A question that has been asked more often in our print technology than any other since the invention of inkjet printers in 1996 is, “Why is screen printing still relevant?” The answer is this: In some product lines, it isn’t; in others, it is almost not; in others still it is very relevant; and in three particular segments, it is growing.

The three industry processes that are growing are: industrial, functional and electronic screen printing (IF&E). There seems to be no slowing down of new applications and ideas in these fields of print.

In preparation for this article, I compiled some past and current predictions from some of the top consultants in our industry, as well as other experts in the IF&E communities. Additionally, current examples of statistics from industry publications prove industrial, functional and electronic screen printing is growing and show no sign of conceding to digital print technologies.

**Past Predictions**

In a screen web article back in 2012, Mike Young, one of the world’s most well-known industrial and functional screen print consultants, was asked, “Will digital print take a significant part of the industrial print market like it did in graphics?” Young said, “There is an opportunity to coexist, playing off each other’s strengths, but there will be no outright disappearance or significant changes to current methods or known/accepted technologies of today,” he answered. Mike was right — there has not been in IF&E as of 2017.

Art Dobie, another IF&E print specialist and Academy of Screen and Digital Print Technologies member, explained in 2012 why he felt screen printing would provide the most opportunities in specialty printing: “In my opinion, the biggest opportunity in screen printing will be in industrial applications. Screen printing just matches up better with the requirements of these types of applications than most other printing methods.”

**Is IF&E Bullet Proof?**

There is no doubt that Mike Young and Art Dobie were right. IF&E is growing, not shrinking. But, is there a danger lurking...
In Mark Coudray’s “The Forth Disruption,” featured in Screen Print Magazine, September 2016, he outlines the massive disruptive technological advancements that have completely changed the opportunities in a formerly very stable graphics manufacturing industry since 1984. Coudray identified three disruption milestones:
1. Postscript 1984
2. Desktop publishing
3. Digital printing

Coudray identified a fourth disruption to which most of our industry has not paid much attention. This current disruption is probably more significant than any other — venture capitalism. I believe this will affect the IF&E print industry very soon. Venture capitalists may soon be attracted to this sector like it has been attracted to the POP and digital textile industries. When this happens, it will be fast. All the necessary attributes of attracting venture capitalists to IF&E are in place:
1. IF&E is highly profitable.
2. It’s growing and changing very rapidly.
3. IF&E is highly fragmented with most competitors not communicating with fellow printers.
4. There are many large family-owned companies that will be targets because they may be willing to consolidate as digital begins to strengthen and erode profits.

Proof of the relevance of disruptor number four is that 2016 was a challenging year for IF&E printers. In that year, there was median sales growth of 12.4 percent. Slower sales growth than 2015, but still good compared to other screen print technologies. Year 2015 reported a 46 percent increase in sales down from 70 percent in 2014.

Is this the perfect storm? We don’t really know, but we didn’t see (or admit) that digital was taking over the graphics production until massive consolidation and venture capitalist moved in. Small graphic shops that were good printers attempted to go digital, but many couldn’t make the turn as profits eroded by the big consolidated companies.

“As hard as I’ve tried, I have not found one instance where digital disruption has entered a market and the old ways survived. It is what I call ‘Digital Darwinism.’ Adapt or die,” said Coudray.

<table>
<thead>
<tr>
<th>Technology Mix</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entirely digital</td>
<td>5.4%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Multi-technology, but mostly digital</td>
<td>21.6%</td>
<td>14.6%</td>
</tr>
<tr>
<td>Multi-technology, with no single dominating process</td>
<td>35.1%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Multi-technology, but mostly analog</td>
<td>35.1%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Entirely analog</td>
<td>2.7%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Figure 1: Data pulled from 2016 SGIA Industry Survey Report

Is IF&E an Exception?
Digital print is not doing very well meeting the demands of IF&E print solutions. The 2016 SGIA Industry Report shows the growth from 2015 through mid-year 2016 in IF&E. The technology mix of companies going entirely digital is only 0.5 percent of companies (see Figure 1). Yet multitechnology mostly digital is growing at only 7 percent when multitechnology mostly screen is growing at 10.7 percent. This indicates printers are adding screen print technologies at a greater rate than digital in the IF&E industry. This did not happen with the digital disruption in POP graphics — that is the exception.

The fourth disruption may be looking for a perfect storm as an opportunity, but the IF&E printers should stay vigilant to keep the industry strong. Everything is pointing to a strong economy on the horizon, but it will not be enjoyed by the masses. We have to stay productive. According to the SGIA 2016 report, these primary barriers to growth are exactly what we saw in the POP graphics industry:
1. Finding new customers
2. Downward pressure on prices
3. Recruiting production personnel

I also noted that competitive improvement plans reported by the IF&E printers were all focused on improving efficiencies rather than upgrading equipment. Although this is a good thing to do, if there were not financial stress on IF&E, adding equipment would be a part of the plans. This may smell like blood in the water for opportunist like venture capitalists (we hope not). Plans include:
1. Lean manufacturing/continuous improvement
2. Reducing operating costs
3. Adding new product lines (the most common)
What about the future of IF&E?

I asked four top IF&E consultant members of the Academy of Screen and Digital Print Technology to comment on the pending relevancy.

Mike Young of Imagetech Consulting International

“In regard to the future of IF&E, screen is certainly not the only option. It is about selecting the most viable process that meets the specification of the product. Out of the gate, screen is a better choice for industrial applications. Industrial printing needs significantly heavier coatings to perform other functions. Also, industrial printing requires many times greater accuracy and close-tolerance deposition. While most printing systems yield between 0.5 to 1.5-micron thickness as standard in a single pass, screen can provide anywhere between 6–50 microns.

Laura Maybaum, Global Screen Product Manager for Nazdar Industrial Applications

“There is a lot of work to get more and more applications onto the inkjet side of things, but there are many applications that require solvent or UV screen inks:

• High opacity
• Smooth and solid spot colors
• High chemical resistance
• High water resistance
• Adhesive resistance
• Specialty surfaces such as high gloss or very low gloss
• Specialty formulations such as non-conductive, dead front windows, textures, ultra-clear windows, etc.
• Specialty colors: metallic, pearlescent, heat resistant, fade resistance, etc.”

In regard to whether digital or screen would be the best quality, Laura said; “Yes. But it depends how you qualify ‘quality.’ The more demanding or exact the specifications for the part is, the more you would lean towards saying ‘yes’ to screen printing. So, the performance requirements of the printed part are the key metric. Industrial printing lends to longer print runs because parts tend to be set up as a standard design. The graphic design and function design are more set in stone. Screen is the best choice in this case. However, there is room for personalization, like ad specialty, container printing, packaging or smart device covering/packing. Digital works well for some short, custom runs.”

Neil Bolding, MacDermid Autotype

“The primary requirement in industrial parts is performance. Screen is just better because flexibility is a high priority in most industrial applications. Digital inks just aren’t as flexible as screen printed inks. Applications like membrane switches are an example. If the ink is not flexible, it will not provide the same level of actuation performance.”

Joe Clarke, Owner of Clarke Product Renovations

“Screen print has an advantage in industrial applications:

1. Higher image quality: Small parts require higher image quality.
2. Precise color matching: For corporate colors challenge digital can’t match the special colors like metallic colors, economical clear coats, textures, etc.
3. Durability is better in screen.
4. Speed: Semiautomatic presses can print 8x10 to 24x32 at 150 to 550
full-sized sheets per hour. Cylinder presses can print 20x40, typically 1000 to 3600 full-sized sheets per hour.

The digital IF&E print industry has an advantage only in very short runs and variable data. Screen is simply the best option for what IF&E is today — peak density, dead-fronts, homogenous windows, faux-chrome finishes, conductive circuits, laminating adhesives, heat-resistant coatings for in-mold label, in-mold decorating, long runs and repeat orders.”

**Technology Advancements That Will Help Digital in IF&E**

1. Single-pass inkjet color engines — This should increase throughput and redefine what short runs are.
2. Variable data on mass-market products are feasible for setting up a screenpress. The demand for variable data will drive the need for digital IF&E.
3. Massive investment by major developers in IF&E such as Oce*, Fujifilm*, Kodak, HP*, Canon*, Memjet, KBA-Kammann*, Agfa*, Durst*, EFI* and others.
4. Advancement in printheads — Samba*, Xaar*, Konica Minolta*, etc. are attempting to resolve ink thickness control and trace quality.
5. Advancement in ink technology in IF&E — Digital for IF&E is much more complicated than mixing pigments for color imaging, and the only specification is adhesion. The ink is a functional part of the part in many cases. If the market continues to grow, ink manufacturers will invest in the technology and solve these problems.

**Purpose-Built Opportunities**

Industrial, functional and electronic print industry product targeting — this is called, “Purpose-Built Print Systems.” These systems are now possible with the new single-pass technology and printhead advancement. In many cases, a printer can be placed in the manufacturing line that can keep with the manufacturing machine of the OEM (Coudray’s fourth disruption). In some cases, industrial print will be built right into production lines of the manufacturing equipment. Do not miss this. This could be your opportunity or your enemy. You may have an opportunity with your customer to supply this as a service.

**Conclusion**

The IF&E screen printing industry is not only alive, but it is growing nicely. There are segments of IF&E printers that are adding digital to service new markets, but it is not taking the legacy print opportunities like it has in graphics POP. Screen remains dominant in industrial and functional printing, even though digital will continue to advance. Finally, watch for purpose-built opportunities. Systems are now possible with the new Single-pass inkjet color engine technology and printhead advancement.

*SGIA Members, in order of mention:
Oce, since 2006
Fujifilm, since 2015
HP. Since 1995
Canon, since 2006
KBA-Kammann, since 2003
Agfa, since 2005
Durst, since 2002
EFI, since 1998
Konica Minolta, since 2016

Mike Ruff has 43 years of experience in the Graphic Arts Industry and is currently the owner of Mike Ruff Consulting. He is a Certified G7 Expert Instructor and a Certified G7 Process Control and Conformance Expert. Ruff is a member of the Academy of Screen & Digital Printing Technologies, the IDEAlliance Print Properties Committee, the USTAG TC130 delegation to ISO technical work groups 3 and 4 concerning creation of standards for graphic arts proo ng and printing. He is the technical author of the International Screen Print Standard ISO 12647-5: (2012; developer of the Chromatix Process Control certification system for grand-format screen and digital printers; winner of the 2010 IDEAlliance Leadership Circle Award; and a two-time Swormstedt Award winner for the best technical article in the specialty imaging industry.