



# Digital Printing for Packaging: Corrugated Packaging and Display

How and Why  
Decisions are Made

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

Produced for SGIA  
[www.sgia.org](http://www.sgia.org)  
703.385.1335

Produced by Karstedt Partners, LLC.

8843 Hammond Drive, Eden, NY 14057-1409  
United States of America

[www.karstedt.com](http://www.karstedt.com)  
716.992.2017

Kevin Karstedt  
[kevin@karstedt.com](mailto:kevin@karstedt.com)

Jeff Wettersten  
[jeff@karstedt.com](mailto:jeff@karstedt.com)

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# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

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## How and Why Decisions are Made

### **Introduction**

In preliminary discussions with SGIA regarding what the industry needed coming out of this study, it was identified that “we need to get into the mind of the converter regarding digital investment.” By understanding converters’ motivations for or against investing in digital, the industry can gain valuable insights for making their own 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 printers go through to make their digital investments. What are the factors that lead converters to invest? What challenges are expected prior to the investment? Does the actual deployment prove them wrong? How helpful is the vendors’ support? What is the customers’ reaction to digital? Answers to those questions and many others in this report will help the packagers to prepare for digital investment and get the most benefits from their decision.

### **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 AICC for their support and assistance in securing member participation for the quantitative interviews. Finally, we want to thank all the interview participants. We spoke in depth with close to 100 individuals from converters to OEMs and association leaders to get insights on the industry. We were extremely impressed and thankful for the participants’ openness and candor that allowed us to learn from them and achieve one of our key objectives – getting into the mind of the converter.

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### Executive Summary

We initially began this project with 10 questions:

- Why do some converters invest while others do not?
- How do converters, both investors and non-investors, manage the evaluation process?
- Did they have specific needs they were attempting to address?
- Does their business model, their markets, their production capabilities, or their customer base have a significant impact on whether they invest?
- For investors, what challenges did they face in evaluation and deployment of a digital business?
- What resources did they use to address the challenges?
- How is their investment working for them, what changes has it brought to their business, both externally and internally, has it met the goals envisioned?
- For the non-investors, what prompted the decision to put off investing?
- Did the non-investors connect with digital printing in a different manner?
- Are they continuing their evaluation of digital investment and if so what are they needing in place before they invest?

As we began conducting the initial qualitative interviews, it became apparent that the information we were seeking was going to require a far broader list of questions, and more in-depth analysis.

Investment in digital assets is moving from a tactical solution around scanning systems to a broader strategic discussion enabled by single-pass printing. The output capability of scanning technology limited participation in a converter's business, and investment was driven around the ability of digital printing to address specific areas of need. The scenario changes with single pass, in both web and sheet-fed configurations. Words such as "supply chain disruption" and "competitive advantage" are now being used by converters.

The converter culture is a tough thing to change. Some converters have a high tolerance for risk and experimentation and eagerly engage in a discussion around digital printing. Others desire to assess the world around them – not ready to invest, but certainly willing to engage to better understand the competitive environment. Others are weary of the discussion regarding digital printing and will engage only when their business is impacted. All of these are typical market reactions and behaviors, not limited to the corrugated market. Single pass introductions are putting pressure on the first two groups to have a strategy in place. It can be a fine line between the first two classifications, as the following quote from a converter interview shows: "You are not asking the right question – rather than ask what a digital investment can do for you, you should be asking what not making a digital investment will take from you long-term." Regardless of orientation, high risks or what is pragmatic, the sentiment expressed reveals the struggle is not around if, but when to make the investment.

The bottleneck is shifting. For many converters, the output of scanning systems meant they either were not willing to invest, or if they did invest, their participation may be limited against what they envisioned as the true opportunity. The industry is seeking solutions capable of participating in production level volumes. Single pass enables that capability. Converters who have invested or are looking to invest in single-pass solutions are now struggling with workflow and integration questions. In the qualitative interviews, converters commented that part of the reason they invested in scanning systems was to better understand and anticipate the challenges presented by digital printing, as they believed an early investment would provide competitive advantage as they scaled up their digital operations.

The interview process also revealed that a digital investment is not for everyone. Converters provided sound arguments on why they would not be investing in digital printing at this time. This does not mean they will forego digital participation, but they may opt to participate through a digital supplier rather than direct investment. This decision is based on business need, the importance they place on in-house production vs. sourcing, and how they anticipate their customers engage with digital printing.

Digital growth is providing opportunity for specialty digital providers. Just as litho label and litho laminate are frequently purchased from third party providers today, digital printing is presenting entry opportunities for new entrants focused on providing digitally-printed product, either as combined board or top sheet in sheet or roll form to converters.

Approximately one-third of high graphics work was sourced across all segments of the 53 high graphics converters interviewed. Even among the converters who indicated high graphics was more than 50% of their overall business, sourcing was utilized on approximately 34% of their requirements. Digital is and will continue to challenge existing norms around production and sourcing...



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### Key findings from the research

- The application target for the early adopters was focused on participation in high graphics – POP/Display and Cartons, with POP/Display being the primary target. The study results clearly indicated the volume of high graphics produced, and the pain associated with that production, is more important than the percentage of total volume that is high graphics.
- Similarly, the converter operating model (produce all high graphics in-house, produce some in-house plus sourcing) does not appear to have a significant impact on digital investment. Digital investment occurs among converters producing all their high graphic requirements, converters that historically sourced their high graphic requirements, and from converters doing a combination of both.
- Approximately 31% of high graphics work was sourced across all segments of the 53 high graphics converters interviewed. For most, the sourcing was directed towards litho label/laminate. Even among the converters where high graphics was more than 50% of their overall business, sourcing was utilized on approximately 34% of their requirements.
- Digital is and will continue to challenge existing norms around sourcing. Converters with digital assets continue to source 20% of their high graphic requirements, while those without digital assets source 48% of their high graphics requirements. Seventeen converters fell into the classification of participating in high graphics but did not have digital assets. The majority of them (82.4%) stated a preference for sourcing digital printing in the future vs. litho label/laminate.
- Thirty-three interviews were conducted with converters having digital assets. Eight stated they had an ROI target less than 1 year, about half (48%) had a target of 1-3 years, and 9 (28%) had a target greater than 3 years. About every second converter (48%) either achieved or was on track to achieve the ROI target. Fifteen (45%) stated they felt they were on track, but it was too soon to tell.

### Final thoughts and the path forward

- Converter risk – five years ago the technology options were limited, market acceptance and opportunities were unknown, output volumes were low, and the cost of print high. The “risk around adoption” was on the converter. Today, the discussion is not as much around risk, as it is in answering the question “is digital printing the best investment I can make at this point in time for my business?”
- Business models – five years ago the capacity of a digital press severely limited where and how it could be used. Decision-making was tactical, not strategic. Today, digital output is requiring a more strategic outlook, at both the internal operational level as well as how converters intend to connect to their customer.
- Converter decision making – while the size of the converter’s operation may provide a clearer path regarding ROI calculations, size can impede quick decision making. The scale of the business, the number of people involved in the assessment, and the options to be considered, from the technology to the business model utilized, add considerable length to the evaluation process vs. smaller firms.
- Technology options – five years ago options were extremely limited. Today, the technology has expanded into scanning solutions as well as single pass. The supplier base has expanded tremendously. While these advancements provide better opportunity for the converter, they also add complexity to the evaluation process.
- Make vs. Buy – five years ago, access to digital printing just about required investment. Today, just as third-party printer emerged with litho label/laminate options, third party digital providers of digital printed top sheets, combined board and converted cartons are emerging.

At drupa 2016 we were aware that several companies would be introducing new single pass digital solutions targeting corrugated converters. We had the opportunity to walk the show with several US converters and asked for their opinions after the show.

“We were surprised by the number of suppliers, as well as the breadth of solutions targeting the corrugated marketplace”.

“We were aware of some of the new presses entering the market. What surprised us, and will really force us to think, is the in-depth discussions we had with suppliers regarding platform options, and how that may impact what we do today, as well as into the future.”

“The throughput increases now hit a spot in my business that is interesting. I still need to understand, evaluate, and assess any trade-offs in speed, print quality, press reliability, capital costs etc. against my business needs”.

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“We have some critical internal decisions to make regarding the technology. We did not see a “single” solution that addresses all the needs across our business, but rather individual solutions from a variety of suppliers that when viewed collectively, will address most of our needs. We need to prioritize our needs and identify where we wish to get started’.

“Just because I have the financial position to invest in digital technology does not mean I should or will. I’m still looking to make investments that provide the greatest return”.

The above comments are still relevant today. In our view, the way to understand the desire for investment and “get into the mind of the converter” is to understand the similarities and differences between investors and non-investors, and the circumstances unique to each driving their decision-making process. All corrugated converters are not the same, and therefore a digital investment will fit some, but not all. We can classify the early adopters into the following classifications:

- I believe digital printing is the future of our business, and we need to be an early adopter to gain competitive advantage.
- I have an immediate need in my business that I feel digital printing can address. The opportunity to remedy this pain point outweighs the inherent risks around the investment.
- I believe digital printing will ultimately provide competitive advantage, but that alone does not justify investment. Likewise, our internal pain points that can be addressed by digital printing get us part way to justifying the investment. It takes the combination of the two to justify the investment.

The participation rate in high graphics corrugated is a key differentiator in interest in digital printing. Participation can be achieved by:

- Converters focused on high graphics – it is the dominant share of overall production and is the driving force in their business.
- Converters with a large volume of high graphics, but high graphics is not the driving force of their business.



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### Methodology

#### *Critical project issues:*

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 customers, products and services post-investment?

For those that have not investigated – why? What drives the different approaches in the three groups: investors, investigators and status quo.

Do differences in high graphic participation, production capabilities and converter size impact adoption and converter perception?

Project challenges specific to the corrugated market:

- High graphics participation
- Converter structure: integrated vs. independent
- Limited digital participation – 80-100 converters with digital assets vs. 1,400 converting sites.

### **Our Approach**

Twenty qualitative phone interviews were conducted with senior management among various converter operations. There were 57 converters who participated in quantitative survey interviews across a wide variety of topics. The topics, as well as the questions asked, were determined from the 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 technologies, or around specific business models, we will discuss these areas conceptually, but not specifically to maintain confidentiality.

### **The Participant Pool**

The study purpose is to understand the how and why relative to digital adoption. In the corrugated market, connection with digital printing generally occurs in one of two ways:

- Direct investment in a digital press, or
- Sourcing digital print from a third-party provider

We felt it was important to understand both approaches. We also felt it was critical to hear from a higher percentage of investors than companies sourcing digital printing. The 20 qualitative interviews included 15 companies investing in digital printing (75%), and five who have investigated, but continue to source; have not investigated, but source; or do not use digital printing at all (25%). In the 57 quantitative interviews, more than half (57.9%) have invested in a digital press. The remainder source digital production. As the survey was designed to target converters actively involved in high graphics, as well as those who have already adopted or source digital printing, we urge caution in trying to extrapolate information from this report into a future prediction for digital participation in corrugated packaging.

A significant challenge in this engagement is how to review the information. The following is our approach:

- Participant demographics – segment the respondents to better understand who they are, what they do, how they do it and their participation in high graphics.
- What business issues did (or do) they have that prompted their investigation into digital printing?

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- How did they go about their investigation?
- For those who invested:
  - Why did they invest?
  - What challenges did they encounter?
  - What has changed because of digital printing?
  - Is their investment in digital printing meeting expectations?
- For those that did not invest:
  - What needs were they trying to fill?
  - What prompted the decision not to invest?
  - Are they now sourcing digital printing? If yes, do they have a preference around supplier, technology or format?
  - Do they plan to continue looking at digital investment?

### ***Qualitative Interview Pool***

The qualitative interviews revealed different approaches, adoption strategies and needs for digital printing among different groups of converters. Within integrated, as well as large multi-site independent companies, high graphics converting operations may reside inside a separate division or operation within the company. The qualitative interviews revealed a lengthier process for evaluating and approving digital investment due to the multiple layers of review and approval. This will be discussed in greater detail in the section on digital printing. Among smaller independents, the inherent risk around investment in new technology was the major driver slowing adoption. The qualitative interviews revealed management structure, as well as management style, plays a significant role in the evaluation and approval for new investment.

To capture these differences, we felt it would be advantageous to segment the converter audience by size and their participation in high graphics. The following is a description of the segmentation we used to build the converter profiles and a breakdown of the respondent pool (Table 1):

- Integrated vs. independent
- Level of the organization: corporate, division or branch
- Number of employees
- Level of participation in high graphics (defined as three-plus-color)
- Digital press: own vs. do not own

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**Table 1: Qualitative interview pool by type**

Type	Level	High Graphics	Digital
Independent	Corporate	<10%	No
Independent	Corporate	<10%	No
Independent	Branch	<10%	No
Independent	Corporate	<10%	No
Independent	Corporate	11%-50%	No
Independent	Branch	11%-50%	Yes
Independent	Corporate	11%-50%	Yes
Independent	Corporate	11%-50%	Yes
Independent	Branch	11%-50%	Yes
Independent	Corporate	11%-50%	Yes
Independent	Corporate	11%-50%	Yes
Independent	Branch	11%-50%	Yes
Independent	Branch	11%-50%	Yes
Independent	Corporate	11%-50%	Yes
Integrated	Division	11%-50%	Yes
Integrated	Division	11%-50%	Yes
Integrated	Corporate	11%-50%	Yes

Source: Karstedt Partners LLC, SGIA

Where are the survey respondents coming from?

### **Quantitative Pool**

About two-thirds of the companies (63.2%) have between 100 and 500 employees (Table 2) and 57.9% of participants have digital printing capability (Table 3).

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**Table 2: Overall participation in high graphics by company size**

Which statement best describes your participation in the high graphics market? (N=57)	Number of employees						
	Total	10-19	20-99	100-499	500-749	1500-1999	>5,000
High Graphics is currently <b>LESS</b> than 10% of our volume, and is not a significant focus for our company.	10.5%	0.0%	8.8%	1.8%	0.0%	0.0%	0.0%
High Graphics is currently <b>LESS</b> than 10% of our volume, but is an area of strategic importance for our company.	14.0%	1.8%	3.5%	8.8%	0.0%	0.0%	0.0%
High Graphics is 11%–50% of our volume, but we <b>DO NOT</b> feel we have a competitive advantage vs. other high graphic providers in our market.	29.8%	0.0%	1.8%	21.1%	1.8%	1.8%	3.5%
High Graphics is 11%–50% of our volume, and we <b>DO</b> feel we enjoy a competitive advantage in our high graphic capabilities vs. other high graphic providers in our market.	10.5%	0.0%	1.8%	7.0%	1.8%	0.0%	0.0%
High Graphics is <b>MORE</b> than 50% of our volume, and is the <b>PRIMARY</b> focus of our business.	28.1%	3.5%	0.0%	21.1%	0.0%	0.0%	3.5%
We are not involved in high graphics.	7.0%	0.0%	3.5%	3.5%	0.0%	0.0%	0.0%
<b>Total</b>	<b>100%</b>	<b>5.3%</b>	<b>19.3%</b>	<b>63.2%</b>	<b>3.5%</b>	<b>1.8%</b>	<b>7.0%</b>

*\*(High Graphics defines as 3+ color, line art or process color work, printed with flexo, offset or digital printing)*

Source: Karstedt Partners LLC, SGIA

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## How and Why Decisions are Made

**Table 3: Those with digital assets – participation in high graphics by company size**

Which statement best describes your participation in the high graphics market? (N=33)	Number of employees						
	Total	10-19	20-99	100-499	500-749	1500-1999	>5,000
High Graphics is currently <b>LESS</b> than 10% of our volume, and is not a significant focus for our company.	6.1%	0.0%	3.0%	3.0%	0.0%	0.0%	0.0%
High Graphics is currently <b>LESS</b> than 10% of our volume, but is an area of strategic importance for our company.	12.1%	0.0%	6.1%	6.1%	0.0%	0.0%	0.0%
High Graphics is 11%–50% of our volume, but we <b>DO NOT</b> feel we have a competitive advantage vs. other high graphic providers in our market.	39.4%	0.0%	0.0%	30.3%	0.0%	3.0%	6.1%
High Graphics is 11%–50% of our volume, and we <b>DO</b> feel we enjoy a competitive advantage in our high graphic capabilities vs. other high graphic providers in our market.	3.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%
High Graphics is <b>MORE</b> than 50% of our volume, and is the <b>PRIMARY</b> focus of our business.	39.4%	6.1%	0.0%	27.3%	0.0%	0.0%	6.1%
<b>Total</b>	<b>100%</b>	<b>6.1%</b>	<b>9.1%</b>	<b>66.7%</b>	<b>3.0%</b>	<b>3.0%</b>	<b>12.1%</b>

*\*(High Graphics defines as 3+ color, line art or process color work, printed with flexo, offset or digital printing)*

Source: Karstedt Partners LLC, SGIA

The small firms in the “10–19 employees” range are specialty digital providers, not full line converters. We included specialty providers – both digital and offset – to get a picture related to sourcing activity. This topic will be covered in greater detail later in the study.

We also conducted a few qualitative interviews with traditional “brown box” suppliers to gain their input on digital printing for high graphics participation as well as for use in one- and two-color production runs. The interviews revealed interest in digital printing requiring further investigation. Again, specifics of what we found are included later in the analysis.

### From the Research

#### Approach to Managing and Producing High Graphics

For most converters, participation is aligned with producing cartons and POP/displays having high graphics. But what is high graphics? For this analysis, we defined high graphics as representing three-plus-color work. We recognize this is a low bar, but we did so consciously to draw a line in the sand between unprinted and one-to-two-color work vs. everything else.

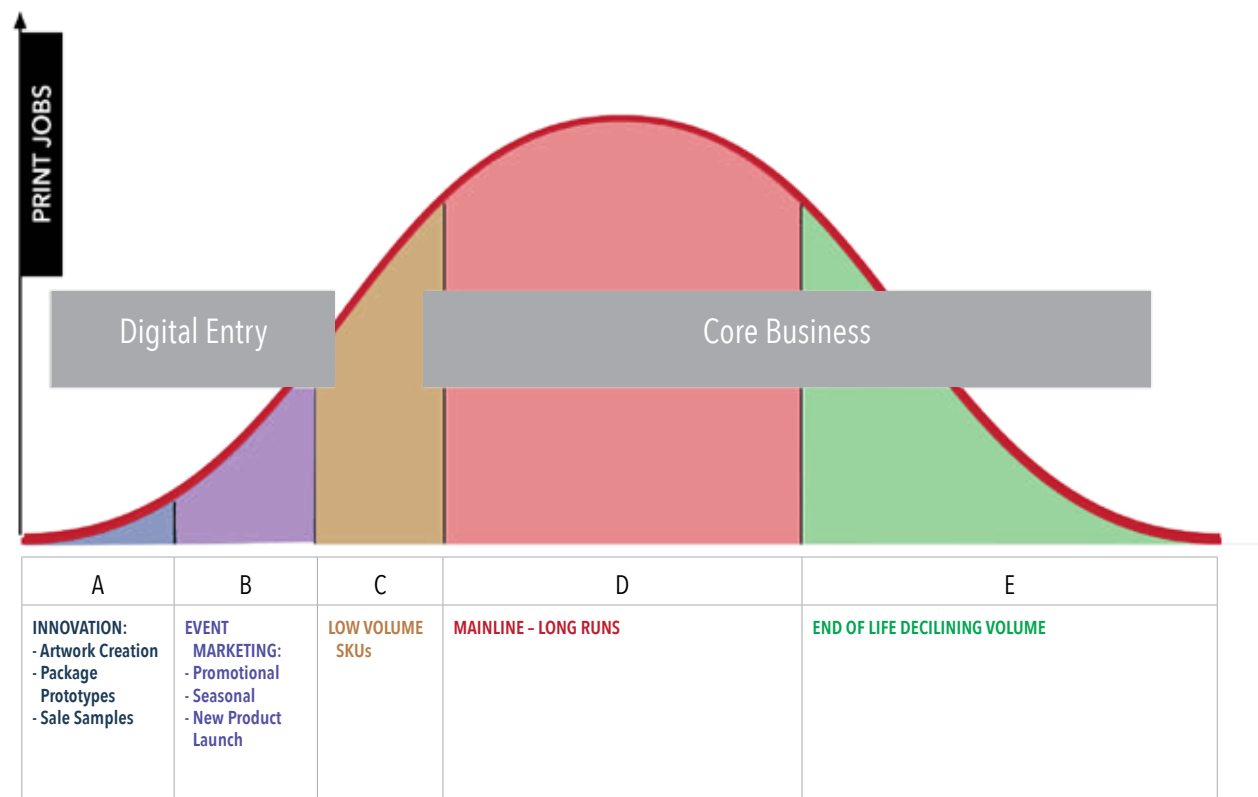
We also acknowledge there are differences in converter capabilities, and there are firms that specialize in producing high graphics corrugated packaging with clear differentiation in their capabilities. Many of these companies were interviewed during the qualitative interview phase to gain additional depth and understanding, while the quantitative interview audience was expanded to include other participants seeking a broader cross section of views and participation.

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The rapid growth in SKUs, along with the problems created for the converter, have been present for years. Graph 1 depicts the typical lifecycle of a product. Digital printing entered the market (scanning technology) with a specific purpose to address the pain points associated with segments A, B, and C. Converters have been seeking solutions (single pass) capable of addressing segments D and E.

**Graph 1: Digital Entry (Corrugated Market)**



Source: Karstedt Partners LLC, SGIA

Printing is just one of the operations required to produce a carton or a box. Converters frequently referenced “touchpoints” during the interviews. While the definition for “touchpoint” changed based on the converters’ business and operational models, the desired result – “a production process delivering a seamless transition between multiple supporting processes” – was consistent. This is far easier said than done. Where does digital printing fit into the process, and what benefit does it provide?

To answer the above question, we wanted to better understand the “rules of engagement” for high graphics participation. For ease of assembling and reviewing the data, the major categories around level of participation have been combined. Where the results are significantly different, or noteworthy, we will comment accordingly.

Recognizing that participation in high graphics is vastly different than unprinted or one-to-two-color printing, what skill sets must a company possess to participate? The heart of the quantitative interviews began by asking companies participating in high graphics to rank the critical competencies required for participation.



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**Table 4: Enabling capabilities for high graphics**

Rank the importance of capabilities contributing to your ability to participate in high graphics, with 1 being the highest, and 5, the lowest contributors (N=53).	High Graphics Participation Level			Total
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16	
Overall Rank 1	Printing	Printing	Customer base	Printing
Overall Rank 2	Service	Converting	Converting	Converting
Overall Rank 3	Converting	Design	Design	Design & Customer base
Overall Rank 4	Design	Customer base	Service	Service
Overall Rank 5	Customer base	Service	Printing	-

Source: Karstedt Partners LLC, SGIA

The overall rankings are not surprising but are somewhat skewed by the number of participants per segment. What is surprising is the differences by segment. The qualitative interviews revealed a reason for this. Among converters where high graphics is a low percentage of their overall volume, printing, and meeting the threshold requirements for participation is the biggest challenge, while finding and managing the customer base is the least challenging aspect of what they do. Contrast this with the converters that have a high percentage of high graphics volume, the reverse is true (Table 4).

Investment in digital printing is found in all three segments. We will investigate the different uses for digital printing by segment, and where and how it fits their business in the section on digital printing.

With the printed image being so critical, what is also important around print management? Total cost and lead time are ranked high by our respondents (Table 5).

**Table 5: Critical areas of importance for high graphics**

Rank the importance to your choice of the print process, with 1 being the most important and 5 the least important factor (N=53).	High Graphics Participation Level			Total
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16	
Overall Rank 1	Image Quality	Image Quality	Image Quality	Image Quality
Overall Rank 2	Total Cost	Lead Time	Total Cost	Lead Time
Overall Rank 3	Lead Time	Application Requirements	Lead Time	Total Cost
Overall Rank 4	Application Requirements	Color Gam-ut/Spot Color	Color Gam-ut/Spot Color	Application Requirements
Overall Rank 5	Color Gam-ut/Spot Color	Total Cost	Application Requirements	Color Gam-ut/Spot Color

Source: Karstedt Partners LLC, SGIA

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To better understand the participation of the segment one converters (high graphics <10% of overall business), we asked them, if high graphics is not the driving force in their business, why do customers come to them for that type of work (Table 6)?

**Table 6: Why customers purchase high graphics from a converter that does not specialize?**

High graphics is not the driving force in your business – why do customers come to you for high graphics? (Select all that apply.) (N=14)	With Digital	Without Digital	Total
It's easier and more convenient for our customers to order from us	21.4%	50.0%	71.4%
The graphics orders are typically combined with other requirements we produce, so it's easier to keep the order together	14.3%	28.6%	42.9%
The high graphic jobs we receive are not at a volume threshold where other converters are interested	7.1%	7.1%	14.3%

Source: Karstedt Partners LLC, SGIA

Additionally, we asked whether they have discretion to pass on orders that do not fit their operating model. Convenience is the main reason for that. The discretion to accept the order or to turn it away depends largely on the customer and on the order itself (Table 7).

**Table 7: Discretion to turn high graphics work away**

High graphics is not the driving force in your business – do you have discretion to pass on orders that do not fit your operating model? (Select all that apply.) (N=14)	With Digital	Without Digital	Total
It depends on the customer	21.4%	35.7%	57.1%
It depends on the order	14.3%	35.7%	50.0%
It depends on how much involvement we have	7.1%	21.4%	28.6%
It depends on how much we can charge for the order	14.3%	28.6%	35.7%

Source: Karstedt Partners LLC, SGIA

Based on the qualitative interviews, converters tend to accept more small orders when they have a digital press. They are cautious in this approach as the small orders require other processing steps. Acceptance is far more likely to serve an existing customer or to "buy goodwill" from a prospect.

As printing is the primary driver for participation, which printing processes are most commonly found at high graphics producers?

**Table 8: How they produce high graphics corrugated**

Please describe your printing capabilities for producing high graphics. (Select all that apply) (N=53).	High Graphics Participation Level			Total
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16	
Offset	7.1%	21.7%	31.3%	20.8%
Flexo Pre-print	7.1%	26.1%	12.5%	17.0%
Flexo Post-print	35.7%	52.2%	43.8%	54.7%
Digital	42.9%	60.9%	81.3%	62.3%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

Post-print flexo is used a lot for producing high graphics (Table 6). Converters without offset or pre-print capabilities may source these products from other converters or specialty printers.

With so many print options available, how are decisions made on which process to use? Converters either present options and recommendations, or just the recommendations to the customer. It's much rarer that the customer would leave it up to the converter to decide, but it happens more frequently for those without digital (Table 9).

**Table 9: How is the decision made on which print process to use?**

How is the decision made on which process to use? (Select all that apply.) (N=53)	High Graphics Participation Level			
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%	Total
We present options and recommendations	57.1% w/Digital – 50.0% w/o Digital – 50.0%	56.5% w/Digital – 69.2% w/o Digital – 30.8%	68.8% w/Digital – 81.8% w/o Digital – 18.2%	60.4% w/Digital – 68.8% w/o Digital – 31.2%
Customer leaves it up to us to select	21.4% w/Digital – 33.3% w/o Digital – 66.7%	13.0% w/Digital – 0% w/o Digital – 100%	12.5% w/Digital – 50.0% w/o Digital – 50.0%	15.1% w/Digital – 25.0% w/o Digital – 75.0%
We make recommendations to the customer	21.4% w/Digital – 33.3% w/o Digital – 66.7%	30.4% w/Digital – 71.4% w/o Digital – 28.6%	18.8% w/Digital – 100% w/o Digital – 0%	24.5% w/Digital – 69.2% w/o Digital – 30.8%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: Karstedt Partners LLC, SGIA

There is a good deal of collaboration between customers and high graphics suppliers. Having digital capabilities expands the options, especially as it relates to service capabilities and differentiation.

### Key Takeaways

- High graphics participation is not dependent on converter size, although smaller converters tend to be more niche-oriented.
- Competitive differentiation when serving large global/regional brands occurs at the print, design and converting level. Among small-to-mid-sized participants, competitive differentiation is more service-oriented.
- The process of producing the print component of the order varies by converter business model. Some converters produce all print requirements in-house, some source all or a high percentage of their print, while others do a combination of both. Sourcing strategy is and will be impacted by digital printing.
- Application orientation in the mix of products – POP/display vs. cartons –also varies among converters.
- Outlook for digital printing: Digital printing gained entry in the corrugated market primarily focused on the POP/display side of converters' applications. With single-pass printing (both sheet and web-fed solutions), the application opportunities are now increasing to cartons.

The value proposition driving both application areas shows some common characteristics:

- Managing specific areas of the business by relieving operational bottlenecks.
- Connecting with speed to market and just-in-time initiatives to accelerate new product launches, manage products on either end of mainline production requirements and provide new capabilities for supply chain optimization.
- Personalization/customization/campaign management – limited use, primarily occurring in POP/display. Converters anticipate broader use around single-pass technology.
- Digital adoption, and the subsequent market impact (as measured by volume share) has been slow to develop in the corrugated market. Our research indicates this is more a function of throughput and subsequent limitations on participation levels slowing adoption, rather than market acceptance or concerns related to the technology.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

### Understanding the Role of Outsourcing in Decision-Making

In an industry that is so focused on volume and low-cost production, where does sourcing fit? Among those converters sourcing high graphics, what do they source, why do they source and how much do they source?

The converter segmentation revealed a high amount of sourcing occurs in the high graphics market. How prevalent is it, and how is it managed? As seen from Table 10, the work is usually produced in-house and outsourced or produced in-house completely, depending on the level of participation in high graphics.

**Table 10: Is work produced in-house or outsourced?**

Do you produce all, source all, or a combination of both for high graphics? (N=53)	High Graphics Participation Level			Total
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%	
Outsource All	35.7%	0.0%	6.3%	11.3%
Produce All	14.3%	39.1%	43.8%	34.0%
Produce and Outsource	50.0%	60.9%	50.0%	54.7%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

**Table 11: High graphics distribution: internally-produced vs. outsourced**

What is your high graphics distribution -internally-produced vs. out-sourced? (N=53)	High Graphics Participation Level		
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%
Internally-Produced	55% w/Digital-88% w/o Digital-31%	80% w/Digital-87% w/o Digital-69%	66% w/Digital-68% w/o Digital-58%
Outsourced	45% w/Digital-12% w/o Digital-69%	20% w/Digital-13% w/o Digital-31%	34% w/Digital-32% w/o Digital-42%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

Of the 53 companies responding 35 (66%) outsource to some level. Why do they outsource?

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 12: Reasons for high graphics outsourcing**

Why do you outsource a percentage of your high graphic requirements? (N=35)	High Graphics Participation Level			Total
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%	
Cost	33.3%	13.6%	20.0%	17.1%
Customer Specifications	0.0%	22.7%	40.0%	25.7%
Print Requirements	66.7%	31.8%	40.0%	37.1%
Job Requirements	0.0%	31.8%	0.0%	20.0%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

The interviews revealed high graphics converters are involved in a broad range of product requirements, from cartons to POP/display. Converters were clear in their message – sourcing is required to meet the wide variety of customer requirements. “We have a high percentage of single-use orders. Every order presents different challenges for structural design, printing, cost and lead-time. Flexibility is key, and sourcing presents options we can take to the customer to not only secure the order, but to produce the order.”

What options or materials do converters outsource? (Table 13).

**Table 13: Material/process utilized**

For your sourced high graphics requirements, which print process, or processes are you most likely to utilize? (Select all that apply.) (N=35)	High Graphics Participation Level			Total
	High Graphics <10% N=12	High Graphics 11-50% N=14	High Graphics >50% N=9	
Litho Label/Laminates	50.0% w/Digital-0% w/o Digital-100%	85.7% w/Digital-41.7% w/o Digital-58.3%	77.8% w/Digital-0% w/o Digital-100%	71.4% w/Digital-44% w/o Digital-56%
Printed sheets	33.1% w/Digital-0% w/o Digital-100%	7.1% w/Digital-0% w/o Digital-100%	0.0%	14.3% w/Digital-0% w/o Digital-100%
Printed and Converted Product	8.3% w/Digital-0% w/o Digital-100%	7.1% w/Digital-0% w/o Digital-100%	0.0%	5.7% w/Digital-0% w/o Digital-100%
Combination of all	25.0% w/Digital-100% w/o Digital-0%	14.3% w/Digital-100% w/o Digital-0%	11.1% w/Digital-100% w/o Digital-0%	17.1% w/Digital-100% w/o Digital-0%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

The qualitative interviews revealed that while a digital investment may reduce the amount of sourcing, it does not eliminate sourcing. The following comments were offered as to why:

- "Customers may continue to specify offset."
- "The job exceeds the economic threshold for our digital press."
- "The job exceeds our target run length for the digital press."
- "In some cases, we may be producing samples for a production run. We know the customer is requiring offset for the production run. Unless the customer is familiar with the digital process and the differences in the image, we may elect to use litho for the samples to have a better match between production and samples."

Among the 33 companies with digital capabilities, we asked a series of questions to assess the impact outsourcing had on their investment decision:

- Did your ROI analysis include moving outsourced production to your digital press?  
Just over half (51.5%) said moving outsourced production back in house was part of their analysis, with slightly less than half (48.5%) saying it was not part of the analysis.
- Including outsourced production as part of the ROI analysis increased as the percentage of high graphics participation increased.
- The qualitative interviews revealed that while most of the outsourcing was litho, prior to making a digital investment, outsourcing of digital printing was also occurring. The converters were asked how much of the overall outsourced work have they moved to the digital press? Although the numbers ranged from 5% to 90%, the average percentage of litho label/laminate business moved from outsourced business to in-house was 40%, and 55% of previously outsourced digital volume was brought in-house, with range between 30% and 100%.

The addition of digital assets does increase the percentage of in-house production, as Table 14 represents. A word of caution, the percentages shown are sensitive to the company size of the respondents. As digital printing is a much smaller percentage of a large company's overall business, the impact will be much smaller. In the qualitative interviews, converters stated the impact is not measured in volume, but in the number of jobs, or set-ups eliminated.

**Table 14: What percentage of your overall outsourced products have you moved to the digital press?**

What percentage of your overall outsourced products have you moved to the digital press? (N=17)	High Graphics Participation Level		
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%
Litho Label/Laminate	67% Range: 40%-90% N=4	33% Range: 20%-50% N=10	25% Range: 5%-50% N=3
Digital brought in-house	0%	50% N=2	60% Range: 30%-100% N=3

Source: Karstedt Partners LLC, SGIA

What were the challenges of moving outsourced requirements to the digital press? The two major obstacles were throughput limitations on the digital press (60.6%) and cost (54.5%) (Table 15).



# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 15: Challenges faced in moving outsourced work in-house**

What obstacles or challenges did you have in moving outsourced requirements to your digital press? (N=33)	High Graphics Participation Level			Total
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%	
Digital Capacity	16.7%	21.4%	46.2%	30.3%
Cost	33.3%	64.3%	53.8%	54.5%
Throughput Limitations	50.0%	78.6%	46.2%	60.6%
Image Quality	16.7%	21.4%	38.5%	27.3%
Customer Resistance	16.7%	21.4%	0.0%	12.1%

Source: Karstedt Partners LLC, SGIA

Digital is pulling business from litho when converters make an investment in digital assets. The qualitative interviews revealed a similar trend with converters that do not have digital assets. We asked several questions in the quantitative interviews seeking more information. Of the 20 high graphics converters without digital assets participating in the quantitative interviews, 17 stated they sourced some percentage of their high graphics printing.

**Table 16: Digital pulling work from litho**

As sources of digital printing increase, which process – digital printing or litho label/laminate – would be your choice for “short-run jobs”? (N=17)	High Graphics Participation Level		
	High Graphics <10% N=9	High Graphics 11-50% N=7	High Graphics >50% N=1
Digital	55.6%	85.7%	100%
Litho/Label Laminate	44.4%	14.3%	0%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

Why would the converter prefer one process over the other? Digital is chosen for its easiness and ability to eliminate extra steps in the process and increase productivity (Table 15).

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 17: Pros and cons of outsourced digital vs. litho**

Which factor would influence your decision? (Select all that apply) (N=17)	High Graphics Participation Level		
	High Graphics <10% N=9	High Graphics 11-50% N=7	High Graphics >50% N=1
Digital printing may provide greater flexibility on sheet sizes that better align with converting capability.	11.1%	0%	0%
We are set up to handle lamination, digital printing is a new process for us.	33.3%	0%	0%
Digital printing may provide greater flexibility on sheet sizes that better align with converting capability.	11.1%	0%	0%
Digital printing is an easier process – from design to receipt of printed sheets ready for converting.	44.4%	28.6%	0%
Digital printing eliminates a process (lamination), improving plant productivity.	0%	57.1%	100%
I may have more material options with digital printing.	0%	14.3%	0%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

Twelve companies currently source digital requirements. We asked if they had a preference in their material and supplier selections.

**Table 18: What is outsourced**

When sourcing digital printing, do you have a preference on the type of digital printing you receive? (N=12)	High Graphics Participation Level		
	High Graphics <10%	High Graphics 11%-50%	High Graphics >50%
Top Sheet	50%	0%	0%
Combined Board	25%	57.1%	100%
Depends on Requirements	25%	28.6%	0%
No Preference	0%	14.3%	0%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 19: Outsourcing options – supplier preference**

When considering potential suppliers for sourced print, which supplier(s) are you more likely to purchase from? (Select all that apply.) (N=12)	High Graphics Participation Level		
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%
A corrugated converter capable of providing both offset litho label/laminate and direct digital print to combined board	30%	45.5%	50%
A third-party printer not involved in corrugated converting, capable of providing both offset litho label/laminate and direct digital print to combined board	20%	18.2%	0%
I have no preference	10%	9.1%	0%
I will continue to use my existing supplier of litho, and find a specialty printer to supply my digital needs	40%	27.3%	50%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

### Key Takeaways

- While sourcing is not a significant factor in the ROI analysis, converters try to maximize in-house production upon investing in a digital press.
- Digital printing is taking share from previously sourced offset requirements.
- Many converters view digital printing as an easier process for managing outsourced requirements.
- Even among converters with a digital press, outsourcing continues. The availability as well as capabilities of single-pass digital solutions are anticipated to significantly impact the outsourcing of offset products.
- Customer acceptance of digital print quality, the process and the capabilities are increasing based on the converter interviews.

### The Path to Digital Adoption – Those Who Have Already Invested

Of the 77 qualitative and quantitative interviews, 84.4% respondents had conducted an evaluation around potential investment into digital printing. Again, the numbers are skewed, as we were consciously looking for converters knowledgeable about digital printing. The high percentage of evaluations does create a good database to assess the process, resources and issues they utilized or encountered during the evaluation. We will utilize the quantitative interviews to discuss the results. In the quantitative interviews, 88.7% of the 53 converters participating in high graphics had evaluated digital printing.

Most converters evaluated through a committee approach. Many converters stated management participation was dependent on the vision or connection to corporate strategy. Management was actively-engaged if they felt digital printing was going to be a significant piece of current or future strategy. If digital investment was being pursued to address a specific issue in the business, management retained the final approval on the investment, but was far less involved in the analysis and evaluation. Corporate size also had a significant impact on the structure and make-up of the evaluation team. The integrated participants reported an internal champion leading the process. Cross-functional members were added to support the evaluation. Individual converting locations desiring to pursue digital printing typically had to work through the evaluation team. The individuals interviewed from the integrated companies indicated the process is very difficult due to the different levels of understanding related to digital printing, and functional areas pressing their own needs rather than corporate or customer needs.

In the executive summary, we grouped converters into these three classifications:

- I believe digital printing is the future of our business, and we need to be an early adopter to gain competitive advantage.
- I have an immediate need in my business that I feel digital printing can address. The opportunity to remedy this pain point outweighs the inherent risks around the investment.
- I believe digital printing will ultimately provide competitive advantage, but that alone does not justify investment. Likewise, our internal pain points that can be addressed by digital printing get us partway to justifying the investment. It takes the combination of the two to justify the investment.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

Early adopter business leaders and their organizations are more comfortable dealing with the unknown. Among the converters adopting, the teams reported the challenge was not if, but what, who and when. For those not adopting, the challenge to the team, or within the team, was, "Does digital printing make sense for our business?" It's difficult to conclusively answer the latter when factual data does not exist.

Next, we wanted to gain insight on the tools they used in the evaluation process.

**Table 20: What tools were used in the evaluation process?**

What tools did you utilize in your evaluation? (Select all that apply.) (N=33)	
Internal cost analysis	78.8%
Vendor support/analysis for ROI	72.7%
Total cost of ownership (TCO) analysis	60.6%
Job run analysis	57.6%
Customer interviews to assess price opportunity	21.2%
Work with industry consultant/expert on the ROI analysis	3.0%

Source: Karstedt Partners LLC, SGI/A

We consciously limited the potential responses in this section based on the feedback from the qualitative interviews. Converters assess image quality and the physical properties of the printed image. They also test performance through converting, and some test performance on packing lines.

Most of the analytical work was focused on costing and trying to estimate the amount of volume that could potentially move to the digital press. Converters stated this was done to build the investment model, help construct the workflow and operational support required, and to define a pricing structure for the market. The converters all stated this was an interesting exercise as it helped them better understand the potential role of digital printing, as well as building an operational model. They also cautioned not to put too much credence into the numbers and use the model as a guide. They said to establish flexibility into the plan.

*"As we began to develop our cost baseline for how we do things today, it became apparent just how lax we are in our costing processes. We update consumables, but machine rates and burden rates had not been updated in quite a while. It took us a long time, and the help of a consultant, to make sense of our costing system."*

*"Our costing system is standards-based, with costing variances captured, but hard to understand. As so much of our digital work is focused on resolving production problems, the costing system was inaccurate. We started to notice the positive impact of our digital press on our monthly reports two months after installation. Our estimates were way understated, and in hindsight, we can identify where and why the improvement occurred, but we never would have found it in the front end of the analysis."*

### Understanding the Digital Investor

Previous sections have touched on the differences between investors and non-investors. Based on the interviews, early investors broadly fell into the following classifications:

- New, or limited participants in high graphics who feel digital printing may provide differentiation to the market.
- Current high graphics participants that have evaluated and committed to a digital investment to address a current pain point.

Corrugated converting is a highly competitive business. While differences exist between high graphics operations and traditional converting facilities, both operations share many of the same competitive challenges – internally, within their operation, as well as externally in the market. Interview participants with and without digital printing stated their business is growing. When asked about the factors behind their high graphics growth, although more than a quarter of respondents (27.3%) depend on new customers, the majority still relies on the combination of new and existing customers (66.7%). Only 6.1% rely solely on current customers.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

The qualitative interviews revealed several challenges in sustaining profitable growth:

- Differentiation is difficult, as “like competitors” generally have similar capabilities in product, cost and service. “Creativity and innovation become key differentiators in attracting new business, but the opportunity to offer something truly unique does not occur that frequently in our industry.”
- Availability of resources – qualified people, in sales as well as operations, are difficult to find. “Innovation is tough as it may require a different skill set. Our business is basically set up to do repetitive operations extremely well. This is what the business, and the individuals, have been set up to do. While we may see change as an opportunity, implementing change can be very difficult.”

This same group was asked, “Do you believe digital printing is or will become a significant factor in driving your high graphics growth?” All 33 respondents said “yes.”

A common characteristic of the early adopters is their strong belief that digital printing will ultimately provide opportunity. The qualitative interviews revealed that while the early adopters believe in the future of digital printing, not all early adopters have digital printing as a significant driver in their corporate strategy. We found similar results in the quantitative interviews (Table 21).

**Table 21: Digital as part of a corporate strategy**

Is digital printing a catalyst driving your growth strategy? (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Yes	66.7%	50.0%	84.6%	66.7%
No	33.3%	50.0%	15.4%	33.3%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

This is where the participation rates in high graphics become important. Where high graphics is more than 50% of the business, 84.6% of converters say digital printing is driving their strategy. This is not surprising, as this group includes new market entrants dedicated to digital printing. For this group, digital printing drives their business, and they are 100% committed to developing digital capabilities as well as a digital marketplace. The more mainstream converters fall into the 11%–50% range. This group is split 50-50 between “yes” and “no” respondents. Their big question: “How much of my existing business can be ‘touched’ by a digital solution, and how much growth can be generated through a digital solution? Is the combination of the two worth the investment, potential loss of focus and effort required around a digital investment?” At least for this group, the answer was “yes.” For many others, the answer was “no,” primarily due to the limited throughput of scanning systems. The jury is still out on the impact of single-pass printing on the rate of adoption, but single-pass printing certainly has the attention of this group of converters. Among the less than 10% range converters, 66.7% have digital printing as a significant driver of strategy. The qualitative interviews revealed high graphics participation in this group is slightly different, as mentioned earlier. For this group, scanning technology does align with output requirements, at least for market entry.

Early investors in this group can be classified as:

- Investors seeking to “make life easier,” either by addressing a specific pain point, or by investing in a digital solution they felt is an easier process to manage.
- Investors looking for differentiation in the market.

Both digital technologies – scanning and single-pass – will be evaluated by all three segments. Technology selection will be based on the anticipated volume required, the desired throughput rate to achieve that volume and the strategy driving the investment. Some converters are leveraging digital printing to fundamentally change their business or market model (strategic reasons), while others are utilizing digital printing to address specific business needs (tactical response). The industry will need to monitor companies pursuing business or market model change, as these are disruptive in nature. Converter success in this area may leave other competitors scrambling to catch up.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

We briefly touched on the process and tools converters utilized to conduct their analysis around potential digital adoption in the previous section. Table 22 is used to show their initial approach – at least half (51.5%) had a management team evaluating the digital.

**Table 22: Involvement in the digital solution evaluation**

How did your organization research and select your digital equipment? (N=33)	High Graphics <10% N=6	High Graphics 11-50% N=14	High Graphics >50% N=13	Total
The management team analyzed, evaluated and made the decision.	50.0%	35.7%	69.2%	51.5%
A core group of a few individuals was assigned the task of analysis and evaluation. The core team made a recommendation to management.	33.3%	35.7%	15.4%	27.3%
A broad cross-functional team was assigned the task of analysis and evaluation. The cross-functional team then made a recommendation to management.	0.0%	14.3%	0.0%	6.1%
A combination of these.	16.7%	14.3%	15.4%	15.2%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

Knowing the number of potential suppliers they evaluated is also a key metric to understand. As can be seen from Table 23, they evaluated at least two suppliers, but the majority evaluated three or more.

**Table 23: Number of suppliers evaluated**

How many suppliers were you initially evaluating? (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
One Supplier	0.0%	0.0%	0.0%	0.0%
Two Suppliers	16.7%	14.3%	15.4%	15.2%
Three or More Suppliers	83.3%	85.7%	84.6%	84.8%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

How long did it take for the decision? It ranges from less than 6 months (30.3%) to up to 12 months (36.4%) and from 12 to 18 months (27.3%) (Table 24).



# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 24: How long did the decision process take?**

How long did your process take until a PO was issued for the equipment? (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Less than 6 months	50.0%	21.4%	30.8%	30.3%
6-12 months	33.3%	14.3%	61.5%	36.4%
12-18 months	16.7%	57.1%	0.0%	27.3%
18-24 months	0.0%	7.1%	7.7%	6.1%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

What lessons were learned during the ramp-up process? Interestingly, the two most problematic areas had to do with business issues – developing a business model and sales training (Table 25). One would think technical issues would have been more troublesome, but this speaks well to both the purchasing company and the OEMs in helping to get the technology right, where there is lacking on the business side of things.

**Table 25: Major challenges encountered in ramp-up**

What are the major challenges in installing and ramping up your digital operations? (Please evaluate each process, with 1 being the least challenging and 5 being the most challenging.) (N=33)	Average ranking of issue by group		
	High Graphics <10%	High Graphics 11-50%	High Graphics >50%
Assessing the capabilities of various digital suppliers	3	3	3
Developing our digital business model	4	4	4
Gauging, evaluating customer acceptance	3	3	3
Integration into other systems (e.g., MRP, financials, business reporting, etc.)	3	2	2
Print production, Quality assurance, Maintenance	3	3	3
Sales training and education	5	4	5
Understanding digital technology	4	3	5
Understanding/developing an accurate ROI model	3	3	2
Workflow and integration issues (Pre-press, customer service, etc.)	3	3	3

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

Table 26 goes together with lessons learned as it addresses the level of satisfaction companies had with their vendors' support in the ramp-up phase.

**Table 26: Satisfaction with vendor support during ramp-up**

How satisfied are you with vendor(s) support in each of the following areas? (5=Extremely Satisfied, 4=Somewhat Satisfied, 3=Neutral, 2=Somewhat Dissatisfied, 1=Extremely Dissatisfied.) (N=33)	Average Rating		
	High Graphics <10% N=6	High Graphics 11-50% N=14	High Graphics >50% N=13
Consumable availability and support	3.33	3.64	4.00
Diagnostic and ongoing educational programs	3.17	3.50	3.08
Installation of equipment	3.50	4.00	3.50
Planning for our pre-press and front end (order entry) needs	3.17	3.07	3.31
Planning our facility and plant layout	3.67	4.07	3.69
Planning for our post-press and converting needs	3.00	3.50	3.77
Preplanning our personnel needs	4.00	3.14	3.46
Training of our sales team	3.17	2.79	3.31
Training of our operators and maintenance personnel	3.83	3.86	4.00

Source: Karstedt Partners LLC., SGIA

Despite the obvious differences between digital and analog printing, digital solutions are not overly complex. At least for scanning systems, and especially among those converters utilizing digital printing to address internal operational issues, integration was fairly straightforward. Converters commented that a reason for this was the "limited nature" of digital printing in their operation.

*"We could easily place our digital press in an out-of-the-way area and develop work around solutions for pre-press and converting meeting the needs of our digital operation while not being disruptive to our core business."*

Suppliers generally receive high markets for installation support, initial training and post-installation service support.

*"The goal from our side, as well as our supplier, is to make us as self-sufficient as possible, as quickly as possible. For the most part, this goal was achieved. The issue becomes, we don't know what we don't know. As new challenges or opportunities materialize, they are new to us, they may be new to the supplier, and it takes time and resources to figure them out. The industry needs specific training beyond the introductory level, to be conducted three-to-six months after installation to enhance capabilities in workflow, design and sales."*

This changes as the level of volume participation increases.

*"When digital printing is a significant piece of your daily volume, 'workaround solutions' are no longer sufficient. The question of workflow increases in importance. Do you align digital printing with your existing workflow, optimize your digital operation around a dedicated operation, or a combination of both?"*

Single-pass printing adds significant complexity. Web-fed solutions add an additional level of complexity, as they will involve a corrugator or laminator to the equation. Design and pre-press are also managed differently.

Sales training is identified as an area of concern for several reasons:

*"While we have a strong desire to grow our digital business, it needs to be managed. Just because we have the capability to produce on a digital press does not mean we should or desire to pursue every order."*

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

*"Digital printing is about value-selling. While our salespeople can and do sell value-add, digital printing adds additional opportunities around how value is defined. These may take time to materialize. Do our salespeople have the capability, and the patience, to engage around these new opportunities?"*

*"The desire to support experimentation at the internal as well as the external level is always in conflict with our day-to-day operation. We have to guard against a rather small part of our business becoming a major distraction."*

These comments are further surfaced when you look at how converters are positioning and utilizing their digital presses. The majority use them to enter the market (78.8%) and to differentiate the product (75.8%) (Table 27).

**Table 27: Converters' value from digital investment**

What value does digital print-ing provide? (Select all that apply.) (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
The ability to offer a differentiated product	50.0%	71.4%	92.3%	75.8%
A lower cost of entry, through sourcing or direct investment	83.3%	85.7%	69.2%	78.8%
Fewer competitors	50.0%	21.4%	46.2%	36.4%
More samples, more opportunities for production orders	16.7%	57.1%	76.9%	57.6%

Source: Karstedt Partners LLC, SGIA

What do they use the digital press for? It is used for low-volume production (75.8%), sampling (69.7%), improving efficiency (57.6%) and to better serve the customers (51.5%) (Table 28).

**Table 28: Use of digital press**

What do you use your digital press for? (Select all that apply.) (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Sampling, concepts and trials	100.0%	71.4%	53.8%	69.7%
To manage low-volume pro-duction requirements	100.0%	78.6%	61.5%	75.8%
Improve efficiency of our high graphics analog presses	16.7%	71.4%	61.5%	57.6%
To better serve our customers	50.0%	50.0%	53.8%	51.5%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

While it is true that converters, especially those involved in single-pass, are still validating certain assumptions in their plan and learning as they go, the information obtained thus far – and how they are moving forward with that information – was noteworthy. We pledged anonymity and protection of confidential information to interview participants, and we intend to honor that pledge by not revealing specific actions.

The message we desire to convey is this. The plans we were exposed to contain clarity and depth. They have been vetted through customer discussions. Some are in the early stages of execution. The plans are gaining traction in the market, and – as demonstrated with an earlier table around ROI attainment – converters are developing realistic, measurable plans, supported by execution to deliver on those plans. Single-pass capacity has more than doubled the available digital capacity in the market, with additional installations coming soon. What will be the impact on your business?

Table 29 demonstrates the measured approach converters have taken in actively promoting their digital capabilities. Let's focus on the 11%-50% segment. This segment is the traditional converter, participating in both POP/display and cartons, with a substantial presence in high graphics printing. About half of the converters in this segment are not actively promoting their digital capabilities.

**Table 29: Converters' promotion of their digital investment**

We actively promote our digital capabilities in the market. (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Agree	66.7%	57.1%	76.9%	66.7%
Neutral	33.3%	35.7%	23.1%	30.3%
Disagree	0.0%	7.1%	0.0%	3.0%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

The qualitative and quantitative interviews revealed many of these converters are invested in scanning systems. Some have already invested in single-pass solutions. They do not promote their digital capabilities today due to throughput constraints. Single-pass removes this constraint, and they will begin to actively promote and solicit customers to their vision of a digital business model (Table 30).

**Table 30: Framing the digital business model**

Digital printing today is more a service offering than a differentiated product offering. (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Agree	100.0%	35.7%	15.4%	39.4%
Neutral	0.0%	14.3%	15.4%	12.1%
Disagree	0.0%	50.0%	69.2%	48.5%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

The customers are also interested in increasing their digital participation (Table 31), and the level of interest increases with the increase of high graphics participation level of converters. Digital sales are trending upward as well.

**Table 31: Customer receptivity to digital offering**

Our customers are seeking ways to increase their digital participation. (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Agree	50.0%	71.4%	92.3%	75.8%
Neutral	50.0%	21.4%	7.7%	21.2%
Disagree	0.0%	7.1%	0.0%	3.0%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

For about half of respondents (48.5%), the ROI target was between one and three years (Table 32), and only 6.1% didn't reach the target, whereas for 39.4%, it was too soon to tell and 48.5% were successful in reaching their target.

**Table 32: ROI target for digital investment**

If you established an ROI target for this investment, what was the target? (N=33)	High Graphics Participation Level			Total
	High Graphics <10% N=6	High Graphics 11%-50% N=14	High Graphics >50% N=13	
Less than 1 year	33.3%	14.3%	30.8%	24.2%
1-3 years	33.3%	57.1%	46.2%	48.5%
More than 3 years	33.3%	28.6%	23.1%	17.3%
Total	100%	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

### Key Takeaways

- Respondents indicate investment in digital printing is delivering/exceeding the expected business and financial projections established.
- Converters have different reasons driving digital investment. Increased throughput enabled by single-pass printing is driving converter decision-making from the tactical (addressing current pain points) to the strategic (competitive advantage, business model change).
- As volume and levels of participation increase, digital integration takes on a higher level of importance. Suppliers can assist the converter to become operational, but the converter must recognize and commit to a continuous improvement path to optimize the operation.
- Industry capacity for digital printing has more than doubled in the past two years, with additional capacity coming on-line. Converters can connect to digital printing through direct investment, or sourcing through third-party printers.
- The digital industry is at a critical juncture due to the capacity increases. Many converters are watching to assess the effectiveness of digital printing and clarity related to the risk associated with the investment.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

### Understanding the Non-Investors

Fourteen of our 53 companies involved in high graphics went through a formal analysis around a potential digital investment, but opted to not make the investment. Two additional converters followed the same path in the qualitative interviews. As before, neither company size nor the participation rate in high graphics was a significant factor in that decision. The top three reasons for not participating in digital are:

- Digital printing did not touch enough of the business to justify investment (insufficient volume or opportunity)
- Concerns about the level of print quality and market acceptance
- Concern about integration issues

Based on our discussions with the non-investors during the qualitative interviews, we believe the primary factor boils down to opportunity. Our conversations revealed the converters found digital printing intriguing enough to investigate, but their investigation did not deliver a compelling reason to justify investment. This does not mean these converters will not become digital investors as market conditions change. They will continue to monitor events and invest when a compelling reason for investment occurs.

Like digital investors, non-investors see growth opportunities with digital printing. The top three values that non-investors recognize are as follows:

- A lower cost of entry, either through sourcing or direct investment
- The ability to produce more samples, creating more opportunities for production orders
- The ability to offer a differentiated product

In the quantitative interviews, 78.6% of the non-investors said they currently source digital printing. Most are sourcing for cost-reduction purposes and/or sampling/prototyping requirements. All feel they will gain some type of competitive advantage by outsourcing. The median number of digital orders sourced per month by non-investors was 3 and the median sheet quantity per month was 475. While the frequency and volume of orders may not be significant, the impact is. "The flexibility of outsourcing digital products enables us to do more samples and prototypes without tying up internal resources." Half of non-investing participants choose combined board as their preferred type of digital printing when outsourcing.

When considering potential suppliers for sourced print, converters either choose a corrugated converter capable of providing both offset litho label/laminate and direct digital print to combined board, or they continue to use their existing supplier of litho and find a specialty printer to supply their digital needs.

### Will digital printing migrate to one-to-two-color printing?

While not "in scope" for this study, we were curious about the prospects' use of digital printing in one-to-two-color work and wanted to explore this issue. The output capabilities of web-fed equipment extend into desired production quantities, so what do converters feel? We asked the question to the four converters that did not participate in high graphics, and seven of the 12 converters in the non-investor group whose high graphics volume fell into either the <10 or 11%-50% segments were also able to respond.

Of the 11 responses received, four felt digital printing was feasible for one-to-two-color work, while seven did not. The following are the reasons cited as the major issues around digital participation:

- The capital cost of a digital system is too high – 45.5%
- The process changes too much; it will be too difficult to support a second process – 18.2%
- Technology and integration issues – 18.2%
- The cost of print is too high – 18.2%



# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

We asked this question due to information received during the qualitative interviews – several converters are utilizing their digital presses for one-to-two-color work.

*“It is not a significant part of what we do in our digital operations, but we have learned to utilize the flexibility of the digital press. If we need to move things around to optimize the operational flow, the problem jobs creating the bottleneck are moved to the digital press, if possible. The increase in productivity for the day more than offsets the perceived higher cost of the digital press for that run.”*

Ultimately, this is what the early adopters of digital printing have learned: How to maximize jobs across their entire operation to achieve the highest throughput at the lowest cost. This is the common starting point for all the investors. In parallel, they began work to solicit future business, enabling competitive advantage.

When we review the previously stated objectives we see they are similar to those raised in the early 2000s, when digital printing was being introduced to the corrugated market. There is no right or wrong answer regarding investment. The 33 who have invested had sound reasons why to invest. Likewise, the 19 who did not invest also had sound reasons behind their decision.

As stated at the beginning of this research, a digital investment is not for everyone, and for some companies, it may be the last thing they should do. As we advise our converting clients, digital printing will have a position in the corrugated industry. We are still years away from having a true picture on the magnitude and the impact of that position. Companies desiring to be on the offense are investing. We advise clients desiring to play defense to understand the technology, understand the deployment models, and understand their position with their customer and how their customer will respond when solicited by a converter with digital capabilities. One easy way to model this is to ask them if they purchase primary labels. If they do, ask the following questions:

- Do you purchase digitally-printed labels?
- If yes, what value does digital printing provide that you could not get through analog printing?
- What percentage of your business has gone digital?
- Do you see that percentage increasing?
- Did you take on a new supplier to support your digital purchases, or did your current supplier invest in a digital solution?

If you really want to understand the future, ask the same questions about their corrugated business.

### **What do Customers Think?**

Digital printing conference organizers work hard to get brand owners on the stage to hear what they are interested in related to digital printing. After all, they are the consumer of the printed packaging that package printers are producing, so it is natural to want to know what your customers are – or will be – looking for 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 five years. 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. We were sure to include both large and small brands. The size of the companies we spoke with went from \$100 million to \$3+ billion in annual sales and ran the gamut from industrial chemicals to food to health and beauty producers. The common thread was they were all 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 was for cost reductions and process-simplification reasons. Most mentioned notable marketing programs that are often touted from 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 most 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 – that digital is having 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 they are open to the benefits that digital can bring them.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

Of those we spoke with, 27% said that recent acquisitions of smaller brands have brought 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 Cost*

One-third of brand owners stated their companies were good at understanding the total cost of an initiative 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 – those that would drive digital – as being as good when 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 surveyed converters, who – for the most part – thought digital print quality was acceptable for their 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 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.”

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

### Conclusions – Key Takeaways

#### Who are the adopters?

33 of the 77 companies (43%) participating in the survey have made an investment into digital printing. This percentage is admittedly high, as we intentionally “recruited” digital investors to participate. What is surprising is the diversity of the group.

- High graphics participation is less than 10% of total volume for 18% of our digital adopters. These firms also had between 20 and 499 employees.
- 42% of our digital adopters have high graphics penetration between 11%-50% of total volume. 71% of this adopter class had 100-499 employees. The remainder have over 1,500 employees.
- High graphics represented over 50% of total volume for the remaining 40% of our digital adopters. Participants in this segment are focused on high graphics, either as specialty converters or trade printers serving the print needs of corrugated converters.

The diversity of participation demonstrates that digital adoption cannot be defined by high graphics participation, company size or application orientation.

#### What drives adoption?

- Managing specific areas of the business by relieving operational bottlenecks.
- Connecting with speed to market and just-in-time initiatives to accelerate new product launches, manage products on either end of mainline production requirements, and provide new capabilities for supply chain optimization.
- Personalization/customization/campaign management – limited use, primarily occurring in POP/display. Converters anticipate broader use around single-pass technology.
- Digital adoption, and the subsequent market impact (as measured by volume share) has been slow to develop in the corrugated market. Our research indicates this is more a function of throughput and subsequent limitations on participation levels slowing adoption, rather than market acceptance or concerns related to the technology

#### Is digital printing a profitable investment?

Of the 33 digital investors, 8 (24%) had ROI target less than 1 year. 16 (48%) had ROI targets of 1-3 years, and the remaining 9 (28%) had ROI targets of greater than 3 years. About half of the respondents (48%) stated they had met or were on track to meet their ROI target. Only 2 (6%) stated they missed, or were behind their ROI target, while 15 (45%) stated it was too soon to tell.

#### Implications for digital adopters:

- Converters have different reasons driving digital investment. Increased throughput enabled by single-pass printing is driving converter decision-making from the tactical (addressing current pain points) to the strategic (competitive advantage, business model change).
- As volume and levels of participation increase, digital integration takes on a higher level of importance. Suppliers can assist the converter to become operational, but the converter must recognize and commit to a continuous improvement path to optimize the operation.
- Competitors are seeking opportunities for competitive advantage -- some by introducing disruption. Converters will need to look at all facets of their business, from customer acquisition, customer retention, design, and production to identify and optimize new avenues of opportunity.
- Technology continues to improve providing new avenues for opportunity, as well as new competitive pressure. Identify where and how you wish to compete in the market. Create a defensible position.
- Do not operate in a vacuum. As brand awareness increases, driven in part by broader brand participation with digital labels, flexible packaging and folding carton, identify early adopters at the brand level, and understand how digital printing is being positioned in other applications.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

### Implications for non-adopters:

- Industry capacity for digital printing has more than doubled in the past two years, with additional capacity coming on-line. Converters can connect to digital printing through direct investment, or sourcing through third-party printers.
- Pursuing new customers with a new product can be expensive and a distraction for your core business. make sure you have weighed the risk/reward.
- “Low hanging fruit” opportunities do exist for converters seeking to become the provider of high graphics corrugated to current accounts. Opportunities materialize in accounts where high graphics requirements are a small percentage of the total buy.
- For many converters, sourcing digital printing provides a lower cost of entry into high graphics printing, better alignment with current converting processes and equipment, the ability to produce more samples, creating more opportunities for production orders and differentiated product.

### Implications for digital providers:

- Customer acceptance of digital print quality, the process and the capabilities are increasing based on the converter interviews.
- The digital industry is at a critical juncture due to the capacity increases. Many converters are watching to assess the effectiveness of digital printing and clarity related to the risk associated with the investment.

### Implications for suppliers:

- While sourcing is not a significant factor in the ROI analysis, converters try to maximize in-house production upon investing in a digital press.
- Digital printing is taking share from previously sourced offset requirements.
- Many converters view digital printing as an easier process for managing outsourced requirements.
- Even among converters with a digital press, outsourcing continues. The availability as well as capabilities of single-pass digital solutions are anticipated to significantly impact the outsourcing of offset products.

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

### Appendix

Where and how do corrugated converters get information on digital print?

We pursued this topic with the 53 high graphics companies participating in the quantitative interviews.

**Table 33: Accessing information on digital**

Is information on digital printing easy to access? (N=53)	High Graphics Participation Level		
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16
Yes	92.9%	95.7%	81.3%
No	7.1%	4.3%	18.8%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

Comments from the high graphics group included:

*"The specifics are often kept secret or still experimental."*

*"Media doesn't write about companies that are not as well-known, such as Barberan. Some new digital technology is kept quiet, so it's hard to research."*

*"Lack of true production information on the internet."*

*"It is evolving so fast and the different technologies provide a level of concern."*

Trade shows and vendors visiting the facilities were rated as the most frequent sources of information on equipment needs, as well as the most useful.

**Table 34: Where is information found?**

Where do you find information related to equipment needs for your business? (Select all that apply.)	High Graphics Participation Level		
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16
Industry or Business Association Meetings and Newsletters	85.7%	82.6%	68.8%
Industry or Business Association Peers	64.3%	78.3%	87.5%
Industry Publications (print and websites)	78.6%	82.6%	87.5%
General Conferences on Digital Printing for Packaging Conferences and Webinars	50.0%	39.1%	68.8%
Trade Shows	78.6%	87.0%	100.0%
Vendors and Suppliers in my Facility	50.0%	91.3%	93.8%
Vendors and Suppliers Traveling to my Facility	35.7%	26.1%	81.3%
Vendor-User Group Conferences	7.1%	13.0%	56.3%
Total	100%	100%	100%

Source: Karstedt Partners LLC, SGIA

# Digital Printing for Packaging: Corrugated Packaging and Display

## How and Why Decisions are Made

**Table 35: Information rating by source**

Please rate the following in terms of informational value you receive from each related to digital printing with 5=Excellent, 4=Adequate, 3=Neutral, 2=Inadequate, 1=Poor, NA=no rating.	High Graphics Participation Level		
	High Graphics <10% N=14	High Graphics 11-50% N=23	High Graphics >50% N=16
Industry or Business Association Meetings and Newsletters	3.93	3.69	3.81
Industry or Business Association Peers	3.64	3.60	3.50
Industry Publications (print and websites)	2.93	3.69	3.83
General Conferences on Digital Printing for Packaging Conferences & Webinars	3.78	3.30	3.50
Trade Shows	4.28	3.68	4.37
Vendors and Suppliers in my Facility	3.60	3.00	4.37
Vendors and Suppliers Traveling to my Facility	3.16	2.09	3.54
Vendor-User Group Conferences	3.42	3.95	2.87

Source: Karstedt Partners LLC, SGIA



# 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.

Kevin and Jeff welcome your inquiries and comments and can be reached at:

Kevin Karstedt  
Kevin@karstedt.com  
716-992-2017

Jeff Wettersten  
Jeff@karstedt.com  
317-710-6744



# 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](http://SGIA.org).**