

The Critical Importance of Workflow in Production Printing

The commercial and packaging printing industries are entering a critical period of change in business model requirements. For decades they have been competing on quality, service, and lowest cost. While most print providers will claim to differentiate on quality and service, these attributes are a standard requirement for any customer. The real differentiation historically has been on cost. Through economies of scale benefits, the industry has been able to squeeze out additional cost savings. This is what has driven the wave of mergers and acquisitions among print providers and converters, causing an average attrition of about 3% annually among print providers. This attrition rate doesn't sound like a high percentage, but over a period of 10 years the industry will have lost more than 30% of independent print provider sites. In turn, this has enabled the remaining stronger ones to keep their economies of scale benefits even as total print volumes declined.

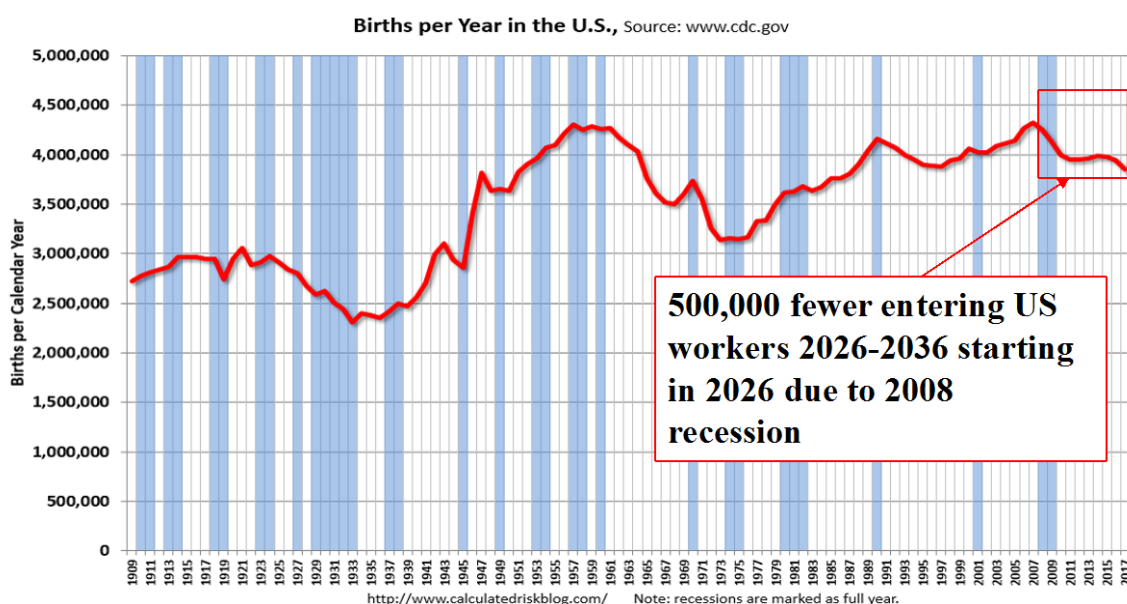
However, something else has changed in the print industry in the last two years. As the demand for all print declined, the economies of scale even for the remaining print providers have started to work against them. The cost of paper has increased 5-10% during the last two years as paper mills reduced their writing paper capacities by shutting down mills. The rising cost of aluminum coupled with trade war tariffs have increased the cost of plates and added greater pricing uncertainty. Ink pricing is increasing as declining economies of scale force higher pigment and dispersion costs. The cost of postage is up ~2%, and labor is getting more and more difficult to find for print providers at a time when McDonalds and Amazon are offering higher wages plus community college tuition reimbursement for low-skill workers.



In short, the cost of goods has increased so much that as an industry it has become impossible to compete on lower costs. Print costs are rising, while budgets to procure print are flat at best. The inevitable result is accelerating declines in print volumes. The silver lining in all this is that the print that remains is becoming more customized and valuable. It is procured in smaller volumes, just-in-time, with significantly lower levels of waste. Mass customization using big data is slowly becoming more common, allowing advanced print providers to compete not on the lowest cost of print, but rather the value of communication campaigns using print. All of this is changing print purchasing behaviors, driving demand for more localized commercial and packaging print. Increasing use of versioning is particularly affecting package printing.

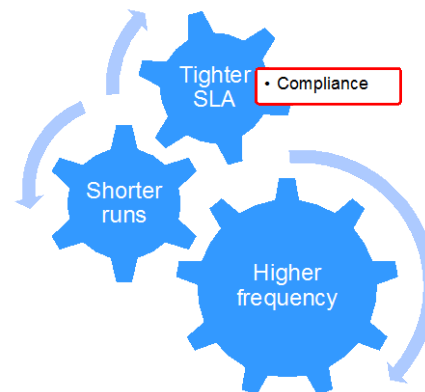
While this transition to new business models - focusing on mass customization and content relevancy - is starting to take hold, additional warning signs of new challenges are looming on the horizon. The next looming challenge is labor, and to be more precise, labor shortages.

In the US market, and this holds true for Europe as well, the 2008 economic recession resulted in families having fewer babies, as they felt economic uncertainty about their ability to financially care for them. According to the US Government's Center for Disease Control which tracks births, between 2007 and 2017 there were 500,000 fewer babies born than in its 2007 peak. The first of those 2008 babies will start to enter the workforce around 2026, which means that between 2026 and 2036 there will be 500,000 fewer workers.



As a result, starting in 2026, businesses will be competing for labor from a rapidly shrinking pool of employees. With less labor supply, wages are apt to increase significantly. In 2019, the average wage for a finishing operator ranged between \$11-13 per hour. With Amazon and McDonald's starting pay at \$15 per hour, one can only imagine where wages will head as we head towards 2026.

To add even more fuel to the fire, print providers have additional pressures from ever short run lengths, higher job frequency, and tightening service level agreement (SLA) deadlines. And don't forget additional compliance pressures from General Data Protection Regulation (GDPR) in Europe and similar upcoming regulations in the rest of the world.



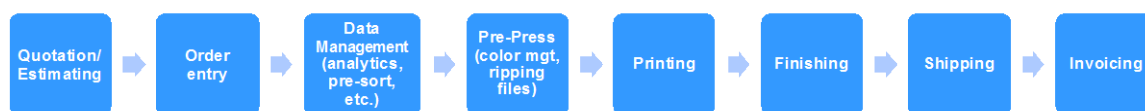
To prosper under these new conditions, print providers will have no choice but to become ever more efficient than they are today through automation and moving print jobs as smoothly through the plant as possible.

Workflow

This is where workflow comes in. Workflow is perhaps the only true differentiator a print provider can compete on since one print provider cannot easily replicate another print provider's workflow. They may have identical printing equipment, but differences in plant layout, software, finishing equipment, and operating processes is what creates their unique workflow.

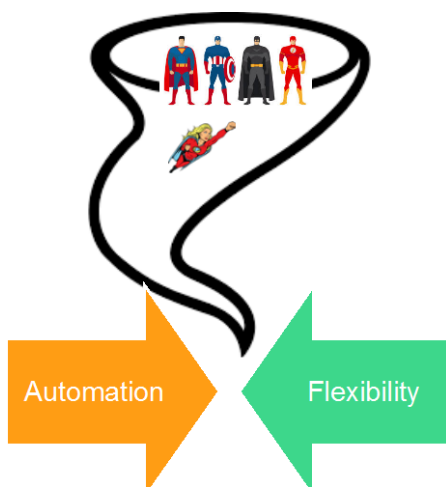
In the broadest sense of the definition, workflow starts from the time the job is quoted until the time it is shipped and invoiced to the customer. Each of the steps shown below have their own sub-steps, and often have their own software programs that don't always connect and communicate with the other software programs in the workflow chain.

Figure 1 Printing workflow steps



Source: IT Strategies, Inc.

Mainly due to legacy infrastructure reasons (conventional and digital printing, various ages of equipment, software, etc.), there hasn't been a single provider who has been able to tie it all together, and there may never be a single provider. Most print providers have self-developed software bridges to cope with all the legacy infrastructure pieces, trying to manage the challenges of bridging automation and flexibility (for last minute order changes, etc.).



To survive, print providers rely upon what we call their “superheroes”, employees who will go the extra steps needed to get the job done as the customer desires. Those “superheroes” fill in the gaps in lack of process, or lack of the ability of existing workflow to cope with the balance between automation and flexibility.

However, with rising labor pressures it is likely to become more difficult to find labor, let alone superheroes. The only answer is to build a core workflow platform that touches all the workflow steps, a platform designed to be robust enough to handle change.

What is required in workflow?

In order to understand what is required, we first need to define each of the discreet stages of the workflow process.

Quotation/Estimating

This may well be the most under-appreciated part of the workflow process as more print volumes move to digital printing. While most print providers have a process in place to estimate conventional print jobs, fewer have a process in place to deal with digital printing jobs. Part of the reason for this is that for some of these digital print jobs the time to enter the data into a MIS system takes longer than it takes to run the actual job. The default position for these types of jobs is the use of a “cost plus profit margin” approach. Often this is really a “guesstimate” of what they believe their costs are based upon prior experience. If “I charge more than \$0.XX per page printed, then I’ll make money.” The problem with this approach is that while one might know the cost of print (especially if it is click charge), one might under-estimate the cost of finishing and other steps since you are not capturing hard data about these costs since it is not entered into an MIS system.

The opportunity cost of this “guesstimate” approach can be high due to variations in ink/toner coverage. With offset printing the cost of ink tends to account for under 5% of the total cost of the print job. With digital printing, depending on coverage, it can account for 5% to 25% or more of the cost of the job. While a “cost plus” approach can make a profit for the print provider, digital printing estimating software would show which types of jobs are more profitable than other jobs, allowing the print provider to focus on selling specific types of jobs, or charging more for heavy coverage or complicated finishing print jobs.

Data Management (analytics, pre-sort, etc.)

There are multiple aspects to this phase of the workflow process, which result in either compliance or allows the creation of additional value and fees.

Compliance

For commercial print, identifying marks on each page (barcodes for example) become very important for compliance reasons. With ever greater awareness and pressure on data privacy (GDPR, etc.), many printers now use vision systems to capture images of every page that has been printed, collated, and inserted into an envelope. Records of those images are kept for a certain amount of time to be able to prove to the client that the information was printed correctly. Often this data will be stored in the cloud, where data storage can be more cost efficient and manageable.

For packaging print, brand protection and the ability to track/trace for security purposes is becoming more important. Hundreds of billions of dollars are lost by brands annually to fraudulent goods. Governments are losing tax revenues due to gray marketing, and are starting to require brands to incorporate unique variable identification codes to allow governments to track and trace the flow of their goods. And the biggest liability of all is consumer safety, with an increasing amount of regulatory mandates required to be able to track and trace goods, especially pharmaceutical drugs.

Analytics

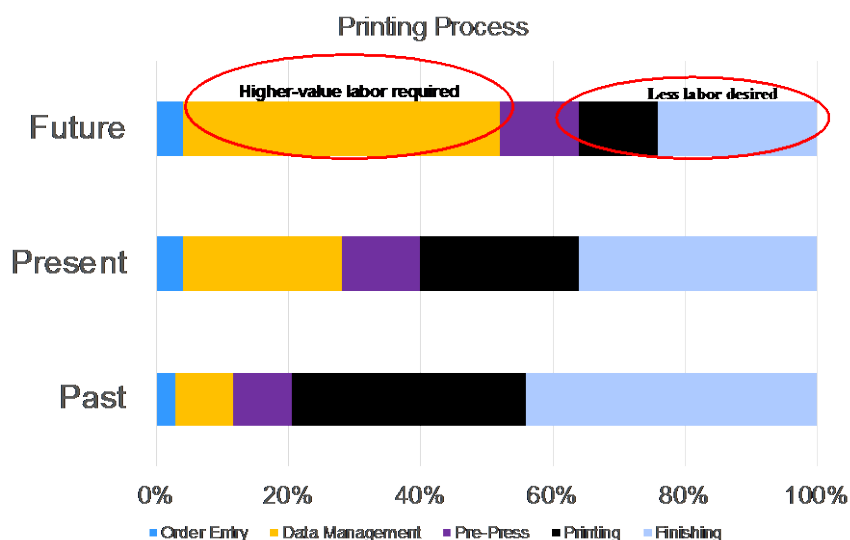
There are two critical pieces of print analytics: device process analytics and content/programming analytics. Device analytics is data gathered about the performance of a given device, its utilization, and maintenance. Device analytical software will continually evolve, with the ultimate objective of being able to predict maintenance and parts replacement just ahead of failure. This will help to maximize uptime, and remove unscheduled maintenance/device problems. It requires sharing of the devices performance (but not customer/file data), with the benefit that the device manufacturer will be able to collect data across its entire base of participating devices. In effect, crowd sourcing of device data to improve performance for all.

IT Strategies expects the use of device analytics to move beyond uptime. Manufacturers, and print is a manufacturing business, are increasingly moving towards using a measurement call “Overall Equipment Effectiveness (OEE)”. It is a measurement of machine uptime, sellable quality, and machine availability. It is a more comprehensive way of measuring the effective utilization of manufacturing equipment (including printing presses).

Content/programming analytics is separate but often connected to workflow at later stages. It is the analytics of how successful a certain print program – whether this is promotional packaging, direct mail, marketing collateral, etc. – has been allows the print provider to help their customer tweak their print communication to make it more effective.

It requires print providers to know more about their customers' business, and requires the customer to be willing to share some of their data back with the print providers. When the stars align, print becomes what is called programmatic. Depending on the response/outcome of the initial print run, a program is put in place to print a second, third, and so on run to encourage those who responded to buy more things based upon a special second offer, and those who didn't respond will get a second different offer. It shifts the focus from a single print job to a print program, emphasizing the value of the program rather than the cost of the single print job.

Over time this results in more frequent and shorter print runs where the value the customer is willing to pay is associated with the return on the promotional results, rather than just the cost of the print. It also shifts the discreet process of the workflow from printing and finishing to data management.



Some of the print providers who have made a successful transition to programmatic print could have up to 80 hours of data analytics and programming for a single job that might only take 8 hours to run. Once this really gets going, the run lengths get shorter and shorter, but more and more frequent. This in turns puts pressure on automating the workflow of those jobs, as the higher frequency of jobs become unmanageable to process manually.

Pre-Press (color mgt, ripping files)

This part of the workflow process has become fairly automated. Color management is a discipline that is well known, and some printing systems even now include photo spectrometers to be able to instant profile new paper. There is a workflow challenge in this area however, one that often doesn't become known until there is a problem.

The problem is variable data and variable images. With ever increasing versioning and personalization driven by programmatic print jobs, the RIP that was at one time sufficient may not be able to keep up with the greater level of versioning and personalization. While variable data is a challenge for commercial print, for packaging print the flexibility to change between versions quickly is becoming more challenging as the frequency of versions increases. Regular software updates of the RIP may mitigate some of this potential problem, but ultimately a RIP upgrade may be needed in order to keep up with the volume of data and images.

Printing

While still the core of what print providers deliver, in a way it has become less important as the workflow and profit focus shifts to managing highly versioned content, data, and images. With ever changing workflow requirements, a key attribute of printing systems is open application programming interfaces (API). API's are interfaces between different applications that receive or post data. API's enable applications to talk with each other and execute or trigger certain actions without the need to having access to the code or database of the service. For example, instead of adding all the shipping prices and options in your database, the workflow connects to the API of UPS or FedEx to get real-time pricing data.

A second important aspect of the printing part of the workflow process is analysis and recommendation of production flow. In other words, for a given job, what is the most time and cost-effective devices on the shop floor that this job should be printed on. Most operation managers use years of expertise and rudimentary data to make the judgement on which device a job should be printed on. But factual data might paint a very different picture of print job flow optimization. The workflow software would need to connect to multiple brand devices, including ideally finishing systems in order to get a full picture of the plants operating efficiencies.

And of course, the integration of quality control and feedback for last minute changes across all of these devices and finishing equipment becomes paramount to running an efficient print manufacturing operation.

Finishing

Finishing is, everything considered, still a manual labor-intensive process. But with labor costs rising, it has to become more automated. Barcoding and other markings are becoming a requirement to help minimize human operator error, and to speed up the finishing process. All of this needs to be programmed into the job during the estimation and pre-press process.

Shipping/Mailing

In the US market this is where direct mailers can save the most money. This is because of a unique cost-sharing program promoted the U.S. Postal Service. U.S. mail going further than a short distance will pass through as many as 6 different mail processing facilities, being sorted and reprocessed each time. After entering the mail stream at a bulk mail entry unit, mail is sent first to the closest of 196 Sectional Center Facilities (SCFs). The mail is then resorted and sent to the nearest Network Distribution Center (NDC), where it is resorted again. It is then shipped to the NDC closest to its destination, which sends it on to the destination SCF. Finally, mail arrives at the recipient's local post office, where it is sorted one more time prior to delivery. If print provider can get their direct mail pre-sorted and privately trucked to the SCF center nearest to the addressee, they can receive postage discounts up to 20%. Large commercial printers like Quad in the US have large fleets of trucks, and often will co-mingle the direct mail printed by other print providers with theirs. They'll pre-sort it to the closest SCF center, and share the postal discount with the other print providers.

The workflow software to co-mingle direct mail needs to be flexible enough to pre-sort the print jobs before they are printed, as well as post-sort if they are co-mingled at other larger print providers that ship the mail to the closest SCF center. In other words, the use of barcodes or other identifying marks needs to be available at all stage of the workflow process.

Invoicing

Often the last step in the workflow process, invoicing is becoming a greater challenge as the job frequency increases with ever shorter runs. Manually invoicing may no longer be an option, especially for high-frequency web-to-print orders. A well-designed workflow program will trigger an API to invoice once the print job enters the shipping stage.

The Legacy Infrastructure Challenge

Most printing plants were established decades ago. Few print providers have the luxury to start a new plant from scratch. Often through mergers & acquisitions print providers have to combine disparate workflows, a process that can take years. Meanwhile as the business models change in the print industry shift the focus from lowest cost to content value, the pressure to update a print provider's workflow becomes greater than ever.

With so many discreet parts and options for workflow, the role of the equipment manufacturer in helping print providers navigate through the morass of options becomes more important than ever.

Just like the business model for print providers is changing, so is the business model for printing equipment manufacturers. Rather than a strict transactional role, printing equipment manufacturers have had to change their role to true partners. If the print provider isn't able to change their business model and workflow to keep up with the changes in the market, they may not survive, and in turn the equipment manufacturer will lose their business.

Printing Equipment Manufacturers as Workflow Advisors

In effect, both the print provider and print equipment manufacturer have become co-dependent. This is why the leading print equipment manufacturers have taken on the role of workflow advisor.

As a starting point, printing equipment manufactures typically offer their own workflow software as part of the printing equipment sale, recognizing that single provider can't possibly offer every permutation of software that might be needed at each stage of the workflow process. Hence the key role and value printing equipment manufacturers is the ability to provide an advisory and integration role for workflow. Their core workflow software becomes the backbone, to which other specialized workflow software functions connect to in order to streamline the entire workflow process.

The benefit printing equipment manufacturers offer to print providers with their workflow offerings is time and money savings. Because they more likely than not have seen similar workflow challenges at other customers they serve, the printing equipment manufacturer will have reduced learning curve in implementing a complete workflow program compared to an individual print provider trying to develop this all on their own.

The Bottom Line

Few could have envisioned how rapidly the print business would change during the last decade. Print providers have to adopt their business models, and move from artisan skill providers to data providers. Print is still at the core of what they deliver, but the value of what customers are willing to pay for is shifting from print quality and lowest cost to content return-on-investment.

Printing equipment manufacturers are co-dependent with print providers to ensure their customers have access to the most efficient workflow options possible, and by default have become the go-to-source for the most appropriate workflow advice and solutions. Their chief role and value is combining the various aspects of workflow software, including legacy and new software, integrated into a single system.

Workflow is becoming the key differentiator how print providers will make money. Due to the complexity of workflow options and configurations, a trusted partner is required to continue on the journey of ever-changing workflow challenges. Printing equipment providers are the ones with the resources and skill to rise to the occasion to help print providers.