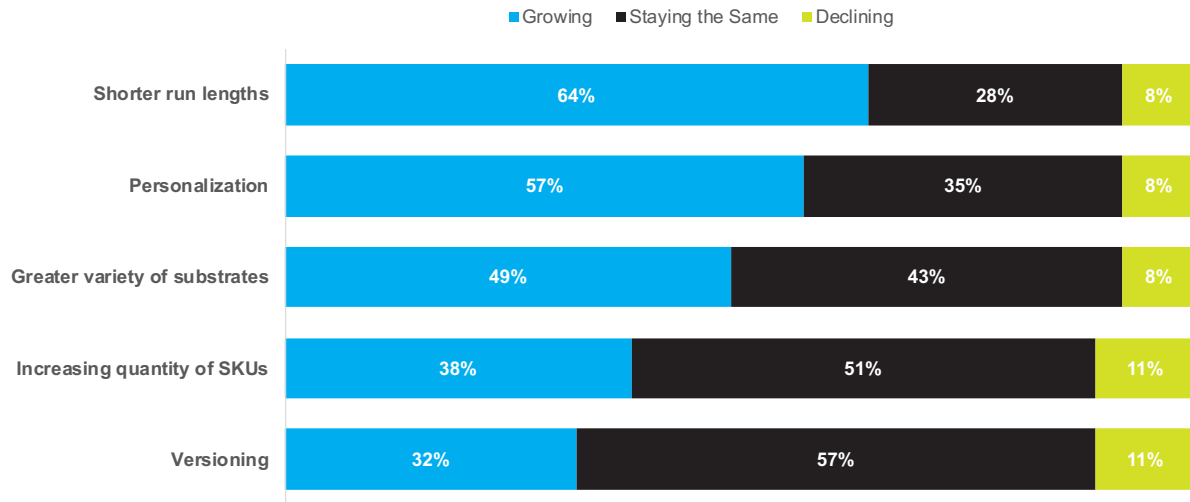
Survey respondents serving the food and beverage market that printed labels and/or packaging on digital presses were asked to rank the level of customer demand for various features and services. More than half of respondents indicate that demand for shorter runs and personalization is growing (Figure 4). Other key areas where demand is growing more than it is declining include substrate variety, increasing stock-keeping unit (SKU) quantities, versioning, printing on sustainable materials, security features, and smart packaging.

While inkjet supports all key brand owner requirements, one of its major benefits for food and beverage producers is product security. Protecting food and beverage products from counterfeiting is extremely important, as technology has made it possible to more easily duplicate product packaging. Another key area of brand protection is gray-market goods, where legal (i.e., non-counterfeit) products are sold outside the normal distribution channel. This is also referred to as product diversion, as products are sold in "unauthorized" places.

Food and beverage brand owners participating in a recent NAPCO survey report that including more authentication or security features for anti-counterfeiting in their packaging is an essential priority.

Inkjet printing can support brand owners in developing solutions to authenticate products. Inkjet presses' ability to print variable images and text is a key weapon in brand protection because brand owners' packaging can include a unique number, image, or code for tracking or authentication purposes. Likewise, inkjet can enable smart packaging features by printing unique barcodes that consumers can scan with smart mobile devices to access digital content on product safety, food sources, ingredients, product freshness, recipes, and other salient messaging.

Figure 4: High Demand Short Runs, Personalization, Substrate Variety

Legend: ■ Growing ■ Staying the Same ■ Declining

	Growing	Staying the Same	Declining
Shorter run lengths	64%	28%	8%
Personalization	57%	35%	8%
Greater variety of substrates	49%	43%	8%
Increasing quantity of SKUs	38%	51%	11%
Versioning	32%	57%	11%

Q. Please indicate if demand from your label and packaging customers for the following requirements is growing, staying the same, or declining. n=74 Package printers/converters that print with inkjet and serve the food and beverage market
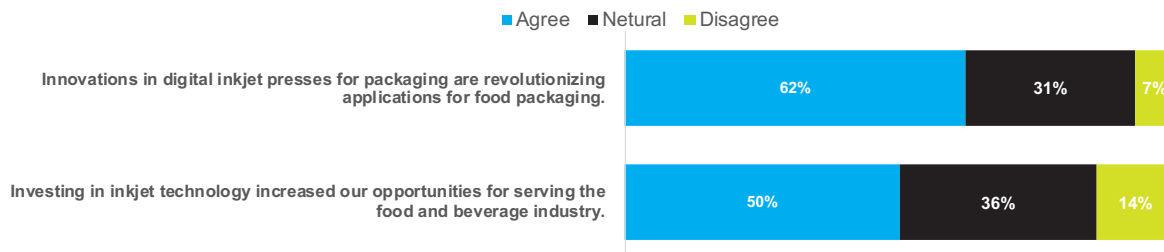
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Inkjet Enabling New Opportunities in Food Packaging

Ongoing advancements in inkjet printheads, inks, and substrates are enabling inkjet presses to produce fundamental food and beverage packaging applications including labels, folding cartons, corrugated, and flexible packaging.

Survey respondents serving the food and beverage market that print labels and packaging on inkjet devices report that investing in inkjet has increased sales opportunities, and close to two-thirds (62%) believe technology innovations are enabling new types of applications (Figure 5).

Figure 5: Inkjet Offering New Opportunities in Food Packaging

Legend: ■ Agree ■ Netural ■ Disagree

	Agree	Netural	Disagree
Innovations in digital inkjet presses for packaging are revolutionizing applications for food packaging.	62%	31%	7%
Investing in inkjet technology increased our opportunities for serving the food and beverage industry.	50%	36%	14%

Q. What is your level of agreement with following statements? n=58 Package printers/converters that print with inkjet and serve the food and beverage market

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However, when it comes to producing food packaging, particularly flexible packaging, flexography is still the most used printing method. Yet, digital printing is making inroads as brand owners look for more affordable ways to accommodate shorter runs, on-demand production, personalization, multiple versions, and fast turnarounds. All indictors point to the fact that inkjet is set to expand opportunities in the food and beverage market as its speed, simplicity, and production versatility make it an economical alternative that can meet a long list of essential brand owner demands.

Inkjet printing is a key technology that is reducing entry barriers to produce labels and packaging for food and beverage applications. The availability of more entry-level digital inkjet printing devices, including compact tabletop or desktop inkjet printers, lets more printers offer packaging to food and food beverage customers.

Because inkjet can print high-quality output on a wide variety of substrates from paperboard to foils to corrugated, it offers brand owners many options to make their food and beverage products stand out. It also permits them to explore new container formats.

Food and Beverage Labels First to Benefit

Labels was the first application to migrate to digital production and inkjet. Most inkjet printing of food and beverage labels is produced on narrow web presses that print high-quality, self-adhesive prime labels. High-performance narrow-web inkjet presses are becoming increasingly adopted by label converters. Some are hybrid lines, with flexographic print units and finishing equipment supplementing the inkjet components.

In addition, wide-format inkjet is used to print larger labels that don't fit on narrow-web presses, or to print metallic or fluorescent inks. A low-cost, wide-format printer can provide great flexibility to deliver small quantities of labels very quickly.

More Color Options for Folding Carton & Corrugated

Inkjet printing of corrugated board for food and beverage applications enables brand owners to add more colors and special effects to create decorative shelf-ready packaging and high-end boxes. Inkjet offers food and beverage producers more versioning options in creating corrugated displays holding individual products (e.g., snack foods, candy, beer, fruits, and vegetables).

Single-pass inkjet technology for corrugated offers food and beverage producers the ability to print high-quality graphics, in addition to the benefits of producing short runs and targeted versions in a cost-effective and time-sensitive manner.

Flexible Packaging Poised for Inkjet Growth

The next food and beverage packaging application where inkjet is poised to grow is flexible packaging. An early adopter of flexible packaging, the food and beverage market, continues to expand its use of the application. According to the Flexible Packaging Association, the food and beverage industries account for 59% of annual flexible packaging sales in the U.S. Pouches and shrink sleeve labels account for the majority of the flexible packaging applications produced.

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Most flexible packaging is produced via flexographic or gravure printing. Digital printing's share is small compared to analog's, but as viable digital platforms emerge it is beginning to grow. The launch of aqueous inkjet printing devices for flexible packaging may expand inkjet printing in food and packaging applications. While UV inkjet has taken a leadership role in digital printing of packaging in general, food and beverage producers have mixed perceptions of the safety of UV inks.
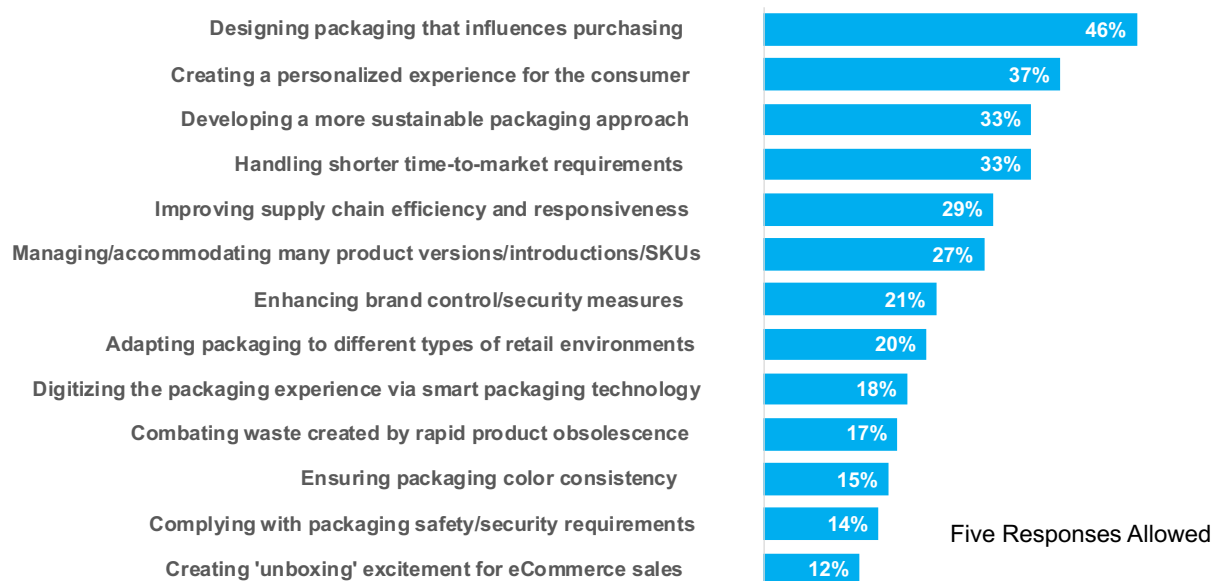
UV inkjet can be a feasible option for producing flexible packaging due to its quick drying capabilities; but safety is a larger concern for food and beverage producers, and even the advent of "low migration" UV inks may not be enough to overcome perceptions and objections.

While adoption of aqueous inkjet printing devices for flexible packaging is minuscule today, its use will likely continue to grow across flexible packaging production as recently or soon-to-be launched inkjet presses for packaging products are adopted.

INKJET SUPPORTS FOOD AND BEVERAGE BRANDS' DIVERSE REQUIREMENTS

On an ongoing basis, NAPCO Research surveys brand owners that buy or influence packaging to identify key trends, opportunities, and challenges. A recent survey of brand owners responsible for purchasing or influencing food and beverage packaging asked respondents to select their top five challenges. Almost half of survey respondents identify producing labels and packaging that influence purchasing as a key challenge, followed by creating personalized customer experiences, meeting short turnaround times, improving supply chain efficiency, and developing more sustainable packaging (Figure 6).

Figure 6: Food and Beverage Producers' Key Packaging Challenges

Challenge	Percentage
Designing packaging that influences purchasing	46%
Creating a personalized experience for the consumer	37%
Developing a more sustainable packaging approach	33%
Handling shorter time-to-market requirements	33%
Improving supply chain efficiency and responsiveness	29%
Managing/accommodating many product versions/introductions/SKUs	27%
Enhancing brand control/security measures	21%
Adapting packaging to different types of retail environments	20%
Digitizing the packaging experience via smart packaging technology	18%
Combating waste created by rapid product obsolescence	17%
Ensuring packaging color consistency	15%
Complying with packaging safety/security requirements	14%
Creating 'unboxing' excitement for eCommerce sales	12%

Five Responses Allowed

Q. What are your company's top 5 packaging challenges?
n=84 brand owners that purchase or influence food and beverage packaging
Source: NAPCO Research 2019

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In the same survey, food and beverage brand owners were asked to select their top packaging objectives. Producing compelling or visually attractive artwork (39%) and offering customers more customized or versioned options (47%) were the top responses.

Food and beverage brands are looking to improve and enhance the marketing power of their labels and packaging. Crowded product shelves are lined with a wide variety of product versions and sizes. Companies are looking for innovative and engaging packaging options to enable their products to stand out from the competition.
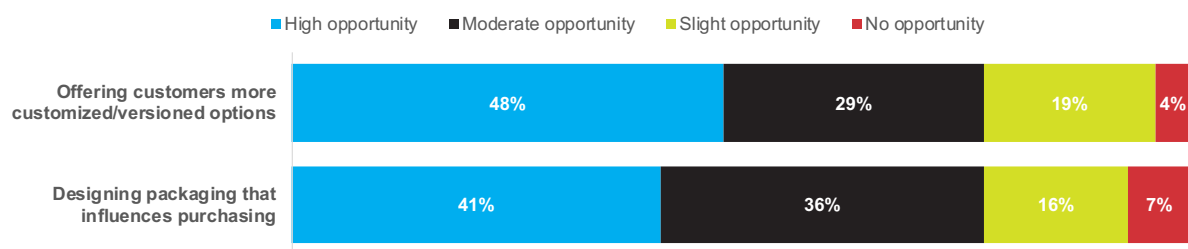
More Versions and Compelling Designs Create Shelf Appeal

New products and versions are the core of most companies' growth strategies, and the source of enormous investments in research, development, and advertising. A new product's success often depends on effective packaging. For established brands, many shoppers come to the shelf looking for a specific product. While the primary job of packaging is to contain, protect, and convey the product, another important role is to ensure recognition of a brand/product that people know and trust.

Long runs of identical packaging are becoming less popular as food and beverage producers increasingly target consumers' interest in and demand for variety. Consumers expect a wide-range of food and beverage options to meet their unique and individual tastes.

Inkjet printing is helping brand owners overcome many identified challenges. Survey respondents printing labels and/or packaging on inkjet devices are finding great opportunity in offering their customers more versions and packaging designs that influence purchases (Figure 7).

Figure 7: Customization, Versioning, and Capturing Attention: Key Benefits

■ High opportunity ■ Moderate opportunity ■ Slight opportunity ■ No opportunity

	High opportunity	Moderate opportunity	Slight opportunity	No opportunity
Offering customers more customized/versioned options	48%	29%	19%	4%
Designing packaging that influences purchasing	41%	36%	16%	7%

Q. Please rank the level of opportunity each of the following offer your organization in serving your customers in the FOOD and BEVERAGE industry. n=58 Package printers/converters that print with inkjet and serve the food and beverage market

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Faster Turnaround and Handling Increasing SKUs: The New Normal

More than half of survey respondents that serve the food and beverage market and print with inkjet presses identify meeting customer demands for faster turnaround and producing and managing many stock-keeping unit (SKU) versions as high/moderate opportunities (Figure 8).
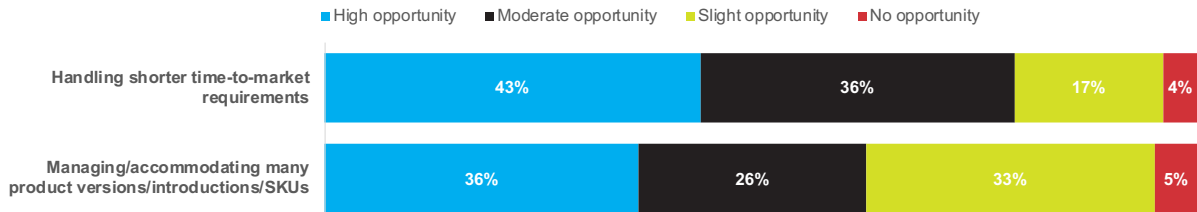
Product development cycles are shrinking, and food and beverage product producers have less time to get products to market. This challenge is intensified by the continual expansion of product versions or SKUs, which typically refer to the different packaging varieties of a product. For example, a tortilla chips snack with five different flavors would be considered as having five distinct SKUs.

According to the NAPCO Research study *Digital Packaging Printing: The Time is Now!*, close to three-quarters of food and beverage brand owner respondents (73%) report that the number of SKUs is growing. Survey respondents report the top reasons for increasing SKUs are keeping up with competitors (47%) and retailers demanding more package sizes (47%).

SKUs are growing as manufacturers expand their product offerings to accommodate shifting customer demographics, threats from competitors, different distribution channels (retail vs. wholesale vs. e-commerce) and retailers' demands for specific product versions for special and/or seasonal promotions. In addition, the shapes, forms, and types of products are changing in response to macro trends: for example, the increase in the number of single-person households that require products in smaller-sized portions.

As a result, product lifecycles have shortened dramatically, and there is huge pressure to handle an increasing number of short runs, SKUs, and quick turnarounds. Label and packaging printers must adapt to meet these evolving needs.

Figure 8: Shorter Lead Times and More SKUs Provide More Opportunity

Legend: ■ High opportunity ■ Moderate opportunity ■ Slight opportunity ■ No opportunity

	High opportunity	Moderate opportunity	Slight opportunity	No opportunity
Handling shorter time-to-market requirements	43%	36%	17%	4%
Managing/accommodating many product versions/introductions/SKUs	36%	26%	33%	5%

Q. Please rank the level of opportunity each of the following offer your organization in serving your customers in the FOOD and BEVERAGE industry. n=58 Package printers/converters that print with inkjet and serve the food and beverage market
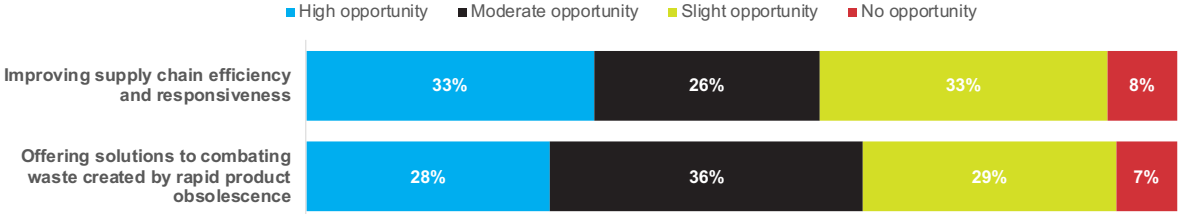
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Meeting Calls for Supply Chain Improvement

Improving supply chain efficiency and responsiveness is a constant challenge for food and beverage producers. Brand owners often view their packaging providers as delivering a supply chain, not a product. Brands want to know how digital printing will improve their supply chains, lower total costs, reduce inventory, and minimize product obsolescence.

Survey respondents that serve the food and beverage market and print labels and packaging on inkjet devices report that improving their customers' supply chain efficiency and responsiveness and offering solutions to combat product obsolescence presented solid opportunities (Figure 9).

Digital print production enables brand owners and print providers to make their manufacturing supply chains more cost-effective through short-run production and automated workflows capable of quick response to frequent product updates. Digital printing on demand also reduces inventories of labels and packaging that can become outdated.

Figure 9: Improving the Supply Chain and Reducing Obsolescence Waste

Legend: ■ High opportunity ■ Moderate opportunity ■ Slight opportunity ■ No opportunity

	High opportunity	Moderate opportunity	Slight opportunity	No opportunity
Improving supply chain efficiency and responsiveness	33%	26%	33%	8%
Offering solutions to combating waste created by rapid product obsolescence	28%	36%	29%	7%

Q. Please rank the level of opportunity each of the following offer your organization in serving your customers in the FOOD and BEVERAGE industry.
n=58 Package printers/converters that print with inkjet and serve the food and beverage market

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CONCLUSION

Food and beverage producers are major consumers of labels and packaging and critical influencers of demand for digital printing. Brand owners understand the benefits digital printing offers and want to use it to better serve customers, sell more products, and improve operational efficiency.

While most food and beverage labels and packaging are produced via conventional printing processes, digital inkjet printing offers much untapped potential to serve the market, and inkjet is poised to redefine application opportunities. Labels, corrugated packaging, folding cartons, and flexible packaging all stand to gain benefits from innovations in inkjet printing heads, inks, substrates, and finishing options.

Survey respondents that print labels and/or packaging on inkjet presses for food and beverage producers report meeting the markets' ever-changing consumer preferences, brand owners' ongoing operational challenges, and customer requirements for packaging that is both functional and formidable in attracting attention and compelling purchasing.

ABOUT THIS RESEARCH

Lowering Entry Barriers in Digital Printing for Packaging is a research study that explores the market tends, innovations, and forces that are reducing obstacles for organizations looking to either enter or expand offerings in label and packaging printing. Based on an in-depth survey of the readers of *Printing Impressions, In-plant Impressions,* and *Packaging Impressions,* the research is divided into the following three reports:

- Inkjet Primed for Mainstream

- Opportunities in Inkjet Label and Packaging Applications

- Revolutionizing Food Packaging with Inkjet

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WHO WE ARE

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

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Beautiful Precision, Simplicity, and Affordability.

Memjet is a global leader in the design and development of innovative thermal inkjet printhead technology, supporting modules, and aqueous inks. The modularity and technical components, combined with Memjet's commitment to customer success, empower OEM partners all over the world to develop fast, cost-effective printing solutions to grow and succeed in new markets. Together, we are building the future of print.

Memjet's range of digital technology powers the way we print today:
1. VersaPass® technology
2. DuraLink® technology
3. DuraFlex® technology

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