



## **The Color of Money**

*Why full-color output is quickly becoming the new standard for conventional office documents, and how your organization can take advantage of color output without compromising the budget*

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## Table of Contents

- 1.0 Executive Summary
- 2.0 Introduction
- 3.0 Why Color Works
- 4.0 Defining Business Color
- 5.0 Critical Applications
- 6.0 Selecting the Right Solutions
- 7.0 Conclusion

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## Executive Summary

Color output is widely available in today's network printers, digital copiers, multifunction products (MFPs), and other devices. Yet many organizations still believe color output is too expensive for everyday use. This is because the document management industry has not adequately prepared most end-users to understand the differences between "business color" used in reports, proposals, strategic plans, and training materials, and professional graphic arts color used in proofs and layouts. This white paper seeks to alleviate this problem by examining all the major differences between these two broad categories of full-color output.

First, we demonstrate how color documents improve communication, enhance your image, streamline workflow, improve productivity, and reduce costs. Then, we discuss what differentiates business color from graphic arts color in terms of observable quality, technical specifications, output type, and software applications. We describe mission-critical applications of business color in the corporate environment, as well as in markets such as healthcare, real estate, faith-based institutions, education, and financial services. Finally, we explore how to assess your own color output needs, how to align these needs with the functionality of a specific device, and how to evaluate the available technology choices.

Overall, we believe organizations that understand the differences between business color and graphic arts color will be able to integrate color document production successfully, overcome the common roadblocks to full-color productivity, keep output costs under control, and gain a significant competitive advantage — while enjoying the tremendous benefits of high-quality documents that incorporate business color.

## Introduction

*“The next big thing in the office will be migration to ‘universal’ copiers and printers (UPCs) capable of printing and copying competitively in color as well as black and white.”*

— CAP Stats, October 2003

Once the exclusive domain of copy shops and print-for-pay providers, full-color output has made its way from behind the counters at local service bureaus into many areas of the modern workplace. Now available through a wider range of network printers, digital copiers, multifunction products (MFPs), and other devices, color output is a feasible choice for just about any conventional document, including reports, proposals, strategic plans, and materials for training and education.

Of course, nobody denies that color documents are more interesting to look at than their black-and-white counterparts. But in some circles, color documents retain the stigma of being (at best) too expensive for everyday use and (at worst) a waste of money. Both are the legacy of early-generation color output devices that were inordinately expensive and generally served as specialty devices for high-visibility documents. In addition, many organizations lack a thorough understanding of what differentiates professional graphics color from “business color,” how best to take advantage of different types of color output, and how to incorporate color output into a sensible, cost-effective document management strategy.

This white paper examines all of these issues, and demonstrates how the strategic usage of full-color documents can improve communication with internal and external customers; enhance your organization’s image among employees, peers, and clients/customers; streamline workflow and improve productivity; and potentially improve revenue and reduce costs.

Although color output will be just one element in your larger document management infrastructure, it is one that can have a tremendous positive (or negative) impact. And it will only become more important as color output devices continue to become more prevalent. Organizations that understand how to integrate color document production — without letting costs get out of control — will be better positioned for success than those who simply add color devices when procurement gives the go-ahead.

Ricoh is a leading provider of document management systems for both black-and-white and full-color applications. We offer a wide range of digital MFPs, network printers, controllers, and software products specifically engineered for business color production, and our experience in document management spans seven decades.

Because of our history in the document management industry and our first-hand knowledge of business color output gained through hundreds of customer engagements, Ricoh is uniquely positioned to explore issues related to full-color document production and assess how color is changing the nature of business communications. We created this white paper to share our knowledge and experience with you.

Color is the standard expectation in nearly all visual media, including film, television, consumer photography, and the Web. In other words, if one of these works is presented in black-and-white, it is done for effect, with the expectation that the audience will notice the lack of color immediately.

In corporate communications, color has not yet become the benchmark, but the trend is heading in that direction. The reason that demand for color output is rising is simple: the power of color is undeniable, and its power is particularly well-suited to printed documents. Here's why:

- **Color enhances communication.** Documents that use color rate higher than monochrome documents in just about every measurable criteria related to the communication of written information. According to a study detailed in *Psychology* magazine, color makes the document itself more attractive, improving the audience's willingness to read it by as much as 80% and their motivation to finish it by 78%. Color helps after the fact as well, accelerating retention and recall by 78% and improving comprehension of the material by 73%. Bottom line: If you want the audience to read your work and remember it later, color is essential.
- **Color increases accuracy.** Just as color makes documents easier to read and comprehend, it also improves how readers respond to direction. For example, forms and questionnaires that incorporate color have a 78% lower rate of error than similar documents printed in black-and-white. This has implications for any organization that distributes paperwork and other forms to employees, or collects written information from customers or end-users through surveys, direct mail response cards, contest entries, or data-gathering tools for customer relationship management programs.
- **Color improves your image.** Using full-color materials sends important messages to your audience about your organization — all of which are positive. In a study by the Wharton School of Business, presenters who used color visuals were perceived as better prepared, more professional, more persuasive, more credible, and more interesting than presenters who used black-and-white visuals.
- **Color sells.** Whether you are marketing a product, a service, or an idea, using color to deliver your message significantly improves the odds of your audience responding to your call to action. Specifically, according to the *Psychology* magazine study, color increases the likelihood people will purchase a product or service by 85%. This is why color is such an important element in materials for sales, marketing, education, and training.

All four of these points are frequently proven in everyday business situations. In fact, a recent survey of small business owners showed that the vast majority (90%) believe color helps attract new customers, present a high-quality image, and make a memorable impression. Nearly as many (84%) said that ideas and proposals presented in color are given greater consideration than those presented in black-and-white. Finally, survey respondents affirmed that color improves the bottom line by making the organization appear to be successful (83%), enhancing the creativity of employees (83%), and giving the organization a distinct competitive advantage (81%).

<sup>1</sup> Case & Company, Inc.

<sup>2</sup> Source: ICR Survey, August 2003.

## Section 3.0

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### Why Color Works

However, while virtually everyone agrees in principle that color is valuable, not every organization is willing to make the investment in color output devices. Historically, the first generation of high-quality color output devices were very expensive and usually targeted at high-end applications in the graphic arts. Today this is not the case. There is a much wider range of equipment available, each with its own strengths and weaknesses, and each designed for a different market niche. Unfortunately, many equipment vendors have done an incomplete job educating business users about the range of products available and how to choose the right hardware for their workflow. In the next section, we'll take a look at some of these differences and examine what makes "business color" unique.

## Section 4.0

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### Defining Business Color

For customers making their first foray into color output comparison, getting a handle on what is available can be extremely frustrating. Some color output devices cost less than one thousand dollars, while others cost tens of thousands of dollars. Yet all of them produce color documents that seem to look the same. So why is the range of prices so wide?

Although many types of color output seem similar, each can be placed on a continuum that stretches from "business color" at one end to "graphic arts color" at the other. Several variables determine where a document falls on this spectrum, some of which will be meaningful to the average business user, and many of which will not. Here, we will look at four:

1. Observable quality. This refers to color characteristics that are visible to the naked eye.

In this respect, business color is pleasing and familiar, but not dynamic or brilliant. Most colors are easily recognizable and reproduced well. In other words, red looks like red and blue looks like blue. Business color is acceptable for all non-photographic images, including charts, graphs, and illustrations used in text documents and presentations. For photographic images, business color is adequate. If you print full-color photographs with a business color device, the decline in quality will be noticeable when compared to output from a high-end graphic arts printer.

Graphic arts color is similar to the final results of offset printing, such as a brochure or direct mailer, and represents photographic images very well. In fact, graphic arts color is often used to produce design comps and page proofs that ensure the color approved by the client matches the color on the final printed piece. Graphic arts color is also referred to as "what you see is what you get," or WYSIWYG (pronounced "wizzy-wig") because of its ability to represent subtle colors (such as silver, taupe, and gray) and unique colors (such as a numbered Pantone® chip for a corporate logo) accurately.

**2. Technical specifications.** This refers to the science behind the way each type of color is produced.

Business color output devices generally use a one-bit or two-bit per pixel color engine, just like a black-and-white laser printer. In the electronic file sent to the device, two bits are used to describe the color of each pixel. With a monochrome printer, the one-bit engine describes each pixel as on (black) or off (white). Color devices use the same process four times, once for each of the four primary printing colors (cyan, magenta, yellow, and black). For example, during the cyan pass, each pixel is characterized as on (cyan) or off (white). By combining these four colors of toner in different combinations, business color output devices can generate up to 256 different colors.

Graphic arts color output devices normally incorporate 4-bit to 8-bit color engines, which use four or eight bits to describe the color of each pixel in the electronic file. Again, four passes are made, but each pixel can represent one of 256 shades of each primary printing color. By combining these four colors, graphic arts color output devices can accurately represent nearly 16.8 million colors.

**3. Type of output.** This refers to the kinds of documents generally associated with each kind of color.

Documents that incorporate business color include word processing files, spreadsheets, and presentations. Word processing files are primarily text, with a handful of color images included. These files may also use "highlight colors" to lend special emphasis to a certain section or block of text. Spreadsheets are also mainly text, but will incorporate color in charts and graphs of data. Presentations may use some photographic images, as well as highlight colors, and full-color charts and graphs.

Documents in the world of graphic arts color include page layouts, drawing and illustrations, and image capture. Page layouts combine images, line art, and text and are used as source files for all commercially printed material. Illustrations include any type of electronically generated artwork. Image capture refers to images that are scanned in or acquired electronically, then corrected or manipulated prior to output.

**4. Application software.** One of the easiest ways to tell whether or not you're dealing with business color or graphic arts color is to look at the application software.

Business color users work in Microsoft Word, WordPerfect, and WordStar; Microsoft Excel, Lotus, and SuperCalc; and Microsoft PowerPoint, Adobe Persuasion, Harvard Graphics, Lotus Freelance, and CorelShow.

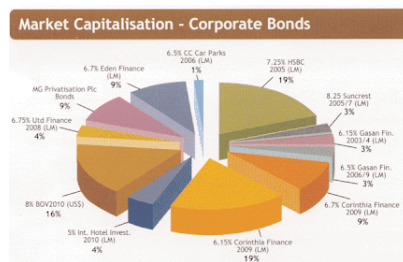
Graphic arts color users work in QuarkXpress, Adobe InDesign, Adobe PageMaker, and Microsoft Publisher; Adobe Illustrator, Adobe Freehand, CorelDraw, and MacDraw; and Adobe Photoshop, PictureIt!, and PhotoDraw 2000.

## Critical Applications for Business Color

By now it should be clear that the average office user frequently works in the world of business color, while graphic arts color is the domain of designers, art directors, and other graphic design professionals. Yet even within the realm of business color, different types of users will have unique needs. Here we will take a look at some of the most popular applications for business color and how they differ.

### General business applications

Most all businesses use color to some extent. And if they do not use color, they most likely have a current black-and-white application that would be better served by color. For example, the rampant popularity of the Internet has dramatically increased the incidence of users printing out content from various Web sites. Because virtually all Web pages are developed in color, the content loses depth and impact when printed in black and white. Other common applications of business color can be found in:



- **Accounting/finance.** Financial reports, quarterly presentations, budget documents, and spreadsheets may all incorporate color in bar graphs, pie charts, and diagrams.
- **Education and training.** Newsletters, training packets, orientation kits, event calendars, seminar handouts, and presentations can all be energized with applications of business color.



- **Sales and marketing.** Product/service launch kits, campaign proposals, flyers, mailer cards, strategic presentations (transparencies and handouts), and advertising concepts are prime candidates for business color.
- **Research and development.** Pitch presentations, product designs, conceptual drawings, competitive research, and progress reports are popular documents for using business color.

### Vertical market applications

In certain industries, business color can be applied to a wide range of market-specific documents. Although copy shops and down-the-street printers can handle these jobs, many organizations prefer the advantage of being able to produce color materials quickly, using in-house devices.

- **Real estate.** Because turnaround time is absolutely critical in real estate, many agents use business color output devices to produce their own property promotions, event promotions, listing information, take-home booklets for open houses, and other marketing materials.
- **Healthcare.** Patient education materials and pamphlets about outpatient programs, internal communications (posters, newsletters, booklets, reports), marketing materials (brochures, leaflets, handouts, press kits, sales tools), standards documents, instruction/training manuals for new hardware or procedures, and HIPAA compliance documents all benefit from clear, memorable messages delivered in color.
- **Faith-based institutions.** Tasked with providing a steady stream of communication materials to growing congregations while preserving the budget, faith-based schools, churches, and other organizations use business color in bulletins, handouts, education materials, newsletters, and documents designed to promote fundraising, outreach, and mission work.
- **Education.** In K-12 schools, even a single business color output device gives a school an affordable way to produce attractive, attention-grabbing handouts, craft instructions, class guides, reading packets, textbook supplements, lecture notes, and many other common documents.
- **Financial services.** Illustrating financial information clearly and concisely is the goal of many financial service organizations, from banking to insurance. Color helps accomplish this goal in account statements, status reports, analysis documents, strategic plans, and educational handouts.

Of course, many organizations — especially large ones that can take advantage of economies of scale — use graphic arts color or offset printing to produce many of the pieces discussed here, in general business as well as vertical markets. But for organizations that want to produce attractive materials in-house and reduce the need for outsourcing color printing, business color output devices provide an affordable solution. In the next section, we'll look at how to match your application needs to the right kind of color output hardware.

## Selecting the Right Solutions

Choosing a business color output device should always start with an analysis of the end-user's needs, not the specifications of the hardware. Considering these factors up front — before you test drive a single copier, printer, or MFP — will help your organization choose a business color solution that makes good financial sense for your specific workflow.

To assess the environment in which the business color device will be used, we recommend three steps:

### 1. Define and prioritize your applications.

Who in your organization is responsible for developing the documents that would be appropriate candidates for business color? What kinds of documents are they? Are they like the examples discussed in this paper, or are they more unique files? How are these documents used? To whom are they distributed in hardcopy form? And how will adding business color improve these documents? Will it make them more effective? Will it increase sales opportunities? Drive revenue? Speed the creative process?

Many administrative teams can answer these questions by conducting an informal email survey among one or more offices or workgroups. Once the results are in, you will have a much clearer picture of where business color can make the greatest impact. Prioritizing these needs now will not only help you find the ideal business color output system, it will help cost-justify the purchase with management and/or procurement. For example, if your survey results show that a workgroup is spending \$1,000 per month outsourcing color output that could be produced in-house, this will provide key leverage in comparison to the annuity cost of a color output device.

### 2. Understand potential roadblocks.

What elements in your current workflow could limit the effectiveness of business color? This is critical to consider, because color systems that are mismatched to the needs of your workgroup will either go unused or be used improperly — both of which result in lost capacity and unnecessary costs. Some of the most frequent roadblocks to using business color are:

- Benefits of business color are not recognized: "Color doesn't make a difference. Why did we spend money on this printer?"
- Users are unaware of the technology's capabilities: "I didn't know I could print my handouts in color. I thought this printer was for design layouts."
- Perceived gaps in user skills: "I don't know how to use color devices. Don't you have to use special software?"
- Time constraints: "Color devices are too slow. I need my reports printed right now, and I don't have time to wait."

- Perceived equipment limitations: “My financial report has 82 charts and graphs. An in-house printer can’t handle it. I need to take this job to the copy shop across the street, like I always do.”
- Budget limitations: “Color output is too expensive. I can’t afford to print these pamphlets in color — I don’t have room in my budget.”

By identifying these roadblocks now, you can take the necessary steps to educate end-users before the device arrives. This way, you can make sure all end-users understand what business color output devices can and can’t do, which jobs they are most appropriate for, how easy they are to use, and the potential impact they can have on a wide range of materials.

### 3. Determine application needs.

When you have determined which offices or workgroups will benefit most from a business color output device, it’s important to analyze the scope of their applications. In general, analyzing three factors will help you develop an accurate application profile:

- **Productivity.** You will need to have a reasonably accurate estimate of the number of documents they produce per month, and the average size of each document. For example, a workgroup that prints 20 reports per month, each of which is 200 pages, will have different needs for output speed than a workgroup that prints 200 reports, each of which is 20 pages — even though the monthly page count is identical.
- **Cost structure.** Based on total page count, what would you consider an affordable cost per page for color output? What are you currently paying per month for black-and-white output? Do you have internal control mechanisms in place for calculating charge-backs? Your business color output provider should be able to recommend appropriate cost-tracking software, in addition to helping you perform a cost analysis for your color devices, within the context of your entire document management fleet.
- **Color balance.** Based on the likely types of documents your workgroup, office, or enterprise will create, what percentage of the total output will require business color? Again, a workgroup that uses black-and-white and color in equal percentages will have different needs than a workgroup that uses color 80% of the time, or one that uses color just 25% of the time.

### Evaluating equipment

Once these three areas have been fully explored, you are ready to examine your options for specific business color output devices.

The list of factors to consider is long and potentially overwhelming. However, the length and complexity of the list can also serve as a good tool for selecting an equipment provider. In other words, the vendor you choose should be willing to educate you thoroughly about all of these issues, answer all your questions, and take the initiative to help you understand all the implications of different devices for your specific workflow — before you make a purchase decision.

As you evaluate various equipment offerings, make sure to keep your application environment top-of-mind. Most important, reinforce with the vendor that you are looking for business color output devices — not graphic arts color devices. This distinction will have a noticeable impact on how different systems stack up against each other in all the key performance attributes, including:

- **Feature sets.** Does the device offer copy, print, fax, scan, or professional finishing capabilities? Does it need to? Can you add more features later, as the needs of your workgroup evolve? Overall, is the feature set oriented toward business color, or does it include graphic arts color extras that the average business user does not require?
- **Color balance.** Is the device designed for dedicated color output, or a mix of color and black-and-white work? If it is designed for mixed workflows, what are the percentages? If your workgroup is using color for more than 30% of its documents, a dedicated color system may be best. However, if your workgroup is using business color in less than 30% of its documents, it is best to choose a black-and-white system with additional color capabilities. This kind of system (also known as “convenience color”) should give users full black-and-white functionality (including print/copy/scan/fax and document finishing) at a comparable cost-per-page to other black-and-white systems without color. Also, be wary of color devices that provide poor black-and-white results, as they will lead to unused capacity.
- **Cost control.** Can the device be configured to control access to color output? This is typically done via user codes entered at the system or through the network interface. By requiring user code authorization, you can specify which users or departments can print or copy in color. However, there are two important factors to consider. First, can you require user codes for color output while allowing unlimited access to black-and-white output? This is very important for mixed devices, because it enables you to control color-related costs without inconveniencing users who only need black-and-white output. Second, is the authorization capability built in, or does it require a separate software package? If a separate application needs to be purchased, installed, and managed, this will affect the total price of the system as well as the ease of color cost control.

- **Network connectivity.** Will the device be connected to your LAN or used in a stand-alone application? If you purchase a stand-alone system today, can you easily attach it to the network later? Is the network interface similar to other printer drivers that users will be familiar with?
- **Ease of use.** Is the operating panel simple and intuitive for the average user? Ease of use will be vital for incorporating business color output devices in offices that are unfamiliar with in-house color printing.
- **Image quality.** For most business color output, 600 dpi is sufficient. However, if higher dpi is available, it should be considered — as long as it does not reduce the total output speed below where your workgroup needs it to be. To make sure the image quality meets your expectations, have the vendor produce a variety of sample documents on a test model.
- **Number and configuration of devices.** If you are equipping more than one workgroup for business color output, your vendor should be able to help you select the best configuration of equipment — and provide pricing options based on the full scope of your enterprise needs.
- **Consumable costs.** Attaining a reasonable cost-per-page depends in large part on the toner yield per cartridge. Make sure to select a business color output device that balances image quality with consumable costs. This can be counter-intuitive to predict, because less expensive color output devices — namely, inkjet printers — often have lower acquisition costs and higher cost-per-page. For example, a typical cost-per-page with black-and-white inkjet printers is \$0.08, while the typical cost-per-page for a black-and-white laser printer is just \$0.02. If your workgroup prints 100 pages per day, the cost difference in the first year alone would be \$1,500 for a single printer placement. This differential could be multiplied up to tenfold for color output devices.
- **Overall objective.** Although this is the most important factor, we're covering it last to reinforce its significance. It reflects a point we've emphasized throughout this paper: your needs should be the focus. It is very easy to get bogged down in the details and technical specifications of equipment. If this occurs, remember to reset your perspective by returning to your overall objective. If your first priority is high-volume color output for a well-defined set of needs, then you should be comparing high-speed, dedicated color systems. If your first priority is starting a transition from black-and-white to business color workflow, then you should be comparing black-and-white MFPs that also deliver high-quality color.

### Conclusion

In any industry or vertical market, organizations that understand the differences between business color and graphic arts color stand to gain a significant competitive advantage. If you understand how best to take advantage of business color in your specific environment, you should be able to integrate full-color document production successfully and cost-effectively, while acquiring several key benefits: higher productivity, smoother communication and workflow, and enhanced brand equity. These benefits, in turn, can help you improve customer satisfaction and loyalty, strengthen relationships with business partners, and get the edge in competitive situations.

When choosing a document solutions provider, make sure to select one that demonstrates a complete understanding of all types of color output. Your provider should be able to help you assess and prioritize your own color output needs, evaluate equipment choices, and help you select color output systems that match your overall document management strategy — as well as your budget. For the long-term, make sure to choose a provider that can help you with today's needs and plan for tomorrow, as well as handle every aspect of the transition from black-and-white to color, including installation, maintenance, end-user training, direct service and support, and ongoing needs assessment.

#### About the Author

Scott Boekweg has nearly ten years of experience in the software and hardware industry, with many of these years dedicated to the office solutions market. He has served in a variety of roles, including solutions engineer, technical sales representative, technical sales trainer, and marketing color and black-and-white to color systems. He holds bachelor's degrees in both information systems and marketing.

