

Color Works

*Using the Impact of Color in Labeling
to Grow and Improve Business*



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Executive Summary

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It is estimated that the vast majority of printers used for business and industrial labeling today are black and white thermal. Businesses that want to leverage the advantages of color labels must rely on inflexible, large printing presses for production. If the business has significant label variety or wants to leverage color more dynamically, this process proves to be labor-intensive, inefficient, and often times wasteful. A two-step process entails large commercial print runs of color-only labels, maintaining a huge inventory of pre-printed labels, and then using thermal printers to add black text to the pre-printed color labels as needed. When a business modifies a label design or changes the process or product tied to a label application, it faces sunk costs for the pre-printed color labels and additional costs for producing new ones.

Many businesses live with this reality because they are unaware of recent advances in color label printing technology. It is now possible to produce on-demand labels containing both color and monochrome from a single printer, eliminating the need for a lengthy, two-step labeling process.

These innovations provide new ways to benefit from color labeling. Scientific studies validate that color can be beneficial to memory, learning, recognition, and recall, among other cognitive functions. With the capability to easily and economically print labels on demand, businesses can focus on using color to achieve strategic goals, such as strengthening brands and improving operations. Color can be viewed as an asset to grow the business rather than as merely a cost to control.

□ This paper aims to:

- Introduce readers to new color label printing technology
- Explain how new technology can replace the traditional method of producing color labels
- Explore some of the ways color labels can be used to build stronger brands, achieve more efficient operations, and improve quality and safety

Part I

■ Is Easy, Economical Color Labeling Just a Dream?

In 1938, Metro-Goldwyn-Mayer (MGM) began work on the script for a new movie entitled *The Wizard of Oz*. There were many critical decisions made about key movie elements during its scripting, filming, and production. Perhaps none of these decisions was more important than the choice to use a relatively new technology called Technicolor to shoot the scenes set in Oz. While most filmgoers would agree that color is important in film, it played an especially significant role in *The Wizard of Oz*. Imagine how much less memorable, impactful, and symbolic a monochromatic treatment of the Yellow Brick Road, Dorothy's ruby red slippers, and the Emerald City would have been.



*It is now cost efficient,
with high enough throughput,
to produce color labels from
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any commercial or industrial
application – on demand.*



The film portrayed Kansas in black and white to reflect its harsh reality, but then portrayed Dorothy's experience in the colorful Land of Oz as a dream. For many years, the ability to easily, efficiently, and economically use color in commercial and industrial labeling solutions has been, like the Oz of film lore, merely a dream. Yet, as illustrated by *The Wizard of Oz*, and proven in numerous scientific studies, color improves the ability to impact and influence audiences^[1].

Surprisingly then, technologies that enable businesses to produce color labels easily and on demand (for label customization) have been limited. Yet color labels have many uses and can improve multiple aspects of any business, including the following:

Business Management

- **Business operations** – Color can be used to improve the efficiency^[2] of tasks as well as communication^[3] between management, co-workers, customers, and partners
- **Quality of product** – Color can be used to reduce errors^[4] in processes and procedures during production

Business Communication

- **Impact of communication** – Color combinations can be used to increase audience response and recall^[5]
- **Influence of messaging on audiences** – Color affects up to 90% of audience judgments about people and products^[6]

Brand Management

- **Business identity** – Color used consistently increases brand recognition^[7]
- **Customization of products** – Color is one of the easiest and most effective ways to differentiate products and services

This paper will revisit these business applications in later sections.

It is now cost efficient, with high enough throughput, to produce color labels from a single printer for nearly any commercial or industrial application – on demand. “On demand” means that any quantity of customized labels, containing any text or color needed, can be produced at the precise moment needed. This process is quantifiably faster and more efficient than existing methods of color label printing.

Part II

■ The Past is Black and White

It is estimated that 95% of printers used for business and industrial labeling today are black and white thermal. This means that most businesses must engage in a two-step process to print color labels.

The first step is to print a large number of color-only labels (without black) using commercial print runs on a large press. To be economical, commercial print runs usually number in the tens



or hundreds of thousands. Assuming a business needs several color label designs for use in a variety of labeling applications, this quickly leads to a large inventory of “static,” color-only labels that must be distributed, organized, and stored until needed. Once this huge inventory is paid for and in place, the business then must manage the second step in the process. This requires adding “variable” black text via monochrome thermal printing to pre-printed color labels.

While an accepted business practice for many enterprises, this approach is time-consuming, uneconomical, and inefficient. Moreover, if the business must change any or all of the color labels for a new or modified application, then it must print several thousand new labels and discard all of the old labels

unused, essentially wasting time, money, and resources. Similarly, if a labeling application simply becomes obsolete, the business has sunk cost into the printing, shipping, storage, and subsequent disposal of large quantities of unused labels.

The disadvantages of the traditional method of incorporating color into labels using monochromatic thermal printers can be summarized as follows:

- **Limited flexibility** – The color on “static,” pre-printed labels cannot be modified quickly or easily.
- **Uneconomical** – Pre-printing color labels requires large commercial print runs to decrease unit cost, resulting in uneconomical overproduction.
- **Inefficient** – Pre-printing requires maintaining an often large inventory of color labels, which is the result of inefficient overproduction, as well as an inefficient process of printing customized black text on pre-printed color-only labels.
- **Wasteful** – Any change in a product or process can render pre-printed labels obsolete and unusable.

Because monochrome thermal printing is so predominant, many businesses have not considered alternative technologies; most perceive color label printing to be too complex and too expensive altogether. To date, no alternative method has demonstrated an economical way to modernize the traditional process – until now.

Part III

Awaken to a Colorful Dawn

Now businesses
can affordably
leverage simpler
color label printing
to grow.



Many possibilities exist for simplifying existing label printing methods, but a major advancement would be the move to a one-step process for printing custom color labels on demand. Such an innovation might be called *Just in Time Color™*. *Just in Time Color™* alludes to Toyota's (and other Japanese companies') innovative lean manufacturing processes, broadly referred to as Just in Time, which were developed in the 1950s.

The *Just-in-Time* operations strategy seeks to reduce stored inventory and its associated cost [8]. Applied to label printing, it eliminates overproduction and the accompanying inventory of pre-printed color-only labels required by the traditional two-step process. Many businesses do not realize that an affordable technology to achieve Just in Time production with their color labeling exists today.

Robust technology for one-step, single-device color label printing is now possible, enabled by purpose-built printers for commercial and industrial environments. This technology opens new avenues for using color labels to achieve business goals, such as building stronger brands, achieving more efficient operations, and improving quality and safety.

Businesses are no longer restricted to the inherent inflexibility of two-step color printing in order to save pennies per label. They can now economically leverage simpler, on-demand color label printing for various applications in order to grow and improve their business.

Just in Time Color™ directly solves many of the challenges associated with the traditional method of color label printing, as summarized in Table 1 below.

Table 1 *Just in Time Color™* Solves Problems with Traditional Color Label Printing

Traditional Challenges

Limited flexibility – The color on “static,” pre-printed labels cannot be modified quickly or easily.

Uneconomical – Pre-printing color labels requires large commercial print runs to decrease unit cost, resulting in uneconomical overproduction.

Inefficient – Pre-printing requires maintaining an often large inventory of color labels, which is the result of inefficient overproduction, as well as a multi-stage process of printing customized black text on pre-printed color-only labels.

Wasteful – Any change in a product or process can render pre-printed labels obsolete and unusable.

Just in Time Color™ Solution

Flexibility – Quickly and easily adjust labeling based on design variations or customizations.

On demand – Print the number and type of labels needed right now – no more, no less.

Just in time – No requirement to pre-print, distribute, organize, and store huge label inventories or manage a tedious two-step printing process.

Efficient – Change a product or process without sunk costs or wasted resources.

The durability of labels produced by alternatives to thermal printing has historically been an area of concern. The perception has been that ink jet label printers cannot produce labels that are sufficiently durable to withstand some applications. This has changed. The labels produced by new ink jet color label printers have been thoroughly tested and shown to withstand even harsh industrial environments, including the achievement of BS5609 Certification on select media.

Part IV

▣ Using Color to Achieve Business Goals

Now that wide-ranging use of color labeling is both feasible and affordable, businesses can leverage it in various ways. Below are two (among many) ways that businesses can benefit from flexible color labeling. The first use case describes use of color labeling to enhance production line quality, efficiency, and safety. The second use case describes use of this technology to enhance customization, differentiation, and personalization to expand business opportunities.

Use Case: Joe, the Production Line Engineer

GOALS

Joe is responsible for managing the overall productivity, efficiency, and optimization of the people, processes, and technologies used to manufacture products. Joe needs a color labeling solution that enables large-scale, high-volume use across a range of products.

CHALLENGES

Joe's day-to-day challenges include the following:

- **Reliability** – The number one challenge is maintaining steady levels of production. Any unplanned slowdown or stoppage in production seriously affects the business.
- **Unit cost** – Because the production line requires large-scale, high-volume use of labels, unit cost control is vital.
- **Innovation** – Constantly improving the productivity, efficiency, optimization, quality, and/or safety of the production line is an important consideration, once reliability is stable and unit cost is controlled.

SOLUTION

Color labeling can be used to innovate and improve production line operations in the following ways:

- **Reduce errors in processes and procedures** – Color labels can increase comprehension of information by as much as 73% ^[4], hence reducing errors.
- **Increase efficiency of production** – Color can be used to improve learning of tasks, processes, and procedures from 55% to 78% ^[2], hence increasing production efficiency.
- **Improve communication** – Color used appropriately can better communicate technical information from production staff to management, co-workers, and customers by focusing attention, grouping elements, and effectively distinguishing important information from its surrounding context ^[3].



BENEFITS

While maintaining high levels of production reliability and low unit cost, advanced color labeling techniques help Joe implement innovation with the following benefits:

- Improve the quality of products through reduced errors in production processes and procedures by, for example, using color coding or pictures on labels to clarify the contents of a container
- Increase efficiencies of production through improved learning by production staff and communication from production staff to management, co-workers, customers, and business partners
- Enhance safety of production employees and a product's end users through better communication among production employees and with customers

Use Case: Kate, the Marketing Manager

GOALS

Kate is responsible for managing the overall process of positioning, differentiating, and conveying the benefits of her company's product line. Kate needs a color labeling solution that provides for smaller-scale, more diverse labeling applications that can be tailored to a range of products and customers.

CHALLENGES

Kate's challenges include the following:

- **Customization** – Each of her multiple products requires a unique labeling solution.
- **Differentiation** – Each product competes against several other products, and a constant challenge is to gain the attention of customers and quickly convey what differentiates her products from those of competitors.
- **Personalization** – Customers form a diverse audience, and each segment has a different set of goals, needs, and motivations. Kate must communicate in a way that is tailored and highly specific to each audience's expectations.

SOLUTION

Color labeling can be used to improve marketing in the following ways:

- **Improve brand recognition** – Color used on products and in marketing communications enhances brand recognition by up to 80%^[7]. Customer trust and confidence are directly associated with brand recognition.
- **More effectively differentiate products** – Research shows that customers tend to reach conclusions about products within the first 90 seconds of interaction, and up to 90% of the judgment is based on color alone^[6]. Hence, the effective use of color on labels can enhance product differentiation.
- **Focus audience attention** – While no single color alone has been shown to universally increase sales or conversions (i.e., web sites), strategic design that incorporates principles such as the Isolation Effect^[5] (i.e., using color contrast to isolate and thereby draw attention to something important) has been shown to be effective in tests^[9].

- **Obtain favorable evaluations** – Scientific studies have shown that personal experience is too subjective, and therefore diverse, to translate into universal meanings of colors ^[10]. However, studies have also shown that consumers judge the appropriateness of color in relation to the product being sold ^[11]. Custom color labeling can improve customer evaluations of products.

BENEFITS

Color labeling can help Kate achieve her goals and overcome her challenges in the following ways:

- Enhanced **customization** of product packaging and marketing communications through smaller-scale, more diverse labeling applications
- Improved **differentiation** of products from those of competitors and increased brand recognition through the use of color
- Increased **personalization** of marketing communications through targeted, optimized color/product combinations on labels

Part V

□ Color Works

This paper explains how new ink jet technology simplifies color label printing by condensing the process from two steps, requiring two types of printer and a huge pre-printed label inventory, to one step using a single device. This advancement provides businesses with

an economical alternative to the traditional two-step process. In addition, the labels produced by new ink jet color label printers have been shown to be sufficiently durable to withstand harsh industrial environments.

This new technology enables color label printing to become an asset to help grow and improve the business, rather than merely a cost to be controlled. Now the advantages of color, which have been validated by science, can be leveraged in labeling applications to help to achieve business goals, ranging from building stronger brands and achieving more efficient operations to improving quality and safety.

From a technological and business standpoint, easy and economical color label printing is no longer like Oz, a mythological thing of dreams. Today, simple color on demand is a reality, and color works.

To learn more about this topic, refer to the online resources in Table 2.

New industrial-grade label printers are capable of 11.8 inches per second throughput with high-resolution color at 1200 x 600 dots per inch (DPI).



Table 2 Additional Information

Learn more about how color labels can help businesses to grow and improve	http://www.epson.com/community/colorshift/
Learn more about new color label printing technologies	http://pos.epson.com/colorworks/ColorProducts.aspx
Shop for color label printing technologies via partners	http://pos.epson.com/colorworks/PartnersAndMedia.aspx

About Epson

Seiko Epson Corporation is a global imaging and innovation leader that is dedicated to exceeding the vision of customers worldwide through its compact, energy-saving, high-precision technologies, with a product lineup ranging from printers and 3LCD projectors for business and the home, to electronic and crystal devices. Led by the Japan-based Seiko Epson Corporation, the Epson Group comprises over 70,000 employees in 108 companies around the world, and is proud of its ongoing contributions to the global environment and the communities in which it operates.

References

1. Wichmann, Felix A., Lindsay T. Sharpe, and Karl R. Gegenfurtner (2002). The Contributions of Color to Recognition Memory for Natural Scenes. *Journal of Experimental Psychology – Learning, Memory and Cognition*, Vol. 28. No.3.
2. Embry, David (1984). The Persuasive Properties of Color. *Marketing Communications*.
3. Keyes, Elizabeth (Fourth Quarter, 1993). Typography, Color, and Information Structure. *Technical Communication*, Special Issue: Visual Communication, 638-654.
4. Johnson, Virginia (1992). The Power of Color. *Successful Meetings*, Vol. 41, No. 7, 87, 90.
5. Van Dam, Gerrit, Joan Peeck, Michele Brinkerink, and Usmar Gorter (1974). The Isolation Effect in Free Recall and Recognition. *The American Journal of Psychology*, Vol. 87, No. 3, 497-504.
6. Singh, Satyendra (2006). Impact of Color on Marketing. *Management Decision*, Vol. 44, Issue 6, 783-789.
7. Lam, Shun Yin (2001). The Effects of Store Environment on Shopping Behaviors: A Critical Review. *Advances in Consumer Research*, Vol. 28, Issue 1, 190.
8. Monden, Yasuhiro (2012). *Toyota Production System: An Integrated Approach to Just-in-Time* (4th ed.). Boca Raton, FL.: CRC Press: Taylor & Francis Group.
9. Chopra, Paras (2010, Nov. 24). Multivariate Testing in Action: Five Simple Steps to Increase Conversion Rates [Electronic version]. *Smashing Magazine*. Retrieved January 2 and 6, 2015, from <http://www.smashingmagazine.com/2010/11/24/multivariate-testing-in-action-five-simple-steps-to-increase-conversion-rates/>
10. Sohn, Emily (2010, Oct. 1). Color Preferences Determined by Experience [Electronic version]. *Discovery News*. Retrieved January 2 and 6, 2015, from <http://news.discovery.com/human/evolution/colors-preferences-evolution-style.htm>
11. Bottomley, Paul A. and John R. Doyle (2006). The Interactive Effects of Colors and Products on Perceptions of Brand Logo Appropriateness. *Marketing Theory*, Vol. 6, No. 1, 63-83.

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