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SERVICE AREA:

Business Development Strategies

ANALYSIS

COLOR MANAGEMENT FOR ON DEMAND PRINTING & PUBLISHING

OCTOBER 2018





contents

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Introduction

Color is crucial in most modern printing applications, with design and communication relying on accurate color reproduction to be effective. At the same time, however, managing color in a constantly changing environment remains a challenge for print service providers. Because it is difficult to create an environment where any two scanners, monitors, or printers reproduce colors identically, it is often necessary to implement color management systems to achieve an exact match across devices. This article provides an overview of color management and also highlights key industry trends, benefits, and challenges.

Key Findings

- ◆ The increasing number of automated color management solutions on the market are designed for PSPs that have become focused on streamlining their workflows.
- ◆ Revenue from color management tools is expected to grow 3.8% worldwide by 2022, with North America and Western Europe being the heaviest users.
- ◆ On demand printing's largest applications (direct mail, books, and brochures) all depend on accurate color reproduction to be effective.

Recommendations

- ◆ Moving forward, PSPs will increasingly see that the ability to ensure color accuracy across all types of printers and substrates is crucial for attracting and retaining clients.
- ◆ PSPs can rely on inline measurement devices like densitometers, scanners, and spectrophotometers to measure color accuracy without stopping production.
- ◆ PSPs with multiple facilities can leverage cloud storage of color profiles and preferences to ensure color consistency across all machines, regardless of location.
- ◆ Solutions with five or more color stations enable PSPs to expand into white ink, neon colors, spot varnishing, and even metallic effects.



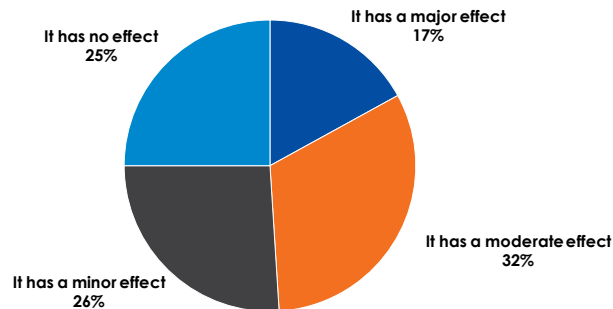
Color Management for On Demand Printing & Publishing

Increasing competition in the digital market and higher quality expectations from customers have made color management a necessity for most PSPs, especially for those that print across multiple devices or in several locations. The demand for systems that can dependably measure color output has never been higher, with many PSPs needing to adopt or pay for professional color management services.

Why Does Color Matter?

For PSPs, the ubiquity of color printing means that being able to ensure consistently accurate colors across all types of printers and substrates is crucial for retaining and attracting clients. For the largest on demand printing applications (e.g., direct mail, books, and brochures), color is an invaluable asset for design and communication as well as a critical factor for the product's overall effectiveness. For recipients, color is an indicator of quality. Color-printed direct mail is more likely to be opened than monochrome mail, books that are printed in full color command a higher value, and color brochures attract more attention. According to research from Keypoint Intelligence – InfoTrends (InfoTrends), nearly half of consumers report that color has a major or moderate effect on their likelihood of opening a piece of direct mail.

Figure 1: How does the use of color on a direct mail envelope affect your likelihood of opening it?



N = 900 Respondents in the U.S.
Source: *Direct Marketing Production Printing & Value-Added Services: A Strategy for Growth*; Keypoint Intelligence – InfoTrends 2015

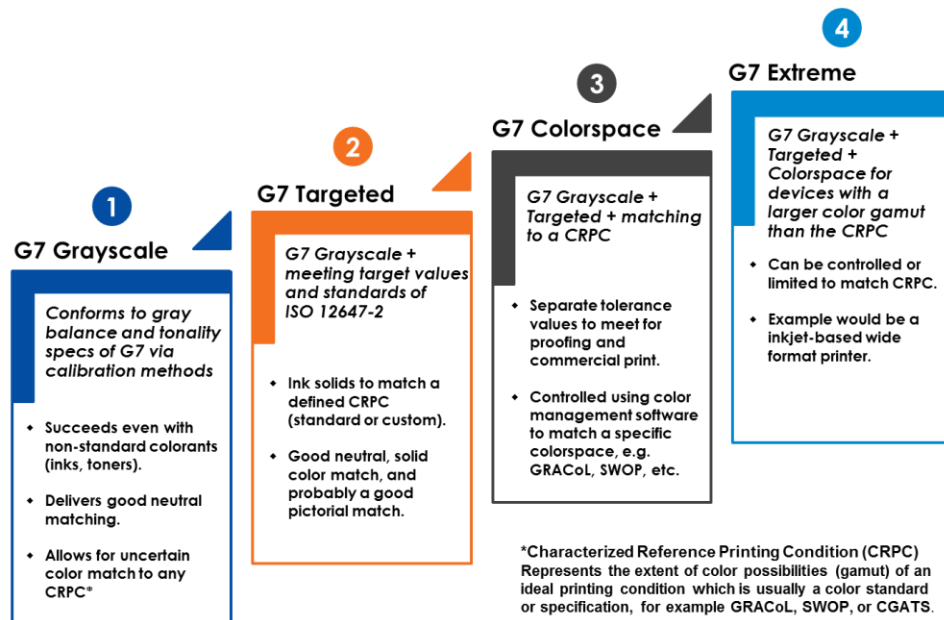


Color Standards for On Demand Printing

While there are no color standards specifically designed for digital printing at this time, specifications from other segments of the print industry have been adopted by PSPs and integrated into digital workflows. Offset specifications like SWOP (Specifications for Web Offset Publications), GRACoL (General Requirements for Applications in Commercial Offset Lithography), and FOGRA are often used for electrophotography (EP) and inkjet alike, with FOGRA being especially common.

G7 certification is also popular in the digital printing marketplace, with Idealliance offering certification programs for both proofing systems and digital presses. It is important to note that for a PSP to become G7 certified, its entire workflow must be examined in addition to its printers (see Figure 2). For a digital press to become G7 certified, it must meet a set of stringent requirements for color accuracy and repeatability, including being able to match GRACoL specifications within $2.5 \Delta E^1$. To date, over 40 digital presses have been G7 certified, including systems from vendors like Canon, Konica Minolta, Ricoh, and Xerox.

Figure 2: Levels of G7 Compliance



¹ ΔE ("Delta E") is a mathematical expression of the color difference between two samples. The lower the number, the closer the color match. Different color standards will have different ΔE tolerances for color matching, but for most applications a ΔE measurement of 2.3 corresponds to a just noticeable difference.



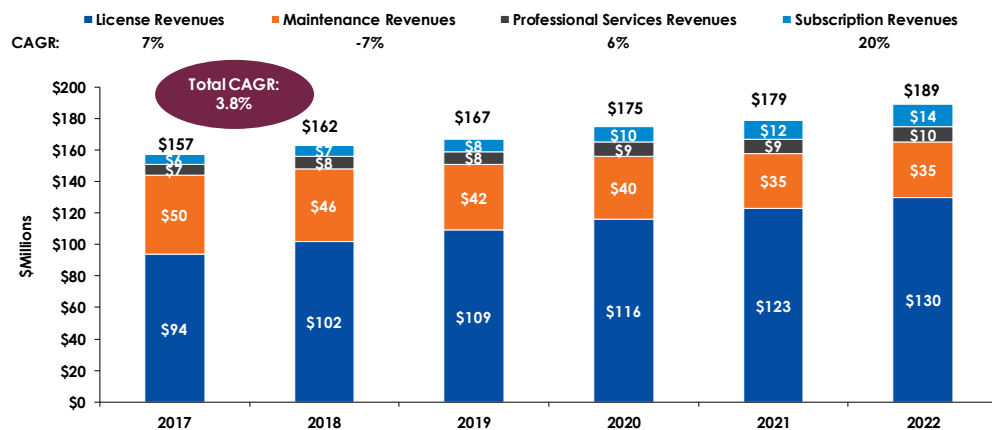
Proofing systems used in the on demand printing industry must also meet a specific set of requirements to be G7 certified. SWOP and GRACoL certification programs for contract proofing systems evaluate the color output of a variety of proofing systems, including digital and conventional proofing printers as well as on-screen soft proofing solutions. To be approved, proofing systems must match the press reference within an average of 1.5 ΔE. There are a number of G7 certified proofing options currently on the market, including over 60 hard proofing systems and over 20 soft proofing systems.

Color Management Forecast

According to InfoTrends' *Global and North American Print Production Workflow Market Forecast*, revenues from color management products will demonstrate a compound annual growth rate (CAGR) of 3.8% by 2022. North America and Western Europe are the top users of this technology, accounting for 81% of the total market. Other regions of the world are expected to show similar growth, albeit from a smaller user base.

Although licensed solutions continue to be the most common in the industry, subscription services are forecasted to grow significantly in the coming years. Color management systems offered through subscription are often cloud-based, which allows color data, management, and expertise to be centralized. By 2022, revenues for subscription-based color management tools are expected to show a CAGR of 20%, while more mature markets like licensed tools and professional services will demonstrate CAGRs of 7% and 6%, respectively. Meanwhile, maintenance revenues are expected to be adversely affected by the increase in subscription sales and will decline at a CAGR of -7%.

Figure 3: Global Color Management Forecast: 2017-2022



Source: Global and North American Print Production Workflow Market Forecast: 2017-2022; Keypoint Intelligence – InfoTrends 2018



Key Trends in Color

Despite the differences among printing segments, many of the same color management trends extend across the print industry. In-line measurement helps printers streamline their quality control and monitoring procedures. Cloud-based color management solutions make collaborating across multiple devices and locations simpler. The increasing ubiquity of 5th color channels and expanded gamut printing enables PSPs to produce a diverse range of specialty products.

In-Line Color Measurement

Traditionally, most color measurement has been done manually by a press operator or a quality control specialist using handheld spectrophotometers or densitometers. While these offline measurements are adequate for determining the color accuracy and consistency of the press, they do require the time, attention, and expertise of an employee. By contrast, measurements taken using an inline spectrophotometer are done automatically, require little to no action on the part of the press operator, and can usually be taken far more frequently than those done offline. As a result, inline measurement devices like densitometers, scanners, and spectrophotometers are incorporated into many of today's digital presses, enabling PSPs to measure color accuracy without stopping production. Many printer vendors have taken advantage of this trend, simplifying device calibration, profile creation, and paper profiling tasks at the digital printer.

Support for in-line color measurement from popular color management software vendors is also on the rise. Solutions like ColorTuner from ORIS or i1Publish from X-Rite are compatible with most presses featuring in-line scanners or spectrophotometers, so PSPs can take full advantage of the real-time monitoring that these devices offer. Ultimately, the trend of combining in-line measurement with other automated systems enables PSPs to increase their operational efficiency without compromising quality. Time is arguably the most valuable resource for printers, and tools that enable them to streamline their workflows and complete jobs faster are a must-have.

Cloud-Based Color Management Systems

Many color management systems on the market today rely on cloud-based functionality to minimize the steps required to create and implement color profiles. When used to its full potential, a cloud-based color management system can significantly reduce time spent synchronizing different printers and devices, streamlining a company's color management workflow. Cloud storage of color profiles and preferences enables PSPs with multiple facilities to ensure color consistency across all machines, regardless of location; this feature is particularly well-suited for larger companies. Cloud-based color management allows these printers to maintain color consistency during all stages of workflow and across multiple platforms by keeping all workstations up to date with the same color standards.



There are a growing number of options available to those who wish to adopt a cloud-based color management workflow. Many vendors already offer color management solutions designed for use with their printers, and those who do not will likely develop something soon. There are also system-dependent color management solutions available for specific machines. These types of products are often white-labelled versions of existing color management software products that are optimized for the given printer. While there are benefits to using specialized software, many of the same functions will also be included in white-label versions.

Color Management Across Devices

For larger PSPs, maintaining consistent color across different printing processes or between presses made by different vendors can be a significant challenge. For companies that produce similar products on different presses (e.g., lithography, flexography, digital), this is especially important. Since the prepress processes (e.g., dot gain compensation curves, color separations) for flexography, lithography, gravure, digital, and other printing methods are different, PSPs will need to ensure that the correct methods and color standards are used. Workflow management software is the most common tool for applying color profiles specific to different printing processes and presses.

Managing color across devices is even more challenging when considering dual delivery of products that include printed and digital components. For example, a marketing campaign may consist of several components, including printed pieces (i.e., direct mail) and digital advertising. Although consistent color between these products is essential, it can be challenging because the digital images (in RGB color) and printed images (CMYK) are reproduced very differently. Campaigns like these rely heavily on color management to ensure a consistent appearance across multiple platforms.

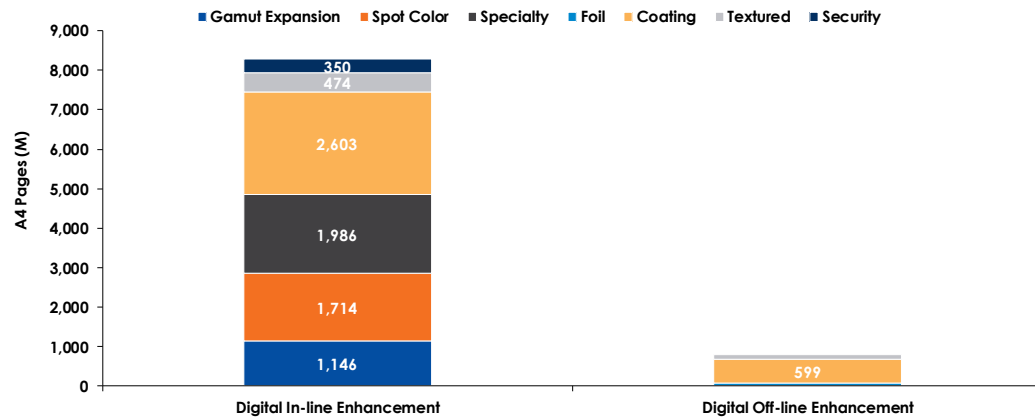
The Industry's Focus on CMYK+

Due to the growing importance of differentiation and enhancing a product's value, an increasing number of vendors now offer solutions with five or more color stations, enabling PSPs to expand beyond CMYK and into specialty colors and coatings. CMYK+ capabilities make it possible for printers to develop offerings that would not be possible with four-color printing alone. Products with white ink, neon colors, spot varnishing, or even metallic effects can all be accomplished with additional color stations.

InfoTrends' 2017 study on CMYK+ printing found that many PSPs already print more than 4 colors (e.g., spot colors, special effects, or gamut expansion). Digital embellishments and coatings are the two largest applications at this time. Spot colors and expanded gamut printing are also common, representing about 2.8 billion A4 pages annually.



Figure 4: Types of CMYK+ Printing (Inline vs. Offline)



Source: *Beyond CMYK: Forecast and Market Size*; Keypoint Intelligence – InfoTrends 2017

For color management, expanded gamut printing is a valuable tool for minimizing the discrepancies between what a client sees onscreen and what they see on a printed page. By adding colors that are outside the traditional CMYK gamut, printers can significantly expand their color capabilities. The most common additions include orange, green, and violet. Several other colors are also available (e.g., reflex blue, rhodamine red, bright yellow, and light versions of CMYK), making it possible to match an even larger range of hues.

When investing in expanded gamut machines, PSPs should take a few considerations into account. The use of additional inks (whether spot colors or expanded gamut ink sets) requires an increased amount of care throughout the workflow process, from file preparation to printing. Documents with colors that fall outside the standard CMYK gamut (e.g., the XCMYK ICC profile from Idealliance, or specialized software such as Esko Equinox) will require specialized color profiles to properly prepare them for production.

The Benefits and Challenges of Color Management

Properly managing color ensures consistent results across different substrates and printers, decreasing the number of jobs that need to be scrapped or reprinted due to color-related issues. In addition, minimizing color inconsistencies within a company's print workflow can help attract new, color-critical clients that require specific branded colors or consistent color across multiple print runs. Ultimately, color management systems can help reduce costs associated with waste and rejected work, enable better utilization of equipment due to increased color consistency across multiple printers, and pull in new revenue from customers that require a high degree of color accuracy. From a brand owner's or customer's point of view, getting the color right on a job is often the top concern, and clients will favor printers that produce work that is both faithful to the original design and consistent over time.



Most printers' motivations for implementing color management practices ultimately come down to print quality and consistency. Predictability and repeatability of color output, regardless of the printing technology used, are invaluable assets for PSPs, and can be the deciding factor for clients.

While the benefits of color management are clear, there are still challenges to its implementation. Implementing a new software may require downtime while the PSP learns the new system, especially if it represents a significant change from the previous workflow. With the significant commitment that is often required, PSPs must be sure that the additional revenue they bring in from color-critical work will enable them to make a return on their investment.

Limited technical skills or a lack of infrastructure can also be a roadblock for some PSPs. Uncertainty regarding which type of color management system will fit a company's specific workflow can be a challenge as well. Confusion over which type of product to purchase, how to best integrate the new technology into an existing workflow, or which color standard to implement can ultimately lead to inaction. For some, taking incremental steps forward will be the best choice. Gradually introducing color management procedures can go a long way in reducing negative aspects like downtime to acclimate to a new system. For other PSPs, enlisting a color professional may be ideal, especially for those with little experience in color management. Professional color management services will be able to assess a PSP's needs and guide them through the process of updating their workflow. Although moving forward can be difficult for PSPs with limited knowledge of color management and its implementation, these systems can be successfully integrated with proper training and realistic expectations.

InfoTrends' Opinion

Any PSP that is interested in adopting color management should examine its current business and determine the value that the new technology will bring to their organization. The most successful approach will vary based on a firm's marketing strategy and how it hopes to position itself within the industry, but the value propositions for color management are clear. When properly implemented, a color management system will enable higher quality and better color consistency.

Printing businesses can differentiate themselves from the competition by offering better color quality with a color management system. Moving forward with the right solution in place, printing firms can attract customers that require a high degree of color accuracy and repeatability.



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