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MAG
THE MAGAZINE
TECHNOLOGY ▸ SOLUTIONS ▸ RESOURCES

2018 SUMMER FORECAST

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- UV and LED curing systems
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What's Next for the Economy and Print?

Ronnie H. Davis, Ph.D., Senior Vice President and Chief Economist,
Center for Print Economics and Management, Printing Industries of America

With the first half of 2018 behind us, we focus on what's next for the economy and print over the remainder of 2018 and 2019.

Here's our perspective:

The Economy—Trends and Risks

For the most part, good news on the economy continues. While GDP grew at only a modest 2.3-percent pace in the first quarter, we still look for around 3-percent growth for the full year. Employment growth remains robust, with job openings just about equal to the pool of unemployed people. Wages and salaries are rising, and inflation is inching up but is within the Federal Reserve's target range. At the same time interest rates are also up.

GDP 1Q
+ 2.3%

Print Sales
+ 2%

Profits
+ 2.92%

GDP 2018
≈ 3%

On the negative side, there are some yellow lights blinking in the form of increasing signs of bottlenecks in transportation, higher energy prices, and worker shortages. At this time at least, our outlook is for the recovery that started in June of 2009 to continue. At nine years old it is now the second longest of the 11 post-war recoveries and appears to have staying power.

Print Sales

If the economy performs as expected, then overall print sales should edge up around 2 percent in 2018 and again in 2019.

Printer Profits

Our data indicates that profits rose last year to 2.92 percent of sales from 2.66 percent the year before. This pace tied 2015 as the highest print profits in the last nine years. If the economy and print markets hold up as expected, printer profits should remain at or above 3 percent of sales in 2018 and 2019.

Technologies, Processes, Products, and Services

Recent trends in technology and print processes will continue. This means wide-format, inkjet, and toner-based digital processes outpace installations of conventional technologies. Hot products and services include signage, in-store displays, packaging, labels/wrappers, direct mail, and promotional materials.

Downside Risks

There are always downside risks on the macroeconomic side, including:

- Trade restrictions/barriers slowing down the U.S. and global economies
- Labor shortages restricting growth
- Bottlenecks—particularly transportation
- Costs and price pressures—Both are inherent in the growing economy and possible missteps by

the Federal Reserve as it unwinds the bond-buying push of the last few years
- Interest rates up from inflation and increases in deficit crowd out private investment

On a microeconomic or print-specific level, risks include:

- Labor issues specific to print
- Postal issues
- Paper prices and supply issues including possible trade restrictions

Get help from PIA's Center for Print Economics and Management

Our Financial Performance Assessment (FPA) program offers a customized diagnosis and strategic and tactical assistance. To find out how an FPA can help, contact **Ron Davis at rdavis@printing.org.**

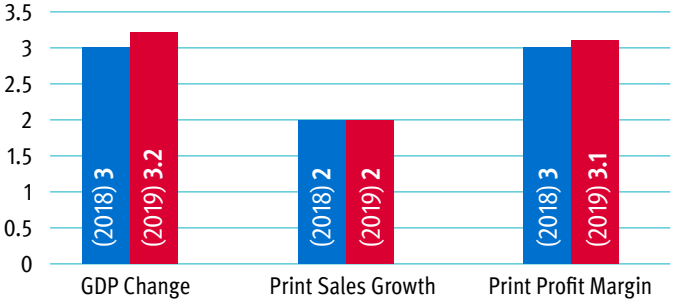
What to Expect:

- Economic and print market expansion should continue.

LEARN MORE

Visit **printing.org/topics/center-for-print-economics-and-management** for more resources.

Outlook for the Economy & Print
2018–2019



- Printer profits should remain high by historical standards.
- Wide-format, inkjet, and digital toner-based technologies continue growing at a faster pace than conventional print .
- Signage, in-store displays, wide-format products, direct marketing and promotional print plus packaging, labels, and wrappers are hot markets.
- Downside risks, while small at the present time, could escalate, so take advantage of the opportunities but be prepared to reverse course if necessary.

More than One Cure with UV

Bill Bonallo, President and CEO, IST America

Over the past several years, LED-UV has been a term widely publicized throughout the graphic arts industry. Though the term started out surrounded by energetic marketing along with some truly amazing claims, over time it has gained acceptance across multiple application platforms, including offset, digital, and flexo.

LED-UV is a different technology from full or pure UV, hybrid or LE, HR, and HUV, in that the light it utilizes is produced by light-emitting diodes instead of a traditional UV lamp. The power output of LEDs is far less than that of traditional UV lamps, so getting the UV energy to the substrate can be a challenge that requires the aid of special optics and/or reflectors. At the same time, the energy required to power the LED system is less than that of a traditional UV system, and fewer sub support systems (such as cooling and exhaust) are required.

The power output of LEDs is far less than that of traditional UV lamps, so getting the UV energy to the substrate can be a challenge that requires the aid of special optics and/or reflectors.

Several of the advantages with LED-UV include instant on/instant off, which allows formatting both around and across the cylinder to match the sheet size, but requires proper press interfaces to achieve that function. LED-UV also runs cool to the substrate since no infrared is being produced. However, the electronics within the LED modules run hot and do require separate water cooling.

The reality is that current LED-UV systems deliver a nearly monochromatic bandwidth and have challenges providing the wide-band UV wavelengths that are required for proper surface cure. That does not mean they are not effective at curing LED material, only that the deficiency is compensated by adding expensive chemistry to the inks and coatings. LED is not just light-source dependent; it is also ink-and-coating-formulation dependent. And although there is steady growth in this area, the suppliers of raw materials for LED-UV inks and coatings are dwarfed by those of traditional UV, keeping LED inks and coating prices high and options limited.

Recently, I and others have witnessed interesting and telling phenomena during some product evaluations. One such case involved a press that was equipped with both traditional UV equipment and LED-UV curing equipment. When running pure UV ink, hybrid UV ink, LE/HR UV inks, and LED-UV inks on the same machine with the same curing equipment, all inks cured well with traditional UV. This is not the case with the LED curing equipment. The LED inks

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cured without a robust top cure, and the LE/HR inks performed similarly with the LED system. The wide band of traditional UVs included everything, even the specialty inks required provided a solid cure.

It is concerning that the very premise of the advantages of UV curing is being redefined. Many industry people jumping on the LED bandwagon have no previous UV experience and, therefore, don't really know what the process is capable of delivering.

If you understand that proper UV curing of a printed product should offer the maximum application flexibility on the widest variety of substrates, increased production efficiency, the highest durability and rub resistance, the highest gloss level with coatings, and the ability to respond to new market opportunities, then UV could be in your future.

Today, there are several UV curing technologies to choose from, and LED is an excellent option for specific applications. Truthfully, all of them are supposed to do pretty much the same thing: reliably and consistently provide the proper dose, intensity, and wavelength of UV energy to the UV-curable material being applied and deliver results that meet customer expectations at press-rated speeds. Perhaps the biggest consideration will be the economics as they vary considerably between the technologies.

One thing is absolutely sure: there is no universal, one-size-fits-all solution when it comes to the selection of UV curing options. Seek out well-known, established suppliers that offer multiple platforms and take advantage of their experience in guiding you through this exciting and sometimes confusing technology.

ABOUT THE AUTHOR

Bill Bonallo is president and CEO of IST America and was personally involved in the development of the CoCure process. IST is a global UV systems solution provider with over 13,000 system installations servicing the graphic arts, digital, industrial, and converting segments of the industry.

For more info, visit: info@ist-UV.com

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New Plate Technology Will Revolutionize Plate Making in the Print Industry

Adrian Shuttleworth, Product Manager, Plates, Kodak

Many printers are making environmental sustainability a priority for their business. Using vegetable-based inks, recycled papers, and alcohol-free fountain solutions in the pressroom; installing energy-efficient lighting in office areas; and recycling anything and everything are becoming standard practice in the print industry.

Eliminating water, chemicals, and energy from plate processing is another big area of interest for printers. In the last 15 years, thousands of printers worldwide have switched to process free plates, slashing both costs and environmental impact in prepress. Despite the benefits promised by process free plates, a majority of offset printers are still using wet processed plates, and printers needing long runs or a very fast, robust plate are hesitant to make the move to process free.

Now, everything is about to change. Thanks to a recent technology breakthrough, up to 80% of offset printers will be able to use process free plates.

In late 2018, Kodak will begin selling a new plate in the Americas that uses this breakthrough technology. After extensive beta testing at nearly 200 customer locations in 28 countries, the new KODAK SONORA X Process Free Plate has proven that it can replace unbaked processed plates in most applications, with no compromises to performance.

One of those beta customers is Southwest Offset Printing. Based in California, Southwest Offset has both coldset and heatset web presses and prints magazines, catalogs, newspapers, and more. Southwest Offset uses about 1,000 plates per day, and they have been impressed by the performance and sustainability benefits of the new SONORA X Plates. Dutch Greve, CEO, commented, "We've saved over one million gallons of water, and that's a big thing. The print quality we're able to achieve with the SONORA X Plate has been outstanding, and the run lengths match the needs of our business perfectly."

Imagine the amount of water, chemicals, and energy the print industry would save if most printers switched to process free plates. That was the vision inspiring Kodak's plate scientists. To design the SONORA X Plate technology, Kodak's scientists combined the standard anodizing layer of a wet processed plate base, which provides robust press performance and excellent ink/water balance, with the process free technology of SONORA XP Plates. The scientists then topped this off with a new coating to improve the platesetter throughput/productivity and extend the plate's run-length capability.

The result was a plate that delivered all the benefits of process free, plus fast imaging speeds, robust handling capabilities, excellent resolution, and long run lengths, even for challenging applications such as UV.

These capabilities, along with confirmation from our customers, support our belief that this new technology

breakthrough will allow up to 80% of offset printers to use process free plates, including:

- Large commercial
- High-quality commercial
- Heatset web
- Offset packaging
- Books
- Large newspapers

Technology is changing our industry, making print more sustainable than ever, and this plate technology breakthrough means that just about any offset printer, printing just about any type of application, should now seriously consider switching to process free.

ABOUT THE AUTHOR

Adrian Shuttleworth has been in the printing industry for over 40 years, starting his career in R&D at Howson-Algraphy in 1976. Having been deeply involved in the development, testing, and marketing of many plate products, Adrian has an extensive understanding of customers' needs and how the features of Kodak plates can benefit (and have benefited) customers throughout the world. Adrian joined Kodak in 2010 as EAMER Product Manager for plates and equipment, then progressed to his current role of WW Product Manager for plates.

View the Sonora X video:
https://youtu.be/tOd2LkHTu4g

View the Taking Print Further panel video:
https://youtu.be/WQxfecmi76E

Print Service Providers: Positioned to Meet Clients' Customer Experience Needs

Corey Smith, Vice President, Service Providers, Quadient

One of the hottest trends across all industries—and affecting the print service provider (PSP) world—is customer experience. This means making it easy and enjoyable for customers to do business with a company. PSPs, of course, are concerned about their customers' experience, but the real opportunity is in supporting clients by providing the ability to meet the expectations of their own customer base.

Customer experience is built around every action a business takes when it interacts with its clients whenever and wherever there is a touchpoint or communication with customers. Sales and marketing departments typically initiate customer contact, so their collateral often gets the most thought and care in terms of design, production quality, and delivery. However, companies can no longer afford to stop there. Customer experience continues with ongoing communications that include routine transactional materials like invoices and statements, customer service communications, correspondence around products and product maintenance, and items like newsletters, catalogs, and promotional materials that keep customers informed about what your client has to offer.

The challenge for PSPs is how to support clients in meeting their customer experience objectives as customer expectations continue to be more complex and wide-ranging. The need for personalization and the use of variable data almost goes without saying. Adding to that requirement is the fact that many customers today prefer to receive and respond to business communications through electronic channels or a mix of print and electronic.

Speed is another serious issue when working with business-to-consumer clients. When a print customer is launching a new product, it may be critical to their success to get their story out ahead of the competition—and through every available communication channel. While much time may be given to developing marketing concepts and design, print buyers are demanding ever-shorter turnaround times when it comes to actual production—without cutting corners in terms of quality.

Digital technology has made it possible to broaden the communications spectrum from hard copy print to electronic, enabling PSPs' customers to fulfill their customers' expectations and provide a positive experience. Over the last 20 years, PSPs have seen a revolution in every process from design to prepress to on-press and post-press systems and have found ways to apply new technology to ongoing customer goals and challenges.

The key is not technology alone. PSPs enjoy a unique position that allows them to capitalize on the trust-based relationships they've already built, helping enterprise clients meet the demands of their customers over the years and by leveraging the technology and

skill sets they already have. Already being entrenched in a customer's operations gives PSPs an edge over new digital-only market entrants, making it a more natural progression to be the chosen company to fulfill the need created by the digital opportunity. Combining PSPs' in-depth knowledge of the full spectrum of customer communications with today's digital technologies—not to mention already being trusted with enterprises' data—means PSPs are now in an enviable position to offer the functionality their clients need right now, as well as the flexibility required to meet future demands.

What To Expect

According to Forbes, by 2020, customer experience is expected to surpass product and pricing as the key differentiator for businesses. To support your clients as they try to better serve their consumers, look for technologies that provide:

- Personalization and variable-data capabilities
- Multichannel output
- Ease of use
- Compatibility with data from legacy systems

While many applications can enable one or more of these functions, compatibility with existing hardware and software must be considered. And, of course, any new capability should offer room to grow with changing customer demands.

Supplementary Content:

Quadient eBook: Service Provider Transformation: A Pragmatic Guide to Achieving Digital Success
https://www.quadient.com/resources/service-provider-transformation-pragmatic-guide-achieving-digital-success

ABOUT THE AUTHOR

Corey Smith is vice president, service providers for Quadient, formerly GMC Software. A Neopost Digital Company, the Quadient portfolio of technology enables organizations to create better experiences for their customers through timely, optimized, contextual, highly individualized, and accurate communications for all channels.

The New Faces of Print

Richard Romano, Managing Editor, WhatTheyThink.com

As I look around my home office, I see a cup full of pens, literally each one bearing a logo from a printing equipment manufacturer, hotel, bank, or auto dealership. There is a bowl full of USB drives, each bearing the logo of the company whose press kit it contains. My stapler has Swingline printed on it; my USB hub has Staples on it. My mobile phone case has customized printing on it. It's Saturday (as far as you know), so I'm wearing a T-shirt that has my gym's logo on it. If I walk out to the kitchen to refill my (printed) coffee mug, there are (printed) magnets stuck to the fridge. Just in one cabinet, there are printed pint glasses from various local events, printed water bottles from various 5K races I have run, a printed YETI cup from an industry association event, and so on.

The answer to the question "What is print?" will continue to change.

When industry pundits say, "There is no demand for print," I say, "Are you kidding me? Look at all the printed stuff in just two rooms." If I went out to stores and restaurants, there would be no end of printed materials. **Print is everywhere.**

Of course, we need to define what we mean by "print."

When people say the demand for print is decreasing, what they're usually referring to is what we might call traditional print, the bread and butter work for the industry for more than a century: brochures, direct mail, catalogs, directories, manuals, transactional documents, and other miscellaneous promotional or marketing collateral materials. Basically, pieces of paper with printing on it. And it's true: demand for many of these items has been declining or is gone entirely, thanks to electronic alternatives like the Internet, PDFs, mobile devices, and social media.

Last year, I and my co-author Dr. Joe Webb published the book *The Third Wave*, one of the themes of which was that there is no mainstream print anymore: print has become a vast, ever-growing assortment of specialty or niche applications and products.

Here's what happened. The combination of the Internet and digital printing helped foster a demand for short-run printing, often customized, personalized, or versioned. Mass printing gave way to on-demand printing. Print only what you absolutely need, and ensure that you don't need an awful lot. But that was still traditional print.

Enter inkjet. It took a long time and a lot of R&D, but we have reached the point where inkjet printers can print on virtually any substrate or object. That's not to say that the same inkjet printer or ink can print on everything, but some species of inkjet can. And since they're digital, inkjet devices have all the

advantages of their toner-based forebears—short-run, on-demand, and customized/personalized printing—but on anything.

So mainstream print is now all the varieties of wide-format printing, from sign and display graphics to retail and POP to wall/floor/window graphics to vehicle wraps. The analog-to-digital transformation is affecting textile printing, with on-demand or fast fashion gaining traction, where customers can order garments or other textile items in very small quantities and even upload their own designs. One major advantage is the elimination of inventory, as well as taking the guesswork out of what designs are going to be in fashion. Also textile-based, soft signage is increasingly replacing vinyl or rigid materials. At the same time, flatbed machines can print on wood, metal, glass, concrete—you name it. Some companies are custom printing directly on doors, bricks, ceramic tiles, even furniture (It's blurring the line between commercial printing and industrial printing).

Inkjet—specifically UV and dye-sublimation—also allows for the customization and personalization of specialty items, what used to be called "ad specialties," everything from pens to golf balls to USB drives, to smartphone cases to baseballs and even footballs to...you name it.

Adding these kinds of applications and products favors small and mid-size print businesses that can be a bit more nimble and creative in adding and changing up their capabilities. The trick, though, is selling these kinds of items. Specialty items can be part of an overall business development approach to sales if a print business is working closely with major customers to develop comprehensive marketing plans that include these kinds of items.

So let's be perfectly clear: there is still a tremendous demand for print. It's just not the print that we're used to.

What to Expect

Traditional print markets will continue to decline, although most of the real decreases have already happened. Wide-format, sign and display, and related applications will continue to grow. Specialty items will take a few years to really catch on. The textile printing microfactory will grow dramatically.

The answer to the question "What is print?" will continue to change. Some traditional wide-format applications will have plateaued, but the advent of new substrates and other materials, as well as an interactive component, will keep demand for these applications high. Anything and everything that can be customized with printing will be. Fast fashion is becoming the rule rather than the exception. Specialty items will be heavily integrated into many companies' marketing plans.

ABOUT THE AUTHOR

Richard Romano is managing editor of WhatTheyThink.com and is the author or co-author (with Dr. Joe Webb) of more than half a dozen books including *The Third Wave*, *Disrupting the Future*, and *This Point Forward*. He is also a regular contributor to the SGIA Journal.

Dan Bendele, President, IPW

What's the Plan? Buying Groups!

The Startup

When I started Independent Printers Worldwide (IPW) back in August of 1998, Printing Industries of America was absolutely essential to our success. After my experience helping Cadmus Communications streamline their procurement programs, Dick Samuels, former Chairman of the Board of PIA of Virginia, believed I could bring a similar program to the independent printer, giving them a major advantage in the ever-evolving industry. Samuels reached out to four key PIA members in the Mid-Atlantic region: Good Printers, Spencer Printing (sold), Teagle and Little (later Centric Communications), and Colorcraft of Virginia (purchased by Corporate Communications Group). Those four in turn reached out to other members of PIA and their respective peer groups, and IPW was born.

The Plan

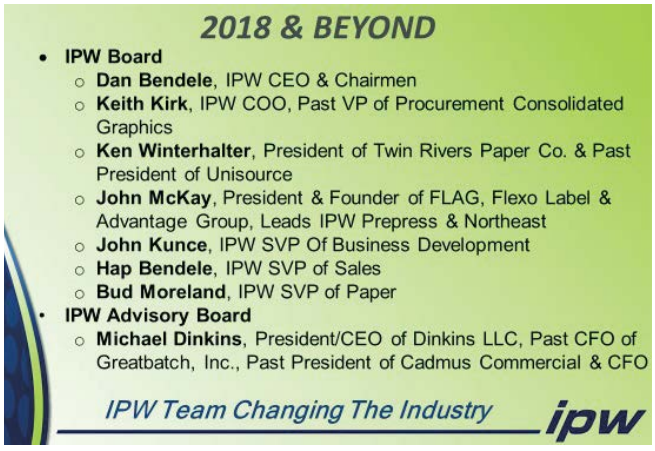
From day one, the goal of IPW was to find ways to help independent printers compete with the top ten companies in our industry. The idea was simple conceptually: Combine buying power to negotiate the most advantageous deals with suppliers. While the concept was simple, practically speaking, this has been a constant battle. Consolidation has had a significant impact on the industry. Consolidation means more leverage for the suppliers and that independents must work even more closely together to keep their competitive advantage.

Constantly Evolving

Over the past 20 years, IPW has evolved alongside the industry. Like many buying groups, we have moved to a confidential model for our contracts with suppliers. The trust our members place in us to negotiate on their behalf is a hallmark of our success. Current PIA Chairman Bryan Hall of Graphic Visual Solutions refers to IPW as his "Vice President of Procurement." Leveraging the power of the buying group's infrastructure allows members to save in ways that go far beyond just purchasing dollars.

The Future of Buying Groups

Buying groups are not going away. To the contrary, they appear to be popping up in unlikely areas. A recent article from *Vice* **(http://prnt.in/groupbuyingcars)** explained how buying groups are a key feature in the adoption and purchase of electronic vehicles, like those sold by Tesla. As suppliers continue to consolidate, buying groups need to adapt and provide members with market disrupting tools.



Centralized Pay

One area that is seeing incredible growth is the concept of centralized pay. Centralized pay allows the buying group to provide a win-win for both the member and the supplier. Paying the supplier faster means more incentives for the members and gives suppliers who previously would not deal with the buying group a massive incentive to come to the table and play ball. IPW is bringing this to our membership through a partnership with TriMega.

The Future is Bright

Like our members, IPW is an independently owned, multi-generational company. I am extremely proud of the work we have done over the last 20 years to give independent printers the tools needed to compete with the top 10 companies in the industry. PIA and its members have been instrumental in our success, and we are grateful for the opportunity to work alongside such excellent partners. As Henry Ford once said, "If everyone is moving forward together, then success takes care of itself."

ABOUT THE AUTHOR

Dan Bendele founded Independent Printers Worldwide, Inc. in 1998. He has served as President of IPW since its inception. His unique background blends financial expertise with a wide range of industry insider talents. Hallmarks of his experience are executive assignments with International Paper and the Director of Procurement at Cadmus Communications. Dan resides in Virginia with his wife Kyra and three of their six children. They have two daughters-in-law and one granddaughter.

Our Customers' Success is Our Success

John Fulena, Vice President, Commercial & Industrial Printing Business Group, Ricoh USA, Inc.

Today, the print and graphic arts industries are changing faster than ever. To navigate this rapidly shifting landscape, many have looked to third-party experts for help. To meet these challenges, Ricoh has recommitted itself to continuous, customer-centric innovation with a new motto: Take a look at Ricoh Production—there's never been more to see.

Historically, we have measured growth in terms of placements, impressions, and revenue. But today, many customers are looking for one-stop destinations for all of their print needs, making the customer experience a key differentiator for print buyers. The old ways of measuring success were suddenly too narrow. It is not just about the next placement, but about focusing on that placement's performance, how it could perform better, and how it can open more growth opportunities for that customer.

At the end of the day, the mindset became not "If you build it, they will come," but "If they succeed, they will come back—and word will spread."

Ricoh's Commercial & Industrial Printing Business Group is committed to making strategic investments that help printers deliver the applications their customers are demanding. From augmented reality applications to a growing sign and graphics portfolio to an expanding consulting services group, Ricoh's set of offerings is expanding to address the needs of customers.

Earlier this year, the group announced a revamped version of its INTERACT User Community Event and a brand-new Marketing Innovators Symposium series. Each takes a collaboration-driven, hands-on approach to help customers find new ways to leverage technologies. Ricoh views these events as a platform to discuss the future of print, the growth of print in general, and what is needed to implement successful strategies moving forward.

In its eighth year, INTERACT is drastically expanding with investments that will bring C-level executives, marketing decision makers, and industry influencers into the fold. The Marketing Innovators Symposium series provides a forum for those involved in the marketing ecosystem to discuss emerging communication trends.

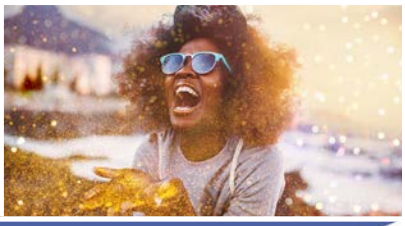
Today's customer needs are different from those of ten years ago. The application requirements have changed, demands for quality are louder, and the expectation for a single print partner is stronger. Ricoh is committed to helping printers become that "one stop shop" their customers are seeking. In 2018, there truly has never been more to see.

What to Expect

In the coming years, the graphic arts landscape will continue to undergo huge changes as different types of application needs converge in single shops and even single devices. Partnering with an expert who works hard to understand your specific, changing pain points and goals will make all the difference.

ABOUT THE AUTHOR

John Fulena is the Vice President of Ricoh's Commercial and Industrial Printing Business Group. He oversees the design and implementation of all marketing and business strategies to drive Ricoh's success in the commercial and industrial printing markets.



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The New Electronic Manifest System for Hazardous Waste

Gary Jones, Assistant Vice President, EHS Affairs, Printing Industries of America

Electronic commerce has finally taken hold at the Environmental Protection Agency (EPA) with the debut of its new electronic manifest or e-Manifest system.

On June 30, 2018, the EPA formally launched its new system. This system mirrors the current approach, but now there is a national system to track hazardous waste shipments electronically. The new electronic filing structure ensures a faster, more accurate way of tracking the cradle-to-grave fate of hazardous waste.

Background

Under the Federal Resource Conservation and Recovery Act (RCRA), each generator of hazardous waste must use a round-trip manifest to monitor the movement of their waste. The manifest has historically been paper-based and served as a way to ensure that the waste was properly delivered to the point of disposal. The EPA's transition to a paperless manifest system has taken many years, with primary motivation coming from the Hazardous Waste Electronic Manifest Establishment Act, which was signed into law in October of 2012. The Act then prompted the EPA to issue several rules occurring in 2014 and at the end of 2017 implementing the new system.

Costs of e-Manifest

The Electronic Manifest Act establishes fees to recover costs associated with maintaining the e-Manifest system. The EPA has determined that the fees will be paid by the receiving facilities, often referred to as treatment, storage, and disposal facilities. A fee will be assessed for each type of manifest copy submitted to the e-Manifest system.

The fees per manifest are represented in the following chart:

Manifest Type	Fee
Mailed	$15.00
Scanned image upload	$10.00
Data + image upload	$6.50
Electronic Manifest	$5.00

Mechanics of the e-Manifest System

Users are able to create manifests electronically and transmit them through the system. Paper manifest and continuation sheet forms will be available for those entities that would prefer to track their hazardous waste shipments with the existing paper forms. However, the EPA's goal is

to eliminate paper manifests within five years. The primary motivator will be the fees associated with paper filing, which are expected to increase every two years.

Generators must register with the EPA before they can use the e-Manifest system. The EPA is recommending that two site managers from each company register so that there can be more than one person who will be able to manage the account. If generators do not create e-Manifest accounts for viewing hazardous waste manifests, they should make arrangements with their waste disposal company to obtain paper copies of completed manifests. In addition, each company that is registering for the manifest must obtain an EPA identification number, a requirement for companies that are classified as small- or large-quantity generators. Companies that are very small-quantity generators are not technically required to obtain an identification number, but need one to use the new e-Manifest. Registration is accomplished online at **https://rcrainfo.epa.gov/rcrainfoprod/action/secured/login.**

The EPA has also established a dedicated web page with links to information such as fact sheets and frequently asked questions. The web page can be accessed at **https://www.epa.gov/e-manifest.**

Summary and Conclusion

As many have experienced, the digital age offers many benefits but also brings some challenges. Given the logistical challenges associated with moving to the e-Manifest system, it will be some time before there is a complete transition to the electronic version. It is anticipated that the generator will initially still be signing paper manifests, as this new system will have a steep learning curve.

The Future of Statistical Process Control of Color

John Seymour, John The May Guy, LLC

People are just not good at statistics.

The lights in Las Vegas are powered by people who trust their instincts more than statistics. We see trends in random data. We tend to overestimate the significance of a single data point. We chase our tails looking for a problem when the press is running normally. We don't notice real problems because of other fires that need to be put out.

W. Edwards Deming developed Statistical Process Control (SPC) as an alternative to making decisions based on gut feeling. One important SPC technique allows one to discern between what he called normal variation (the variation that is inherent to the current equipment and the way it is used) and special cause variation (the variation that is caused by some change to the process).

Depending on whether the variation is deemed a normal part of the process and whether the resulting product is meeting customer tolerances, there are four possible actions, as shown in the diagram:

- Normal and in tolerance—No worries.
- Abnormal and out of tolerance—Diagnose the problem and fix it. Viscosity? Ink film thickness? Bad plate? Roller pressure?
- Normal and out of tolerance—Long term, the only solution is to fix the process. Maybe it's new equipment or software, or maybe it's a change to the standard operating procedures. Or maybe the customer spec needs to be revised. In the short term, avoid knob tweaking. It will only increase the variation.
- Abnormal and in tolerance—This is a tough call. On one hand, customer tolerances are being met, so why bother? On the other hand, this could represent an opportunity to improve, or it could foreshadow a preventative maintenance issue.

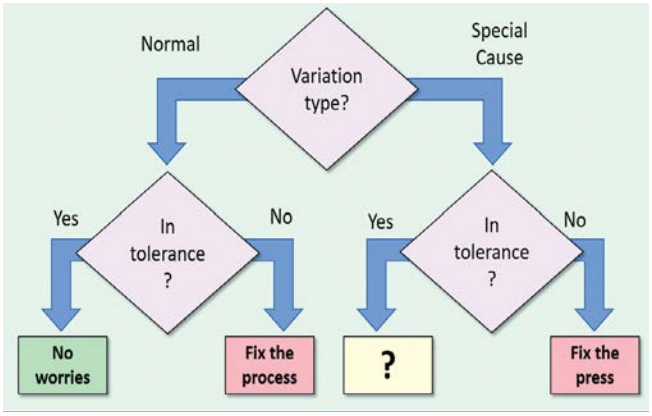

Figure 1

The color difference (ΔE) has long been used as a metric for acceptance tolerances. Indeed, much of the impetus for developing better color difference formulas has been this very practical industrial problem. Tolerances are put into place to objectively quantify the customer's requirements, in this case, for color fidelity. As such, a metric that quantifies our perception of color difference is appropriate for customer tolerances.

It should come as no surprise that practitioners of SPC have often used the ΔE color difference as a key metric to benchmark their process. The foundation of SPC is to characterize the normal variation of the process so that you can identify when things behave abnormally. But, for reasons that are almost universally underappreciated, all ΔE color differences—ΔEab, ΔECMC, ΔE94, or ΔE00—are inappropriate for purposes of SPC.

In figure 2 below, the circular image at the left shows that ΔE does not properly characterize color variation. The X represents the target color and each dot represents a color measurement. It is correct to say that all the measurements are between 1.5 ΔE and 3.0 ΔE from the target, and this is useful information for quality assurance. But if another data point is within that blue ring but on the opposite side of the target (such as the O), the ΔE color difference will make the data point appear to be part of the normal variation, even though it's clearly not.

Figure 2 below illustrates the newly developed ColorSPC technique. Instead of using regions based on human perception to characterize the process, ColorSPC fits an ellipsoid to the measured data. Anything within the ellipsoid is considered normal variation. The O, being well outside this ellipsoid, is now labeled as special cause variation.

This technique can be used to identify special cause variation in the pressroom. It can be used in the press office to identify when a press run is wonky and can be used to compare one process against another, as in, "Did this new equipment improve variation?" It can be used in the business office to evaluate whether a customer tolerance for color variation can be routinely met.

What to Expect

Today, over a half-million color measurements have been used to develop and test the theory of ColorSPC. Data has been collected from web offset, flexo (process colors and spot), newspaper, and toner-based printing, as well as from photography and plastics. Proof of concept has been demonstrated.

Proof of usefulness is underway. The author is actively working with people who have large quantities of color data and questions that they want to ask of that data. Contact John Seymour at **john@johnthemathguy.com** to get involved. In the next three years, software that performs ColorSPC will be available from a variety of companies.

For More Information

Statistical process control of color, a method that works:

https://prnt.in/statisticalprocess

Is my color process going awry?

https://prnt.in/colorawry

Is my color process all wonky?

https://prnt.in/colorwonky

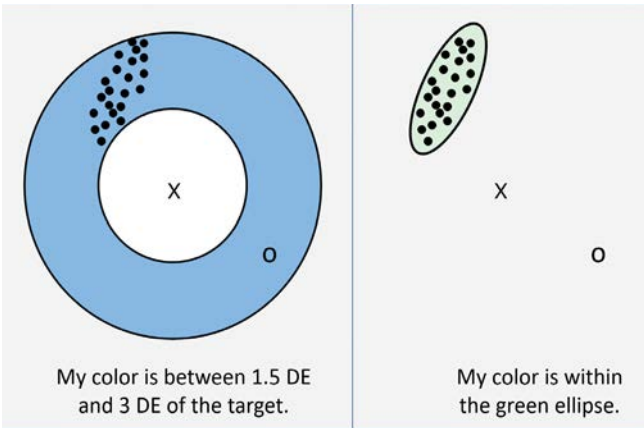

Figure 2

ABOUT THE AUTHOR

John Seymour is an applied mathematician and color scientist, working as a consultant since 2012 under the name "John the Math Guy." John currently holds 27 U.S. patents, has authored over 50 technical papers, and has keynoted at six conferences. He is currently on the Board of the Technical Association of the Graphic Arts and of the Inter-Society Color Council. He writes a blog which is described as "applied math and color science with a liberal sprinkling of goofy humor."

Production Inkjet: How Far We Have Come

Jim Gavitt, Vice President, Sales, Xerox

In 1995, in an office at Newell Brands, I took part in an emergency marketing meeting to discuss the fact that the Internet was going to change the landscape of retail immediately. Specifically, within five years, many brick and mortar stores would be shaken due to the majority of retail sales taking place via the Internet.

While the notion seemed likely at the time, the growth of what we now call e-commerce was much slower than originally expected. It took decades (not years) for Internet retail revenue to be a mere 10% of overall retail sales.

The print industry has faced a similar growth pattern when it comes to the adoption of inkjet technology. At the time, drupa 2012 was considered to be the start of the acceleration of inkjet technology. While "the big guys" with specific needs and high volumes did adopt inkjet technologies as a lower-cost alternative to offset or digital toner printing, the medium and smaller players did not follow suit. The capital investment was simply too hard to swallow and the required volumes to keep the engines running were too high for them to commit.

From what I saw at drupa in 2016, inkjet technologies and innovation had stalled. However, I believe we are finally at the point where a mainstream adoption of inkjet technology will infiltrate all sizes of print manufacturers. Inkjet offerings are coming in many different configurations, from roll-to-roll, to roll-to-cut, to pure cut-sheet.

Specifically, cut-sheet options have offered the opportunity for small- to medium-sized operations to adopt inkjet technology without having to change the entire workflow of their facilities.

Cut Sheet
Offers flexibility in stock and applications. Operations that have cut sheet environments often leverage existing finishing equipment.

Roll to Cut Sheet
Cost effective for manufacturers with limited application mix at mid to higher volumes. The cut sheet-out flexibility enables optimal finishing utilization.

Roll to Roll
Lowest run cost to produce the highest volume. Ideal for targeted application mixes.

All that said, there is still a major gap in the quality of toner vs. inkjet. The high photographic quality that you experience on digital production presses, like the Xerox® iGen® 5 Press, is simply not attainable with inkjet. Consequently, there will continue to be a place for traditional digital offerings.

In the future, we will continue to see improvements in speed, cost, stock flexibility, and quality. Xerox offers several enhancements in each of these areas and continues to invest a large percentage of our R&D dollars to continue down that path. At drupa 2020 I would expect that the topic won't be "Where are we going in inkjet?" but rather "How far have we come?"

ABOUT THE AUTHOR

Jim Gavitt is Vice President of Sales for Xerox Corporation and sits on the Board of Directors for Printing Industries of America.

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Have You Heard about the New European Privacy Regulations?

Keith B. Daniels, Jr., J.D., CIPP/US

Printing Industries of America includes member companies of many sizes who service clients in North America and elsewhere. While eyes have been on the changes in taxes and regulations in Washington, D.C., many organizations will be surprised about new developments in Europe that will affect them greatly. Does your organization do business with European clients? Do you collect or process private information on any European corporate clients or individuals? If so, as of May 25, 2018, the General Data Protection Regulations (GDPR) apply.

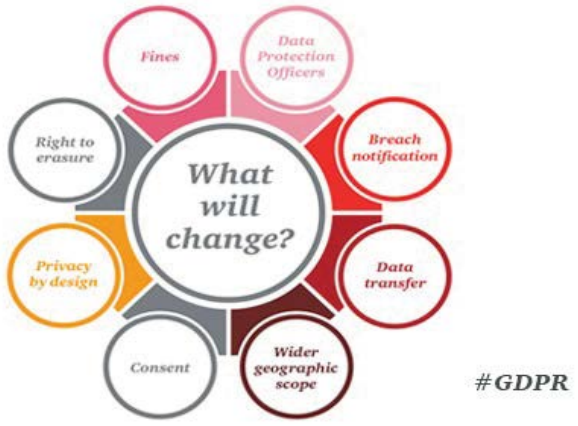
The European Commission issued the GDPR's 99 Articles two years ago and set the deadline for the start of regulation. Since then, countries within the European Union have appointed regulators (the "Statutory Authorities") to handle enforcement in their countries, and many organizations are in the process of trying to be compliant. However, the journey to compliance is a long road that few have finished yet.

GDPR protects the personal data of European citizens, defining personal data as any information relating to an identified or identifiable natural person (data subject). An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier (such as a name; an identification number; location data; an online identifier; or one or more factors specific to the physical, physiological, genetic, mental, economic, cultural, or social identity of that natural person).

Things like IP addresses, application user IDs, GPS data, cookies, media access control (MAC) addresses, unique mobile device identifiers (UDID), and International Mobile Equipment IDs (IMEI) are some examples. Thus, the data protected in the EU is much broader than under U.S. laws and regulations.

Who must protect this personal data? All establishments within the EU are subject to it and so are all non-EU organizations that offer goods or services or engage in monitoring within the EU. It does not matter the size of your company, the amount of goods or services you sell, or how much data your organization processes. Thus, the GDPR applies to organizations in and out of the EU, including in the U.S.

If you need to start or finish the journey to compliance, you are not alone. A recent study from CompTIA found that just 13 percent of organizations said they were fully compliant with GDPR, while 52



percent of the 400 U.S. companies surveyed said they were exploring if GDPR applied to their business, didn't think it did, or were unsure of the impact.

More information on this study can be found at: **https://associationsnow.com/2018/04/reports-suggest-many-organizations-arent-ready-gdpr/.**

If your organization does fall under the GDPR, the regulators are looking for you to start and to be able to show your efforts. If you do not and come under the scrutiny of a Statutory Authority, the penalties can include fines of up to 20 million euros or up to 4% of worldwide revenues. Individuals can also bring lawsuits, which will bring class actions, now a U.S. issue, to Europe.

I do not suggest hiding your head in the sand. If your organization comes under the GDPR and you cannot document your efforts, you need to get help and get moving.

The GDPR will have global impact on data privacy. Expect many changes in privacy rules worldwide in the coming years. As for the GDPR:

1. Personal data is in the control of the individual, who can demand to know where their data is, have it changed, or even be forgotten.
2. Only collect personal data that you need and only store it for as long as you need it.
3. Data breaches can lead to fines under GDPR and need to be reported within 72 hours.
4. Someone in your organization should be responsible for data protection and compliance with GDPR.

ABOUT THE AUTHOR

Keith Daniels has been involved with cyber security and network protection issues since developing the first policy for data breaches and business interruption for Lloyds of London around the time of Y2K. Since then, he has developed other insurance policies for insurance carriers to cover cyber breaches and has advised many organizations on risks. Keith regularly writes and speaks on data security and privacy and offers services from his location in the Minneapolis, MN area.

How Digital Technology and Software Impact Intellectual Property

Harvey R. Levenson, Ph.D., Professor Emeritus, Cal Poly

Intellectual property awareness and protection used to be a non-issue in printing, publishing, and related areas. However, with the growth of software-driven technology and the Internet, intellectual property awareness and protection has come to center stage in graphic communication. Knowledge of copyrights and patents is now essential. The industry has changed, with software infringement cases representing one of the highest areas of dispute in copyright and patent litigations.

Technology is a Double-Edged Sword

While technology improves quality of life, simplifies tasks, and provides instant access to information, it also compromises privacy, confidentiality, and security. We are all open books to anyone wanting to explore our personal lives. Is the trade-off worth it? Most people believe so. If they didn't, the Internet, email, and online commerce would not have grown the way it has. Indeed, the printing and publishing industries would not have changed the way they did from traditional to digital imaging, resulting in the birth of e-publications.

Growing Markets Are Impacting Intellectual Property Protection

The growing markets resulting from digital imaging have focused on the speed and manner in which people receive information; both have caused concern about intellectual property protection. The ease with which information can be captured and shared has resulted in reduced attention to respecting copyrights. Copyright infringement has grown as a result. For example, in addition to e-publishing, digital technologies have inspired the birth and growth of custom printing, variable-

data printing, "just-in-time" printing and publishing, customization of media, on-demand printing, one-to-one communications, the "market of one," and targeted marketing. Each greatly increased the pace of information flow and has impacted the degree to which copyrights have been violated. Add to this the applications of cloud computing, short-run color, high-speed wide-format printing, printed electronics, 3D printing, e-ink and e-paper, and micro cameras, and the speed of information flow from one point to another becomes enhanced. In addition, mobile devices speed the ability to copy and infringe. This is particularly true with access to mobile devices and applications such as QR codes, Clickable Paper, RFID, apps development, and near-field communication.

Facing a Changing Communication World

The publishing industry is looking closely at the cost/benefit ratio of traditional printing and distribution vs. e-publishing and distribution. The print and distribute vs. distribute and print models are being carefully assessed. Obviously, with paper representing 30 to 50 percent of the cost of printing, e-publishing makes sense from a financial standpoint. However, does it reduce the benefit of the published product? It is generally accepted that print is more detailed and informative than electronic media. Ask anyone who has read a book and then viewed a movie based on the book, and they'll say that the book had more meaning and detail. The same is true of a story in a printed newspaper or magazine relative to an audio or video representation. This raises questions about a printed story vs. a story read on a computer screen or mobile device. Does the reader come away with the same understanding of the content in both instances? Are advertisers as or more content with advertising in e-publishing vs. in traditional print? These are topics of exploration in the publishing world: print vs. electronic distribution.

Patent Trolls Beware! We're Onto You!

The printing industry in the U.S. has been in decline for over 20 years. Traditionally a low-profit industry, printers and their suppliers are trying to find ways of increasing products and services focusing on digital technologies and applications to increase profits and save jobs. Patent trolls are inhibiting growth and causing companies to close or downsize because they cannot afford to absorb the huge fees demanded by trolls while maintaining or growing business. Trolls are equivalent to extortionists lacking business morals and ethics or concern for the nation's push to grow companies, produce jobs, and keep or bring back as much business as possible to the U.S.

Companies faced with threatening patent troll litigation should not settle by paying license fees. Giving in to such demands will exacerbate the problem and encourage additional intimidating and threatening lawsuits. A solution is bringing together all companies named in a suit that has been filed by patent trolls and to work as a unit in bringing the matter of alleged infringements before the U.S. Patent & Trademark Office for invalidity hearings. Such challenges are often won.

WHAT TO EXPECT

Outlook: Now and the Future

A lot has recently occurred that has transformed defendants to aggressors and the plaintiff trolls to be the losers. But to keep this up, we must continue our industry position of not being intimidated and of not responding directly to requests from attorneys representing the trolls.

ABOUT THE AUTHOR

Dr. Harvey R. Levenson is Professor Emeritus, former Department Head of the Graphic Communication Department, and past Director of the Graphic Communication Institute at Cal Poly. He remains active in the industry as a speaker, writer, consultant, and expert witness focusing on technology and intellectual property including patents, copyrights, trademarks, and trade secrets. His latest book, *Introduction to Graphic Communication, 2nd Edition,* is the first printed interactive book using Ricoh's "Clickable Paper" application for two-way communication. **www.igcbook.com.**

Recycled Paper Made with Renewable Biogas Energy

Renée Yardley, Vice President of Sales and Marketing, Rolland Paper

North America's only biogas-fueled paper mill is committed to sustainable manufacturing.

Rolland manufactures premium commercial papers from post-consumer recycled fiber and is the only paper mill in North America fueled mainly by biogas energy from a local landfill.

Biogas—also known as garbage gas because it is created by decomposing landfill waste—epitomizes sustainability. The post-consumer fiber and biogas we use are renewable and readily available, displacing virgin fiber and fossil fuels. Rolland is leading the drive toward truly sustainable manufacturing.

By replacing fossil fuels like coal and natural gas, biogas reduces Rolland's annual carbon dioxide emissions by the equivalent of 23,400 compact cars. A life-cycle assessment of Rolland's environmental footprint showed that Rolland Enviro Print, an uncoated premium printing paper made with 100-percent post-consumer fiber, has carbon dioxide emissions 62 percent lower than the average virgin paper manufactured in North America.

"While Rolland has been manufacturing recycled paper since 1989, we pioneered the use of biogas in 2004 and remain the only paper mill in North America to use this energy," said Renée Yardley, Vice President of Sales and Marketing. "Quite simply, it's aligned with our social and ecological values—we are committed to sustainable manufacturing that is better for the environment, for business, and for society at large."

Benefits of the Biogas Process, from Landfill to Paper Mill

Created by decomposing organic waste, biogas is mainly carbon dioxide (CO_2) and methane (CH_4)—two greenhouse gases that are released into the atmosphere unless utilized. Biogas is captured at

the landfill site, pumped into a purification system, condensed, and then transported in a dedicated eight-mile pipeline to the Rolland mill in Saint Jerome, Quebec.

Biogas is burned in a boiler, creating steam for use in papermaking, and accounts for a full 93 percent of the mill's thermal energy needs. Burning converts the methane in biogas to carbon dioxide, which is 21 times less harmful to the atmosphere than methane. Biogas is cost-effective and in its first year of use reduced thermal energy costs by 35 percent.

The inspiration that sparked Rolland's Biogas Innovation

The inspiration for biogas as paper mill fuel did not come from an engineering firm or Rolland's team of scientists, but rather from a single employee (then the Purchasing Director). A TV program on greenhouse gases triggered his curiosity, and then he approached upper management. This led to the major investment and the work of internal and external specialists, which turned the initial biogas idea into a textbook case of sustainable manufacturing.

Rolland's businesslike balance between minimizing environmental impact and maximizing print performance makes it an ideal supply chain partner for eco-oriented printers and corporate customers.

ABOUT THE AUTHOR

Renée Yardley is VP Sales and Marketing, Rolland Paper, a division of Sustana Group. She is a senior Sales and Marketing Executive with over two decades of experience in global organizations including Tembec, CCM and General Motors. Renée holds a Bachelor of Commerce and MBA from McGill University and an MA in General Management form Harvard University.

Active in the Montreal community, Renée was president of Literacy Partners of Quebec. She currently sits on the board of directors for the Lakeshore General Hospital Foundation and mentors MBA students at McGill.

Taking Print Beyond the Visual

Designing for sensory marketing can open new doors and transform the traditional printing business

Dawn Nye, Manager of Solutions and Services, Konica Minolta

Go ahead, touch the cover of this magazine!

The tactile effects you will experience include Luxe Films premier laminate, hot foil stamping, spot UV coating, and raised 3D effects. Combining the visual appeal of the image with the tactile feel of raised spot varnish and foil, the cover has been designed to awaken and engage your senses. Known as sensory marketing, this concept is gaining popularity, and printers who embrace it can gain significant advantages, including expansion into new markets and applications.

The Science of Appealing to the Senses

Even if you are not familiar with the term, you just participated in sensory marketing. For decades, brands have theorized about how to best inform and persuade customers, ranging from storytelling to the use of images to help improve results. As it turns out, the best approach is to appeal to all the senses.

According to a March 2015 article in *Harvard Business Review,* "The Science of Sensory Marketing," we're about to enter an era in which many more consumer product companies will take advantage of sensory-based marketing. New academic research reveals the science behind the striking ways our senses can affect attitude, mood, and memory more profoundly than just words and images. Aradhna Krishna directs the Sensory Marketing Laboratory at the University of Michigan and is considered the foremost expert in the field. "In the past, communications with customers were essentially monologues—companies just talked at consumers," Krishna said. "Then they evolved into dialogues, with customers providing feedback. Now they're becoming multi-dimensional conversations, with products finding their own voices and consumers responding viscerally and subconsciously to them."

New Opportunities for Printers

Advancements in digital foil, spot UV, and specialty print are presenting printers with new opportunities to transform their businesses. As companies strive to improve the ROI of their marketing campaigns by adding tactile embellishment, touch offers a powerful way to help marketers provide tangible, trackable results.

FEEL COLOR

This is print reimagined.

Join us at PRINT® 18 to learn more about our production print solutions and how they can grow your business

Accurio ANSWERS
BY KONICA MINOLTA

Experience perfect, infinite color, every print, with the AccurioPress C6100 / C6085
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*PRINT 18 RUNS FROM SEPTEMBER 30 - OCTOBER 02, 2018 @ MCCORMICK PLACE SOUTH, CHICAGO, IL

Printers can take advantage of textured print by applying it to heavy, high-quality card stock for direct mail or by adding foil and varnish to decorative packaging. It's about making products and messaging stand out to become more intriguing and emotionally attractive. Consider Apple Inc. for a moment. A critical factor of their success is not just the design and innovation of great products, but also the fact that they apply that same level of care and detail to the aesthetics of their product packaging and collateral materials.

One of the greatest challenges for today's commercial printer is adding value to printed pieces to fuel revenue growth and separate themselves from the competition. "A key emerging trend is the growing success of printers using digital enhancement technologies to embellish print," said Jack Noonan, Marketing Manager at MGI USA. "This represents a tremendous opportunity for printers to increase print volumes, add new clients, and ultimately boost profitability."

According to an August 2017 blog by Jim Hamilton of InfoTrends, print customers indicated that they are willing to pay 24% to 89% more than CMYK-only prices for digital print enhancements.

Creating the Cover

The creation of the cover of this magazine was a 100% digital process, from start to finish, completed by Print Panther. Starting with the design, the covers were printed on a Konica Minolta AccurioPress C6100 and laminated using Nobelus 1.1 mil LuxeFilms® FineLinen™. Print Panther then applied enhancements using Konica Minolta's MGI JETVarnish 3DS with inline iFoil System.

The special effects possible with these new solutions include embossing and de-bossing, multiple-colored hot foil stamping, spot UV coating, and special 2D and raised 3D effects. The technology can even accommodate variable-data printing for hot foil and/or spot UV coating that can be applied to text, images, or both, and in print runs from a single sheet to thousands. Read here for more information: **http://prnt.in/kmfoil.**

Print Panther was one of the first in North America to install the MGI JETVarnish 3DS with iFoil. They made their decision after reading *UnSquaring the Wheel,* a collaboration by three well-known authorities in the graphic communications industry: Wayne Peterson,

Dr. Joe Webb, and Professor Chris Bondy of RIT. The book affirmed Print Panther's vision for their future direction, and now they are currently in the midst of a true business transformation.

Two years after installation, Christine Yardley, President of Print Panther, revealed how the business has changed: "Leading edge advantages like digital foils and varnish enable us to differentiate Print Panther from other printers. We are bringing an artisan, bespoke quality back to print that has been missing in our highly price-competitive industry for a long time. I think we've also ignited a creative spark in many of our customers when they see the possibilities." Yardley reported a sales increase of 34% since deploying the new system and expects that trend to continue. To learn more, contact Christine Yardley at **www.printpanther.ca.**

The bold move has propelled Print Panther's growth and is gaining them industry-wide recognition that includes: winning entries at the 25th Annual Foil and Special Effects Association Gold Leaf Award in Nashville, Tennessee in April 2018; an Innovation Award at PROKOM in Budapest; and multiple Benny Awards, Certificates of Merit, and Awards of Recognition in various categories at the Premier Print Awards in Chicago.

Relatively Easy Learning Curve for Designers

From a design point of view, envisioning the final output and then working backwards to align the images and text with an optimal mix of special effects is a crucial process needed to maximize impact. This is where the creative element comes into play, as it is relatively easy for designers to incorporate the desired effects into their work.

The graphic artist simply creates separate digital layers for the foil and varnish areas, then exports them in a 300-dpi greyscale .tiff format. The traditional print layer is created and exported as a regular PDF file. This brief video explains the process: **http://prnt.in/foildesign.**

To further extend the learning of these techniques and educate the next generation of designers, Konica Minolta USA recently placed an MGI JETVarnish 3DS with iFoil System at California Polytechnic State University in San Luis Obispo, California. Konica Minolta also contributes to PIA's new iLearning Center course on Designing for Embellishment.

Learn more about Konica Minolta and their wide range of graphic communications technologies and solutions by visiting Konica Minolta at **www.kmbs.konicaminolta.us/.**

ABOUT THE AUTHOR

Manager of Solutions and Services for Production Print, Dawn Nye has more than 35 years of experience in the graphic communications industry. Her background ranges from typesetting to product management and education. Nye is the recipient of a Gold Key Award from the International Graphic Arts Honor Society. She sits on the Board of Directors of the Technical Association of Graphic Arts and is a board member of Printing Industries of America.

Digital Enhancement Opportunities

Joseph Marin, Vice President, Education and Training, Printing Industries of America

Digital enhancements are the digital application of spot colors, white or clear toner, spot or dimensional varnish, foil, or other effects to printed material. When incorporated correctly with a design, they can add stunning visual and tactile appeal to the printed sheet. Depending on the hardware solution used, many of these effects can be applied in one pass, inline with four-color process. Because all of these techniques are 100% digital, any of these effects can be incorporated with variable-data printing, something you could not do just a few short years ago.

Digital Foil, digital spot varnish, white ink

Digital toner, digital spot varnish

Digital Enhancement Effects

Spot colors

We all know that spot colors can be created by mixing CMYK inks and toner, but with enhancement effects, a separate digital ink or toner color can be printed in addition to CMYK. Why? Not all spot colors can be reproduced faithfully with CMYK toners and ink, so to get the most accurate color match, a spot color is printed. This is especially important for brand colors and packaging where color match is very important.

White and clear toner

White toner can produce creative effects when printed on colored paper stock. White solids can also be printed on colored paper, then process color can be printed on top of the white, creating another unique visual effect. Clear toner can be printed as a spot (on images, for example) for visual impact or overall to provide more protection for pieces. Note that clear toner cannot add dimension—only a gloss effect—and only spot UV can add both gloss and dimension.

Spot and dimensional UV

Digital spot UV can be added to the final printed piece for visual impact. Dimensional spot UV is typically

applied to specific image or graphic elements to add physical dimension or a raised, tactile feel to the page. Depending on the process used, there are many possibilities for the coating thickness. The thickness of the UV coating can vary anywhere from 15 microns to 100 microns or more to create a dimensional, embossed effect. Adding these effects appeals to more of our senses—not only visual, but touch as well.

Toner over foil

This effect is achieved with the blend of CMYK toner and the reflective qualities of the foil. First, a solid foil is applied to the paper. Next, a CMYK image is printed on top of the solid foil, creating an iridescent effect. The result is a spectrum of hues with a shimmery, metallic appearance.

Spot foil

Traditionally, these foil effects were created using a letterpress and a hot metal die to transfer a thin layer of metallic foil to the surface of the printed sheet. These foil effects can be applied digitally, allowing for faster turnaround and lower production costs. And because it's applied digitally, it allows for variable-data printing of these foil effects, something that was impossible just a few years ago. The most common colors of foil are silver and gold, but there are a wide variety of other metallic colors and tones available as well.

End Goal: Consumer Experience and Response

For the print client, what matters most is getting attention and response, and all of these unique digital enhancement options are opportunities help to cut through the marketing noise and clutter. For years we've known that a consumer's experience is both visual and tactile. Customization and enhancements such as varnish, foil, white ink, and other digital effects add value to the printed piece and establish a unique connection with the consumer. This connection, in turn, leads to a sense of ownership—the experience of both seeing and touching an object increases the perceived ownership of it; and the higher the perceived ownership, the more likely one is to react or buy.

Fourth Generation Digital Printing Technology Expands Opportunities for Print Providers

Scott Robertz, Digital Printing Systems Product Manager, Komori America

As digital printing technology continues to improve, many print providers are finding new ways to employ it, both as a replacement for offset on some jobs or in entirely new applications that open new revenue streams. The new generation of inkjet technologies, especially on the sheetfed side, is making it possible to print the same quality digitally as offset—and on the same substrates—allowing for much more flexibility as well as opportunity.

Having substrate freedom is a huge leap for those who want to print digitally because traditionally you could only print digitally on a very limited range of substrates. When you add that to the tighter front-to-back registration for duplex printing and the fact that it's now possible to use inkjet in B2 size formats, many printers have been able to expand the list of products and services they offer to customers and even enter new markets, such as packaging and signage.

The possibilities from digital technology are limited only by imagination.

While traditional offset remains a significant part of commercial print work, there are areas where printers are successfully utilizing these advanced digital capabilities either alone or in conjunction with offset. Three of these are:

- **Offset replacement for short-run work.** This has long been regarded as a key application for digital printing, and now the numbers as well as the applications are expanding. A typical rule of thumb is that jobs requiring 3,000 or fewer sheets are most efficiently produced using digital print rather than on offset, and the jobs might include work on 18-point card stock, 24-point board, and even plastics and synthetics.
- **Variable-data printing.** Newer digital technology gives variable data new boundaries. Now variable data can be incorporated in sheet sizes up to 23" x 29" and on a variety of substrates. The ink used on this generation of digital technology is very durable, making it possible to produce jobs with personalized imaging, names, and addresses for mailing without the need for post-print coding. This saves in cost, time, and labor-intensive stops in the workflow.
- **Sheetfed-size inkjet for point-of-purchase and display jobs.** The ability to digitally print on card stock, vinyl, and other specialty substrates means that print providers can transfer some point-of-purchase and display work from both offset and large-format devices to a digital inkjet press, producing these products with a higher print quality, more quickly, and at lower cost.

Specialty applications are also an opportunity to offer added-value work very profitably and are also

made possible by substrate flexibility and higher print quality. For example, with the quality and the print registration offered by the new technology, many customers are printing things like perfect bound books where there are many cross-over photographs. When printed traditionally, it has been very difficult to get the images to match perfectly for color. With advanced digital technology, the color is a 100-percent match from front side to back side, and the front-to-back print registration is vastly superior to older generations of digital print technologies. Hybrid printing is also a possibility, letting print providers keep this type of work in-house and under their control. Digital packaging, too, is presenting itself as an exciting opportunity and is fast becoming a lucrative print market and a viable means for present and future growth.

Advances in digital technology are making it possible for print providers to expand the services they can offer to existing clients and even attract new ones. The possibilities are limited only by imagination. What hasn't changed is customer demand for quality, speed, and reasonable pricing. The expanded and improved capabilities of the latest generation of digital printing technology enable print providers to meet and even exceed those customer expectations.

What to Expect

For this year and through 2021, we see a wider adoption of digital inkjet printing technology due to the flexibility and options it brings to the print provider.

Over the next five years, the outlook includes the introduction of larger and faster sheetfed inkjet devices and perhaps a radical industry shift in terms of digital versus offset from a cost and quality standpoint.

ABOUT THE AUTHOR

Scott Robertz is the digital printing systems product manager at Komori America, a premier manufacturer of printing solutions, providing technology suited for a competitive printing marketplace.

What is Business Intelligence and How is it Changing Companies' Businesses?

Dr. Mark Bohan, Business Driver, Heidelberg, and Jacob Hededam Hummel, Solution Manager, Heidelberg

Financial pressures in the market are challenging printers' ability to maintain their profitability, let alone increase it.

These come from customer demands for more cost-effective print, while the cost of production increases through paper, consumables, and inflation on salaries, rent, utilities, etc. The case for standing still and accepting the status quo has long since passed; improvements in efficiency and productivity are needed just to preserve current profitability. To this end, we are seeing the development of the Smart Print Shop where companies are leveraging the best of today's technology, knowledge, and infrastructure to gain the competitive advantage.

There are six key areas that need to be addressed in the Smart Print Shop, and these are shown below in Figure 1. Starting with the critical area of customer interaction, they move through four activities relating to the business and production side, improving the performance of the company, and are completed with Business Intelligence.

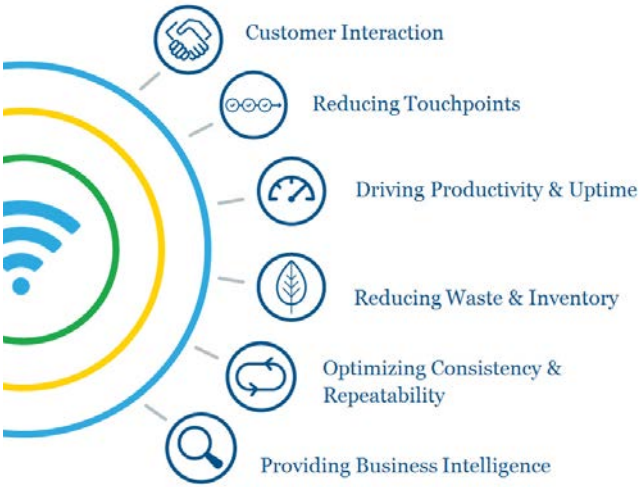

Figure 1: Key areas in the Smart Print Shop

Before jumping in to Business Intelligence, it is worth taking stock of the extent of data today and how it has changed.

- Every two days we create as much information as we did from the beginning of time until 2003.
- Over 90% of all the data in the world was created in the past two years.
- The total amount of data being captured and stored by industry doubles every 1.2 years.
- If you burned all of the data created in just one day onto DVDs, you could stack them on top of each other and reach the moon—twice.
- The boom of the Internet of Things (IoT) will mean that the amount of devices that connect to the Internet will rise from about 13 billion today to 50 billion by 2020.

So what is Business Intelligence? If you were to search for this, you would get millions of hits with countless examples of how it can be defined in different scenarios. Simply put, it is a tool for analyzing data and presenting it in ways that are actionable to help companies make informed business decisions. Key performance indicators such as daily orders, profitability, production performance, and the ability to effortlessly drill down on this data—filtering the information to provide critical insights into performance and behavior—are just some of the benefits of Business Intelligence.

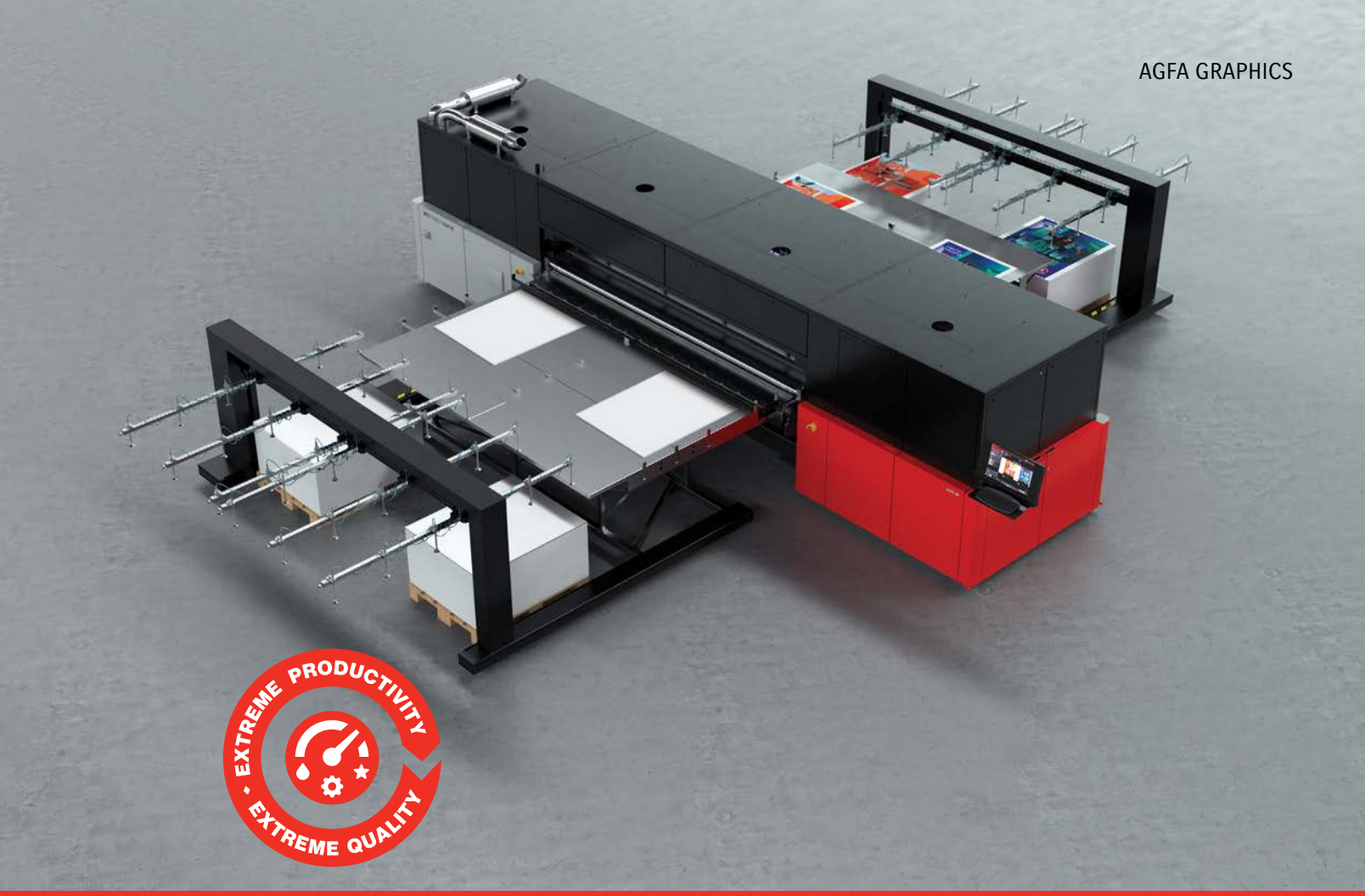

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Figure 2: Example of a Business Intelligence Dashboard

There are many factors to be aware of when implementing Business Intelligence, and a selection of them are shown in Figure 3. These factors continue to adapt as laws and governance change both within your own market and within your customers. We all have heard a great deal about the General Data Protection Regulation (GDPR), which recently took effect. When working with Business Intelligence, it is important that these are all handled effectively by your partner or in a homegrown solution.

Business Intelligence solutions come in many different forms with regard to data complexity and ease of use. Traditional systems are great with highly complex data but are challenged as they can be slow, cumbersome, and at times very expensive. In recent years, there has been an explosion of modern self-service tools that are much more user friendly but have issues with businesses that have highly complex data. We are now starting to see the introduction of specialized systems that bridge this gap, being industry specific, providing the benefits of the easy-to-use tools, and being able to build custom reports and analytics easily for the highly complex data that is collected in the printing industry.

Figure 3: Factors impacting Business Intelligence

So how does a Business Intelligence system work in practice? Underpinning everything is data collected from equipment and/or an MIS/ERP in the facility in real time. Many facilities are collecting and storing this already; the key is to be able to combine and leverage the information. At intervals, data will be transferred into a central storage area (often in the cloud) and at this time the data cleansing, storage,

backup, and maintenance will be carried out. The user can subsequently access the data, analyze, and strategically manage their business. Consider the following questions: How quickly are you responding to business inquiries? What is impacting your sales team's effectiveness? What is the performance impact of different materials, procedures, and staff? What are your actual production costs? How much did you bill today? Can you optimize work in progress? How did the new procedures impact performance? These are just some of the question Business Intelligence can help you answer and improve.

The power of Business Intelligence is in providing timely and correct information to make better business decisions and improve understanding of the past, current, and future states of the company in an easy-to-access and easy-to-manipulate manner. Business Intelligence will allow you to fully understand the strengths and weaknesses of your business from the perspective of your own performance and, critically, your customers' behavior.

Without data you cannot effectively manage and make informed decisions on the future state of your business.

ABOUT THE AUTHORS

Dr. Mark Bohan is a industry evangelist experienced in the development and successful implementation of new programs, products, and business models to drive companies profitability. He is an acknowledged expert on print operations, workflow, and the latest printing technologies.

Jacob Hededam Hummel has more than 16 years of experience in a variety of senior level sales and business development positions. After his years at CTO performing a digital transformation of a large Danish print shop, he has returned to Heidelberg Druckmachinen as the mastermind behind the new Business Intelligence platform, Prinect Smart BI.

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CONGRATULATIONS

2018 INTERTECH™ TECHNOLOGY AWARDS RECIPIENTS

An independent panel of notable decision makers named these technologies deserving of a 2018 InterTech Technology Award. The innovations listed here are expected to significantly advance the production of the graphic communications industry in the near future.

CloudLab
printQ 3D Packaging Design

EFI
EFI Nozomi C18000 Press

Global Graphics
ScreenPro™

Heidelberg
Primefire 106

HP Indigo
HP Indigo Pack Ready Lamination

Koenig & Bauer North America, Inc.
Rapida LiveApp

MacDermid Graphics Solutions
Anti-Fluting Plate Technology for Corrugated

MGI Digital Technology
JETvarnish 3D Web

Nobelus
4-Step Sleeking™ Process

Techkon USA
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Using SVG File Formats for Web and Print

Jon Hall, Senior Graphic Designer, Printing Industries of America

Low-resolution JPGs—The Designer's Bane

Countless designers have been in this situation: You ask for a high-quality logo file so it can be placed on a large job for print production, but your contact provides a low-resolution PNG or JPG file that was pulled from their website. Both of these formats are hard to work with in order to make a logo crisp and clear for large-format productions. In this situation, designers need to perform some Photoshop magic or go back and ask for an .eps vector logo. Logos should be clean, crisp, and look great in any situation—whether it be web, print, or video. As a way to ease the pain of low-res images being used for logos, SVG files are the perfect format for high-quality, small-file-size vector-based graphics.

Enter the SVG File Format

The Scalable Vector Graphics (SVG) file format has been around since 2001, but unfortunately, it's rarely used by the printing and graphics industry. At their core, SVG files are vector artwork files that are code-based, making them extremely small in file size while retaining the highest quality for vector art. Traditionally, they have not typically been used in the print industry because an SVG file has been considered a web-only file format.

In reality, SVG files can and should be used by the printing industry for common vector artwork files, such as logos, icon graphics, and other vector artworks that are both web and print focused. From a design side, an SVG file is created by programs that can handle vector format graphics, such as Adobe Illustrator or CorelDRAW. In addition, these files can be opened by a number of raster and mixed programs like Adobe Illustrator, Photoshop, GIMP, Inkscape, and many more.

SVG Files for Print

A common misconception is that SVG files are only for the web. In fact, they have the ability to keep CMYK colors. An SVG file not only contains all the graphic elements of a vector image (like anchor points and vertices), it also contains color information in RGB and CMYK profiles and special effects, like drop shadows. SVG 1.1 even supports the use of ICC color profiles for both CMYK and RGB when saving them. In addition, SVG files save the color hexadecimal number as a backup coloring system for use on web and video production. However, current Adobe software does not translate the CMYK color profile accurately, so as new iterations become available, this will be integrated into the workflow.

SVG Files in the Future

SVG files are being utilized more than ever since mobile content has become a dominating force in all areas of commerce. As advertising agencies and companies embrace mobile content where file size is limited and access to high-quality graphics is more necessary than ever, the use of SVG files will become much more prevalent. Having high-quality logos and graphics at your disposal will prepare you for the next step in marketing your company in both web and print.

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Is it Time to Switch Your Editing Software?

Dr. Taz Tally, Photographer and Author

I was not an early adopter of Adobe Lightroom and still perform my advanced image editing functions (such as compositing and mask-based image adjustments) in Adobe Photoshop. However, I now perform 90% of all my image adjustments and 100% of my image management with Adobe Lightroom, and here are 13 reasons why you too may want to make the switch.

1. Lightroom's image management, editing, and output tools are all contained in one simple, single-layer interface that contains seven modules, including: the Library module (for viewing, labeling, sorting, comparing, and naming); Develop module (for image adjustments); and five output modules known as Map, Book, Slideshow, Print, and Web.
2. Lightroom's image management tools are more robust and comprehensive than those in Photoshop.
3. Interfaces for all Lightroom modules are consistent, making learning to navigate and use its tools much easier than in Photoshop.
4. Navigation in Lightroom is very intuitive, with all modules containing similar access, viewing, and adjustment areas.
5. Lightroom Presets help you streamline and provide consistency throughout your workflow, whether you are adding images to Lightroom's database, adjusting, or outputting images. Interface-wide Presets, including identity plates, titles, captions, and watermarks, make them available in all export modules and tools.
6. Image adjustment tools in Lightroom are intuitive and logically and sequentially organized in the order in which you are likely to use them.
7. Your knowledge of Adobe Bridge's image management tools and Adobe Camera Raw's image adjustment tools transfer well to Lightroom's Library and Develop modules respectively.
8. Lightroom's built-in keyboard shortcuts throughout its interface help speed your workflow.
9. All adjustments that you apply to any image in Lightroom (not just RAW images) are nondestructive, because you're working on and viewing thumbnail images only. Actual changes to your images only occur upon output, when new images are created and adjustments are applied.
10. Working in Lightroom is much faster than Photoshop, also because of thumbnail-based views and editing. This is a huge benefit for people who work with large and/or multiple files.

11. You can work back and forth between Photoshop and Lightroom with ease through the "Edit In" function for those occasions when you do need Photoshop's compositing and/or masking capabilities.

12. The Export Dialog puts Photoshop's Image Processor—as good as it is—to shame in terms of features and capabilities.

13. Learning Lightroom is an order of magnitude easier and faster than learning Photoshop because of its simple, logical, and consistent Interface.

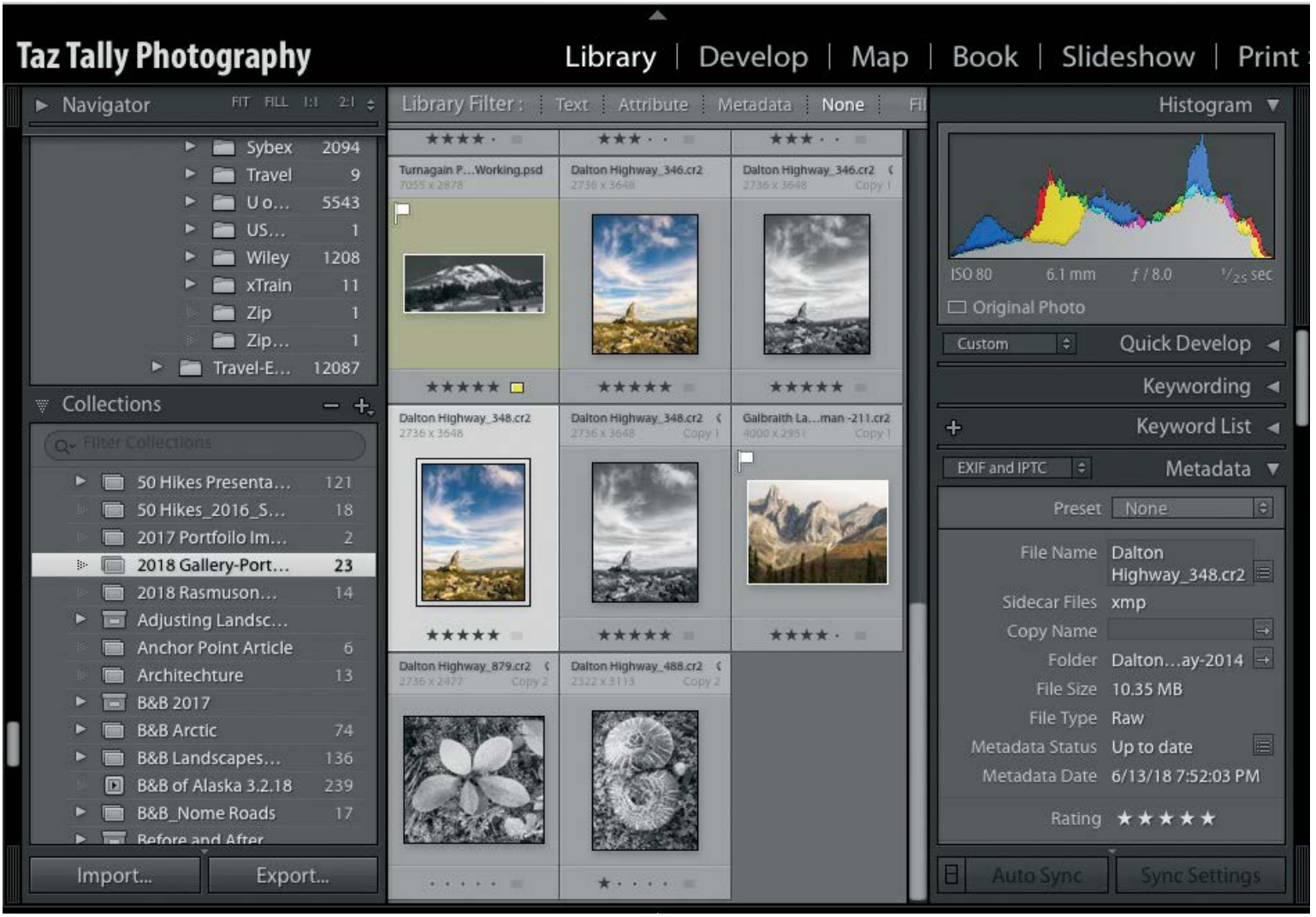
Should you switch to Lightroom as your primary image editing and management tool? If most or all of your image adjustments are whole-image adjustments, Lightroom's powerful, easy-to-learn and easy-to-use image editing tools and robust, intuitive built-in image management and export capabilities may well make a switch to Lightroom worthwhile for you and your company.

To learn more about Lightroom's image management and editing tools and workflow, check out Taz's Print 18 "Color Correction & Image Adjustment for Print and Web with Lightroom" hands-on computer lab workshop, which he is offering on Sunday, September 30, from 10:00 a.m. to 12:30 p.m.

ABOUT THE AUTHOR

Taz Tally is an author and photographer who operates his own scanning and output service bureau and has served as a digital imaging and scanning consultant for many printing and design companies. Taz's photography can be viewed at **taztallyphotography.com.**

Contact Taz at **taztally@taztallyphotography.com**



Innovation Marches on with Production Inkjet

Jim Workman, Vice President, Center for Technology & Research, Printing Industries of America

Production inkjet presses are becoming faster, capable of higher quality, and are pervading almost every major market application from posters to catalogs to folding cartons. The past year provides a good snapshot of how fast the technology is evolving.

Production inkjet presses had already achieved throughput to rival sheetfed offset. However, image quality and the inability to print standard coated stock have limited the use of the presses to applications that are primarily on uncoated paper such as transactional documents, books, and typical direct mail pieces.

As we enter the final quarter of 2018, production inkjet is a more robust technology that is overcoming previous limitations. Here is a sample of the technology that is now available:

The Screen Truepress Jet 520HD, a 2017 Printing Industries of America InterTech Technology Award recipient, prints at 1,200 dots per inch over a web width up to 20 inches. It uses multi-sized droplets to provide sharper detail, has mechanisms to prolong head life, and is constantly monitoring itself to minimize streaks and artifacts. The pivotal innovation of the 520HD is the development of proprietary inks that can print on non-treated coated paper. Paper savings can be up to 25% compared to printing inkjet treated coated stocks (although the printing speed is reduced).

The HP PageWide Web Press T490 HD, another 2017 award recipient, is more than double the size of the 520HD and capable of printing a 42-inch web. Remarkably, it can image that web width at up to 1,000 feet per minute with 1,200 nozzles per inch. You can switch to the quality mode and image at 500 feet per minute using 2,400 nozzles per inch with two drop sizes. In this mode, image quality in skin tones, shadow detail, and solid tint areas are all improved.

At the rate that innovations are occurring in each of these areas, it's important for companies to investigate whether the equipment they're considering can be upgraded in the future.

A crucial feature of high-speed inkjet is that every page can contain variable information. The ingenuity of marketing campaigns and the availability of data are driving greater use of customized print. The challenge has been to screen variable images and data fast enough to avoid slowing down press speeds. With greater computing power, but especially new screening engines such as ScreenPro from Global Graphics, this obstacle is being overcome. ScreenPro uses a halftone pattern that decides which combination of dot sizes to use for a given density. Its screening algorithm is

also able to mask visible imperfections caused by the physics of jetting water-based ink onto a substrate.

All of the innovations in inkjet have brought us to the point that inkjet is an economical replacement for longer-run toner-based work and shorter-run offset jobs. The introduction of Canon's ProStream presses and similar technology will likely accelerate the shift to inkjet. The ProStream prints 1,200 dots per inch with multiple drop sizes at 262 feet per minute on up to a 22-inch web. The use of new polymer-based high density inks, application of a special primer, and a carefully controlled drying system results in vibrant colors, smooth shadings, ultrafine details, and ink gloss levels that can meet the quality requirements for premium direct mail, catalogs, and other demanding applications. The ProStream has the ability to print standard gloss paper.

Nor is all of the research and development focused on web inkjet. Heidelberg's new Primefire 106 is the first 40-inch sheetfed inkjet press targeted at folding cartons and other larger format applications. It gives carton manufacturers the ability to test-market short runs with the same print file before moving to offset for the full production run. The seven-color system prints 1,200 dots per inch on 2,500 sheets per hour and can simulate 95% of the Pantone colors within a 2-Delta-E difference. Primefire incorporates a flexo priming unit that improves dot sharpness.

Production inkjet is even taking hold in corrugated package production. EFI's introduction of the Nozomi C18000 gives companies the ability to produce on-demand and customized corrugated packages. The Nozomi is 71 inches wide and prints on various board types at speeds of up to 246 feet per minute. To put that in perspective, it can print 10,000 35x35-inch boards per hour two-up, and it is available in either a four- or six-color configuration, plus a white ink that will soon be available.

Inkjet print speeds are primarily dependent on the substrate type; the speed of the inkjet heads, screening, and inspection technology; and how fast the inks can be dried. At the rate that innovations are occurring in each of these areas, it's important for companies to investigate whether the equipment they're considering can be upgraded in the future. It's also worth asking about the recyclability of the printed products, since some inkjet devices image in a way that creates recycling and de-inking challenges.

The message should be clear—there's plenty of research, development, and new products coming to market. Companies ignorant to the rapid pace of developments in production inkjet presses are making a competitive blunder. While prices can be high and the technology is still young in our industry, production inkjet will increasingly be a driving force in our industry's future.

Printing Industries of America has a variety of production inkjet resources for member firms, including a listing and information on available presses from 14 different manufacturers.

For more information, visit:

www.printing.org/resources/production-inkjet-resources

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