

## The Evolving Impact of the Corona Virus Upon Digital Printing Print Provider and Equipment Provider Industry

There is no reference in our modern industry to be able to refer back to as a guide for what could happen in the future. The corona virus has made our physical and economic world come to a hard stop. As it impossible to accurately predict future, we have no choice but to stay flexible when it comes to trying to project the impact of a worldwide quarantine and economic re-start. We can however try to project the impact upon the digital printing world by separating short from long-term concerns, and looking at specific macro-trends in vertical markets. Short-term the big concern for many is financial survival. This is a large concern for many providers, and accelerated print provider consolidation is a likely outcome. For digital printing equipment vendors, high-profit consumable annuities will cushion the profit impact compared to other industries, but top line revenues – particularly those whose product lines are concentrated on high-capital cost goods - will likely see a steep decline in 2020.

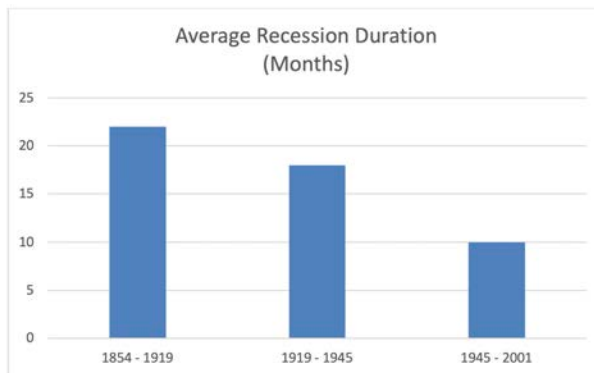


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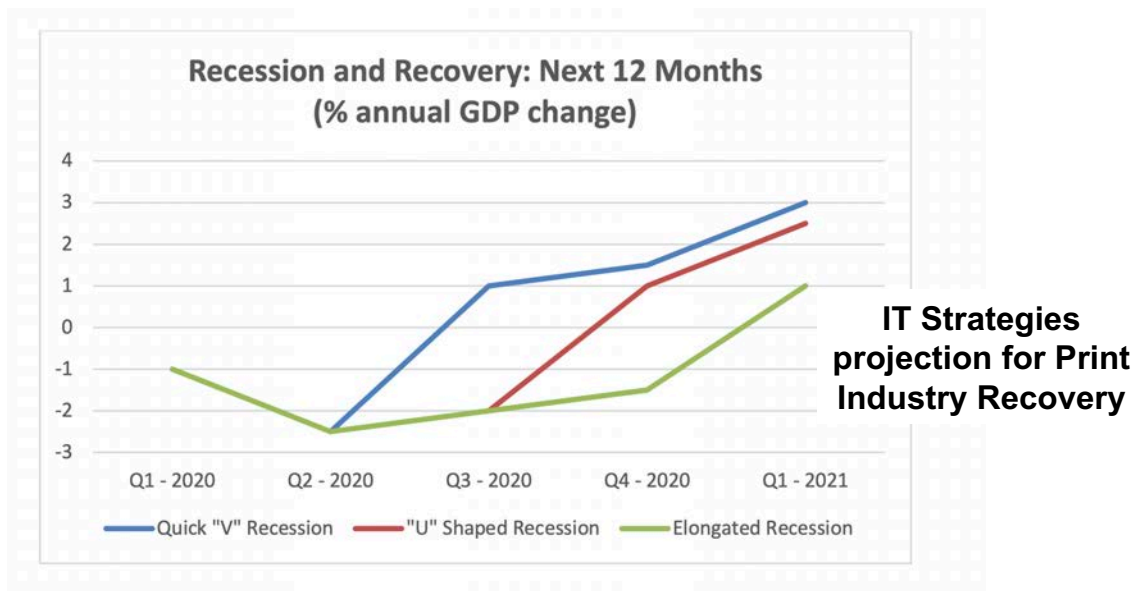
A bigger concern perhaps is long-term potential change to the demand for print caused by potential habit change. We may find publication print advertisers will have irrevocably have shifted their resources to electronic alternatives. Banks and others who rely on transaction printing statements may push even more aggressively to move their customers to on-line interactions, as they want less physical touches during their transaction process.

But yet we believe there is a silver-lining for digital print. In the immediate post-corona virus print orders are expected to be small; this makes digital print a good fit for those short-runs, runs which when digitally printed require less labor than conventional print. Longer-term pressure for content to be more relevant will likely accelerate the decline in demand for long-mid run conventional print, increasing opportunity for versioning and micro-versioning enabled by digital print.

Many financial institutions believe as of the end of March 2020 we have already entered a financial recession. A look back at previous recessions would seem to indicate we're looking at a 10-month period before we can expect to enter a period of recovery.



A historical perspective may not be an accurate indicator since our modern economy has never encountered a hard-stop caused by a pandemic. Some would argue that since the economic stop happened so abruptly, we'll have a similar sharp recovery. It's what some call the quick or sharp V-model (see graph below). Others expect a U-shape recession curve, a more gradual recovery. The most pessimistic model projects an elongated recession.



IT Strategies projects a recovery somewhere between the U-shaped and elongated curve recession due to print's discretionary position in advertising related volume, habit change, and high hardware capital cost. Effectively IT Strategies predicts a recovery for the print industry starting around October 2020. There are three negatively influencing factors that we believe will prevent a recovery from commencing earlier (assuming the worldwide quarantine starts ending in May).

The negative influencing factors on print's economic recovery include:

1. Habit change: Will we have learned to live with less print?
  - This will more severely affect advertising related-conventional print than digital print
2. Accelerated print provider consolidation
  - Surplus of used equipment that will find its way onto the market
  - Less customers overall for equipment
  - Will banks lend money for high-capital printing investments for an industry collectively perceived to be in decline?
3. Availability of components and sub-components to manufacture new digital printers
  - Unclear at the moment what supply risk is to manufacturers of printing/finishing equipment

If IT Strategies is right about the negative influencing factors, what can digital printing equipment vendors do to mitigate these factors? We believe actions that can be taken now should include:

- Identify economic stability of existing accounts
  - Which print providers will likely have financial difficulty? Can they be helped? What are the contingency plans to take back equipment?
  - Will those who survive gain business? Will they need re-furbished equipment? New equipment?
- Identify economic health of partners and competitors
  - Are critical partners (finishing) financially stable? If not, what are alternative partners?
  - Which competitors are likely to weaken? Can share be taken pre-emptively?

Beyond these short-term actions, we need to look forward to what we can do to make print better for everyone. This can include:





- Thoughtful marketing of the “value of print” through samples, case studies, etc.
- Communication to all levels of supply chain offering help to enable fast recovery
- Expansion of hardware range, low to high-end, with emphasis on low to mid-range products to help print providers enter new application segments with lower-risk
- Investigate government Stimulus options
- Plan recovery by specific application
  - Separate short from long-term viability

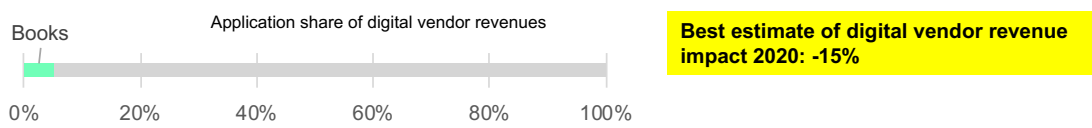
Since few print providers and equipment providers cover the range of all print applications, it is the last suggestion that is perhaps most helpful in determining what a specific impact might be. IT Strategies has assembled a perspective across twelve different applications, looking at the potential impact of the corona virus on print providers, equipment sales, ink/toner sales, and component/printhead suppliers. For each application, we provide a downside and upside perspective. To give it monetary context, for each application we provide a scale of the significance of that application's revenue across the combined twelve applications. For example, digital printed folding cartons provide only about 1% of all vendor's digital printing revenue and hence any impact from the corona virus will be relatively insignificant to digital printer vendors overall. But wide format graphics accounts for 16% of total digital vendor market revenues, and hence any impact in this application is significant. We end with a percent projection what to the best of our beliefs will be the worldwide 2020 revenue impact will be upon digital printer vendors in that application.

## Books

The book printing industry is more protected than one might be inclined to believe. Book print volumes have been remarkably stable during the last few years as interest in reading books electronically tapered off. IT Strategies expects the impact from the corona virus be modest on digitally printed books. The downside, especially in the US market, is Amazon’s temporary shift away from promoting and delivering books in favor of food and pharmaceutical products. The good news is independent booksellers are picking up some of that volume on-line, as most of their retail stores are closed. The upside for book manufacturers is with people being quarantined at home, they have more time available to read. Unit sales of print books remained steady in the week that ended March 21, after dropping by 10 percent the previous week, according to NPD BookScan. Sales of children’s nonfiction were especially strong, rising by nearly 70 percent that week, a spike that resulted from millions of children being home schooled. Some are buying electronic books, but more prefer the printed version. Another upside is regulatory mandates that require educational books to be printed and ready for the Fall school season. The impact upon new digital printer sales however is not likely to be good. In the US the largest two book manufacturers were in financial trouble before the corona crisis began, and this situation has only gotten worse. They won’t be ordering new equipment. Medium and smaller book manufacturers are becoming more attractive to publishers as a means to balance risk. They will likely stretch existing capacity rather than buy new equipment, or perhaps purchase gently used equipment that is likely to become available from print providers in other applications segments.

Figure 1 Impact of the Corona Virus on Digital Book Printing

	Print Providers	Digital Printing Equipment Sales	Ink/Toner Sales	Printhead sales
				
Downside	Amazon slows promotion/delivery priority for books. Disruption to warehouses.	Large book manufacturers all financially challenged; no capital	Low	Few new presses sold; slows printhead need
Upside	More people at home with free time, looking for alternative entertainment including books. On-line book sales strong Educational book printing must continue for Fall	Medium book manufacturers likely to pick up share; larger long-term contracts will enable capital investments required for short-runs	Low	More smaller-scale IJ presses sold – and replacement sales needed



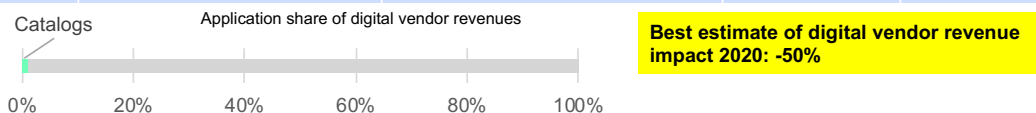
With printed book sales projected to be relatively steady, toner and ink revenues may be down slightly but not significantly. The downside is in few new hardware sales also impacts sales of printheads in this application segment. IT Strategies projects that with flat to moderately down ink/toner sales and a stall in hardware sales overall, digital printer manufacturer revenues will be down 15% in 2020 compared to 2019 for book applications.

## Catalogs

Catalogs have been in decline for many years, declining in the US market from 19 billion catalogs mailed down to 9 billion in 2018, and a projected 5 billion by 2024. The corona virus won't help slow this decline. Business to business (B-2-B) catalogs are effectively undeliverable since many businesses are closed. Consumer catalogs can be printed in large volumes in less than 4 weeks, but getting the artwork ready can take significantly longer. This is causing retailers to shift their efforts to electronic advertising channels to move inventory now. The timing pressure and unsellable inventory risk for time-sensitive goods (like Spring and Summer clothing) is especially high. The upside for specialty good catalogs is stronger, especially ones with highly targeted items like gardening seeds and items that make people happy to be at home, but the print volumes are low. For printing equipment vendors, the news in catalog printing is not good. Like the book industry, the same too largest print providers in the US are in financial trouble. There are not many other exclusive catalog printers left in either the US or Europe so demand for digital printing equipment will be nearly no existent in 2020. Ink/toner sales will continue to accelerate downwards as advertisers shift their short-term advertising online.

Figure 2 Impact of the Corona Virus on Digital Catalog Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
	●	●	●	●
Down-side	B-2-B catalogs stall; B-2-C under pressure from lower-cost electronic alternatives	Top 5 (80% share) will utilize existing excess capacity; no resources for new capital. Existing catalog sales people hesitant to promote digital; view it as complicated, risky	Poor	Few new presses sold; slows printhead need
Upside	Specialty catalogs (gardening, etc.) gain more consumer attention due to shifting priorities at home. On-line retailers gain interest in catalogs as multi-channel is showing sales lift	Medium-small providers may try to extend into catalog applications; only data savvy will succeed	Low- difficult to set-up infrastructure	More smaller-scale IJ presses sold –and replacement sales needed



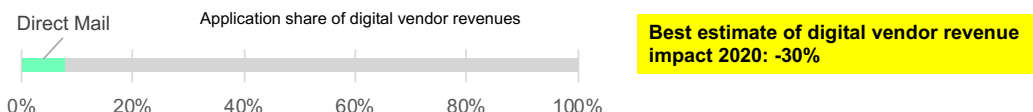
One small upside is that we're starting to see some on-line only retailers offering catalogs, with early indicators that catalogs are a strong compliment to on-line advertising to lift sales. But the impact on digital printer vendor revenues is small. Conversely the steep projected decline project in 2020 for digitally printed catalogs in 2020 is not very impactful as digital printer vendor's catalog revenues account for less than 1% of all digital printing vendor revenues.

## Direct Mail

Direct mail is a discretionary advertising expense in times of crisis. Retail stores are mostly closed; travel, tourism and luxury are paused; and sporting and live events are cancelled. Solicitation letters are still being mailed, as many non-profits are in dire need for cash. But on the whole whatever advertising is left is shifting to on-line channels where people’s eyeballs are currently focused.

Figure 3 Impact of the Corona Virus on Digital Direct Mail Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
	●	●	●	●
Down-side	Advertising is discretionary; demand for DM stalls short-term. May accelerate shift to on-line advertising as that’s were currently people purchase	Few resources for new capital	Design shifts to lower ink coverage to save \$	Few new presses sold; slows printhead need
Upside	Solicitation letter volume remains strong. Remaining DM has to be more relevant, variable. Only digital printing can deliver	Will extend existing under-utilized equipment as far as possible delaying new equipment purchases	Strong upside in 2021 if more volume shifts to digital print	More smaller-scale IJ presses sold –and replacement sales needed



The impact upon new equipment sales will be stark. Just as a series of highly capable and high output quality production printers are ready to be launched for DRUPA, few if any print providers are in the market for new printing equipment. Like other print applications, they’ll likely look for used equipment once demand returns. Many will delay purchases, and when they do start to require new digital printers, they may buy smaller-scale models with less productivity and significantly less capital equipment cost risk to tie them over until volumes re-bound and additional capacity is needed.

The silver-lining may well be in ink and toner, as advertising will need to re-commence quickly as soon as the quarantine requirements are lifted. The unknown factor is habit change: will advertisers continue to shift more of their budgets to on-line advertising, or will they see the benefit for multi-channel advertising?

With these uncertainties, IT Strategies is predicting digital printing vendors revenues derived from advertising will likely be down 30% in 2020 compared to 2019.

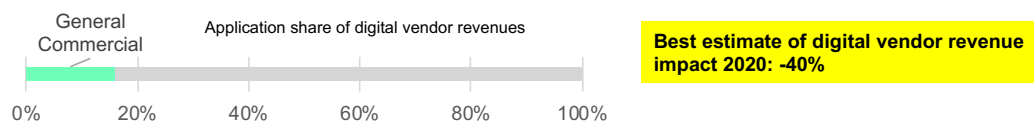


## General Commercial Print

General commercial print will likely be hard hit for two reasons. One is a short-term sharp reduction in the need for promotional materials due to the quarantine and economic slowdown. Big brands that rely on dealers to sell their products may also be reluctant to contribute or pay in its entirety for marketing collateral as they try to regain their footing. The second reason is a delay in future product development and hiring, which means delays in the need for general marketing collateral. The risk is that having little marketing collateral on hand becomes the “new normal” for businesses. The upside for digital printing is they will likely place smaller, more frequent orders that fit better on digital printing equipment. Like other applications, service level agreements are going to dictate when general commercial print needs to be delivered. Perhaps general commercial print will escape penalties for late delivery that are common in other applications like transaction and sometimes direct mail, but nonetheless customer expectations for faster delivery are likely to accelerate and make offset’s set-up time and cost a greater challenge for commercial printers.

Figure 4 Impact of the Corona Virus on General Commercial Digital Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
	●	●	●	●
Down-side	Habit change prevents recovery; will reset market to “new normal”. People cautious in re-ordering print	Few resources for new capital; \$500,000+ capital especially hard hit	Digital print will pick up some volume from offset as run length declines	Few new presses sold; slows printhead need
Upside	Remaining marketing collateral has to be more relevant, variable. Only digital printing can deliver	Shrinking volumes drive demand for shorter runs, and hence increase demand for digital print	Strong upside in 2021 if more volume shifts to digital print	More smaller-scale IJ presses sold –and replacement sales needed







The good news past 2020 is that an accelerated trend towards smaller runs, with faster delivery expectations, should fuel the need for digital print. With the upcoming generation of digital production printers capable of printing on glossy offset coated stocks, timing for those new digital production printer introductions that are slightly delayed will hopefully match the resurgence in demand.

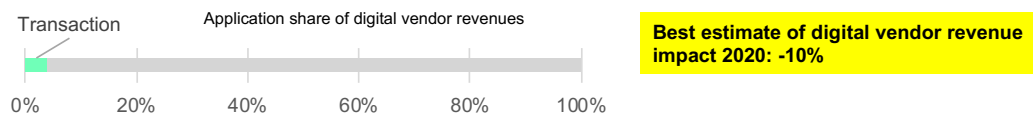
IT Strategies estimates digital printer vendor revenues derived for commercial print could be down as much as 40% from 2019 to 2020.

## Transaction Print

Transaction print is mostly recession proof. Monthly bills still need to get sent, and cashflow in times of crisis becomes more important to business's survival than ever before. The downside is that paper bills are still more likely than electronic statements to result in paper check payments in the US. Especially at the moment when offices are closed, financial companies and the like don't have the resources to process all those paper checks. So long-term this will likely accelerate the push to electronic billing, increasing the likelihood of electronic payments. Short-term however sadly there is likely going to be extra need for transaction statement bill reminders and overdue notices. In many countries those overdue bill notices are required to be sent by mail. Transaction statement providers at the moment are busier than ever.

Figure 5 Impact of the Corona Virus on Transaction Print

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
				
Down-side	Push by banks, etc. for more electronic payments, less human touch	Few resources for new capital; \$500,000+ capital especially hard hit; likely to see further provider consolidation	Slow decline	Few new presses sold; slows printhead need
Upside	Need to communicate to customers. Statements must be sent; increased reminder and overdue bill notices in many countries must be sent by snail mail by law	Print is a vehicle to stand out from electronic communication overload; become blended DM tool	More use of color if blended DM catches on	May see need for IJ press which can print on coated offset stock



None of this is likely to be any solace to digital printing equipment vendors, as long-term the trend for transaction statements precludes many from wanting to make big new capital equipment purchases. Secondly, everyone is so busy that few have the staff to conduct due diligence on buying new printing and related equipment. They'll push overtime in order to fully utilize existing capacity. The good news however is toner/ink consumption for transaction printing is steady, and perhaps growing.

A second potential upside is the gradual transformation of transaction statements into some that looks more like a highly relevant direct mail piece. As that happens, ink coverage is likely to increase, further helping stabilize (and maybe grow) ink/toner revenues.

IT Strategies projects the decline in new equipment purchases drags down any lift from consumable revenue, causing overall digital printer vendor revenues in transaction print to be down as much as 10% from 2019 to 2020.

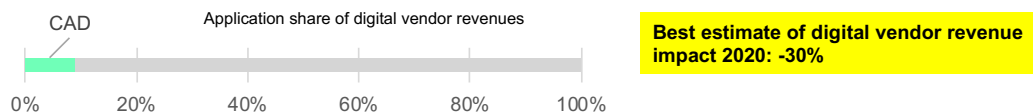


## Wide Format Inkjet CAD

This is a print application that has little relevance to most digital printer manufacturers outside of HP, Canon, and Epson. It is worth including however because it is a significant revenue source for those companies, and accounts for nearly 10% of digital printer vendor revenue in the twelve segments covered.

Figure 6 Impact of the Corona Virus on Wide Format Inkjet CAD

	Print Providers	Digital Printing Equipment Sales	Ink Sales	Printhead sales
	●	●	●	●
Down-side	Construction stalls; so does need for CAD drawings; oil exploration slows as oil/gas prices collapse	Stall; low capital equipment cost makes it easy to buy quickly once needed again	Poor; Immediate decline	Few new printers sold; slows printhead need
Upside	In-house print demand for signage grows; businesses buy CAD IJ printers to keep messaging current	Alternative to outsourcing	Upside on color coverage if signage rather than CAD applications	Low-upside as utilization will be low for in-house use



CAD IJ printers historically were dependent upon construction, architectural drawings, and oil/gas exploration. All of these activities are slowed or stopped. The good news is the use of these IJ CAD printers is increasingly shifting to use for graphics printing in office supply stores and the likes. These large unit office supply printshop contracts swing wildly every couple of years, and could lead the winning vendor to have a good revenue year.

The good news is these units tend to be relatively low-cost capital investments, so a recovery could happen quickly especially as recovering print providers look to expand into alternative applications. Single-pass CAD printers could find a home at commercial printers for point-of-purchase signage for example.

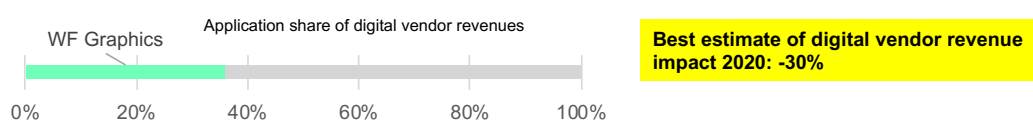
This is a segment that only significantly matters for three manufacturers. IT Strategies best estimate is digital printer vendor revenues for this segment will be down 30% in 2020 compared to 2019. The wild card like all of the other print markets is when the quarantine ends on a worldwide basis, and the curve shape of the economic recovery in the construction business.

## Wide Format Inkjet Graphics

Much to even our surprise, wide format graphics inkjet remains the largest production/industrial/graphics vendor revenue market among the applications we cover. Wide format inkjet graphics accounts for over \$4 billion in vendor hardware and ink revenues worldwide annually. About 60% of the output is related to point-of-purchase signage, which is highly advertising dependent. Remembering advertising is a discretionary expense, we expect a sharp V-curve recession and uplift. The quarantine has eliminated most retail shopping at the moment, and many retailers will likely go out of business. We expect the ones who survive to rely heavily on the promotional strength of point-of-purchase signage, driving impulse expenditures ones people are able to go out and shop and socialize in person again.

Figure 7 Impact of the Corona Virus on Wide Format Inkjet Graphics

	Print Providers	Digital Printing Equipment Sales	Ink Sales	Printhead sales
	●	●	●	●
Down-side	On-line shopping accelerates decline of in-store shopping; reduces discretionary in-store advertising	Stall; lower capital equipment cost makes it easy to buy quickly once needed again, but \$500,000+ HW will struggle through 2021	Poor; Immediate decline	Few new printers sold; risk is spare parts cannibalized from spare printers
Upside	Signage is only way to effectively drive impulse buys. Consumers ready to leave home and shop once quarantine lifts	Low upside; Will utilize existing capacity	Upside if retailers combine print with electronic advertising	Some replacement heads needed



Most of the expenditures on wide format IJ printers are for device that sell for under \$25,000. This should enable a quick return to renewed capital investment, once demand recovers. The downside of course is that there will be surplus used equipment on available the market for pennies on the dollar, and some of the larger print providers may jockey for position in consolidating volume on big, UV-flatbed printers including some of the models that were developed for corrugated box printing.

Because this market is so dependent on in-store advertising, it is among the more difficult to project in terms of recovery and impact from the corona virus. Assuming quarantine on a global basis ends around June, IT Strategies expects digital printer vendor revenue downturn of 30% compared to 2019. However, should the quarantine extend into the Fall, the revenue decline could be significantly worse.

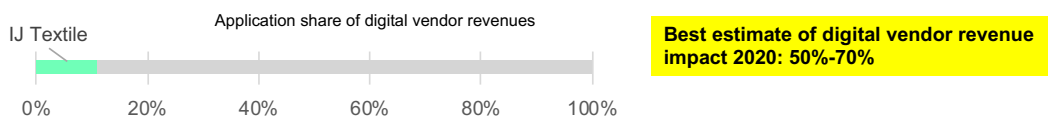
## IJ Textiles

IJ Textiles is the hardest hit category of all digital print markets. The importance of Italy and China in digital textile manufacturing cannot be overstated, and the epi-center of the corona virus in both these regions has decimated economic activity. Virtually anyone involved in the inkjet textile business in these regions has been or has seen a family member touched by the corona virus. So few are coming to work, which directly impacts ink sales. Secondly, inkjet apparel textile printing was to a large degree the domain of fast fashion retailers. Fast fashion retailers are mainly dependent on retail storefront sales, which have closed. So effectively inkjet textile apparel printing gets hit from both the hardware and ink side, unlike other print applications where there are some silver linings, however small they might be.

Many clothing retailers are currently projecting a 40% decline in their business for 2020 and are moving on to plan for 2021. They are scrambling to sell existing Spring and Summer fashion inventory for 50% off or more, on-line, with the fear that customers will soon have promotional offer overload and will stop buying altogether.

Figure 8 Impact of the Corona Virus on Inkjet Textiles

Apparel	Print Providers	Digital Printing Equipment Sales	Ink Sales	Printhead sales
	●	●	●	●
Down-side	Much inkjet apparel print is in hard-hit countries (China, Italy)	Stall	Stall	Stall
Upside	None	Stall	Stall	Stall
Soft signage	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
	●	●	●	●
Down-side	Related to advertising; discretionary	Stall	Stall	Stall
Upside	Need for street décor once past quarantine	Utilize existing capacity	Stall	Stall



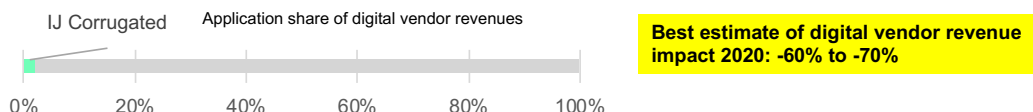
Soft signage is different than apparel because it is advertising and promotional related. IT Strategies expects this segment to act more like the wide format IJ graphics segment, with a projected decline of more like 30-50%. The projected decline is higher than wide format graphics because soft signage is a premium, and higher cost item than paper or vinyl-based wide format signage. But lower cost hardware will enable this segment to recover faster than apparel. The bottom line is that for a market that accounts for about 11% of digital vendor revenues it is the single application that IT Strategies projects will be impacted most.

## Corrugated IJ Packaging

The corrugated IJ print space has struggled after what we retrospectively may call a false start in 2018. It is among the most technically challenging and demanding applications in the digital print market, giving the operating environment conditions and demand for high productivity. Many of the units introduced did not deliver upon their initial promise, which caused a decline in unit sales in 2019. The technical challenges are slowly being resolved, but just as they are being resolved, the number of converters willing to invest in a new business segment at high-capital cost have become a plentiful as unicorns.

Figure 9 Impact of the Corona Virus on Inkjet Corrugated Packaging

	Print Providers	Digital Printing Equipment Sales	Ink Sales	Printhead sales
	●	●	● ●	●
Down-side	Supply chain management rather than promotion is on top of brands minds; converters can't sell brands on back of digital print right now	Risk averse to capital investment; especially in areas where demand has to be generated; difficult to justify ROI on \$500,000+ equipment	Down	Down
Upside	Impulse buys – driven by relevant, timely POP displays, etc could drive revenue for retailers	Will utilize existing capacity	Flat	Flat



Largely related to advertising, the focus among brands has shifted away from focus on advertising to immediate supply change challenges. However, corrugated printing is not all about the printing of boxes. The majority is related to point-of-advertising signage. Given that supermarkets are still open as essential businesses, this is one segment that appears to be continuing business as normal. As a result, ink sales are remarkably stable at the moment, but all capital investment has stalled.





This leads IT Strategies to project a 60-70% digital printer vendor revenue decline in 2020 from 2019, as unlike in more mature markets, ink revenues account for but a small percent of total vendor revenues in this application.

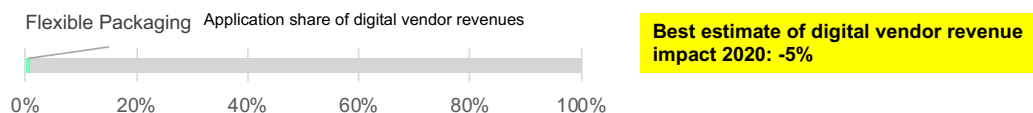
Fortunately, this is still an emerging market so the steep projected revenue decline is not as impactful as it would have been if the market had been more mature, like wide format graphics for example. Equipment vendors may have to resort to creative financing to encourage converters to continue to adopt these high-capital investment inkjet printers.

## Flexible Packaging Printing

Like most packaging applications, flexible packaging is more or less economic recession proof. The volume switches from institutional size packaging (for restaurants) to consumer packaging. Effectively this means an increase in packaging volume. There is a decline in the purchase of luxury products (like cosmetics), but overall it is an application that is remarkably stable. On the digital packaging side, there is only one significant vendor presence in digital flexible package printing. We expect prospective and frequent customers like E-Pac to delay the equipment installation of their announced large volume purchase.

Figure 10 Impact of the Corona Virus on Digital Flexible Packaging Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
				
Down-side	Little downside on demand overall for consumer food/beverage; Flexible film use for discretionary cosmetics takes big decline	Risk averse to capital investment; especially in areas where demand has to be generated	Flat	Mostly toner; little IJ activity
Upside	More eat-at home volume; drives consumer packaging demand	Will utilize existing capacity	Flat	No impact



Consumable revenues however should be fairly stable, as at home workers out of creativity or desperation try to develop new food and beverage products to sell. The ability to order packaging in small lots (digitally printed) removes one barrier in the process of getting their concepts/goods to market.

The corona virus impact will also allow the inkjet development projects some extra time to get to market. With both DRUPA and Interpak delayed until Spring 2021, the extra year of development time may mean that inkjet based flexible packaging printers will be closer to actual commercialization.

Like corrugated inkjet, flexible packaging accounts for but a very small percentage of digital printer vendor revenues. Where it is a projected 5% revenue decline or something steeper won't have much impact on the total digital printer vendor market revenues.





## Folding Carton Printing

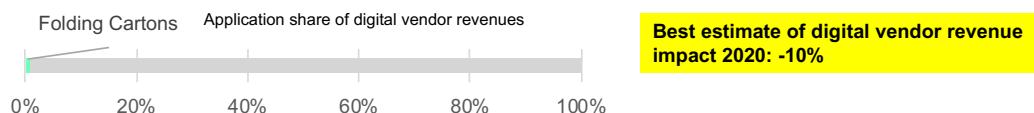
There are conflicting opinions about the future of folding cartons. Some say they will continue their downward volume trend in favor of flexible film which is significantly less expensive as a substrate (and getting less expensive as oil prices collapse), and others will say it will make a resurgence as a more sustainable and recyclable material than film. Regardless of the outcome, digital printing of folding cartons has not yet achieved any significant position either in the world of folding carton production or digital printer vendor revenues.

Both toner and inkjet printing technology play a role in digital folding carton printing. On the high productivity side, Heidelberg had the lead position in terms of early market development. With the recent March 2020 announcement of Heidelberg’s exit from the inkjet folding carton business, IT Strategies believes its untimely exit effectively has sold Heidelberg’s growth options for the future.

Toner represents a much larger portion of the digital folding carton printer market, but this technology hasn’t fared much better in unit sales performance mainly because there is an oversupply of really low-cost offset capacity available. A large portion of toner technology usage to print folding cartons stems of “off-use” devices, high-end copier/MFPs that can handle thick substrates up to 14” wide. It’s a niche, but one where the capital equipment entry cost risk is low.

Figure 11 Impact of the Corona Virus on Digital Folding Carton Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
				
Down-side	Little downside on demand overall for consumer food/beverage; marijuana packing continues to grow	Risk averse to capital investment; especially in areas where demand has to be generated; difficult to justify ROI on \$500,000+ equipment	Flat	Mostly toner; little IJ activity
Upside	More eat-at home volume; drives consumer packaging demand	Will utilize existing capacity	Flat	No impact







Like the other packaging segments so far, the impact of these developing markets upon total digital printer vendor revenues is very low. Digital packaging market development is a long-term investment, one that at the moment best suits digital printer manufacturers with strong balance sheets.

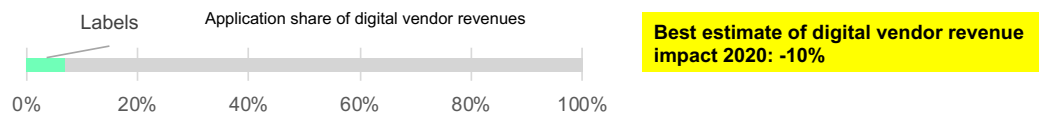


## Labels

The 2008/2009 economic recession proved that labels are fairly recession proof. They can be utilized among multiple parts of the supply chain, can be digitally printed just-in-time due to the large based of digital label printers on the market, and offer the most flexibility among any of the packaging modalities.

Figure 12 Impact of the Corona Virus on Digital Label Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
				
Down-side	Historically recession proof; shift from institutional to consumer packaging	Risk averse to capital investment; especially in areas where demand has to be generated; difficult to justify ROI on \$500,000+ equipment. Recovery labor busy, no time for CAPEX investigation	Flat	Toner dominates; IJ printhead sales limited
Upside	More eat-at home volume; drives consumer packaging demand	Will utilize existing capacity	Flat	Toner dominates; IJ printhead sales limited



The challenge for digital printing equipment vendors is that the high profit margins have enabled many converters to run at low utilization capacities. This is a testament to the label market's profitability, but it also highlights the downside in terms of new equipment sales since there is sufficient room to increase the production utilization on existing installed systems. The good news is that toner/ink consumable revenues are projected to be strong. With significantly more revenues stemming from consumables than new hardware sales, the overall negative impact upon vendor revenues is relatively muted.





The other good news in this segment is the relatively stronger portion of revenues from consumables will end up generating a higher percentage profit for digital printer vendors since consumable sales are far more profitable than hardware sales.

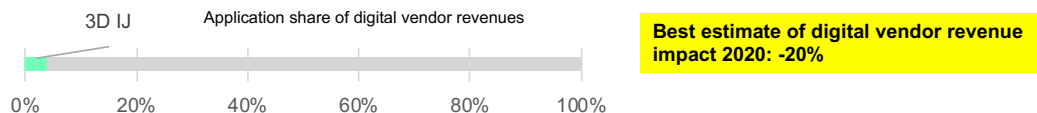
IT Strategies expects this segment to see -5% vendor revenue declines in 2020 compared to 2019, but note that the impact will be uneven among the various printing equipment manufacturers. Some have significantly larger and more stable business revenues than others. There is also risk of further market consolidation, but this may lead to some demand for the new generation of far more productive digital label printing systems.

## 3D Inkjet Printing

We've included 3D inkjet printing in this report as for many digital printer vendors this is the frontier of future revenue generation. While not a new market and an over-simplified description on our part here, the more recent development of inkjet binder jetting of metal powders to make actual parts (rather than polymer jetting used for prototyping) has many 3D inkjet printer manufacturers interested in taking advantage of their ability to make parts to help stem the impact of the corona virus. Several manufacturers are offering along with their customers to make plastic masks, parts of ventilators, etc.

Figure 13 Impact of the Corona Virus on 3D Inkjet Printing

	Print Providers	Digital Printing Equipment Sales	Ink/ Toner Sales	Printhead sales
				
Down-side	Manufacturing re-boot reduces interest in experimenting with new technology	Risk averse to capital investment; especially in areas where demand has to be generated; difficult to justify ROI on \$500,000+ equipment	Flat	Limited market; impact upon overall printhead volumes low
Upside	Showcase for ventilator parts manufacturing, etc. On-shore manufacturing of parts becomes key contingency strategy	Will utilize existing capacity plus if demonstrated to be successful will buy more HW	High upside 2021 and beyond, but binder fluid use is low compared to graphics markets	Limited market



The timely ability to highlight the value of 3D inkjet printing has given some breathing room particularly to more recent start-ups in this application space to develop their business and prove to investors the merit of their investment. The downside is that the spike in interest has limitations of the amount of capital that can be invested, and no one is certain how long this investment cycle driven by the corona virus will last. The long-term impact of the corona virus upon 3D printer manufacturers is likely to be less welcome. Much of the interest in 3D inkjet printing has stemmed from automobile manufacturers looking to make new types of lighter weight, much stronger parts than steel. Lighter weight is critical in the ability to extend the range of electric automobiles. Automobile manufacturers are once again caught in a perfect storm, as the average life of cars in the US has been extending beyond 10-years as customers hold off until they feel comfortable with electric automobile technology. Add the economic recession, and it becomes easy to see why customers will delay investment in new automobiles since for many consumers automobiles rank among their top five expenses. Ironically the impact of ride-share services like Uber may no longer be the threat to the automobile industry it was just a short few weeks ago.

IT Strategies projects a 20% decline in 3D printer vendor revenues in 2020 from 2019.

## The Bottom Line

The impact of the corona virus on print providers and digital printer vendor revenues varies widely depending upon the implication. To add another layer of context to the impact of the corona virus, we've overlaid our percent revenue decline projections upon the hardware/consumable/service revenues upon each application 2019 vendor revenues for toner and inkjet production/graphics/industrial printing systems.

Figure 14 Contextual corona virus digital printer vendor revenue impact by application

Segment	Digital vendor HW & Ink/Toner value (\$ bn, '19 WW)	Share of Digital vendor print revenues'19 WW	Est. Impact from corona Virus 2020	Digital vendor HW &B Ink/Toner value (\$ bn, '20 WW)
Books	\$0.49	5%	-15%	\$0.42
Catalogs	\$0.1	1%	-50%	\$0.1
Direct Mail	\$0.9	8%	-30%	\$0.6
General Commercial	\$1.7	16%	-35%	\$1.1
Transaction	\$0.4	4%	-10%	\$0.4
WF IJ CAD	\$1.0	9%	-30%	\$0.7
Wide Format Graphics	\$3.9	36%	-30%	\$2.7
Textiles IJ	\$1.2	11%	-70%	\$0.4
Labels	\$0.8	7%	-10%	\$0.7
Corrugated	\$0.2	2%	-60%	\$0.1
Folding Carton	\$0.1	1%	-10%	\$0.1
Flexible Packaging	\$0.1	1%	-5%	\$0.1
3D IJ	\$0.4	4%	-20%	\$0.3
Totals	\$10.9		-32%	\$7.4

As you can see, the impact upon digital packaging (excluding labels), catalogs, and 3D inkjet printing is relatively small since those are still in the early stages of their life cycles. But for well-established digital printing markets like wide format inkjet graphics printing, the impact is going to be significant. This will especially impact high-capital cost equipment manufacturers. Like weather, the impact upon the digital printer industry is going to be local, or in this case application specific. In a perfect world, it highlights the need to be diversified.

During the remaining 9 months of 2020, the immediate downside includes accelerated consolidation among print providers. This will lead to fewer future customers, but also short-term a surplus of used equipment that may re-enter the market at very low prices delaying new printer hardware sales. Many of the advertising related print applications have seen an immediate stop, but most likely will experience a sharp V-recovery. Longer-term there is a concern of habit change: if people learn to live without print now, any future demand for print has to be of even greater value than it was in the past.

This leads to a long-term silver lining for digital printing. Once we get past the short-term immediate crisis, future print orders are likely to be in even shorter-runs than before in order to conserve short-term cash, and to reduce what had been a fairly significant waste of print that was over-ordered and never used (think about the ~30% of point-of-purchase signs that printed and shipped to retailers but are never used).

The analog-to digital print conversion process for many advertising and inventory-related print products (books) may well have gotten the kick it needed to further encourage digital production print to fit the “new normal” of expected order patterns.

Of course, the immediate concern is the safety and welfare of human life. It is starting to look more and more that the impact is going to be worse than any of us could have imagined at the beginning of 2020. Many print providers will disappear along with digital printer manufacturers with weak balance sheets. But one has to remember retail expenditures to buy finished print total in the hundreds of billions of dollars worldwide. It is and will remain a large market.

While the corona virus and its impact were not even remotely imaginable, it will provide an opportunity for a hard and difficult reset in the print industry. It will leave those left with a bigger short-term opportunity to fill the void for those who have disappeared. Long-term, meaning 2024 and beyond, it will position those digital printer manufacturers who come out of this crisis with a stronger opportunity than ever to replace the trillions of pages that are still printed with conventional offset/flexo/other technologies. Forward we go.