



The Case for Digitally Printed Packaging

Brand owners seeking successful marketing strategies in a highly competitive marketplace are increasingly turning to digital printing to produce innovative packaging designs. In this *Executive Insights*, L.E.K. Consulting looks at if, when and how digitally printed packaging could change the game across labels, cartons, flexible pouches and corrugated containers. Digital printing has the potential to transform the packaging industry, but it will be a marathon, not a sprint.

Digital technologies have substantially disrupted a number of traditionally analog industries (e.g., computers, cameras). Are we at an inflection point today when digital printing can revolutionize the consumer packaging industry? Could digitally printed packaging equipment finally be ready to fulfill the promise of changing the game in consumer packaging? In certain segments, usage of digital equipment for packaging is already compelling (e.g., labels for short-to-midsize run lengths). Beyond those segments, the growth arc for digitally printed packaging is expected to continue to unlock additional segments, creating both an opportunity and a threat for players exposed to analog printing. Nonetheless, the existing barriers to adoption are real, which is expected to drive a more gradual “evolution” of the overall packaging market, rather than a rapid “revolution.”

Food and beverage labels out front

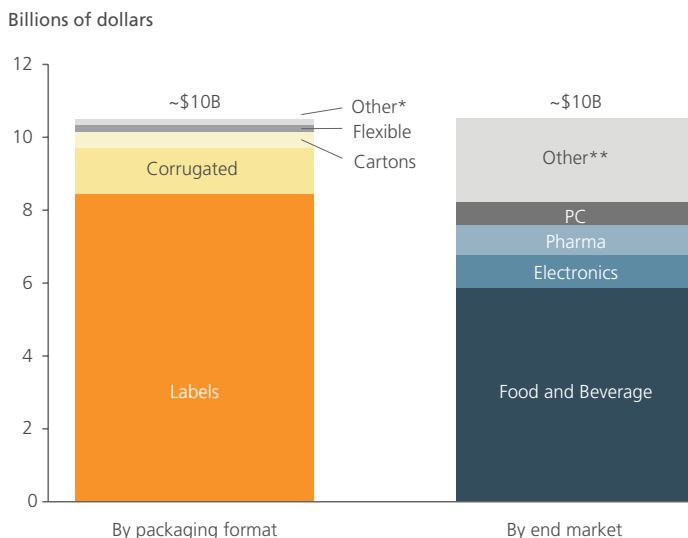
Relatively high brand/SKU fragmentation across numerous product categories has made food and beverage companies the predominant users of digital print services (some 50-60% of the market, according to L.E.K.; see Figure 1), with others including electronics, pharma and personal-care providers. While many firms stand to benefit, the rise of digital printing is considered particularly advantageous for Tier 2 and private-label companies, which view digitally produced packaging as essential to product differentiation (for example, prepared food maker Bear Naked Granola adopted digital printing as part of the effort to design individualized granola blends and package designs). Craft beer labeling remains a prime example of digital printing in action — even with the added cost, scores of microbreweries continue to invest in digital print packaging in order to achieve unique, attractive containers bearing vivid colors and distinctive images. Digital printing has allowed various other companies to keep pace with growing demand for microbrands, ranging from health-and-wellness products to those aimed at specific demographics or regions.

Today, differentiated product packaging is considered key to driving brand appeal and, in turn, piquing consumer interest. In recent times, regional Tier 2 and private-label brands in particular have turned to digital printing in an effort to compete with branded or Tier 1 suppliers. Even though this method costs more per unit, the reduced setup time and cost of digital printing makes it economically feasible for these smaller firms to offer a wider range of short-run products and, in turn, take on much larger competitors. Case in point: Since launching in 2012, French baby food start-up Yooji has brought to market over 20 different SKUs using limited digital print runs, vastly exceeding initial sales expectations in the process.

The Case for Digitally Printed Packaging was written by **Thilo Henkes** and **Alan Lewis**, Managing Directors and **Jeff Cloetingh**, Senior Manager in L.E.K. Consulting's Packaging practice. Thilo, Alan, and Jeff are based in Boston.

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Figure 1
Worldwide digital printing market by packaging type (2016)



Note: *Other includes rigid plastic and metal; **Other includes household and cleaning products, tobacco, pet food/pet care, etc.
Source: L.E.K. analysis of various sources (e.g., Smithers Pira)

Tier 2 and private-label brands are not the only users of digital printing. Larger national and global Tier 1 firms with longer print cycles are also turning to digital printing for specialty runs associated with tailored marketing campaigns (allowing the likes of Reese's, for instance, to rapidly increase the number of seasonal/holiday peanut-butter-cup promotions over the past 5-10 years). Additionally, digital printing allows CPG firms to bring products to market faster, while enabling them to utilize newer packaging solutions (such as custom QR codes) and improve labeling consistency.

Perks of digital printing

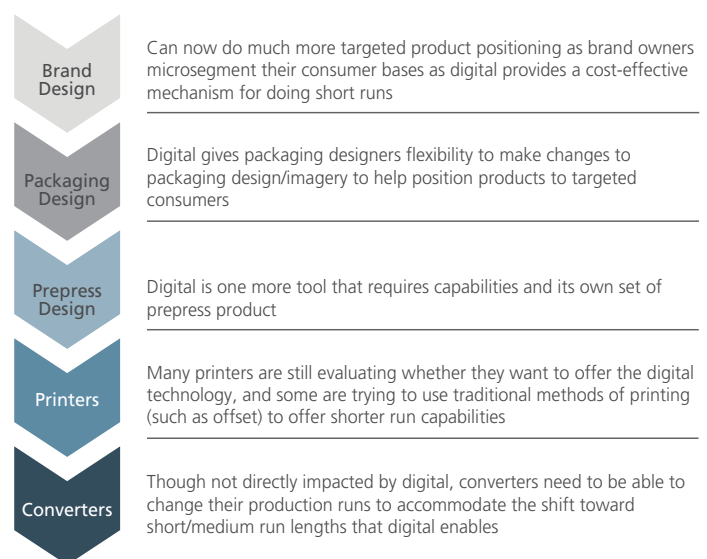
Digital printing offers brand owners a wide range of benefits, including:

- The ability to streamline new product launches (especially for high-iteration prototyping)
- Lower-cost, rapid setup makes shorter run lengths financially feasible
- Shorter run lengths means brand owners can microsegment/hypercustomize packaging aimed at specific consumer segments
- Reduced burden of carrying packaging material inventory (a challenge for brand owners)
- Reduced risk of packaging obsolescence (which can lead to waste)

For example, the rapid increase in SKU variations per brand, as well as seasonal and other one-off promotional packaging applications, has driven brand owners to demand dramatically reduced run lengths and time to market, making digital far more attractive for a wide range of CPGs. Similarly, companies with short-run products (e.g., Green Mountain Coffee Roasters' K-cup lids and cartons) have taken advantage of digital printing to improve cost efficiencies in pre-press and raw-materials needs.

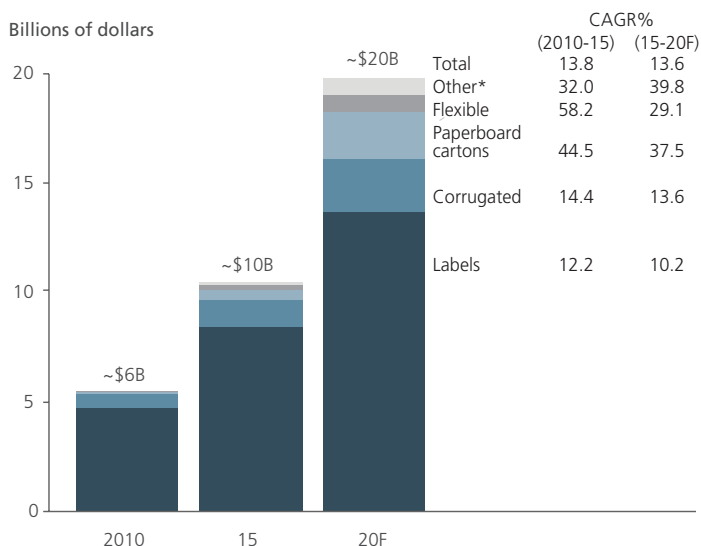
Brand owners aren't the only ones benefiting; digital technology is also creating opportunities for other participants within the value chain, including package designer, pre-press, printer and converter segments (see Figure 2). Packaging designers now have tools that afford them greater flexibility in developing packaging targeted at microsegmented consumer bases, or packaging that hits faster refresh cycles. Prepress providers are not likely to be disintermediated by digital, as pre-press still needs to provide graphic design and brand owner iteration management activities (digital is a tool and does not negate the need for the typical types of services provided by the pre-press part of the value chain). Printers and converters can also benefit from digital as the technology is one more process to provide customers with added value (though digital does require a different skill set from analog technologies and that does create challenges).

Figure 2
Implications of digital printing on traditional packaging value chain players



Source: Company websites; L.E.K. interviews and analysis

Figure 3
Worldwide digital printing market by packaging type
(2010-20F)



Note: *Other includes rigid plastic and metal
Source: Smithers Pira; L.E.K. interviews and analysis

Growth prospects

Over the next several years digitally printed packaging is expected to advance incrementally, rising from 2.6% of the market in 2015 to 3.9% by 2020, and the segment as a whole is forecast to double in size on a global basis (to \$20 billion through the period; see Figure 3). Geographically, Australasia is expected to see the highest digital penetration by 2020 (6.0%), followed by Western Europe (5.0%) and North America (4.8%). Product labeling and increased demand for wider web applications (covering corrugated, cartons and flexibles) will be key drivers through the end of the decade, with prime labels likely seeing the biggest increase in market penetration by 2020 (in contrast, nonlabel digital packaging applications are expected to show a more modest increase in share). A gradual reduction in consumable pricing resulting from increased competition is expected to drive down digital's variable costs by decade's end; in addition, an increase in digital printing speed is expected to reduce overhead costs by over 40% through the period, according to L.E.K. analysis.

Furthermore, the rate of digital printing adoption is expected to be driven by technology enhancements capable of producing higher-quality content delivered faster and more efficiently, and include:

- Advanced print processing (from a current low of 78 ft/min to as high as 750 ft/min)
- Integrated finishing systems (such as die cutting, embossing/debossing)

- Equipment that can facilitate wider web widths aimed at flexibles, cartons and corrugated packaging substrates

Despite the numerous advantages, digital penetration of printing technologies has been slow. Printers and converters using older analog equipment such as offset, gravure and flexographic printers have little incentive to swap out legacy equipment that typically has a life span of several decades and, in many instances, has already been substantially depreciated. As such, printers and converters balk at investing upward of \$2 million to \$4 million in order to build their digital print capability. Digital press run times can be prone to print-head plugging, which can reduce job speeds. Additionally, until recently digital has for the most part been a "narrow web" technology (i.e., limited to material under 16 inches in width) and, in general, has been suitable mainly for thinner substrates (as opposed to thicker paperboard stock, for example). Furthermore, analog printers are not standing still; analog printing equipment companies are increasing output speeds, which puts upward pressure on the hurdle to justify digital print.

But with flagship brands increasingly pressured by competing private-label products with lower price points as well as challenger Tier 2 brands with highly focused customer targets, larger brands are themselves turning to unique, digitally produced packaging in order to remain viable. Along the way, technological advances have made wider digital print jobs, such as those used for cardboard cereal boxes or other heavy stock containers, increasingly cost-effective. And with per-unit pricing continuing to fall and printing speeds moving faster, the case for digital becomes more compelling; by 2020, digital printing is expected to be cost-effective below 35,000-40,000 labels per run (up from below 24,000 labels per run in 2016) and cost-effective below 35,000-40,000 flexible/carton units per run (up from below 16,000 flexible/carton units per run in 2016). Thus, as the economic run length for digital continues to increase, Tier 1 companies and other firms with a wide range of SKUs and packaging formats are likely to be more amenable to digital print services, particularly as their smaller competitors continue to cut into market share.

To date, digital printing has played a lead role in several successful Tier 1 product enhancements. Coca-Cola's singular "Share a Coke" packaging campaign, whereby individual Coke containers were embossed with popular first names of consumers in place of the standard Coke logo, was made possible using digital printing of more than 800 million labels in 15 languages across 70 countries with 1,000-plus first names that went onto store shelves. Going forward, other larger brand owners are expected to increasingly rely on shorter runs of differentiated packaging types as a tie-in to promotional campaigns and other one-off

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marketing efforts that would be economically challenging using traditional analog approaches.

Evolution rather than a revolution

The ability to pique consumer interest through differentiated packaging will remain central to product marketing going forward, most noticeably within food and beverage but also for other segments with higher-than-average brand and product fragmentation. As such, we see digital print technology offering a number of key advantages, not only for brand owners in need of greater flexibility but also for providers throughout the packaging value chain that can properly align their services to meet the growth in digital demand. Though not quite a disruptive technology per se, digital is nonetheless poised to increase its share of the printed packaging market, particularly as newer solutions narrow the digital-analog performance gap, driving down consumable costs in the process.

Digital printing checklist

- Does your company view digital printing as a threat or an opportunity?
- Which attributes within the digital printing value chain would work best for your type of business?
- Does your company have a strategy for how to leverage digital printing technology to be innovative and proactive in their marketing of solutions?
- Could digital printing help the firm better serve its current clientele, not to mention bring new customers into the fold? Could it act as a front-end offering for the purpose of pulling through existing services?
- Should your company build from scratch or acquire its digital capabilities? Are strategic partnerships necessary in order to be truly competitive?

About the Authors



Thilo Henkes joined L.E.K. in 2000 and has more than 15 years of consulting experience specializing in transaction support and developing post-acquisition, value-

enhancing strategies for portfolio companies. He is a Managing Director and Partner, and leads the firm's Paper Goods and Packaging practice. Thilo is also active in our Building Materials & Industrials Products and Private Equity practices.



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