# Digital Printing for Packaging: Flexible Packaging

## How and Why Decisions are Made

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# Digital Printing for Packaging: Flexible Packaging How and Why Decisions are Made

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**Figures and Tables**

# Digital Printing for Packaging: Flexible Packaging How and Why Decisions are Made

## INTRODUCTION

The Specialty Graphic Imaging Association (SGIA) identified the purpose of this study as, "to get into the mind of the converter regarding digital investment." By understanding the converter's motivations for or against investing in digital, the industry can gain valuable insights for investment and strategy decisions. Understanding these questions drove the discussion points in qualitative interviews and questions in the quantitative surveys, and ultimately, brought the research team to its conclusions.

The report focuses on the decision-making and evaluation processes packagers go through to make their digital investments. What leads converters to invest? For many packagers, production needs were the main drivers of their decision to go digital, but customer influence is also important. What challenges are expected prior to the investment? The challenges are anticipated in getting sales teams up to speed, handling finishing and secondary processes, and training the production staff.

How could the packager prepare for the digital investment? The survey suggests that investing in software as well as finishing equipment, such as in-line coating, dedicated slitting and digital embellishment may smooth the process of digital adoption later on.

What are the benefits of investing in digital? Ability to run versioning, gaining new customers as well as new businesses from existing customers – those are just some of the benefits mentioned by our respondents.

## ACKNOWLEDGEMENTS

First, we would like to thank SGIA for commissioning this study, and for providing ongoing support in constructing and executing the research requirements for the report. Next, we would like to acknowledge and thank the Flexible Packaging Association (FPA) for their support and assistance in securing member participation for the quantitative interviews. Finally, we want to thank all the interview participants. Your time and willingness to help us better understand your business, the challenges you face and your approach to addressing those challenges is greatly appreciated.

## EXECUTIVE SUMMARY

The key findings from this study are stated below. It is the crowning effort of speaking and interacting with industry participants, and it is anxiously awaited by those who helped to bring it to text on paper.

The main reason for going digital is to streamline operations. Those who have yet to invest say they need a compelling business case and format size that fits their needs. Flexible packaging converters scored three size options highly – 23–30 inches, 31–42 inches and over 42 inches.

If you're not ready to invest, outsourcing digital may be the way to go. About two-thirds of participants who are planning to invest in digital say they're outsourcing it to gain customer support and digital understanding without having to invest early.

About three-quarters (71.4%) of participants who are planning to buy digital equipment expect to develop a new pricing model for the benefits of digital.

The most challenging issue early adopters experienced during ramp-up was getting their sales teams up to speed with digital. Finishing/secondary processes, as well as training/retraining production staff also scored highly. Order entry/handling quotations should also be taken into account.

What benefits does digital bring to the industry? Versioning, variable data jobs, efficiency and short turnaround times are some of the benefits expected from digital.

And there are still more questions: Which is more important – the kind of imaging technology used or how it works? Is digital imaging's quality where it needs to be? Most say yes, but how many are still forming an opinion? What are the lessons learned from other packaging segments? What is the customer's perception of digital?

## METHODOLOGY

### Qualitative and quantitative interviews

The critical objective of this research was to get in the mind of the converter on all facets related to digital investment: Why did they invest or not invest? How did converters go about their investigation? What worked or did not work during their investigation? How was the decision made? What critical assumptions did they have to make? How is their investment working? What issues did they face? What has changed in their internal and external management of customer, product and service post-investment?

For those that have not investigated – why? What drives the different approaches in the three groups:

- Investors
- Investigators
- Status quo

### Our approach

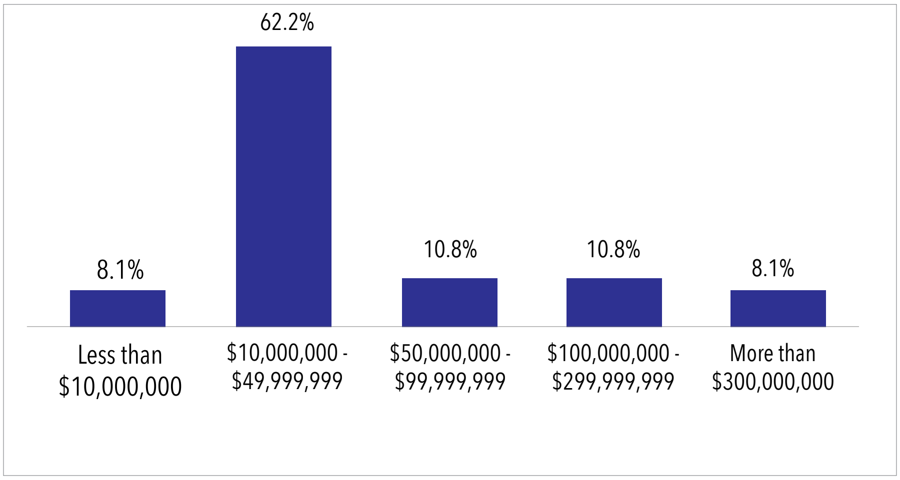
We conducted 14 qualitative phone interviews with senior management among various converter operations. Online quantitative questionnaires with 37 converters were conducted across a wide variety of topics. The topics, as well as the questions asked, were derived from responses gathered in the qualitative interviews.

As confidentiality is critical in this type of survey work, information gathered is shown in the aggregate form only. Likewise, where there is limited participation in certain topics, technologies or around specific business models, we will discuss these areas conceptually, but not specifically.

### Participants

There were 37 total respondents: 14 companies participated in in-depth telephone interviews, and 23 additional companies participated in the online survey. About two-thirds of the respondents (62.2%) have between $10 million and $50 million in annual sales, with an even mix of companies smaller and larger (Figure 1).

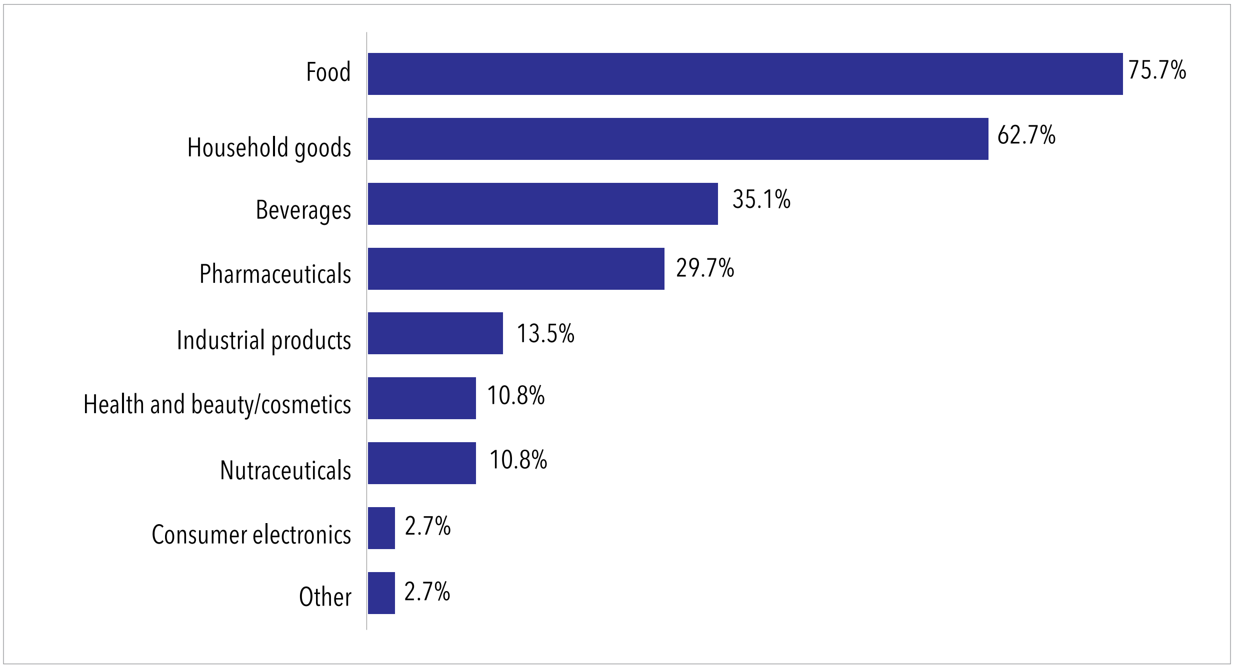
**Figure 1: Total annual sales revenue**




N=37

The majority of respondents serve "Food" (75.7%) and "Household Goods" (62.7%) markets, with "Beverages" (35.1%) and "Pharmaceuticals" (29.7%) being also popular among the respondents (Figure 2). It is also worth noting that some of those responding to the quantitative online survey came from the ranks of narrow web label producers that, in recent years, expanded their capabilities to include production of pouches and sleeves and are commonly used by larger flexible producers as suppliers of short-run flexible packaging. Some in this group have invested in digital for narrow web applications they are now using for flexible packaging.

**Figure 2: Markets served**

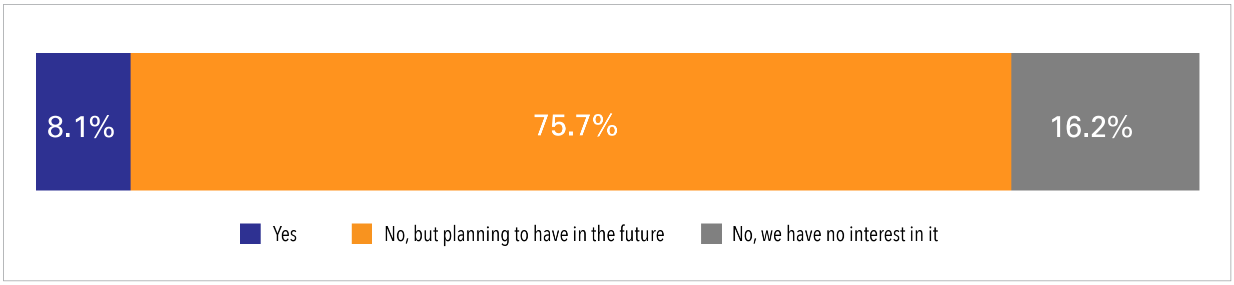



N=37

### Those with and without digital

Of the four main packaging sectors (labels, folding cartons, flexible and corrugated packaging) flexible packaging is the one digital printing has least penetrated. Only 8.1% of our respondents currently have digital solutions deployed, however 75.7% are planning to have it in the future (Figure 3). This report focuses on how early adopters of digital and companies looking to invest in the future view and evaluate digital solutions for flexible packaging.

**Figure 3: Do you have a single pass digital printing solution for flexible packaging?**




N=37

## MAIN FINDINGS

The research team originally planned on breaking this section into those with digital and those still looking at digital. When the data began coming in from the interviews and surveys, it became clear that the majority of flexible packagers are planning to invest in digital but haven't done it yet.

### What is the perceived value in being an early adopter?

Only 8.1% of the respondents have invested in the digital equipment. But what do we know about them? They serve food, household goods and nutraceuticals markets. Their main driver was to access the benefits of digital. The majority of them had a multifunctional team to evaluate the investment decision. However, all of them developed a new pricing model for digital. For the return on investment (ROI), the cost per impression and total cost of ownership (TCO) analysis were used. They had to invest in production software and dedicated slitting to make the digital adoption easier. Generally, those companies were happy with vendors' support in installation, training of production staff and planning. The main challenges that they had were in handling quotations and order entry, finishing and getting sales up to speed. This group was satisfied with production and quality. The main benefits of digital for them were the ability to run variable jobs and versioning, short turnaround, and getting new customers.

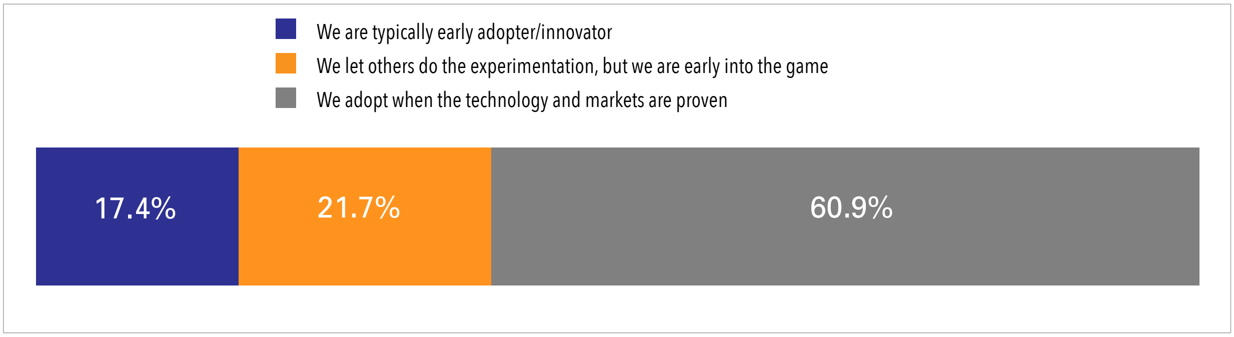
Those companies who have invested early in a single pass digital solution said, for the most part, they are happy they did so. Granted, it would be unexpected that someone investing so heavily would say they made a mistake, but in candid discussions with a number of early adopters, the research team feels for the most part they all would do it again – albeit with some changes to their execution plans.

There were two main themes identified by this group of visionaries. First, they felt getting an early start in the digital revolution has positioned them better for when more broad-ranging solutions come to their sector. Everyone interviewed sees their current investment as just the first in a future of digital investments. They expect the two-to-three year jump they have on the digital market to be a strategic advantage for their companies.

### How do flexible packagers see themselves?

When we asked survey respondents how they perceived themselves when it came to getting involved with new or disruptive technologies, 17.4% related to the characterization that they were "early adopters of innovations". About a quarter (21.7%) identified with the statement, "We let others do the experimentation, but we are early into the game." The largest group, almost two-thirds of respondents (60.9%), show a more pragmatic view by identifying themselves as those who "adopt when the technology and markets are proven" (Figure 4).

**Figure 4: Where are you on the innovation scale?**




N=23

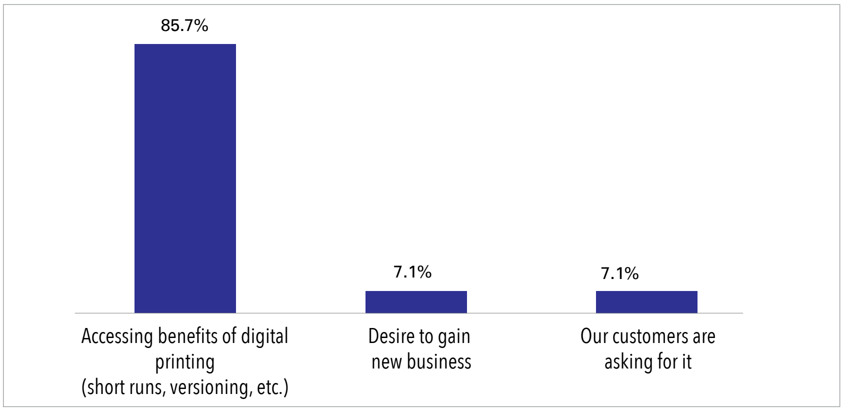
**Understand the decision-making process**

***What is the catalyst driving the evaluation?***

Companies that have already invested in digital were asked about their motivation for doing so. Their objective was accessing benefits of digital printing (short runs, versioning, etc.). As well, this group clearly had an objective to be recognized as an early adopter and innovator by their customers, with the driving force for being digital coming from the inside rather than the outside of the business. A majority of those planning to invest are also looking for production efficiency.

Flexible packaging producers do not feel themselves being pushed by their customers to get into digital yet. This is in contrast to the labels sector, where digital is a more mainstream production process and where customers are now looking more favorably upon digital and, in some cases specifying that a supplier have digital printing capabilities.

**Figure 5: Main driver for purchasing a digital press**




N=14

Again, a major reason for investing in digital was operational efficiencies. Respondents stated that short runs were becoming more troublesome in their facilities, customers were requiring less and less packaging be kept in inventory, and that they were in need of added capacity and wanted to go digital rather than invest in another analog press at that time. This group of early adopters clearly stated a key driver for investing early was that it would give them a leg up on competitors that waited to invest.

Those who didn't have digital equipment yet were similarly clear on why they would (soon) be in digital, stating they were looking at the production advantages digital can bring to their plants. While in the carton study there was a distinct lack of reference to one of the main reasons OEMs are touting digital, for those jobs that require personalization and one-to-one campaigns, the flexible packaging group showed more interest in being able to provide personalization. This is a topic that could warrant more study.

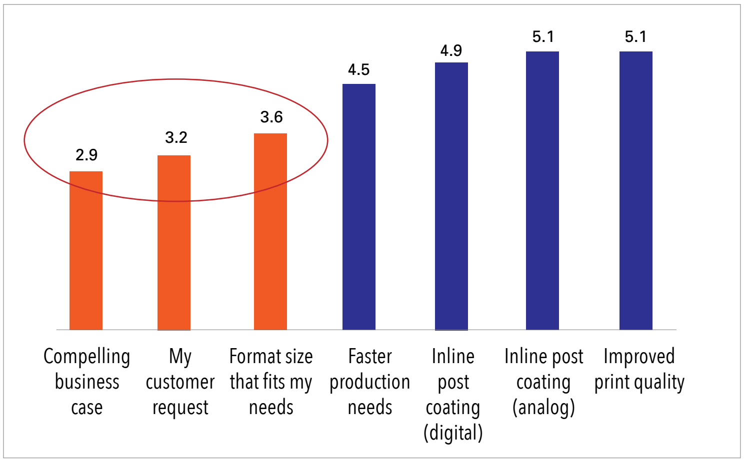
***What needs to be in place before you will invest?***

This question was asked of those still evaluating and yet to invest in digital to gain insight to what is keeping them from investing. We asked them to rank several issues thought to be keeping the next round of digital investors on the sidelines.

We assume that if an issue is ranked highly important that it is an issue that is, in the mind or the survey taker, not currently in place. For example, where a respondent has given a high ranking to the issue "my customer request," it implies that today's customer is not requesting, and they are waiting for that to happen. The three issues that are rated of highest importance to be in place before a company would invest go hand-in-hand. Compelling business case, customer request, and format size ranked by far the highest in importance (Figure 6). The easy side of this equation is the format size, which is addressed more in another section, but it is not off base to say that most of the flexible packaging industry is looking for a larger format digital solution. With everything else remaining the same, including print quality and production speed, a larger format size may be enough alone to compile a compelling business case for many.

On the flip side of this graph we can see that neither the print quality of the current batch of solutions nor current production speeds are an issue for respondents. This shows a maturing of thought and acceptance by converters in this field, and it indicates that in their minds the mark for quality has been reached successfully. The question of digital print quality was also asked to brand owners who have stated that digital print quality is no longer a major issue for them, it is an accepted reality (Appendix).

**Figure 6: What needs to be in place for you to invest in digital?**




N=14 (the lower the number, the higher the important of the factor)

***Outsourcing digital***

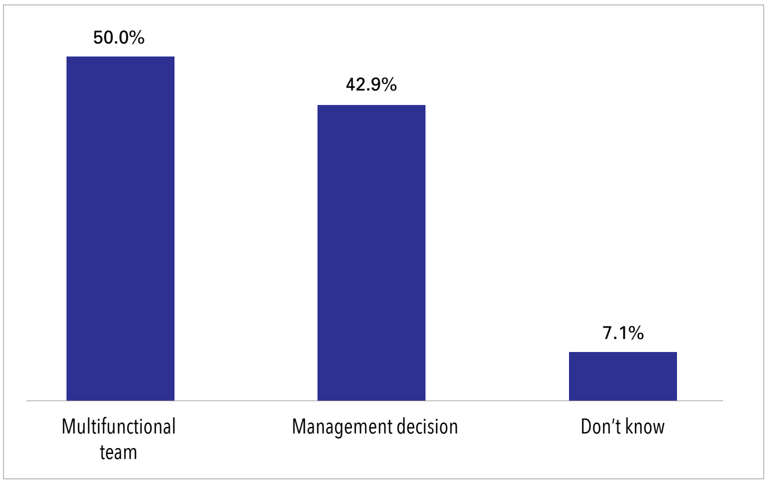
Among those who are planning to have digital equipment about two-thirds (64.3%) currently outsource digital print. There are a few reasons given for outsourcing, foremost is to avoid turning work away, e.g., "When we have digital we don't want to go back and chase this work we lost by not doing it originally." Another reason is to gain working knowledge of the digital process through working with others who have already built a digital offering. This outsourcing concept mirrors findings in the folding carton and corrugated studies.

***Who makes the decision to invest in digital?***

"Was a multifunctional team established to evaluate digital solutions?" This is probably the least surprising question posed to the flexible packaging group. There is an entrepreneurial spirit around most independent flexible packaging producers in North America and likewise, there is a very corporate feel in most of the larger integrated converter groups. Half of the companies plan to have a multifunctional team to evaluate the investment and slightly less than half of them will rely on the managerial decision. Although we do not have a lot of responses from those who already invested in digital, the ones we do have seem to prefer the multifunctional group.

It is safe to say that most of those who will be in the next round of digital adopters are already steeped in the developments and many are ready to move when solutions are made available that fit their needs. What needs to be in place before they invest, we will find out further in the report.

**Figure 7: Multifunctional team or management decision?**

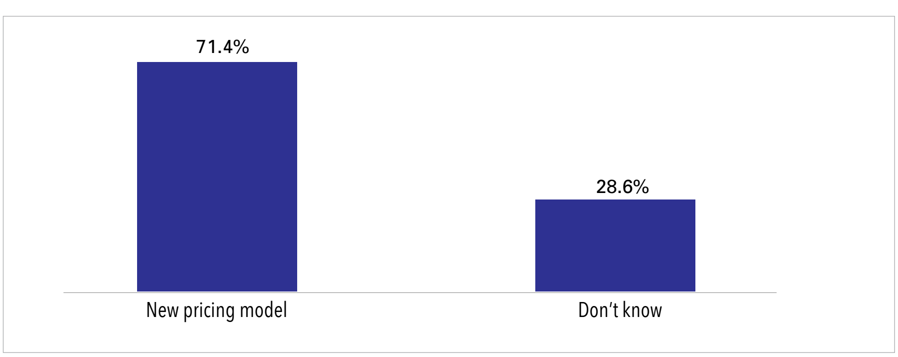



N=14

***Is there a need for a new pricing model?***

Looking at how the labels market developed in the early days of digital implementation, we were interested in understanding if companies investing in digital technologies and bringing new production and marketing opportunities to the market would change how they priced their products and services. With 100% of those who have already invested stating they have instated new pricing models and 71.4% of those still evaluating (Figure 8) saying the same it is safe to say that this trend will continue. This also confirms the thinking of innovators to realize the advantages they gain through digital and that they are willing to take advantage of them while they are available.

**Figure 8: New pricing model (expected)**




N=14

**Digital is not just for printing**

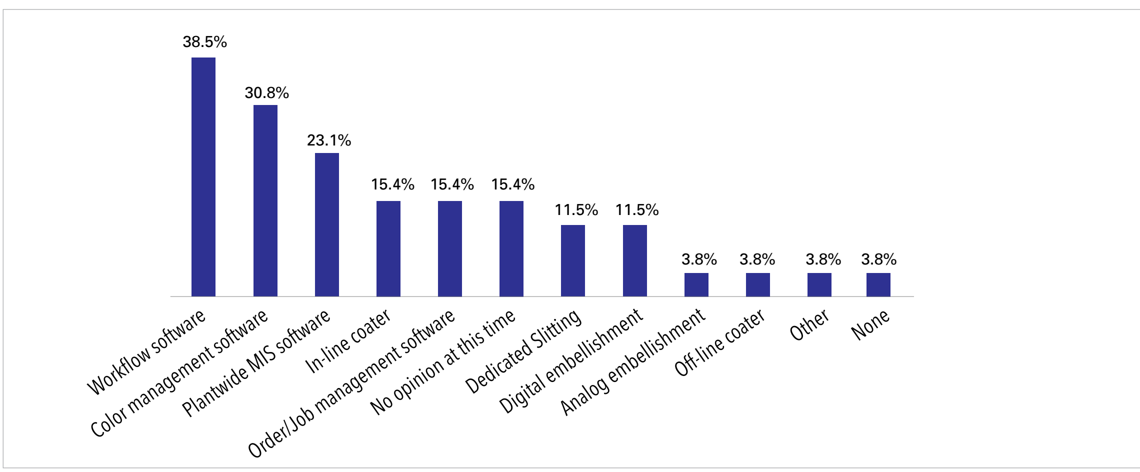
***Software purchases and equipment plans***

Equally important is the "digital mix": the software that early adopters need to consider as part of their move into the digital arena. We can get a good look at this by evaluating the purchase intentions of various types of software – the tools that drive the tools – by those in our study planning to invest. This strategy is well supported by early adopters' experience with the color management software and plantwide MIS prior to going digital. Interestingly, if they didn't invest in the plantwide MIS prior to the digital investment, they had to do it right after it was made, which supports the idea that software investment is an important part of digital investment.

What software do those still planning to go digital expect to purchase as part of their implementation? As shown in Figure 9, the most popular types are "workflow software," "color management software," "order management software" and "plantwide MIS software". The first three from the list are the tools that are directly related to filling or driving the digital press. Forward-looking companies tend to invest in the infrastructure ahead of "going digital" so they will be ready for the digital press when they get it.

"The easy part of short runs and digital printing is the printing; finishing is the hard part," is a statement made over and over again by people evaluating and implementing analog or digital short-run production. A truer statement may not have been made. This statement resonates with the study group, as many plan finishing solutions as part of their initial digital implementations: 11.5% plan on adding dedicated slitting and 19.2% plan to add inline or offline coating solutions. Digital embellishment solutions are also being considered (Figure 9).

**Figure 9: Equipment/software purchases (expected)**




N=26

**How was digital printing ultimately evaluated/graded?**

Companies investing in digital need to make sure their digital solution is well integrated into existing production on their analog systems. Extended color gamut printing on digital solutions is a way they could match production on analog presses that utilize special colors. While the use of extended gamut printing often slows digital presses, the need for matching production output outweighed the need for speed. Customer feedback on the digital print was also a key criteria. Some said they showed customers samples of digital and analog and that they were unable to distinguish one from another. A key takeaway here is that the quality of digital print is now considered acceptable for most packagers and their customers.

***How was an ROI established?***

Interviewed companies all stated they had a great deal of production run data, and all saw the potential opportunity for a digital solution fitting into their production mix, but noted the lack of actual production data from vendors that could accurately be represented in ROI projections. It was felt that while OEMs try to give good ROI data for evaluation purposes, the data is less than what most consider solid. The general feeling is that broader and more accurate production data was needed at the time they were evaluating to allow for accurate ROI projections. Vendor-supplied ROI data generally showed a much more optimistic result than was actually delivered, according to early adopters. All those interviewed in this group identified the need for systems developers to have a better understanding of the industry's production expectations and requirements when they are marketing and selling systems into this market. The statement "they didn't know what they didn't know" was commonly used. But respondents understood the numbers would not be totally accurate and were willing to adjust their expectations accordingly. The median prediction for seeing an ROI was 3.1 years. The most popular ROI measures were "cost per impression" (84.6%) followed by the "total cost of ownership" (53.8%) (Table 1). Time will tell which ROI measures are the most reliable and predictive.

**Table 1: ROI measurements**

| ROI measurements | |
|---|---|
| Cost per impression, or MSI analysis | 84.6% |
| Total cost of ownership (TCO) analysis | 53.8% |
| Rely on vendors to assist with ROI analysis | 30.8% |
| Poll customer base to determine viability and ROI | 15.4% |

N=13

### *How long did the evaluation process take?*

When asked how long the evaluation process took, interviewees most often chuckled before responding. Digital printing for folding cartons and flexible packaging has been talked about in earnest since drupa 2012. Early adopters of the technology were looking at systems even before 2012, so the answer to "How long did it take?" could be as long as seven years. The shortest time given from the time "real looking" started was three months; other responses ranged from 12 to 18 months. The answer to how long these kinds of evaluations and decisions usually take was given the same 12 to 18 months.

It is safe to say that most of those companies that are in the evaluation stage of their digital exploration are well down the road to making a decision and are just waiting for the right solution to be presented. The time to prove a technology worthy of consideration will constitute the bulk of time spent in a sales cycle, and the business case can quickly fall into place if OEMs do their homework ahead of time.

### Getting information on digital print

93.8% of respondents find accessing information on innovations, such as digital printing and finishing, sufficiently easy. There are various sources of information (Table 2), but many said that they were going to need much more information as they move deeper into their exploration. The most frequently used sources of information are industry publications (print and websites) (68.8%), trade shows (62.5%) and vendors and suppliers in the printer's facility (62.5%), as well as the industry or business association meetings and newsletters (56.3%) (Table 2). Those are also considered to be the most valuable sources of information for flexible packagers (Table 3).

**Table 2: Sources of information on digital printing and finishing by their frequency of use**

| Sources of information on innovations such as digital printing and finishing | |
|---|---|
| Industry Publications (print and websites) | 68.8% |
| Trade Shows | 62.5% |
| Vendors and Suppliers in my facility | 62.5% |
| Industry or Business Association Meetings and Newsletters | 56.3% |
| Industry or Business Association Peers | 43.8% |
| General Conferences on Digital Printing for Packaging | 37.5% |

N=26

**Table 3: How valuable are the informational sources for the investment decisions?**

| Sources of information | Adequate/Excellent |
|---|---|
| Trade Shows | 93.8% |
| Vendors and Suppliers (my facility) | 81.3% |
| Industry Publications (print and websites) | 68.8% |
| General Conferences on Digital Printing for Packaging | 62.5% |
| Industry or Business Association Meetings and Newsletters | 56.3% |
| Industry or Business Association Peers | 56.3% |
| Vendors and Suppliers (their facilities) | 56.3% |
| Vendor-User Group Conferences | 25.0% |

N=16

Which trade shows have they attended in the last 6 years? The most frequently mentioned destinations were: PACK EXPO, FPA, CPP Expo, World Pouch Forum, drupa and Digital Packaging Summit.

### Installation and Integration

The research team was interested in the process and planning that goes into bringing a new printing process into an existing environment, and how the early adopters planned and executed this process. The early adopters segment is much smaller than the segment of those planning to buy, so we will focus our attention here on the expectations.

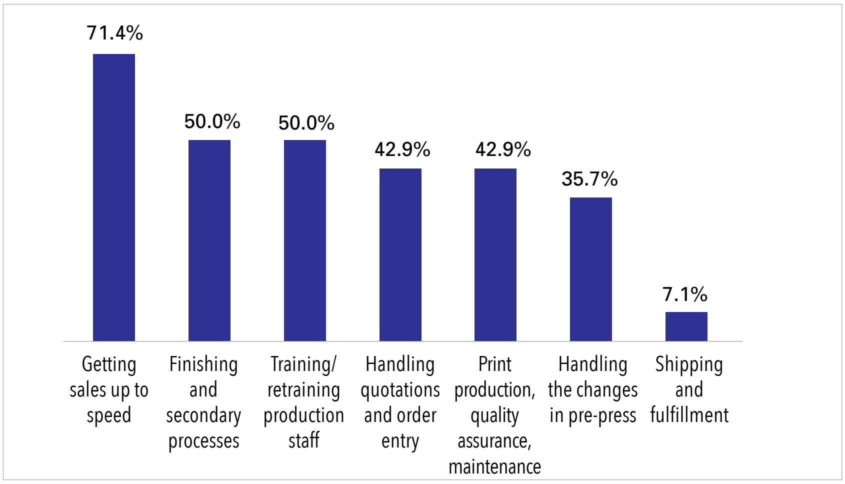
For any project of this magnitude, a project management team will be put in place. Interviewees all stated that their personnel will be the leaders of installation and integration teams with significant assistance expected from the vendors. For the physical part of the installation, for example, the vendors will guide in-house teams with recommendations and specifications needed in terms of the amount of work-in-process output they should expect to have and the space around the equipment for it.

#### *Challenges: areas easiest and hardest*

Although the challenges expected stretch from prepress to finishing, the highest concern is in the sales area, "getting sales teams up to speed with digital" (Figure 10), and reality supports it. This concern about getting sales up to speed was also seen in both the folding carton and corrugated studies. With those groups there were enough early installations to break the results into those who have experienced the ramp up and those who are still exploring. Those who have already installed confirmed sales training was the most significant challenge they faced.

The other areas where at least half of the respondents demonstrate concern are finishing and secondary processes and training /retraining production staff. Learning from the folding converters, those areas were challenging for early adopters, but not as challenging as sales. Two areas where the folding carton segment had a mismatch between the expectations and reality are of note for the flexible converters. The challenges were overestimated in training and handling the changes in prepress, but they were underestimated in handling quotation and order entry. Only time will show which areas would be the most difficult, if any, but knowing what other segments' experience could be beneficial not only for flexible packagers, but also for OEMs helping companies become digital with less pain.

**Figure 10: Where will the challenges be?**




N=14

*Sales Training* – As was found in other print sectors where digital was integrated, sign and display and commercial print, selling digital to an existing customer base is a difficult proposition. The benefits that come with digital are not fully understood by either the producers of digital packaging or their customers. This makes developing and implementing an effective sales and marketing plan exceedingly difficult.

There seems to be a decided need for effective sales training programs for these early installations of digital printing. Understanding the value proposition customers of digital printing are looking for is a critical need.

Sales professionals are being told to sell short-run digital in volumes that would be unimaginable to produce before digital. How are these short runs priced? How is a sales person compensated for an order that can be shipped by Federal Express instead of on a company tractor-trailer? How can a company capture the associated real value that just-in-time manufacturing can bring to a customer? These are some of the questions companies new to digital need to understand as they build sales and marketing programs.

*Prepress* – The other area of solid agreement was that prepress was an area where they were well prepared for the addition of a digital press. This is a testament to the planning these companies made ahead of their installations. OEMs have a solid understanding of the volumes and types of prepress files that are needed to feed their systems. It is also safe to assume that companies making a digital investment will have made similar investments in their digital front end in recent years.

*Order Entry* – Order entry, unlike prepress, is an area that most felt was more problematic for them upon startup than they had expected. "We did not realize that we needed the same level of automation in our order-entry process as we do in our prepress operations." This statement covers the sentiment heard from most in this group.

*Production/Quality/Maintenance* – For the most part, interviewees agreed that they were well equipped and trained by their systems suppliers to produce work when following the systems installation. As with the other studies, this group of early adopters feels that training programs had been developed that were good at getting their internal people up to speed for all levels of making the systems productive. Operator training along with training of maintenance and quality programs was thought to be well developed and delivered.

*Shipping and Fulfillment* – Efficient operations have efficient fulfillment operations in place. Early digital installations were well equipped to handle the new volumes of short-run orders that would come off the new press. "We have been working with shorter runs for the past five years, so dealing with these new smaller orders had not been too disrupting for us." "We are built for short runs and have planned accordingly for all aspects of our business, including order fulfillment." These statements are indicative of those early adopters who had downstream efficiencies built into their operations well before the digital press came into play.

*Finishing* – This is another area where this group felt less prepared than they would have liked following their digital installations. Running short runs in different widths through existing finishing solutions has been ranked as a "challenging" part of ramp up, which leads one to understand that many who say it is a non-starter are overstating a bit. This also says that some operations are better suited for digital than others and that OEMs are addressing the right markets with the current round of digital capabilities.

*Operator Selection* – It is always good to take advantage of what others have learned and this seems to be the case when choosing the right kind of person to be a digital press operator. The labels sector has been digital for more than a decade and companies implementing digital solutions have had decided on what type of person makes the best digital press operator many times over. Like conventional presses, digital presses perform best when file preparation is done correctly and consistently, and maintenance is performed as and when needed. With this said, many of these operations for analog presses are done with a mix of keyboard entries managed by software and mechanical operations that require cleaning and moving things. Similar operations on digital presses are mostly performed through interactive workstations and software. This kind of focus for digital solutions has led most early adopters of digital to find their digital press operators from the ranks of their prepress operators. One interviewee from the carton report put it this way, "Press guys run the department but prepress guys run the presses." This is seen to be the path taken by most early adopters of digital.

***Why invest in digital?***

One of the objectives of this study was to "get into the minds of the converter regarding digital investment" so we can understand what drives such major decisions. We asked the respondents what they expected to gain out of their digital investment.

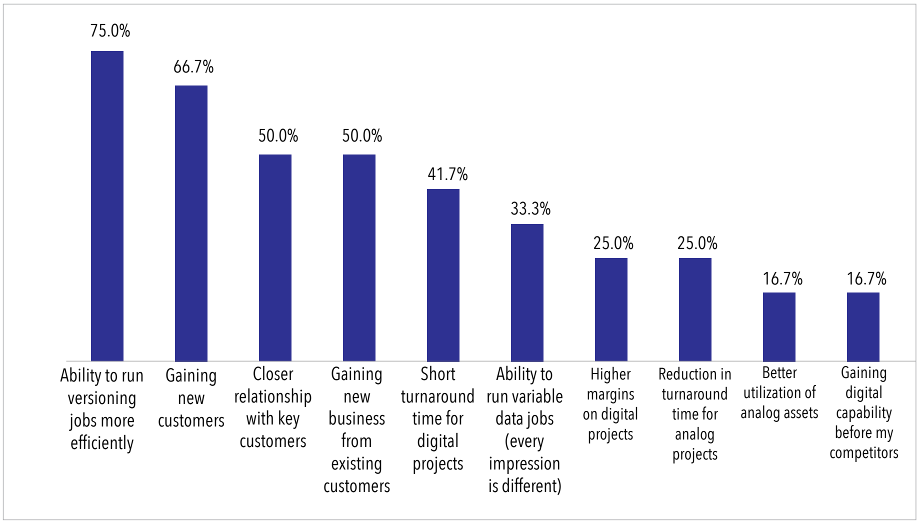
Digital is a bit more entrenched in folding cartons than in flexible packaging, but not hugely, yet the major response to this question from those in the carton study was for the benefits related to short runs; versioning, and the need for better plant efficiency; use of analog assets. Those in flexible packaging see those advantages as well but also have a clear eye on new customers and variable data projects. Those we interviewed who had already invested in digital all identified ability to run versioning jobs more efficiently as their main motivator for getting into digital.

*Operational Relief* – Scoring high are issues related to improving plant operations. The ability to more effectively run versioning jobs, improved turnaround times and better use their analog assets are all issues that support production floor efficiency.

*New Work* – Also scoring high are the prospects of gaining new work from existing customers and maintaining closer relationships with them, as well as gaining new work from new customers. This shows a desire to leverage significant investment and new capabilities to get into new, digitally enabled revenue streams. About two-thirds (64.3%) of those yet to invest say they currently outsource digital printing, which allows them to stay engaged with their customers and gain understanding while they wait for their own digital entry.

*Personalization* – One area to note is the way packagers look at the ability to run jobs requiring variable data. Flexible packagers seem to be more interested in personalization than their colleagues from the folding carton segment (Figure 11).

**Figure 11: Digital benefits for those planning to buy**




N=12

### *Features preferences*

*Format size*

For this line of questioning, we broke format sizes into four groups: 16 to 22 inches wide, 23 to 30 inches, 31 to 42 inches and over 42 inches. Table 4 shows that a large-format digital solution is yearned for, but the most desirable size is spread between three categories. With this table representing those still waiting to invest, it is clear that many are waiting for a wider digital solution, one that better fits their current production capabilities, before investing. We believe that this distribution is reflective of the industry in general.

**Table 4: Preferred format size**

| Format size preference | 16'' to 22'' | 23'' to 30'' | 31'' to 42'' | Over 42'' |
|---|---|---|---|---|
| **Desirable** | 17.9% | 60.7% | 75.0% | 50.0% |
| **Neutral** | 28.6% | 14.3% | 10.7% | 21.4% |
| **Undesirable** | 53.6% | 25.0% | 14.3% | 28.6% |

N=28

*Imaging technology*

Trying to gain perspective on what kind of imaging technology prospective users prefer, we asked them about their preference between:

- Aqueous Inkjet
- UV Inkjet
- Dry Toner
- Liquid Toner/Ink

Those with a digital solution preferred the technology they currently had, which is not surprising. Those still looking, unlike their carton cousins, had almost no preference in imaging technology. More than half (57.1%) said they had not yet formed an opinion. They did, however, strongly agree that whichever imaging technology was employed had to match their existing analog print and quality (Table 5).

This shows a mature understanding of the current state of digital printing in packaging and goes along with only 44% requiring improved print quality before investing. The technology is not as important as how well it works. This is good news for consumers of the technology, although it might not be for OEMs with a vested interest in one technology. The industry is now more interested in the function than the feature of the digital offering and shows a shift to a more pragmatic view of digital implementation.

**Table 5: Imaging method preference**

| Imaging method preference | |
|---|---|
| Have not yet formed an opinion on imaging method | 57.1% |
| Imaging method IS NOT as important as matching my analog print and quality | 28.6% |
| Aqueous inkjet | 7.1% |
| Dry toner | 7.1% |
| Liquid toner/ink | 7.1% |
| UV inkjet | 7.1% |
| Imaging method IS important, and it has to match my analog print and quality | 7.1% |

N=14

*Views on FDA Approved Inks*

How important is the ink approval by FDA? Nearly all (93.8%) respondents specified that FDA ink approval is important for them. This response reflects the 75.7% of respondent companies serving the food sector.

***What do customers think?***

For early adopters coming from various packaging sectors, we asked, "How did your customers react when informed of your company's digital technology investment?" Not surprisingly, two-thirds said their customers saw it as favorable, with the other third replying customers were neutral on the topic. This goes along with the fact that most companies say they are not feeling pressure from their customers to go digital. One interviewee even stated that they took a long time to tell some customers because they were worried they were going to ask for price reductions due to the new investment. Another customer just said they did not want to see any change in print quality with this new digital press.

Digital printing conference organizers work hard to get brand owners on the stage so attendees can hear what they are interested in. After all, brand owners purchase the packaging that package printers are producing, and it is natural to want to know what your customers are, or will be, looking to their supply chain to provide. With that in mind, the research team interviewed 11 brand owners of various sizes to get their opinions on the current state of digital printing for packaging and where they would like to see it in 5 years. The size of the companies we spoke with went from small local brands to those with over $3 billion in annual sales and ran the gamut from industrial chemicals to food to health and beauty producers. Because most would only speak if their company was not mentioned, all comments are used in conjunction with others and will not be attributed to any specific company. The common thread was they all were familiar with digital printing for packaging in their companies and in the supply chain in general.

*Scale and cost*

What is interesting in these discussions is that most of the interest in digital related to cost reductions and process simplification. Most respondents mentioned notable marketing programs that are often touted from the magazines and at conferences but most look at them as "flashes in the pan." While they see the benefits for using digital for specialty programs and brand building, where they see the greatest potential impact is in overall cost reductions.

As you would expect, the larger brands cite the volumes of product packaging they produce as most often best done by volume producers and volume-oriented processes, and by extension they are not well suited for digital printing. But what is interesting is that the next statement these people made showed a shift in the conventional thinking, stating that digital is gaining an increasing place for them as they are seeing shifts of volume from high to medium to low at an increasing pace. This means that five years ago there were few projects or SKUs that lent themselves to short-run production or digital production, but that has changed, and brands are open to the benefits that digital can bring them.

Of those we spoke with, 27% said recent acquisitions of smaller brands have brought to them new smaller volume products that bring along their own supply chains that often include suppliers with digital printing capabilities and a new set of "best practices." "We are not only buying companies, but we are also buying nimbleness and new thinking when it comes to getting products to market."

*Who drives digital?*

While many said that marketing groups within the company are keen on the capabilities of digital printing for brand-building purposes, all but two companies said that purchasing or procurement groups were the ones that drive large-scale digital efforts within the company. Marketing groups will drive special projects, but purchasing will drive long-term projects such as cost- or complexity-reduction projects.

*Total delivered cost*

A third of brand owners stated their companies were good at understanding the total cost of an initiative and taking inventory logistics and management and other tangible savings into account when evaluating a cost-reduction program that may include digital printing. This is important to understand, with purchasing organizations driving many digital initiatives. This also means that two-thirds of the brand owners did not see their purchasing groups, which would drive digital, as good at looking at the big picture: "Some in purchasing still cannot get over the higher price per carton with digital."

*Is it good enough?*

Everyone we spoke with had positive impressions of digital print quality. This maps back to the converter surveys, which for the most part found digital print quality acceptable for packaging usage. Those with special color requirements stated a confidence in digital being able to match them but noted a need for comprehensive color management tools to assure it is done correctly.

*Digital for e-commerce*

Half of our interviewees stated that e-commerce was becoming a bigger part of their company's strategy. "Some of these new companies we are buying are real big in e-commerce," said one company. "And we have to get good at it too, and we see digital printing being part of that mix."

**Where Would You Like to See Digital in Five Years?**

This question brought forward some interesting comments that speak for themselves:

- "I would like to see late-stage packaging done on filling lines. This will require solutions that can check print quality on those filling lines too."
- "I would like to see digital treated as just another printing process."
- "The entire process needs to be more integrated … I see a time when all our assets from television, radio, internet, print and all flavors of packaging are seamlessly managed and produced regardless of what process is used to get the scene."
- "We have lots of initiatives that are geared at reducing complexity and thus cost. Digital can help there, but today it can add complexity rather than reduce it. I see the potential for significant complexity reductions with digital, but it is going to take a while to realize it."
- "We need a total business – end-to-end – solution that includes digital but goes all the way through our business."
- "I would like to see the entire process more 'user friendly,' seamless from concept to package … not a field of specialists but one of seamlessness."
- "I would like to see digital able to handle larger volumes of our work. Instead of saving X% on a small volume of our work, I would like to see X% saved and a large volume."

**CONCLUSION**

- Our data suggests that flexible packagers tend to invest when the technology is proven.
- The majority of respondents already take advantage of digital, but through outsourcing.
- The main drivers behind their digital investment decision are not only to access the benefits of digital from the operational point of view, or to get production relief, but also to open the new market opportunities with new customers and strengthening relationship with existing ones.
- A compelling business case, customer request and format size are the three factors that need to be in place for flexible packagers to invest in digital.
- Having a robust digital infrastructure that includes production software and finishing equipment ahead of digital investment is a key element to digital implementation's success.
- For site planning and installation preplanning, companies could rely on OEMs, but would be better off by taking on the job of "project management" internally, using the resources of the OEMs as needed.
- Challenges are expected in getting sales up to speed and in finishing/secondary processes, as well as training/retraining production staff. Based on the folding cartons' experience, the first one shouldn't be underestimated. Sales training and sales program development should be a key point of focus for all new installations of digital presses. Order entry/handling quotations should also be taken into account.

- For ROI expectations, the majority currently focuses on the cost per impression or MSI analysis. With a larger pool of installations now and into the future, more reliable ROI data will be available.
- The majority of flexible packagers expect to use a new pricing model for digitally-produced products to capture "value added" product components.
- With purchasing driving most initiatives, brands are pragmatic when looking at digital opportunities, focusing more on functionality than on features.
- The type of digital imaging to be used is not as important as matching the company's analog production. The choice for imaging method is driven by its ability to match the analog print and quality. However, FDA ink approval is important for almost all of our respondents, as the majority serve the food sector.

## APPENDIX

### What do brand owners think of digital packaging?

For the purpose of this report, the interview team conducted in-depth discussions with 11 brand owners to gain their perspective on the use of digital printing for their packaging. The companies interviewed range from small local brands to multi-billion-dollar global brands. To assure candid responses, interviews were conducted with the understanding of strict confidentiality and that all responses will be used without company names associated. Below is a list of the company types and sizes that correspond with the questions and responses that follow. Each participant was asked the same questions and for their vision of what five years in future will look like for their company in regards to digital printing for packaging.

### Brand owner companies

1. Large Multinational – Food
2. Large Multinational – Consumer products
3. Large Multinational – Food
4. Large Multinational – Food
5. Small Multinational – Chemical
6. Large Multinational – Consumer products
7. Large Multinational – Cosmetics
8. Small Regional Brand – Beverage
9. Local Brand
10. Regional Large Brand – Food
11. Large Multinational – Beverage and Snack

### Q1: What are your overall impressions of digital printing for packaging?

1. Digital for packaging is great for short runs and for matching analog printing.
2. Less than impressed with the productivity of digital so far. Would like to see it used for production printing, but our needs are global and large scale.
3. Large-scale production issues. Large CPGs are heavily invested in the way they have done business for years – large-scale production – and their suppliers are geared the same way. Most suppliers have some form of digital but most have not fully embraced it yet.
4. We have a growing interest in digital. We see the potential and are looking at it seriously.
5. For our purposes, digital is the perfect choice. We have almost all our SKUs shifted to digital for labels and corrugated boxes.
6. Overall, I think it is good, but we have yet to have much experience with it.
7. We are large and global, it is hard to get digital to be implemented everywhere at the same time. We have to work regionally, which slows the process.
8. It is great for the PS labels that we use. There are lots of suppliers to choose from, and I got a good price shopping around.
9. I think it is great and fast, but too expensive. I am a little guy, and cost is everything to me, especially in startup mode.
10. Good for a lot of users but we are still looking for the right fit for us.
11. Digital is really good at what it is really good at, but it is not really good at a lot of packaging still.

**Q2: Do you currently use digital printing for packaging and if so, for what?**

1. We use it extensively for testing and sampling. We will typically run 500 to 1,000 packages that include labels, cartons and pouches. We print on board, paper and films. We pack most of these products manually. We also do some production runs for small regional products. We have recently purchased some companies that are active in small markets that are new to us and they are already digital users.
2. We use it for testing and product development but not for any production.
3. Digital is being done by some of our regional groups. In North America some of our new acquisitions are startups that are using digital.
4. We have purchased some small brands that are using digital for introductions and even for small run production.
5. We have 700 SKUs that are almost all shifted to digital labels and boxes.
6. We have one product line that is using it a little, but it is too early to tell how effective it is.
7. We do some small special projects in some regions, but no real production. We have recently purchased some smaller brands and are learning from them.
8. We use digital labels for all our products and have [done] that from the beginning.
9. All our labels are done digitally.
10. We do some samples and prototyping, but we do a lot of tubs and in-mold where digital is not real strong.
11. We have used digital for some very big projects so far in multiple areas of the world.

**Q3: Are these efforts driven from within the company or outside it?**

1. We have a sourcing group that finds suppliers with the right capabilities. Sometimes our design firms bring us options for digital suppliers. We are always looking.
2. We have people looking at digital in R&D for supply chain purposes and in marketing for brand building.
3. R&D and packaging procurement groups are actively looking at digital for cost reduction and process simplification.
4. Inside through the new companies and our procurement group that is really good at understanding the overall true cost of producing and managing packaging. Some of our key suppliers are also investing in digital and bringing possible solutions to us.
5. They are driven by purchasing.
6. Inside it is (or will be) driven by procurement. Vendors have come to us, but nothing has happened yet.
7. Most of our interest comes from inside through procurement efforts
8. I knew what I wanted and went out to find it. When I put my first ad out about what we were going to do I got calls from a bunch of digital label suppliers.
9. I drive everything and it is all operations-oriented, but the labels have to look great too, and that is marketing. Both have to go together for me.
10. Driven by marketing.
11. Driven by inside the company.

**Q4: Where does your company see using digital and to what extent? Marketing opportunities or operational (i.e. inventory reduction, faster reaction time).**

1. Clearly, my group is looking at marketing opportunities as we do all the new product testing, but the company is looking to use digital in other places to reduce inventory and print closer to the production lines and times.
2. We would like to see it help us for supply chain simplification and inventory reduction. There is a lot of interest by R&D in what it can do.
3. We use it for both marketing and operations. New products are a big use for us.
4. We are looking at the e-commerce connection with digital and new product launches. We are also looking at late stage production of packaging.
5. We are driven by operations for cost effectiveness, but our packaging is more attractive done digitally too.
6. We would see the most benefit in operations for inventory management. Much of our product and packaging is produced in China, and I do not see a lot of opportunity for digital with that arrangement.
7. We would like to use it for better use of inventory and [to] make business more efficient, and marketing is nibbling around the edges for new markets and e-commerce
8. I use it for everything we produce, and I see it as both operational and marketing. We are small and nimble and can react very quickly, and digital is part of our strategy.
9. As we expand we need to react quickly, so I see our use of digital labels increasing.
10. I would like to see digital help us with inventory reductions and faster reaction times.
11. We see advantages in both marketing and operations. The biggest issue is the ability to address the volumes we require; this is where the big money will be seen.

**Q5: Do you actively seek suppliers with digital capabilities?**

1. The work my group does is not always with our normal suppliers (we do lots of samples), but our suppliers know we are looking at digital very closely and they are all actively involved in digital to one extent or another.
2. We have annual supplier summits where we show suppliers what we would like and ask for their help. We also look to suppliers to bring us ideas, they have much more experience in these things than we do.
3. Yes, we are looking for the best of the best to be our suppliers and we see the best investing in digital.
4. We have some of the best suppliers; they know we are looking at digital, and they are too, so we do not have to look for new suppliers.
5. No, our suppliers brought it to us.
6. No
7. No
8. I can only use suppliers that have digital.
9. Yes, I have to have a digital supplier
10. No
11. Our supplier network includes the best of the best, and the best have digital capabilities and know we expect it too, but not every kind of packaging can be done digital yet.

**Q6: Are you asking existing suppliers to gain digital capabilities?**

1. All our suppliers know we are looking at digital and most of them are helping us in that effort.
2. Through our supplier summits they know what we are looking for.
3. Indirectly, our suppliers know we are looking strongly at digital and favorably on suppliers with digital.
4. We have some of the best suppliers; they know we are looking at digital and they are too.
5. No
6. No
7. No
8. No need to.
9. I only work with digital suppliers.
10. No
11. Not really, they know what we expect and work to adjust their capabilities accordingly.

**Q7: Do you welcome suppliers coming to you with digitally-enabled opportunities?**
**Marketing Opportunities – Operations Opportunities**

1. Our brand design group is open to speaking with suppliers, and our R&D and Sourcing groups are too.
2. Yes, but it is really hard to break into our supplier system.
3. Yes, come to us.
4. Yes, our suppliers bring us ideas all the time.
5. Absolutely, we welcome the contact.
6. We like to stay in the loop, so we welcome conversations, but we produce so much overseas.
7. Yes, we look for suppliers to educate us.
8. If someone has a better mouse trap, I welcome them trying to sell it to me.
9. If someone has an idea on how I can make more money, I'm all ears.
10. Yes, we like to see what is going on and what our suppliers are up to; they know so much more than us in this area.
11. Yes

**Q8: What are your impressions of digital for labels, cartons, flexible packaging, corrugated, displays and POP?**

1. For sampling we use it for labels, cartons and flexible and results are good for samples but cartons and flexible are not to production capabilities.
2. Labels are good and play a role, hard to see cartons producing at the scale we need.
3. Does not apply.
4. Digital for all is doing great, production issues for flexible and cartons still exist but quality is good. Most of what we produce is for such high volumes.
5. Very high marks for labels. The high and low end of the market is being served well in the corrugated space. We do displays for marketing, and this used to be agony, but not today. Do not use cartons or flexible.
6. Labels have been done for a long time, and I think that is done very well by digital. We use some digital displays and what I have seen it works very well, quality is good. We use it for some big box programs.

7. What I see is good.
8. PS and glue labels are great; I want to see inexpensive labels for cans and want to get good pricing on beverage carriers digitally done.
9. My labels are great quality; I have seen some displays that are great too.
10. Labels are good. We do some display work with digital in other groups, and what I have seen looks good.
11. Labels are very good, cartons and corrugated are gaining, and flexible is an unknown to us. We do some displays and that goes very well.

**Q9: What are your impressions of digital print quality?**

1. Fantastic
2. Quality is good, color gamut is not good. Biggest issue is producing at the scale we need.
3. Quality is very good, still concerned with the price of digital.
4. Mostly good, still some color issues that needs to be verified. Color management needs to be built into the production process.
5. For the right applications digital is 100% on.
6. What I have seen is good.
7. Quality is good.
8. All I have seen is great, and I have used most of them.
9. It is great for my products.
10. I see no problems.
11. Most is very good, issues still with color that are getting worked out.

**Q10: Do you have a preference for digital technology?**

1. None – we don't even know what technology some of our vendors are using.
2. No preference.
3. Personally, I like inkjet; I like the pay for what you use pricing model.
4. No preference.
5. None
6. I like what I have seen by some of the inkjet systems.
7. None
8. Just looking for good quality and good service.
9. I have used 'toner' and inkjet and both are good.
10. None, I like it all.
11. No, I have seen great quality from many different solutions.

**Q11: Where do you see digital in your company in 5 years?**

1. I want it to fit into our regular production process, to be just another print process. We are always looking to save money; digital can really help us there.
2. Like to see it work for full scale production.
3. I would like to see more brands taking advantage; that will raise capabilities and lower prices to everyone. I see using it for promotions, building retailer relationships with exclusivity and retailer specific SKUs and for direct to consumer and e-commerce.
4. Looking at very late-stage packaging done on filling lines:
   a. Need for print quality inspections on the filling line
   b. Like to see it treated as just another tool in the production box – not a niche process
   c. Suppliers being more productive in producing our work
5. Tech will be less expensive than it is now. What will be printed will be printed digitally. Would like to see the process more friendly and seamless from concept to production, not a field of specialty but one of seamlessness.
6. We are all about saving time and money. So much talk about it, and I would like to see it work for us moving forward. Would like to see it as a regular process.
7. Want to see a closed loop system from concept to production (TV, print, packaging, display, e-commerce).
8. Making my life easier.
9. I hope it will let me be even more nimble with my product launches.
10. Helping me get more products to customers better and able to print on plastics and tubs, a better supply chain.
11. I see all our operations tied together – design to production of all packaging and outward facing media that includes e-commerce.

**Key responses**

1. We are always looking to save money, digital can really help us there.
2. "Five years ago I was Wowed by digital, 10 years from now I will be Wowed by digital, right now I am guarded to what it can really do for us."
   a. We are considering "whole in the wall" production by working with a partner supplier.
3. We have bought some small nimble companies to learn how they work quickly and digital is one of the things we are learning from them.
   a. We are looking to manage complexity in our production processes. Digital looks to be a tool we can use for this purpose.
4. E-commerce may push us to digital.
   a. We are very good at understanding the total delivered cost of packaging.
5. Even though this is getting better and easier, I never see bringing digital printing in-house.
6. I would like to see it as a regular process, not a specialty.
7. The process from design to production is still too complicated and displaced. The process needs to be seamless.
8. I would have had a hard time starting this business up without digital.
9. It would be very hard for me to start this company if I had to do things the old way when it comes to labels.
10. I would like to see digital make a more effective supply chain.
11. Digital has the potential to be a supply chain changer, the next generation or two will make big changes.

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# WHO WE ARE

**Karstedt Partners, LLC.**
*Karstedt Partners* has purposefully positioned itself at the very forefront of technology development and its subsequent adaptation into the packaging graphic supply chain. Over the past 20 years they have ridden the waves of digital technologies from the early days of digital workflows, to digital proofing in the 1990s through Computer-to-Plate in the early part of this century and onto Digital Printing today…not to forget other innovations including RFID, Track & Trace, Brand Security, and just plain Process Improvement. *Karstedt Partners* has worked on the cutting and bleeding edge of technology development and implementation and brings an enormous level of understanding and industry connections to their clients.

Since 1996 *Karstedt Partners, LLC* has been a trusted source for insights, innovations, and consulting services to constituents in all sectors of the consumer products and packaging supply chain. Brand Owners, Graphic Service Providers, Package Printers, and OEMs have counted on *Karstedt Partners* counsel and guidance with developing efficient and effective workflows and tools aimed at improving time-to-market and product quality.

Through direct client involvement and through numerous industry and association research projects, the insights and recommendations of *Karstedt Partners* has directly or indirectly impacted many in the industry by providing unbiased analysis and assessments of the ever-changing landscape of digital package printing.

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# WHO WE ARE

**SGIA — Supporting the Leaders of the Digital & Screen Printing Community**

Specialty Graphic Imaging Association (SGIA) is the trade association of choice for professionals in the industrial, graphic, garment, textile, electronics, packaging and commercial printing communities looking to grow their business into new market segments through the incorporation of the latest printing technologies. SGIA membership comprises these diverse segments, all of which are moving rapidly towards digital adoption. As long-time champions of digital technologies and techniques, SGIA is the community of peers you are looking for to help navigate the challenges of this process. Additionally, the SGIA Expo is the largest trade show for print technology in North America. "Whatever the medium, whatever the message, print is indispensable. Join the community – SGIA."

**For more information on SGIA, visit SGIA.org.**