

# Analysis



May 2012

## Highcon Euclid: Enabling the Digital Packaging Opportunity

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## Executive Summary

One of the key challenges for the short-run folding carton market is the analog cutting and creasing process. Highcon, a market innovator dedicated to streamlining the converting process, plans to address this issue head-on with the introduction of Euclid, the world’s first production speed digital cutting and creasing machine. Euclid transforms cutting and creasing from an analog to a digital workflow, dramatically streamlining the finishing process. It was launched at the drupa exhibition in Dusseldorf, Germany during May 2012.

## Key Findings

- While printing technology has evolved, converters must streamline the entire workflow to meet the just-in-time, on-demand needs of clients.
- Packaging is a large, established industry that is relatively stable in comparison to other segments of the traditional printing industry despite the economy.
- A tremendous amount of growth is occurring in private labeling, the epicenter for short-run package printing.
- Digital technology is transforming the packaging supply chain by cutting costs, shrinking cycle time, and minimizing errors and defects.
- Over the past two decades, we have witnessed key areas of the package printing supply chain becoming digital. Finishing, however, has remained analog.
- Highcon’s Euclid machine combines the company’s Digital Adhesive Rule Technology (DART) to create the digital crease lines with a unique high-speed and high-quality laser cutting solution.

- By changing the model so that a single supplier is responsible for the cutting hardware and die creation consumables, Highcon's solution involves fewer stakeholders and establishes a single point of contact for the entire solution.
- Highcon expects the price of the DART to be much less than the price of a die produced by a third-party.
- While a die cutter might require one to three hours to set up before it can commence cutting and creasing (at a machine time cost of \$300-\$900), a Highcon Euclid can already be a significant way through the production before a conventional machine is converting sellable sheets.
- Enabling on-demand production of packaging allows brand owners to improve cash flow by eliminating inventory, improve their sustainability by reducing obsolescence, and handle demands more dynamically by reacting to market shifts.

### Recommendations

- Digital cutting and creasing complements lean initiatives because it delivers predictable and accurate performance, eliminates waste, and reduces variability.
- For a converter to be truly successful in addressing the new markets that digital and offset press developments enable, the entire workflow must be optimized for on-demand production.
- With the ability to flexibly lay out multiple packages on-demand on a sheet, it will become increasingly important to produce dies on demand rather than waiting to produce custom dies conventionally.
- Because of its quicker job change over time, Highcon's Euclid can bring converters substantial savings through increased productive time, especially for short runs and on-demand production.
- Brand owners are demanding packaging suppliers that meet their need for faster turnarounds, more SKUs, smaller volumes, and less waste. Meeting all demands requires a re-engineering of the entire carton board workflow including cutting and creasing.

### Introduction

Packaging is crucial for driving customers to select a product, with many buying decisions made in "the last four feet" based on the perception that the packaging creates. For brand owners, the packaging of their products is a strategic tool to drive profitability.

Packaging and label converters are re-evaluating their business models and transforming themselves from producers of goods to providers of services. They are examining tools to provide brand owners with affordable solutions for versioning, personalization, new packaging, anti-counterfeiting, security, flexibility for an increased number of SKUs, improved turnaround time, reduced waste, and improved time to market.

Creating a package and getting it to the right shelf at the right time is a complicated process. Many stages have been streamlined by digital technology, reducing cycle times and cost while improving flexibility. The design and preparation stages of the printing process (art working and prepress) have been digitized, and the printing process itself has been streamlined. To date, the one stage in the process that has not been transformed by the benefits of digital technology is the cutting and creasing of the carton board to create the physical form of the package. This causes a bottleneck—while the graphical elements of a package can be created, approved, and printed in hours or days, the cutting and creasing (particularly the preparation and set-up of the cutting and creasing machinery) can add weeks to the process. Current techniques also incur significant set-up costs to manufacture the cutting and creasing die and prepare it for production. These high setup costs and times do not sit comfortably with the market's demands for cost-effective production of smaller quantities of more versions produced on demand.

Highcon, a market innovator dedicated to streamlining the converting process, plans to address this issue head-on with the introduction of Euclid, the world's first production speed digital cutting and creasing machine. Euclid transforms cutting and creasing from an analog to a digital workflow, dramatically streamlining the finishing process. It was launched at the drupa exhibition in Dusseldorf, Germany during May 2012. This whitepaper explores the critical drivers that make digital packaging a good business opportunity. It also considers the impact that Euclid will have on streamlining workflow for converters of all sizes, using both litho and digital presses to print.

### **The Short-Run Packaging Opportunity**

Packaging is a large, established industry that is relatively stable in comparison to other segments of the traditional printing industry despite the economy. Almost all items are sold with some form of packaging. To keep a competitive edge in the marketplace, brand owners change their packaging designs more often than they change the products within these packages. This means continual demand for prototypes, short runs, and custom printing and cutting. In addition, the application of digital technology to the packaging market means that brand owners can make their manufacturing supply chains more cost-effective by significantly reducing time to market and waste from obsolescence. They can also offer enhanced efficiency to their customers by moving production to a just-in-time environment that diminishes warehousing and inventory needs.

## **Growth in Short-Run Packaging**

### **Driving the Market Opportunity**

The opportunity for short-run packaging is enormous. There are two key constituencies that will ultimately drive the market opportunity—the head of supply chain management and the brand owner.

Supply chain managers are beginning to understand the savings associated with digital print production technologies. On-demand printing enables packaging to be individually tailored to specific clients while saving on raw materials, and releasing capital that might otherwise be tied up in stock. The migration to “just-in-time on-demand” means a reduction in warehouse demands, which can be linked directly to cost savings.

Marketers understand that a quality package is just as important as the product itself. Brand owners are beginning to appreciate the value associated with versioning and short runs. They understand the benefits of digital package production in making marketing more precise and efficient with no compromise in quality. Packaging can really make a product stand out on the shelf, and this is of paramount importance to the brand owner. In challenging economic times, packaging is playing an increasingly important role in the marketing mix. It is the last opportunity to influence the consumer’s purchasing decision at that “moment of truth.”

### **Benefits for End Customers**

From an end customer perspective (e.g., supply chain managers and brand owners/marketers), the key contributors to the “growth” in digital packaging are outlined below.

### ***Increases in Private Labeling and Shorter Runs***

A tremendous amount of growth is occurring in private labeling, the epicenter for digital package production. On retail shelves across the world, private brands are making their presence known. According to a recent study conducted in the U.S. by the Private Label Manufacturers Association (PLMA; [www.plma.com](http://www.plma.com)), overall sales of store brands increased 5.1% between 2010 to 2011, pushing private label dollar share up half a point to 19.5%. According to data collected by the Nielsen Company, this was a record high for the 52-week period ending December 24, 2011. Private label unit share rose to 23.6% during the same timeframe, setting another record. This means that more than one out of every five items sold in U.S. supermarkets, drugstores, and mass merchandisers is private labeled. According to Mintel USA ([www.mintel.com](http://www.mintel.com)), the private label market has enjoyed sales growth in recent years that is not expected to decrease in the near future. Private label companies continue to introduce better-for-you products and more attractive packaging, all while being easier on consumers’ wallets. These efforts seem to be working—Mintel research found that 44% of grocery shoppers believe that store brand

products are of better quality today than they were five years ago. These statistics point to increased opportunities for short-run packaging producers.

### ***Package Testing***

New products are the lifeblood of nearly every company's growth strategy, as well as a source of enormous investments in development, research, and advertising. New product success is largely dependent on effective packaging. For established brands, many shoppers come to the shelf seeking that particular product—and the primary role of packaging is to ensure recognition of the brand that consumers know and trust. Packaging is often the last step of an extended process, but after years of new product development and concept testing it is likely to be rushed out in several months to meet an introductory deadline. Digital package production technology enables companies to accelerate testing processes and procedures as well as the associated time to market.

### ***The Push for Versioning, Customization, and Personalization***

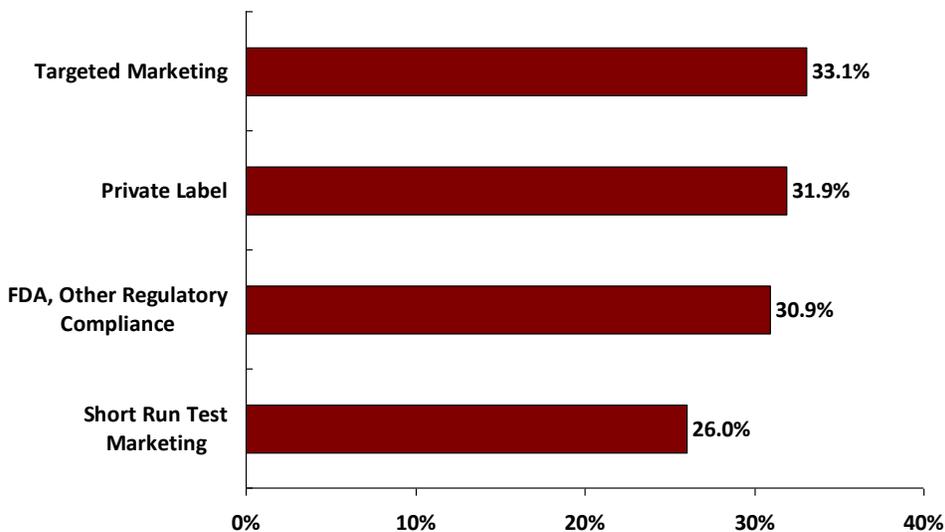
The ability to produce unique printed products creates a variety of marketing opportunities as well as the potential for ensuring brand and image integrity. Apart from production quality and convenience, things like wine labels can include hotel or restaurant names and images, or even be personalized for special occasions like weddings or visits from very loyal guests. Cosmetics and toiletries can be branded to specific retail outlets or specific locations. Golf ball cartons can be customized for tournaments and ultimately become collectors' items. And all of these products can incorporate multi-lingual support because they can be produced in short runs.

### ***Streamlined Solutions for Secure Variable Data Label Printing***

Digital presses offer an additional advantage over traditional flexographic printing by virtue of their ability to print different images with every impression, as opposed to repeating the static images engraved on printing plates. In the labels and packaging industry, this capability enables one-step bar code serialization, where each label or package carries a unique identifier that enables distribution tracking and helps thwart product diversion and counterfeiting. "Track and trace" serialization is especially useful in pharmaceutical label manufacturing. Some national and state governments around the world are already scheduled to mandate track and trace for prescription drug packaging in the next few years.

During July 2011, InfoTrends released a study entitled *Packaging and the Brand Owner*, which surveyed over 150 brand owners. These brand owners expected various types of versioning at their companies to increase by more than 30% over the next two years.

**Figure 1: Over the next two years, how much growth do you expect to see at your company in the following types of “versioning”? (Means)**



N = 155 Brand Owners

Source: *Packaging and the Brand Owner*, InfoTrends 2011

### ***Making the Package Interactive***

Brand owners are beginning to utilize packaging to structure interactive dialogues and communities with end consumers. One way to do this is by placing QR (quick response) codes on packages and labels. These high-density barcodes are readable by cell phones and simple PC cams. Recipients can quickly and easily interact with the QR-enabled labels or packages they receive. They simply point their camera at the QR symbol and they are instantly connected to a QR-encoded Web page without ever having to remember or type in numbers and promotional codes—they just point and shoot. We are seeing a number of examples where firms are integrating QR codes into packages and labels:

- In Japan, QR codes are used at McDonald’s. The packages of 19 sandwiches, 8 side dishes, and 5 salads on the menu include QR codes. When scanned, these codes bring up a URL that will take customers to the nutritional information for the food they are eating. Customers can view the amount of calories in their meal, as well as the amount of sodium, fat, protein, and carbs. Information is available for individual items as well as combo meals. Consumers can also obtain allergy information—although that might come a little too late if the food has already been purchased!
- Pepsi Max bottles in the U.K. are being printed with QR codes, providing an innovative means for Pepsi to communicate with and give back to its consumers. These codes resolve to a wireless application protocol (WAP) site with games, videos, and “weird and wacky Websites.” As consumers become more familiar with these codes and their uses, Pepsi will seek further opportunities for utilizing them in communicating with consumers. In the meantime, this is a fun way for consumers to be introduced to further mobile applications.

Folding cartons are leveraging another interactive concept known as augmented reality to make the actual container interactive. Augmented reality enables the seamless integration of information such as 3D content into live video streams or other real-time displays. This technology has been in existence for more than 15 years, with customized applications in industrial automation, theme parks, military, marketing, and now publishing. With augmented reality, you can display 3D animated content on top of a book, have a video playing when you open up a new page, or introduce interactions between the book and the reader.

**Figure 2: The Reality/Virtuality Continuum**



The physical document's location and orientation can be tracked by pointing a low-cost camera (e.g., Webcam, camera phone) at the printed piece. In some instances, the book, catalog, or document can look like a conventional printed piece except that it also has unique 2D markers or identifiers printed on the page. These markers or identifiers serve two primary purposes:

- The camera uses the marker or identifier to determine the graphical model that is associated with that page in the physical book
- The camera uses the marker or identifier to enable the 3D graphics to remain in physical alignment (registration) with the book, enabling readers to see the graphics from whatever perspective they desire.

Danish toy manufacturer LEGO launched its Digital Box in selected toyshops and stores worldwide. This interactive terminal utilizes innovative technology supplied by Metaio in the form of a software program specially developed for the LEGO Group by the Munich-based experts in augmented reality solutions. Together with a camera and display screen, the software enables LEGO's packaging to reveal its contents fully assembled within live 3D-animated scenes.

**Figure 3: LEGO's Digital Box**



### ***Playing to Packaging's Existing Strengths***

While augmented reality and integration with other media undoubtedly enrich the packaging experience for the consumer, there are also inherent attributes of the package that provide brand enhancement. While TV and film scramble to offer that extra dimension, packaging is already a tactile 3D multi-sensory medium that does not require special glasses or new displays. A folded carton is inherently 3D, and further impact can be added by manipulating the package's form through cutting and creasing to add a further layer of engagement. Unfortunately, the cutting and creasing process itself restricts the creativity that can be applied to this 3D form. Simple techniques such as internal cuts (e.g., cutting out different-shaped apertures in the package) can be highly effective in achieving standout on a shelf, but they are currently complicated. A more flexible and responsive cutter could enable greater creativity.

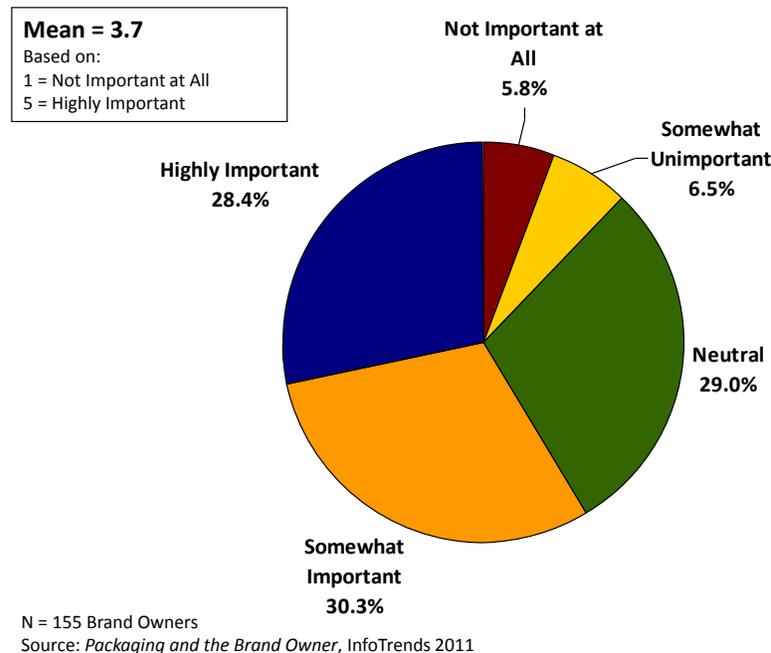
### ***Improvements in Supply Chain Management***

Digital printing technology is transforming the packaging supply chain by cutting costs, shrinking cycle time, and minimizing errors and defects. It has been said that digital print production isn't a manufacturing process, but a business solution. Digital printing complements lean initiatives because it delivers predictable and accurate performance, eliminates waste, and reduces variability.

### **An Emphasis on Sustainability**

On-demand digital packaging production also ranks as a "sustainable" process. Short-run technologies deliver environmental advantages including savings in ink and materials. They also support processes associated with a streamlined make-ready that produces good labels and folding cartons within a few minutes. In the case of toner and inkjet digital printing, eliminating printing plates cuts waste and expenses while also contributing to a more environmentally-friendly process. In InfoTrends' *Packaging and the Brand Owner* study, 28.4% of brand owners considered sustainability to be highly important, while another 30.3% deemed it as important. When the responses to this question were assigned a numerical value (1 = not important at all; 5 = highly important), brand owners assigned a mean rating of 3.7 out of 5 to the importance of sustainability.

**Figure 4: How important is sustainability to your company's decisions about the purchase of packaging and labels?**



It is interesting to note that when this data was cut by company size, businesses with over \$1 billion in annual revenues assigned the highest rating to sustainability (4.1 out of 5). This comes as no surprise since the largest firms are typically the most advanced and focused on implementing "green" policies for their operations and purchases.

That push for sustainability comes from the very top of the supply chain. Brand owners and retailers alike are using sustainability criteria in selecting suppliers. Firms such as Walmart and Proctor & Gamble are making greater demands on their suppliers that go beyond minimum legal compliance. More and more frequently, companies are being asked to complete sustainability scorecards to be considered or remain as suppliers. In addition to requesting evidence of compliance, these scorecards create proactive

initiatives to improve sustainability. These include providing ideas to improve the client's sustainability and showing evidence of how they in turn are asking their suppliers to confirm and improve sustainability.

### Addressing the Missing Link – Finishing

There is no question that the drivers are in place to make packaging a double-digit growth opportunity for converters. Over the past two decades, we have witnessed key areas of the package printing supply chain becoming digital. Finishing, however, has remained analog. Some vendors have attempted to bring the benefits of digital production to carton board applications. While the concept was being proven, available technologies limited their use to a few niches. This was due to the small sheet size of the digital print devices and the use of existing analog cutters and creasers. Although the two could be combined in a single line for an efficient on-demand workflow, the cutting and creasing process still relied on a traditional die, meaning that while companies could benefit from flexibility of digital to change the print, they remained hidebound by the limitations of analog for the shape and form of the carton.

Converters and their customers have been unable to benefit from the speed and flexibility that digital solutions can provide to finishing. Highcon's Euclid machine combines the company's patent-pending Digital Adhesive Rule Technology (DART) to create the digital crease lines with a unique high-speed and high-quality laser cutting solution. This is a game-changing concept that is designed specifically to address brand owners' requirements.

**Figure 5: Highcon's Euclid Device**



### **The Emergence of Digital Carton Board Printing**

drupa 2012 marked the introduction of a significant number of digital presses targeting the carton board market. These product launches highlight the fact that many firms see the need to offer the packaging converter devices that enable the cost-effective production of carton board in short runs and on demand.

Indigo Founder Benny Landa (also an investor in Highcon) unveiled his new Landa Printing venture at the show. Packaging is one of the target markets for this technology. Indigo, which is now part of HP, unveiled its first B2 format cut sheet machines, including a carton board optimized variant called the Indigo 30000. Fujifilm and Dainippon Screen, which unveiled their first concept machines at drupa 2008 (the Jetpress 720 and the Truepress SX, respectively), introduced new commercial machines at drupa 2012. Fuji showcased a new concept B2 inkjet press optimized for carton board production, while Screen extended the substrate range of its Truepress SX to include carton board. Komori and Konica Minolta also demonstrated B2 inkjet press technology, while Ryobi and Miyakoshi showed a liquid toner device that handles a B2 sheet.

### **Digital Converting Complements Offset Too!**

While the headline-grabbing announcements were about larger format sheet fed digital presses, developments in litho printing of carton board also require more effective cutting and creasing to fully utilize their enhanced capabilities for short-run and on-demand production.

For the past few years, advances in offset press and prepress technology have made the printing of carton board cost-effective for on-demand and versionized production. It is now economical to produce a 500 or fewer sheets. It is also practical for jobs to be on and off press and ready for finishing in hours. Offset press and prepress advances including CTP closed loop color, simultaneous plate-changing, enhanced UV-curing, pre-setting, and automated setup have had a dramatic impact. The majority of converters have press technologies that can address the challenge of on-demand short-run production; it is in post-press where there is a gap in their arsenal.

For a converter to be truly successful in addressing the new markets that digital and offset press developments enable, however, the entire workflow must be optimized for on-demand production. The ability to produce a few hundred or low thousands of printed sheets on-demand is useless unless there is an equally dynamic technology to cut and crease those sheets into finished folded cartons. The Highcon Euclid is this missing piece of that puzzle, enabling an end-to-end on-demand folding carton workflow.

### Highcon: Addressing the Finishing Challenge

It should be noted that Highcon has approached the market in a different way from many technology businesses. The firm used its industry expertise to identify a problem that needed a digital solution rather than developing a technology and then seeking to find an application that it could address. The key members of Highcon's management team include its two co-founders:

- Aviv Ratzman, CEO: Ratzman, age 42, is an 18-year veteran of HP Indigo.  
COO
- Michael Zimmer, ~~VP of R&D~~: Zimmer, also an HP Indigo veteran, is a 45-year old with 15 years in the printing industry.

Ratzman and Zimmer both worked on the development of the HP Indigo digital printing presses. The genesis of the Highcon concept came from that experience, in particular the understanding that digital print on its own wasn't enough to enable the packaging market to transition to on-demand production supporting a more efficient, cost-effective, and sustainable business model.

### *The Way Things Were... and Still Are!*

According to Ratzman, die-cutting is a real bottleneck in the current production process of the packaging sector. The basic die-cutting process is the same today as it was back in the middle of the 20th Century, when Bobst launched the first Autoplaten machine. In the 70 years since that time, the printing process has undergone several technology revolutions—including the fall of letterpress to offset lithography as the dominant production process and the advent of digital printing using toner and later inkjet.

The traditional business model involves two sites, namely a printer/converter and a die producer. This adds extra steps, costs, and time to the process. The skills and equipment required to manufacture dies using the current process of a plywood form with metal cutting and creasing rules along with foam rubber supports means that a specialist die maker must make the dies. While outsourced die production by a specialist firm can achieve economies of scale and better utilization by serving several converters, this also means that there is inevitably additional time required to submit the order and design, complete manufacturing, and ship the die to the cutting and creasing site. This process typically takes one to five days today, making a true on-demand carton board production model impossible. One option to reduce that time is to store pre-prepared dies on-site to enable quick call-off for repeat jobs or standard formats. Unfortunately, this strategy limits flexibility, especially the ability to react to changes in pack format or the demand for a different mix of SKUs ganged on the same sheet. As the number of SKUs increases and private label manufacturing continues to rise, there will be strong demand for late binding production processes. With the ability to flexibly lay out multiple packages on-demand on a sheet, it will become increasingly important to produce dies on-demand rather than waiting to produce custom dies conventionally.

### ***A Business Model that Meets New Market Demands***

For on-demand carton board production to be truly effective, the flexibility to create new dies on-demand is paramount. The bottleneck to date has been having access to the tools that can produce dies on-demand.

Software tools that create, edit, preview, proof, and approve packages provide instant results and are available from a number of sources. One of those sources is Esko, a market leader in packaging software. Highcon has formed an alliance with Esko to enable seamless integration of Euclid into the converting workflow. The Euclid system is open and can accept industry-standard cutting and creasing templates from all major packaging structural design and prepress workflow packages. For example, it is possible to use the Euclid at a converter running Heidelberg's Prinect or Kodak's Nemergy.

It is also possible to create a design and to proof the graphics and the structure, including rendering it in 3D to view it from all angles and placing it in a virtual store environment. Digital files can be created, distributed globally, edited, proofed, and approved in minutes. It is moving from the signed-off design to the actual cutting and creasing process that is inefficient and time-consuming.

As an analogy, printers and converters should cast their minds back to the time prior to CTP where platemaking was a multiple-stage process involving a film intermediary to expose the plate. Additionally, these entire operations were frequently outsourced to a trade platemaking house, adding days to the process. Just as CTP was one of the enabling technologies that dramatically reduced the viable minimum run for offset printing, the Highcon Euclid offers a similar transformative capability to enable short-run cutting and creasing on demand.

Zimmer explains, "We realized that there was a need for an end-to-end solution, and that post-press—especially in the carton board converting sector—was still a very analogue and craft-based process."

According to Highcon, one of the biggest impediments to innovation in the converting machinery market has been the business model. Hardware vendors are separate from the die manufacturers, and this disjointed supply chain means that innovation is difficult for either side. By changing the model so that a single supplier is responsible for the cutting hardware and die creation consumables, there are fewer stakeholders and a single point of contact for the entire solution. This enables innovation as well as a new business model.

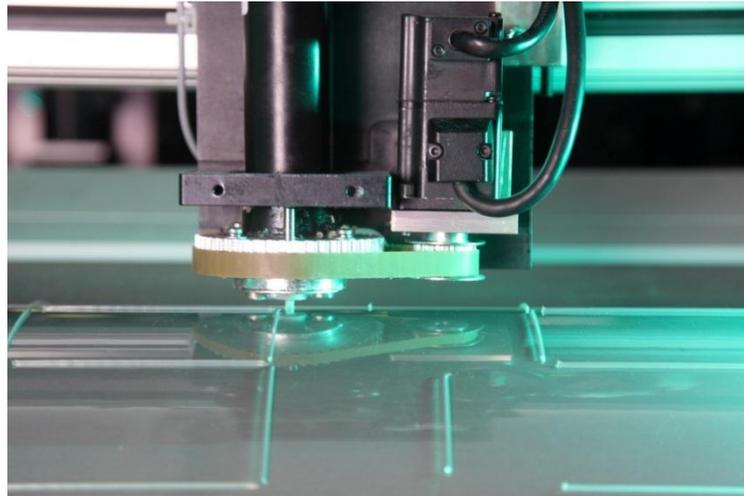
### *Core Technology*

With its Euclid offering, Highcon has totally re-engineered the die-cutting and creasing process. Rather than using a single die for cutting and creasing, the firm has separated the two processes out. Creasing rules are embossed into the board using a rotary die matrix. This is produced using Highcon's DART process. There are three consumables for DART:

- A foil, or base sheet on which the creasing matrix is made up
- The UV-cured polymer used to make the rules
- A female counter that the sheet being creased is pressed against by the die

The creasing rules are produced by applying a special UV-cured polymer to the base foil. The result is a robust and yet rapidly produced <sup>Dart</sup> ~~die~~. While Highcon talks about Euclid being suitable for runs up to 10,000 sheets, the cut-off is not due to the durability of the DART (which the company claims is appropriate for in excess of double the maximum expected run length), but rather the economics and the running speed of the system and the point where a conventional cutter becomes cost-effective.

**Figure 6: The DART Writing Head Applying UV-Cured Polymer Rules to Foil**



Lasers are used to cut the boards, providing a quick and accurate counterpart to the creasing. Highcon has multiple patents filed covering most aspects of the technology employed in Euclid, including the DART system, the laser cutting, and materials handling.

**Table 1: Technical Specifications for Euclid**

Item	Metric	Imperial
Sheet size max (portrait)	760 x 1,060 mm	30 x 42 in
Sheet size min (portrait)	350 x 400 mm	14 x 16 in
Paperboard thickness	0.3-0.6 mm	12-24 pt
Throughput up to*	760 x 1,060 mm 1,500 sheets/hour	30 x 42 in 1,500 sheets/hour
Throughput up to*	760 x 470 mm 3,000 sheets/hr.	29 x 18.5 in 3,000 sheets/hr.
Height of feeder pile (incl. palette)	1.1 m	3.3 ft.
Height of delivery pile (incl. palette)	1.1 m	3.3 ft.
Net cutting area	740 X 1,050 mm	29 X 41 in
Gripper margin	15mm	0.6 in
Length	8.6 m	28 ft.
Width	2.1 m	7 ft.
Height	2.3 m	7.5 ft.
Net weight	5 tons	5 tons

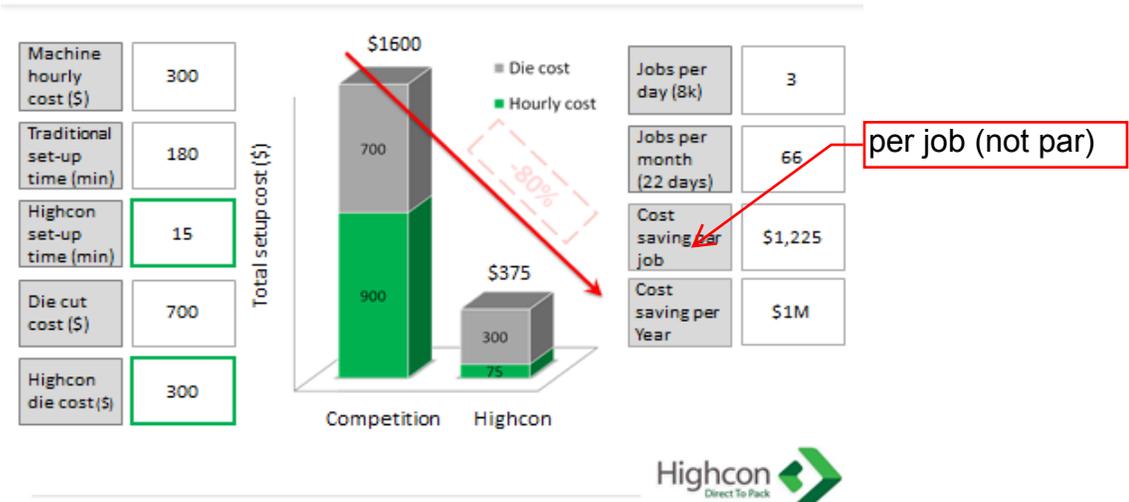
*\*Depends on cutting length lines and substrate type*

**How the Costs Compare**

While digital print is commonly sold on a click model (meaning that the customer pays for every sheet or image produced), this model doesn't stack up for converting. Highcon examined the current pricing model employed by die makers and adapted it for the digital age. In die-making, the die is priced based primarily on the length of the rules needed, both for cutting and creasing. An average die (in the B1 format) has 20m of rules, of which 10m are creasing and 10m are cutting. Lasers are used for cutting in the Highcon Euclid, eliminating that element of tooling from pre-production. Highcon will sell containers of the UV-cured polymer used to create the folding rules along with the plastic foil onto which they are applied and female counters into which the sheet to be folded is pushed into by the foil and die-lines. Pricing has yet **around** company expects the production of an average die to use \$300 of materials. Simpler dies with less folding crease lines will cost less, while more complex dies will cost more. This model is familiar to converters. The price of the DART is still expected to be much less than the price of a die produced by a third-party, which Highcon's research estimates at \$700<sup>1</sup>.

**Figure 7: Euclid's Running Costs vs. a Conventional Die-Cutter**

**Setup – Up To 80% Saving** for one-time job

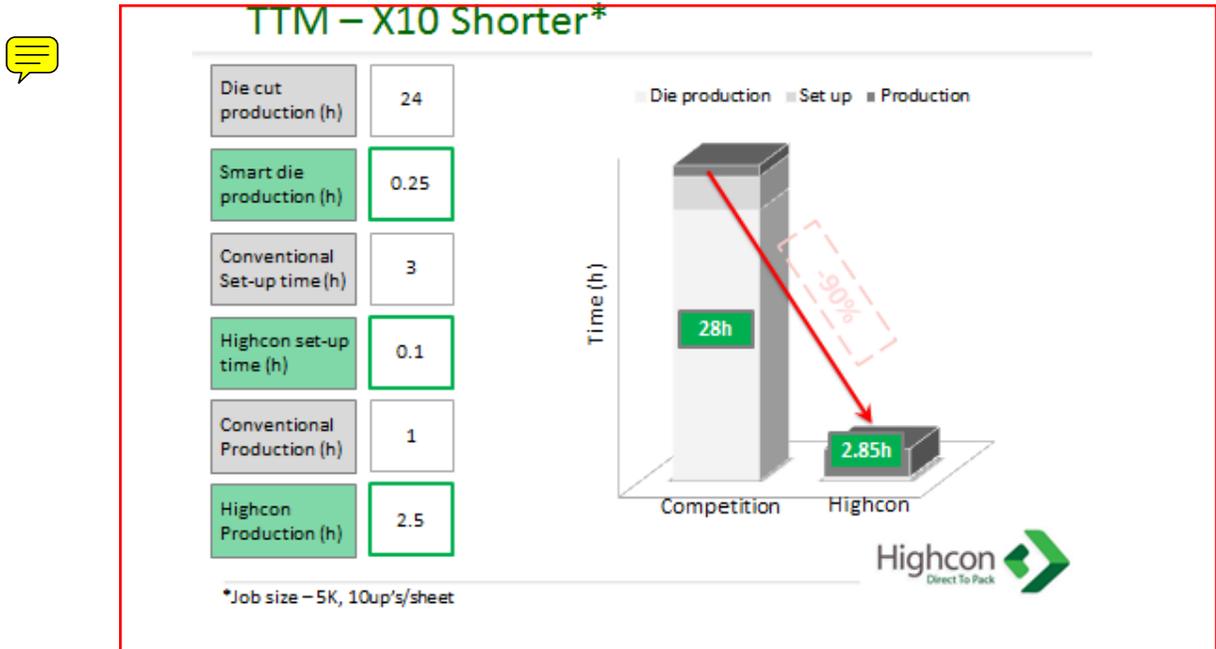


<sup>1</sup> This cost is a global average that depends on the complexity of the die. It is also subject to some regional variation based on competition in local markets.

**Time is Money!**

Since die production cost is only one part of the picture, Highcon highlights other cost savings that its Euclid provides. The average hourly rate for operating a cutter is \$300. Job changeover time is reported to be much quicker for Euclid (i.e., an average of 15 minutes). Assuming an hourly rate of \$300, this would generate a cost of \$75. This is opposed to one or more hours for a conventional die and die-cutter (costing between \$300 and \$1,200 for one to four hours of set up). This is clearly an area where converters can achieve substantial savings through increased productive time, especially for short runs and on-demand production.

**Figure 8: Significantly Quicker Time-to-Market vs. Conventional Die-Cutters**



According to the data that Highcon has collected from converters in North America and Europe, there is a considerable spread of set-up times for conventional cutters. Considerations include the skill of the operator, the age and automation of the machine, and the complexity of the job. One of the salient facts discovered by Highcon's research is that die cutters aren't in production for half of the available time; they are most likely being adjusted. So while the 1,500 sheets per hour figure quoted for Euclid sounds substantially slower than the rated speed of today's die cutting technology (up to 8,000 sheets per hour), it is very rare that a machine will run at its rated speed in production. While a die cutter might require one to three hours to set up before it can commence cutting and creasing (at a machine time cost of \$300-\$900), a Highcon Euclid can already be a significant way through the production before a conventional machine is converting sellable sheets.

### ***Solving an Existing Problem***

Converters report that they are often called on to produce short-run rush jobs. These often entail lifting a long run job from the cutter to put the rush job on. The extensive setup time required to prepare the rush job and re-set the lifted long run job highlight the inefficiency of using current cutting technology for both short and long runs. A converter could group short-run and rush jobs onto a Euclid while a conventional die-cutter could be deployed for the longer run jobs, improving overall operating effectiveness and total production capacity.

There are short runs and on-demand jobs in the current business model, but converters take them on reluctantly based on their clients' requirements rather than actively promoting the capability. Highcon's research shows that this reluctance is due to current technologies, which make the production of these jobs inefficient and unprofitable. Euclid makes it possible to produce those jobs more efficiently and cost-effectively, immediately providing a benefit to the business.

### ***Creating New Opportunities***

Euclid offers an additional advantage—once there is a technology that solves the current bottlenecks in the process, converters can actively engage their customers about shorter runs and on-demand production. This offers a significant opportunity for converters to develop new services so they can help customers improve their supply chain efficiency. Enabling on-demand production of packaging allows brand owners to improve cash flow by eliminating inventory, improve their sustainability by reducing obsolescence, and handle demands more dynamically by reacting to market shifts.

Solving existing problems is only part of the Euclid and DART technology. As they adopt the new technology, innovative converters will undoubtedly find that it enables new approaches to the market as well as new products and services. By engaging with designers in a collaborative sharing process to explore the capabilities of the Euclid, new concepts that push packaging design and production may emerge to improve shelf appeal. As is the case with any new technology, it is safe to expect that previously unconsidered applications and approaches will become apparent once this tool is in the hands of entrepreneurial converters. The Euclid enables out-of-the-box thinking about packaging. Highcon has already identified one creative application that the Euclid opens up—internal cuts. These are apertures of variable size, shape, and position used as a creative design element to add visual impact to the package to achieve standout, rather than a structural element. They complement the graphic design, but in a physical form. The ability to change the size, shape, and location of these internal cuts easily provides a powerful tool for designers to create additional standout on the shelf.

## InfoTrends' Opinion

Brand owners are demanding packaging suppliers that meet their need for faster turnarounds, more SKUs, smaller volumes, and less waste. There are clear signs that the print industry is stepping up to this challenge—we are seeing developments in offset and digital printing technology that address these needs. Nevertheless, fully meeting all demands requires a re-engineering of the entire carton board workflow, including cutting and creasing. Highcon's founders, with their experience with digital printing equipment and a keen understanding of the issues at stake, are supporting printing developments to provide a total solution. The result is the Highcon Euclid.

There is an immediate requirement for a cutting and creasing platform to improve the efficiency, economics, and sustainability of short-run work that is currently being produced. As the demand for short-run cartons increases, the benefits of a Euclid become even greater. Conventional machines that require hours to set up spend a greater and greater percentage of each shift in make-ready rather than production. A company that is seeking to increase capacity for short runs via conventional devices would need to make a significant investment in additional equipment and operators without any way to generate additional revenues to support those increased costs. Highcon's Euclid provides a more cost-effective and scalable solution for short runs. It is creating a new short-run opportunity for converters. If you haven't looked at the short-run packaging opportunity, now is the time!

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