



BY STEVEN SCHNOLL

# ARTIFICIAL INTELLIGENCE IN THE GRAPHICS WORLD

SMART CHANGE STARTS HERE.

Self-driving cars, tracking air pollution, Google searches, robots, automation, and predicative analytics are just a few of the capabilities that are transforming our lives by applying Artificial Intelligence (AI). But does AI have any relevance to a graphic communications professional taking on the problems facing their respective company? AI has been a big buzz concept over the past few years. The interesting fact is that AI has been around for many years. Alan Turing, a British polymath mathematician started to first explore AI in the early 1950s.

This white paper will examine AI as it impacts the graphics industry. The first thing that needs to be done is to define the term Artificial Intelligence or AI. Many sources are available but one of the most relevant definitions was found at Dictionary.com. They defined AI as “the capacity of a computer to perform operations analogous to learning and decision making in humans, as by an expert system, a program for CAD (Computer Aided Design) or CAM (Computer Aided Manufacturing), or a program for the perception and recognition of shapes in computer vision systems.” Sounds straightforward but at the same time a little scary and confusing. Can computers or robots replace the human? The reality is AI is the intersection of people, technology, and data.

In the article, Artificial Intelligence: A Primer<sup>1</sup>, Sam Kwok, a senior partner at Garage Technology Ventures starts by making a bold statement: “Artificial Intelligence has the power to change lives, companies and the world.” The Primer concluded that “executives, entrepreneurs, governments and investors who take informed risks on AI technologies will be rewarded.”

George Lucas in Star Wars was certainly rewarded with his two famous AI robots, C-3PO and R2-D2, who questioned many human decisions and provided important answers for the Star Wars characters. But that is the world of science fiction. The proof of concept must be shown to printers, designers, data managers, and many others. The question is, can an AI behave like a person and make decisions like a graphic arts professional?

While AI has the power to change the way business is done, the question people in the graphics industry want to know is: How is AI impacting the print world?

## APPLYING AN AI STRATEGY

As you read how AI technology is impacting the world, one starts to wonder: Is that really true? To ignore this potential may be one of the biggest mistakes our industry can make. Instead, smart business leaders must consider what is available in the marketplace and then determine the various approaches to implementation. AI technology is evolving very quickly and can be seen already in many areas of the graphics world.

One example of a company that has changed the face of the print industry is Vistaprint, now called Cimpress N.V. They started the ball rolling by automating the order and production process with web portal technology. In the past, customer service people would take a phone call and then receive materials for printing. The customer service representative would write up a job ticket and then put the job into production. In most companies there are many production touchpoints that add costs. Vistaprint automated that whole process with software that permits them to offer 500 business cards for \$9.99 plus shipping and handling. When you analyze their production process, these cards are manufactured with only four human touchpoints. The result is Cimpress/Vistaprint has also grown from a startup 20 years ago to a company doing over \$2.5 billion in revenue. AI has been an important part of their growth.

Over 50 years ago, MIT professor Jay Forrester invented a table game called the “Beer Game.” (No, it didn’t allow students to drink beer in class.) The game, according to professionals at MIT, “simulates the supply chain of the beer industry in order to hammer home a core element of MIT management thinking in every aspect of a business system.”<sup>2</sup>

<sup>1</sup> <https://www.garage.com/artificial-intelligence/> accessed on June 11, 2019

<sup>2</sup> [https://executive.mit.edu/blog/mapping-risk-with-the-beer-game#.XP\\_n7G9Kiv4](https://executive.mit.edu/blog/mapping-risk-with-the-beer-game#.XP_n7G9Kiv4) Accessed on June 11, 2019

Let's take the Beer Game and apply those same game rules to the print industry. If you analyze the many production steps in a typical PSP, you will most likely identify many weak links or costly redundant steps. The arrival of more efficient data collection has profound implications. However, before any company starts to think about pursuing the AI route, one must define the many components and opportunities that currently exist for a graphic arts company and what future paths may become available. While all this sounds good, the looming question is: What will it take to make AI a true reality in the graphics industry? Some examples where AI may impact the supply chain elements in the graphics industry are:

- Provide sales with more customer knowledge and insight
- Automate order entry and workflow
- Better layout and impositions
- Production/press scheduling
- Color controls
- Personalized/customized documents
- Equipment maintenance records
- Maximizing labor output
- Smarter hardware — machine learning
- Identifying complex print projects with practical solutions

Most graphic arts companies have some sort of ERP/MIS in place that tracks the manufacturing process of their operation and collects data. While these software packages do a lot of compilation of data, the question that needs answering is: What else can they do to make a printer more efficient and automated? Can print oriented MIS and AI be the new MIT Beer Game?

Let's examine four different organizations that have AI products that are utilized by the graphics industry.

## **MINDFIRE [WWW.MINDFIREINC.COM](http://WWW.MINDFIREINC.COM)**

David Rosendahl, one of the co-founders of MindFire, a leading marketing automation software provider, shared some great insights. "AI has been around for a number of years and is becoming more and more practical to use. AI has many benefits for marketers—from drawing valuable insights, to automating marketing tasks." Rosendahl believes AI can be a powerful marketing tool for any size business. "For example, we use AI to help marketers (and the sales teams they support) identify high-value prospects within a sea of potential opportunities. This is done by analyzing prior cohorts who have achieved the desired objective (an appointment, a demo, a sale, and so on), and then creating a machine learning model that examines new people and provides a score relative to their propensity to take the next desired action." This becomes a critical tool in business dynamics to identify the best potential customers for one's business.

MindFire's Da Vinci software certainly falls under the AI scope. According to Joe Manos, EVP, Da Vinci helps "...all printers do something every successful business requires, regardless of size or capability: find more customers without the frustrating, costly, and time-consuming process of producing regular self-promotional marketing campaigns. This addresses the number one challenge all PSPs face: getting face-to-face with prospects and customers to discuss new print solutions. We're doing that by providing printers everything they need—including end-to-end campaign content—so that 80% of the work is done with only minimal customization required to launch." Rosendahl believes "AI has many practical applications with real business driving results." The "AI vision is still way off from being fully realized, but there are numerous examples (like Da Vinci) that are driving revenue for printers."

One company that seems to be on the forefront of AI technology is Electronics For Imaging (EFI). EFI is the leading printing Management Information System (MIS) software provider in the world. EFI has successfully created a few tools that are using AI at their core; these tools are part of EFI's productivity suite. EFI claims the productivity suite can make decisions and analyze many thousands of options better than any human. EFI was the first that combined business processes and production processes into one seamless package. The integrated AI achieves results like increased efficiency, automation, and profits that a PSP could only dream about a few years ago.

It is clear that with digital automation and AI, the print industry is going to change dramatically and for the better. Udi Arieli, Senior Director at EFI for Scheduling, PrintFlow, and TGO, is one of the technology leaders for EFI. Arieli and his team developed a groundbreaking approach to enhancing productivity called the Theory of Global Optimization (or TGO) several years ago. His thoughts on TGO were the foundation for the scheduling software program PrintFlow from EFI.

EFI PrintFlow was one of the first AI products geared to the graphics market. The EFI website defines this product as "... intelligently optimizing the sequencing of jobs and synchronizing production as it considers the thousands of constraints that affect every step of every job, PrintFlow's holistic, rules-based approach to scheduling allows you to handle more work in the most profitable way possible." Simply put, PrintFlow "is the automated dynamic scheduling tool that makes decisions for you," a wonderful production automation characteristic of AI. Additional AI-driven products from EFI include IQuote, a smart estimating and planning software, and Metrix, a planning and impositioning software that uses rules-based automation.

EFI recently did a graphic that created an exciting comparison of what AI can specifically do for a PSP: "The Scheduler vs. The Optimizer." Most PSPs will easily recognize many of the points illuminated in this graphic. The chart defines two aspects of production; one is a "task juggler" attempting to sort all the data streams in a manual manner, while the Optimizer uses AI automated data to improve production and profitability to become a "profit wizard." The options are clear.

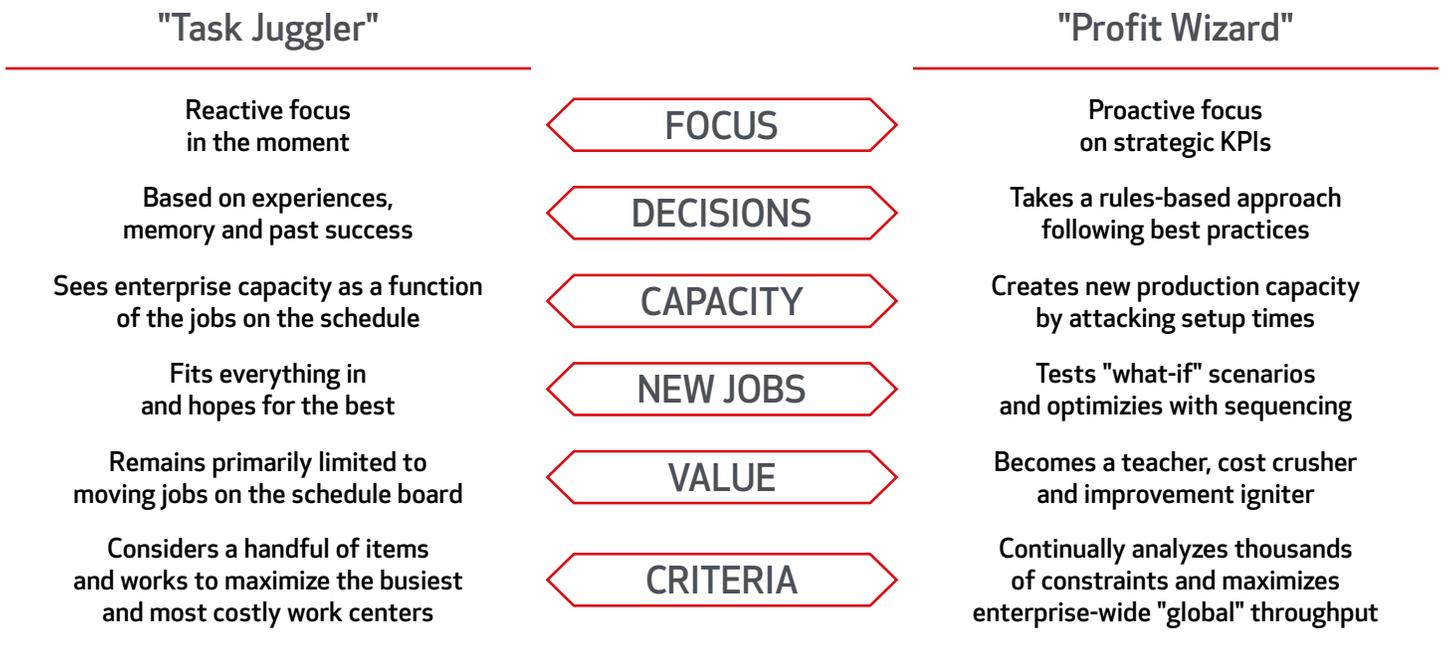


Figure 1: Courtesy EFI

# BLUECREST WWW.BLUECRESTINC.COM

BlueCrest, formerly a division of Pitney Bowes Document Messaging Technologies, is now a new standalone company. The company has taken its long history in mailing and inserting and expanded their product offering into print and software automation. Their goal is to “Optimize print and mail by adding power, flexibility, and accuracy to an operation.” They are doing that by offering software solutions across both print and mail that include AI.

“Print and mail operations are under increasing pressure to achieve SLAs (Service Level Agreements) or risk penalties that can be as high as \$10,000 per day,” said Marie-Pierre Belanger, Vice President Digital Solutions, BlueCrest. “We are leveraging artificial intelligence solutions to help drive productivity and better business outcomes for our clients.”

BlueCrest’s Clarity™ solution provides powerful real-time insights and predictive analytics that drive operational performance and higher profit margins. With an intelligent

view into the interaction between machines, jobs, and operators—it allows print and mail operations to leverage the sensor data from connected printer and inserter systems to understand root cause, address critical issues faster, and turn complex data into business insight. It provides the capability to create the ideal combination of operator and equipment for every job to increase productivity, optimize yield and quality, meet SLAs, and lower the cost of running the operation.

Through an incremental approach to continuous improvement, BlueCrest DirectView™ solutions help drive greater operational efficiency and productivity within the inserter work cell. With insights derived through DirectView, print and mail operations can easily obtain the real-time critical information needed to monitor work cell productivity and maintain optimal performance. Data related to idle time, non-productive time, machine, and application type is tracked, enabling production managers to proactively implement adjustments and immediately monitor results.



Figure 2: BlueCrest Clarity™ Optimizer Production Manager Dashboard

BlueCrest also offers solutions to help enterprise organizations take advantage of “intelligent” print and mail operations. OfficeMail™ is a hybrid-mail solution that lets users send documents from the desktop right into a production environment that includes printing and mailing. This product provides a smart and “nimble” production process that enterprise organizations can easily use to create important customer responses leveraging a state-of-the-art production operation for greater efficiency and accuracy. The tracking of every step plus oversight and proof of mailing to support compliance are all built into the process, saving many manual hours. This is exactly what AI was meant to do.

# UNITED STATES POSTAL SERVICE POSTALPRO.USPS.COM

The Postal Service employs AI and other emerging technologies in a variety of ways to streamline operations across its vast network and improve the customer experience.

Examples include:

- AI models that predict the time, location, and volume that mailers will drop mail at facilities so it can be processed more efficiently.
- Analysis of billions of captured GPS locations to inform mailbox locations and to determine whether an address was serviced properly.
- Computer vision models capable of detecting dangerous items in the mail to protect our employees and customers.

In general, USPS uses AI to automate data analytics processing, supplement manual effort, and identify key drivers

of behavior. These algorithms detect and uncover patterns in massive amounts of data to provide insight through machine learning, clustering, and natural language processing techniques. USPS' AI technologies and models iteratively learn and are designed to continuously improve over time, leading to enhanced performance across all impacted areas.

And although it does not use artificial intelligence, Informed Delivery® is an innovative game-changer from both a commercial mailer and general consumer perspective. This daily notification of mail and packages coming soon to your mailbox bridges the physical mail piece and the digital world. Registered users can digitally preview, manage, and interact with their mail and packages from anywhere—using a computer, tablet, or mobile device via email notification, mobile app, or online dashboard.

## IMPACT OF AI IN GRAPHIC COMMUNICATIONS

Whether you are committed to AI technology today or not, you must be aware of some very relevant data. Marco Boer, VP at IT Strategies, ([www.it-strategies.com](http://www.it-strategies.com)) pointed out that their research has illuminated several very important facts that are impacting the print industry. One deals with the pragmatic need for automation and the other the aging workforce. Boer highlights that due to the 2008 recession, 500,000 fewer workers are anticipated to enter the workforce starting in 2026. This will force wages to increase and competition for jobs to become fierce. These statistics make it very challenging for printers to find the right path forward. This will require graphic arts professionals to seek out more AI software to operate their operations efficiently with a sophisticated automation level.

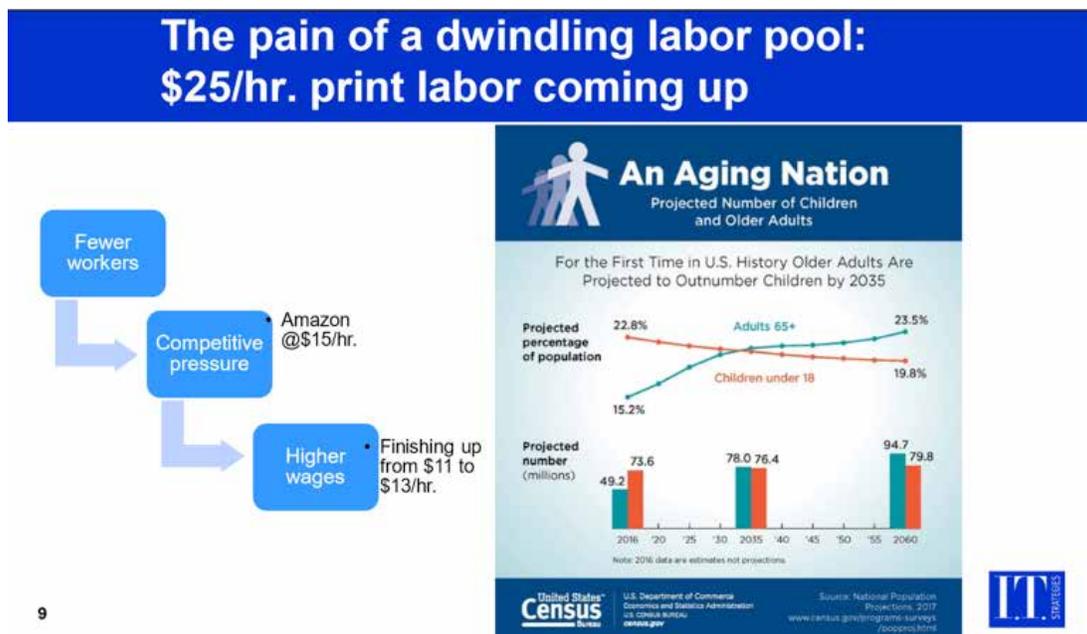


Figure 3: Courtesy IT Strategies

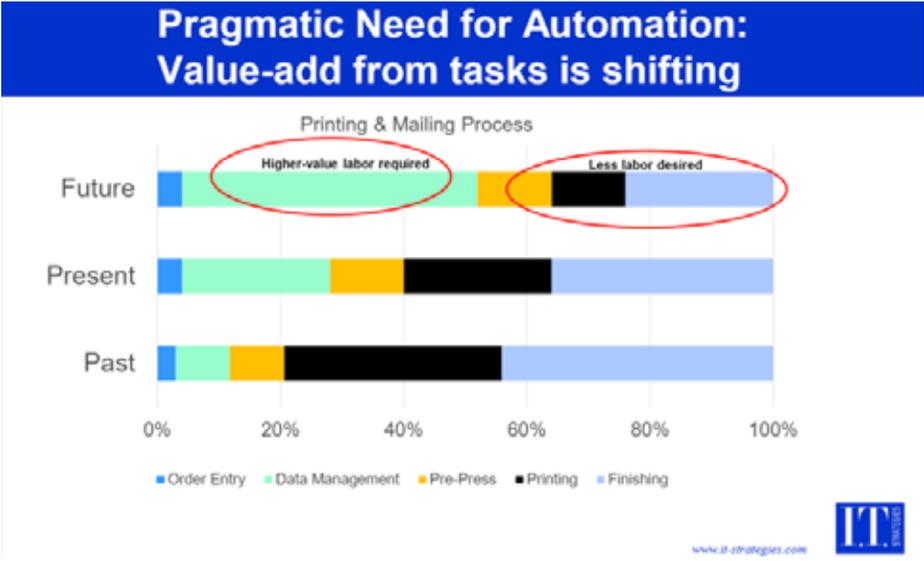


Figure 4: Courtesy IT Strategies

Most graphic communication companies have no computer scientists on their staff to teach AI to the team. Therefore, it is important to leverage the knowledge base of some of the companies cited in this white paper and others who are also dealing with this technology. Team up with AI partners to beat the manual competition. Whether it be the USPS or many private companies, AI is providing glimpses into our business that have never been seen before. It provides a 360-degree view of our print world. The following illustration provides a schematic of AI as it may be applied to the print industry to make for a smarter and more profitable entity.

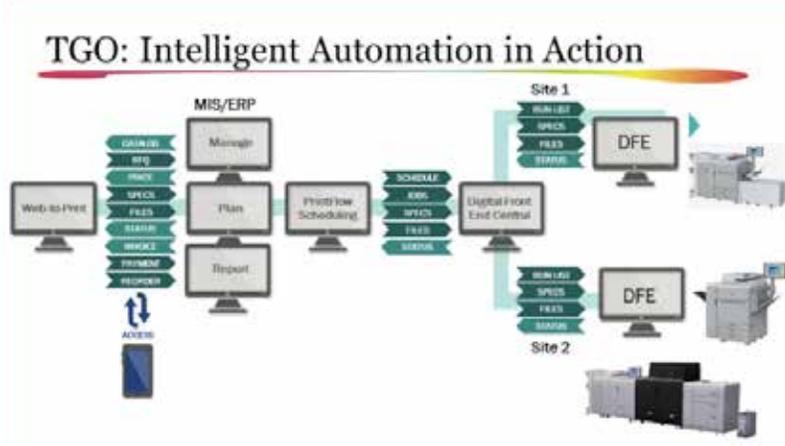


Figure 5 Courtesy EFI

As the field of AI advances, there is no correct answer whether robotic machines and intuitive computer software can totally replace humans in many graphics' jobs. However, we have seen hardware and software making major inroads in automating marketing, production scheduling, color controls, equipment monitoring, and many other areas in the print industry. While this debate between artificial and human intelligence will continue, history has told us that progress and meaningful AI breakthroughs will continue. Alan Turing posed an important question decades ago that is still relevant today: "Can machines do what we (as thinking entities) can do?" The answer is still being worked on.

## ABOUT THE AUTHOR



### Steven Schnoll

Steven Schnoll is the managing director in the consulting firm of SCHNOLL MEDIA CONSULTING. He has had leadership and ownership interests spanning several decades in five content media organizations and one software company. He has built a reputation as a practical innovator for companies attempting to enter new markets or revitalizing existing markets. Steven was inducted into the prestigious Ben Franklin Honor Society of the Printing Industries of America in 2008.

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