

The drupa logo consists of the word "drupa" in a bold, lowercase, sans-serif font, positioned on a red background that features a white grid pattern of small squares.

Global Trends



4th drupa Global Trends report Introduction

Welcome to the 4th drupa Global Trends report, tracking key economic and market developments across the global printing industry. Following the very successful drupa held in the spring of 2016, Messe Duesseldorf refreshed its expert panel of printers and suppliers from amongst the visitors. The survey conducted in October 2016 had nearly 1200 participants with a good cross section from all the main market sectors and regions. Our thanks must first go to them for participating.

Each Autumn we circulate two separate surveys for printers and suppliers, sharing some common questions, but also asking more specific questions relevant to each group. 839 printers participated and whilst the majority were from Europe (525), the rest of the world was well represented in all regions (314). Given the relatively smaller number of suppliers, we were pleased to receive responses from 331 of which 220 were from Europe, but again all the other regions were well represented.

Messe Düsseldorf, in its role as drupa organiser, thanks our two partners for conducting and authoring this report series - Printfuture (UK) and Wissler & Partner (Switzerland).

We hope you find the resulting report informative. We would be pleased to receive any feedback, so send us an email to drupa-expert-panel@drupa.de.

The drupa team
March 2017

drupa Global Trends March 2017



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Executive Summary

A positive story from most printers and suppliers in most regions

Two years ago we were able to report an almost universally positive picture from both printers and suppliers reporting on their own companies' economic health, described as the 'drupa barometers of economic confidence'. Last year the picture was more variable between the regions, with some doing well and others struggling. It is a similar picture in 2016, however the variances are even larger.

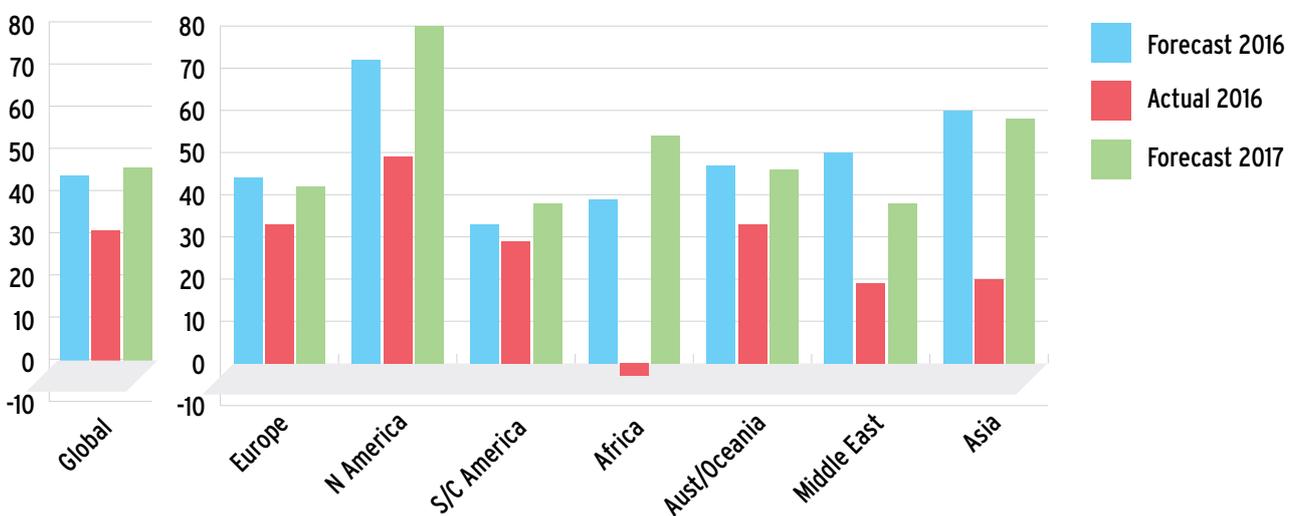
Nevertheless in global terms, 42% of printers¹ described their business as in a 'good' economic state, whilst 11% described it as 'poor'. So a

positive net balance of 31% and it is that 'net balance' that we show in the chart below and is used in many of the subsequent charts. As always the forecast for next year is somewhat more optimistic than the reality the following year, whilst in some cases the difference is striking eg Africa, which reported a net decline in confidence, the first time for any region since this report series started in 2013.

1. Numbers of printer participants by market sector and region are given in the Appendix. Supplier participants reporting for a region may or may not be based in that region. As most suppliers serve multiple markets in most cases there is no attempt to analyse by market.

drupa Printer Barometer 2017 - economic confidence

% net balance positive v negative



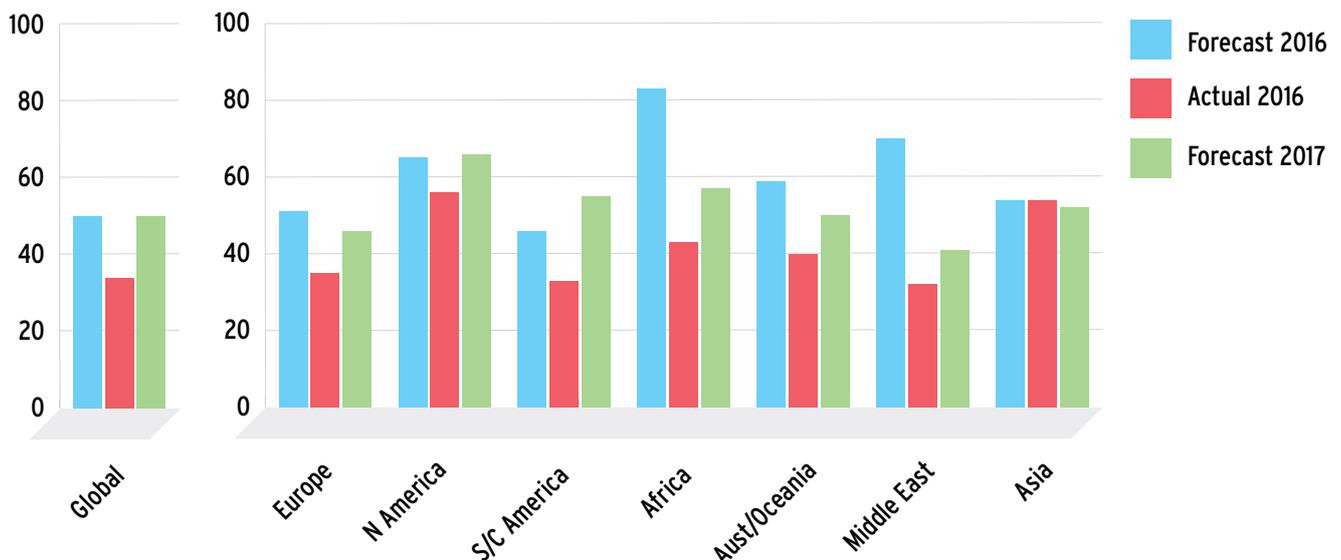
How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

Drilling down into end market sectors, Functional and Packaging printers globally are more confident than Commercial printers who are in turn more confident than Publishing printers, a pattern that has been present since 2013. However that global summary masks significant variations at regional level. Publishing printers in Africa and Asia were more confident than those in Commercial print and it was the reverse of that in Australia/Oceania and the Middle East.

In general it is a similar positive story for suppliers in general with 56% reporting their company in a 'good economic condition and just 6% stating it was in a 'poor' state, a positive net balance of 50% - the same as last year. Curiously the regional variations are less than last year.

drupa Supplier Barometer 2017 - economic confidence

% net balance positive v negative



How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

Perhaps amongst both printers and suppliers in general a more cautious (and perhaps more realistic) outlook is emerging. The economic summary in the main report indicates there is good cause for that caution.

The printers' and suppliers' own more detailed financial performance figures support this

more conservative view. Printers globally report continuing falls in prices which are compensated for by increasing utilisation and hence raising overall revenues at a cost of falling margins.

Global printer financial performance measures

% net balance positive v negative



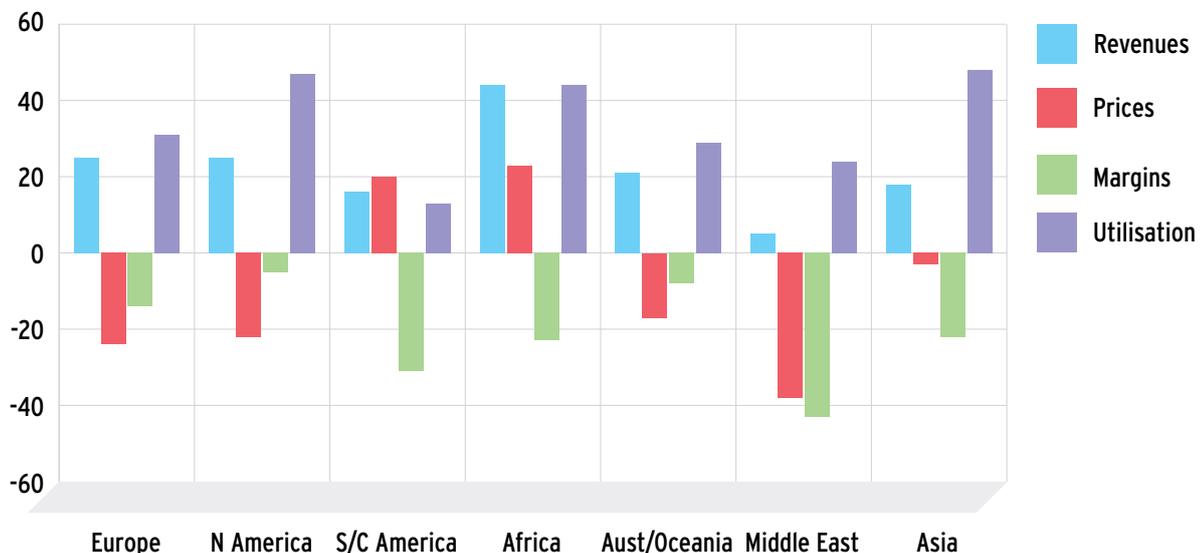
How have your company's revenues, prices, margins, utilisation and paper/substrate prices changed over the last 12 months?

Drilling down into the data both by region and by market sector, the picture is more complicated eg South/Central America and Africa reported net positive price increases whilst the Middle East reported severe price and margin falls.

Similarly whilst Publishing printers in North America show falls in revenues, prices and utilisation; in South/Central America and Africa rises were reported in all three measures.

Printer financial measures by region 2016

% net balance positive v negative



How have your company's revenues, prices, margins and utilisation changed over the last 12 months?

Despite the general squeeze on margins, employee numbers continue to rise globally with a +9% net balance, ranging between +21% North America and 0% South/Central America and Australia/Oceania. Whilst production employee numbers increase globally +9%, there is a small decline in administration employees of -2%. In the more developed regions numbers employed in publishing printers are falling sharply eg -21% North America.

Globally for suppliers the pattern is similar with revenues up 17% but prices down -24% and margins down -27% (nevertheless the best i.e. least negative, net balance in three years). Again the picture is patchy regionally with the Middle East and South/Central America struggling.

Supplier financial performance measures - net balances

% net balance positive v negative



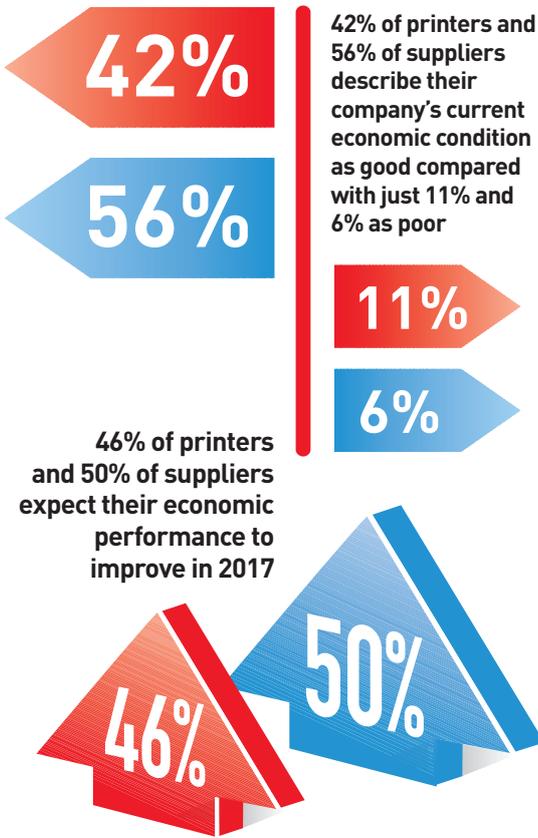
How have your company's revenues, prices and margins changed over the last 12 months?

You might expect that global and regional financial market conditions would affect printers and suppliers alike. Not so. Globally printers report better financial conditions this year on all topics (except average debtor days where they like suppliers reported a worsening picture). Whilst globally suppliers report a worsening on all topics; with terms getting worse particularly in South/Central America, Africa and the Middle East (printers agree in these regions).

Printing is a very diverse industry when it comes to the print technologies used. Fourteen out of sixteen technologies listed scored a 10% or

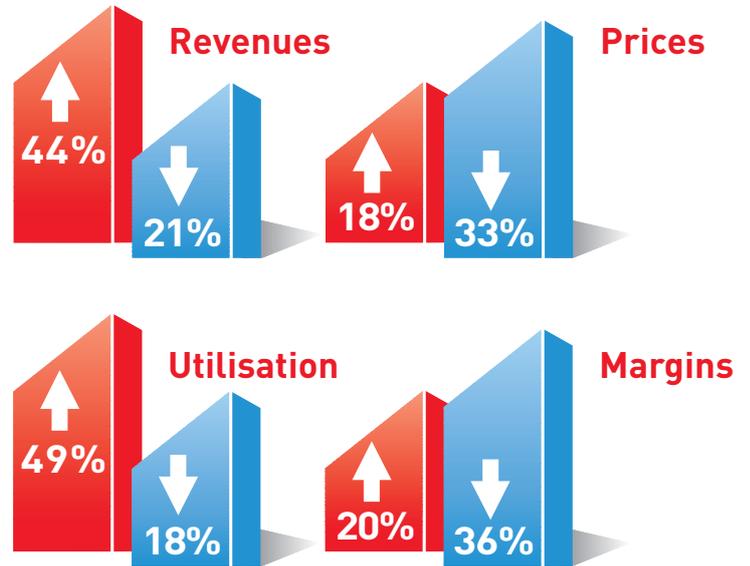
above penetration in at least one of the market sectors. Overall Digital toner cutsheet colour presses led by a wide margin in terms of the positive net balance of print volumes in 2016 at +25% followed by Digital inkjet rollfed colour at +11%. The picture is more complex when you drill down into the market sectors, where for example there is 8% growth overall in Sheetfed offset thanks largely to Packaging and Publishing markets and an 8% growth overall in Flexo due to Packaging and Functional markets.

How are companies doing?



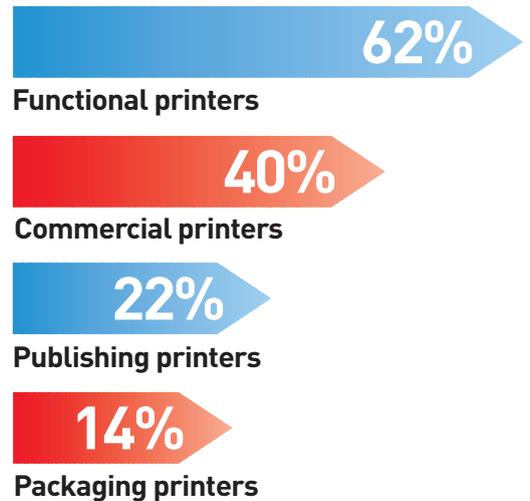
Key financial measures for printers

Reported rise
Reported fall



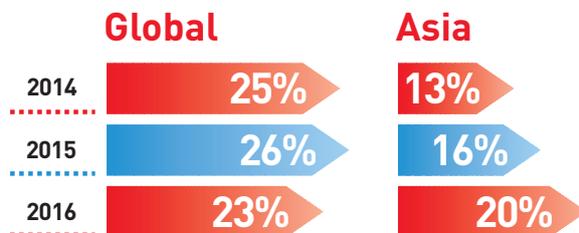
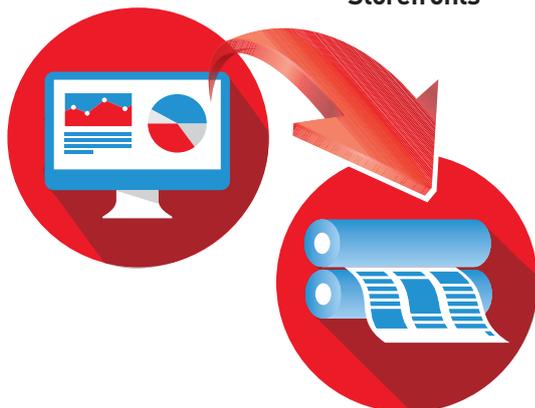
Digital print

Proportion of printers reporting that more than 25% of turnover was digital

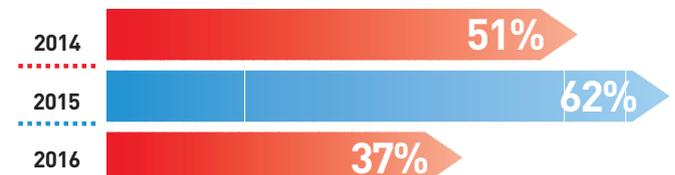


Web to Print

Proportion of printers operating Web to Print/Storefronts



North America



Past trends in the production mix of conventional print continued this year with ever-shorter run lengths, ever-shorter lead times and an ever-increasing number of jobs. However there was a major surprise in the apparent irreversible transition to digital print; as for the first year there was a small but distinct reduction in the proportion of turnover that was digitally printed. Drilling down into market sectors, digital print is clearly having the greatest impact in Functional markets followed by Commercial then Publishing and then only modestly to date in Packaging.

Disappointingly the proportion by value of digital print that is variable stubbornly refuses to rise. In 2013, 19% of the printers then using digital print reported more than 25% of their digital print was variable, while the figure for 2016 is 18%. As variable data is the major added value component of digital printing this is an alarming trend.

Another striking figure this year was the clear fall in the proportion of printers who reported they have a Web to Print/Storefront installation. After several years of steady increases this year there was a significant fall - down 3% globally. Not all regions fell but some were decisive eg North America down 25%.

Capital expenditure

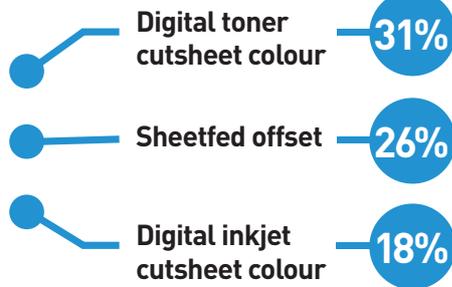
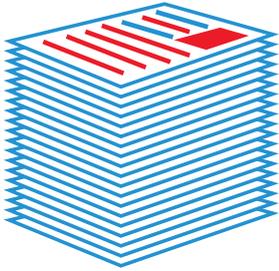
The drupa expert panel was recruited afresh from attendees after the very successful drupa in Spring 2016. There they saw an incomparable technical demonstration of the future of the print industry, so it is natural that they hold ambitious plans to invest in that future. Printers in all regions, except the Middle East, reported growing levels of capital investment. Functional and Packaging printers were more confident of rising investment levels than those in Publishing and Commercial sectors. For the first time investment in Finishing is the top priority, closely followed by Print Technology. However there is greater investment in PrePress/workflow/MIS as printers begin to realise the need for greater automation.

As for plans for investment in print technology, Sheetfed offset has knocked Digital toner cutsheet colour off overall top place, with Digital inkjet cutsheet colour growing rapidly to take equal third place alongside Flexo. Drilling down into market sectors there is for the first time in this report's history i.e. since 2013, a different market leader in each market sector with Digital toner cutsheet colour in Commercial, Sheetfed offset in Publishing, Flexo in Packaging and Digital inkjet rollfed colour in Functional.

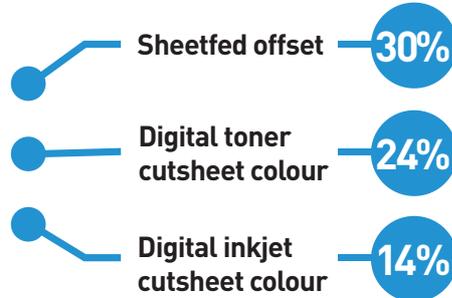
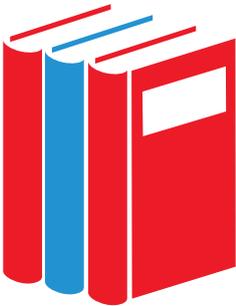
Suppliers' capital investment plans remain strong globally with most regions forecasting a net increase. The exceptions are those regions struggling in performance terms eg South/Central America and the Middle East. By far the most popular investment type is the development of fresh sales channels (46%) but even Research and Development, the least popular type of investment is up to its best level yet at 20%. Suppliers will spend more next year on marketing and whilst trade shows and product training remain the most popular uses of that budget, online content and education is almost the fastest growing customer support tool.

Top print technology investment plans

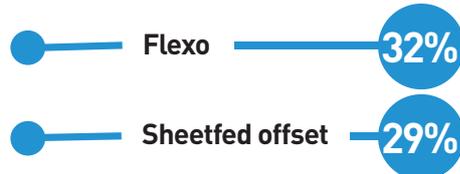
Commercial



Publishing

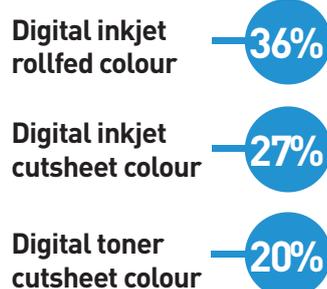
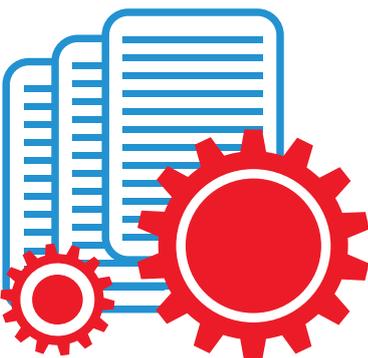


Packaging

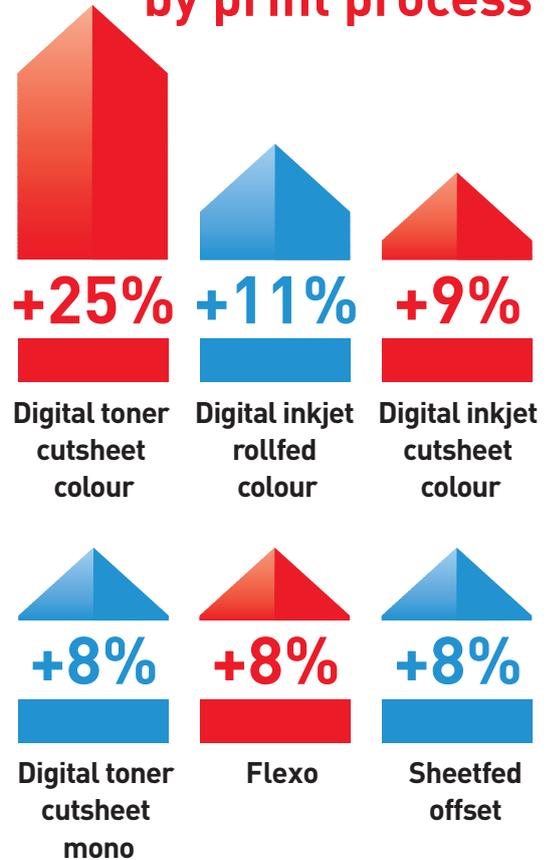


Three technologies share 3rd place:
Digital toner cutsheet colour
Digital inkjet rollfed colour
Hybrid offset/flexo/digital

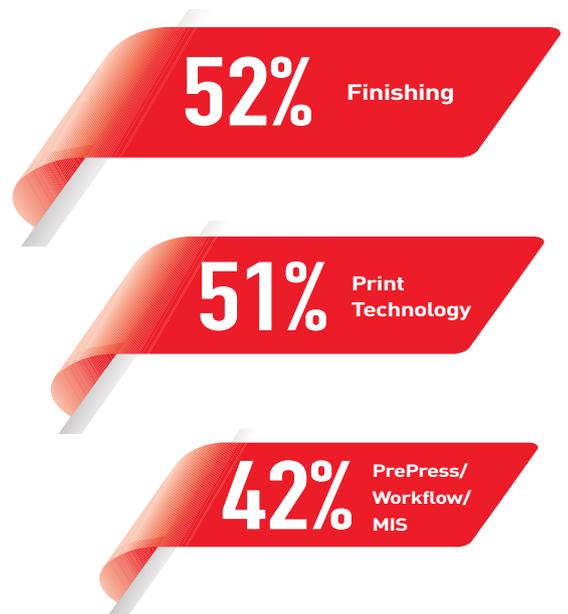
Functional



Changes in volume by print process



Top investment priorities



Strategically both printers and suppliers agreed the biggest constraints to growth were a lack of demand creating strong competition. But drilling down into the causes of the lack of sales, printers were agreed that finding new customers was the most difficult whilst for suppliers it was competitive pricing. As to how best to drive improved profitability, printers put their faith in a combination of reduced staffing/improved productivity and new print technology whilst suppliers will rely on new products and new sales channels.

Market specific trends

Commercial printers facing the impact of digital communications have been encouraged to find new revenue streams with fresh added value services. With four years of data now available it must be reported there is no evidence of any such growth, with the notable exception of wide format print up from 37% in 2013 to 50% in 2016. North America leads the way in adding new services, but even in that region there is some evidence of a fall in the range of services offered. Multi-channel or cross media services are still a minority application (18% globally), although again North America is well ahead (38%).

Publishing printers are having the hardest time in adjusting to digital media as evidenced throughout the report. An increasing number of titles have online editions with the consequent reduction in circulation, although the number of titles lost to online-only editions remains very low. Other means of creating added value such as personalisation, versioning and variable content are growing but slowly (once again North America showing the way). Yet relatively few publishing printers are adding fresh added value services beyond the historic prepress, design and storage/fulfilment options.

Packaging printers have seen a relatively small impact of digital media to date at least and remain generally confident across all regions. On the other hand the level of adoption of added value SKUs remains modest in most cases, with interactive features the most common to be

adopted. It is clear that digital print is starting to have a real impact (32% offer it globally), most commonly for labels but with flexibles and folding cartons following and some signs for corrugated.

For Functional printers the story remains very positive, with those in this market sector putting ever more resources behind it as they enjoy good growth rates in most applications. Inkjet is the dominant print technology for most applications (up from 61% in 2014 to 74% in 2016).

In conclusion

Following the successful drupa in Spring 2016, this survey has provided the statistical support that shows print is recovering from the double hit of the global recession and the impact of digital communications. Printers report sustained improvements in revenues to offset reductions in pricing and margins and strong capital investment plans. Whilst for suppliers, improving revenues and margins coupled again with strong investment plans show a positive future.

The good news is not universal; while Functional and Packaging print are in expansive mode, Publishing print is in a more defensive mode with Commercial print somewhere in-between. In regional terms, the Middle East has chronic problems undermining performance and Africa and South/Central America remain fragile.

All print companies must continue to adapt and meet the market challenges head on. This will mean a ruthless approach to efficiency and automation while at the same time learning new skills and developing new added value services. Nevertheless it is pleasing to report that overall, print has got its 'mojo' back.

Economic Summary 2016-17

Global growth remains weak as fresh storm clouds gather

Global growth remains weak, even though it shows no signs of noticeable deterioration over the last six months of 2016. The latest World Economic Outlook shows an inevitable slowdown for the advanced economies, which is offset by an economic pickup for emerging and developing economies. In summary the world economy is not moving forwards but sideways, the lack of momentum and support for economic activity is creating negative economic and political forces.

Global output growth is projected at 3.1% in 2016 and 3.4% in 2017. The same as in early July, after the United Kingdom's "Brexit" vote to leave the European Union. "Brexit" is still very much unfolding and in part as a result, the global growth forecast for 2016 and 2017 has been revised down by 0.1%; compared to a 0.1% upward revision for 2017.

The impact of Brexit is concentrated in advanced European economies, with a relatively small impact expected elsewhere, including in the United States and China. However there is expected to be a gradual reduction in the level of uncertainty going forward with arrangements between the European Union and the United Kingdom avoiding a large increase in economic barriers, no major financial market disruption, and limited political fallout from the referendum but increasing negative outcomes and political uncertainty elsewhere in Europe are a distinct possibility.

A raft of slow-moving changes that are playing an important role in the outlook for advanced economies (as well as for some emerging market economies) include:

- Demographic and labor-market trends
- Slowdown in productivity
- Stagnant income growth
- Political discontent

Slow moving changes create significant risk

There are particular risks that have become very prominent in recent months. The first is political discontent and inward-looking policies. The Brexit vote and the election of Donald Trump as US President have brought into focus the growing discord about immigration and globalization. This has highlighted concerns about the impact of foreign competition on jobs and wages in the face of very weak growth prospects. This has driven the appetite for protectionist policies that have a wider impact on global trade flows and integration.

There are growing concerns about unequal pay and the widening gap of income distribution, fuelled by weak income growth and disappointing productivity results. Uncertainty about how these trends will evolve has caused leading companies to put on hold significant investment and hiring decisions, which will create a slow down in short term activity. A second major risk is stagnation in advanced economies, where balance sheets remain under considerable strain. At the same time, a protracted period of weak inflation in advanced economies risks interest rate hikes that will cause spending to decline, eventually creating even weaker overall growth and inflation.

Another important risk flagged to influence the global economic outlook is China's ongoing adjustment and transition away from reliance on investment, industry, and exports in favor of greater dependence on consumption and services, which could cause more volatility than expected. This would have important implications for commodity and machinery exporters as well as for countries indirectly exposed to China through financial contagion channels. That risk is heightened by the current short-term growth measures which China is relying on and a still-rising credit-to-GDP ratio, lack of decisive progress in addressing corporate debt and state-owned enterprises governance issues.

Underlying economic vulnerabilities persist

Although financial conditions in emerging markets have continued to steadily improve, underlying vulnerabilities remain among some large emerging market economies. High corporate debt, declining profitability and weak bank balance sheets, are leaving these economies exposed to sudden shifts in investor confidence.

Prospects for 2017 are relatively unchanged for advanced and developing economies. Over the medium term, advanced economies will continue along a disappointingly low growth path, while emerging markets will continue to accelerate. Growth in emerging markets and developing economies is expected to strengthen slightly in 2016 to 4.2% after five consecutive years of decline, accounting for over three-quarters of projected world growth this year. However, the outlook for these economies is uneven and generally weaker than in the past.

Even with expectations of lower interest rates in advanced economies, reduced concern about China's near-term prospects and some firming of commodity prices, prospects differ sharply across countries and regions. Asia in general and India in particular are showing robust growth while sub-Saharan Africa is experiencing a sharp slowdown from its big commodity exporters despite a number of smaller countries benefiting from lower commodity prices. In advanced economies, a subdued outlook subject to major uncertainty and downside risks may fuel further political discontent, with anti-integration policy platforms gaining more traction. Several emerging markets and developing economies face daunting political and policy challenges as they adjust to weaker commodity prices.

U.S. growth has been disappointing in 2016 according to the IMF World Economic Outlook Report, as the trend in global output is away from mature and relatively slow-growing economies, toward emerging and developing economies continues. President Trump may

change this. Negative output gaps remain widespread, and the world economic crisis has left a cocktail of interacting legacies—high debt overhangs, non-performing loans on banks' books, deflationary pressures, low investment, and eroded human capital—that continue to depress potential output levels. Investors and consumers have become more cautious fearing income growth may lag for much longer and realized growth may fall as well.

Growth has been too low for too long

These interacting legacies could be reversed if global demand were higher. But the policy response so far has been to rely excessively on central banks. Markets fear that policy has no further room to counter the next big negative economic shock or the gathering political fallout from persistently low growth. The slow and incomplete recovery from crisis has been especially damaging in those countries where the distribution of income has continued to skew sharply toward the highest earners, leaving little room for those with lower incomes to advance.

The result in some richer countries has been a political movement that blames globalization for all the problems and seeks somehow to wall off the economy from global trends rather than engage cooperatively with foreign nations. It is accepted that growth has been too low for too long, and in many countries its benefits have reached too few—with political repercussions that are likely to depress global growth further. The anticipated recovery in 2017 and beyond, could be derailed by several, interacting developments: a bumpy transition in China, a sharp further fall in commodity prices, a tightening in global financial conditions, or a sharp hike in trade barriers. This could be further complicated by geopolitical tensions flaring up in the Middle East and Africa further complicating policymaking and adding to the existing humanitarian crises.

An upside outcome could be the adoption by many countries of comprehensive, consistent, and coordinated policies to boost growth. Among structural policies, a renewed commitment to lowering trade barriers is especially important, in contrast to current trends. At the same time, governments must recognize the need to develop labour-market resilience, to lower barriers to entry in product and service markets, and to ease adjustment for those most vulnerable to the dislocations from technology, trade, and structural reforms. Here too, policymakers can send the clearest message and have the biggest effect through coordinated action.

Other risks have become more salient. The Brexit shock occurred amid unresolved legacy issues in the European banking system, in particular in Italian and Portuguese banks. Protracted financial market turbulence and rising global risk aversion could have severe macroeconomic repercussions, including through the intensification of bank distress, particularly in vulnerable economies. Continued reliance on credit as a growth driver is heightening the risk of an eventual disruptive adjustment in China. Many commodity exporters still confront the need for sizeable fiscal adjustments, and emerging market economies more broadly need to be alert to financial stability risks. Political divisions within advanced economies may hamper efforts to tackle longstanding structural challenges and the refugee problem; and a shift toward protectionist policies is a distinct threat. Geopolitical tensions, domestic armed strife, and terrorism are also taking a heavy toll on the outlook in several economies, especially in the Middle East, with further cross-border ramifications.

The Fourth Industrial Revolution

It is clear that any future growth prospects are constrained by long-term trends. Many economies around the world struggle with the double challenge of slowing productivity growth and rising income inequality, often exacerbated by rapidly ageing societies. Stagnation and inequality of income growth has created more inward-looking policies and a general questioning of the benefits from globalization - the Brexit vote being the most tangible example. On the positive side, there is tremendous opportunity for higher economic growth and societal progress through the Fourth Industrial Revolution based on digital platforms. This Revolution is characterized by a convergence of technologies that is blurring the lines between the physical, digital, and biological spheres. Breakthroughs in technologies such as artificial intelligence, biotechnology, robotics, the Internet of Things, and 3D printing, will provide new routes to growth but will also provide significant social challenges

Chief Executives are re-thinking everything

Everything is changing for senior executives, except the expectations of their investors and stakeholders around higher growth and profits. The list of what is changing includes unprecedented rapid technological advances, the blurring of sector lines, uneven geographic growth, workforce dynamics and more geopolitical uncertainty. These changes are driving companies to reinvent and rethink their strategy.

According to the Global Competitiveness Report more than half of executives surveyed plan to make acquisitions in the next 12 months. This is a clear signal of their determination to counter the low-growth, disruptive environment. Despite economic uncertainty, the appetite for M&A remains well above the average and points to an upturn in the first half of 2017. 91% of executives expect the deal markets to grow or hold steady over the next 12 months. Executives report a big increase in the number of potential targets they are reviewing. Nearly half of respondents say they have five or more deals in their acquisition pipelines. Executives are looking for acquisitions in innovation and start ups that complement their current strategy and offer the potential to supercharge future growth.

2016 has brought a drop off in megadeals and the focus is now on acquiring smaller, more innovative companies and this is reflected in the sizes of planned deals over the next 12 months. Cross-border M&A is still attractive, despite the rise in economic nationalism, protectionist measures and a slowdown in global trade. Companies are expanding geographic reach at an even faster pace in order to follow their customers, exploit strengths across high-growth markets and acquire talent and intellectual property. The top five investment destinations are:

1. United States
2. China
3. Germany
4. Canada
5. France

A new wave of technological convergence and digitalization is materializing in the Fourth Industrial Revolution, where innovation and business sophistication is an important way to create new products and services. In a global

economy innovation and business sophistication are now much more closely associated with income levels especially in emerging economies and commodity exporting markets.

In future financial results will be more aligned to better productivity and how new technologies are integrated into existing production processes. This will change the ways in which investment is made in basic physical and human capital. The fast pace of technological change and the move away from commoditisation are creating incentives for firms to engage in more innovative and creative activities.

Sources:

- *World Economic Outlook 2016* www.imf.org
- *Global Competitiveness Report 2016-17* www.weforum.org
- *World Employment Social Outlook 2016* www.ilo.org

4th drupa Global Trends report 2017 - The full report

Printer and supplier economic assessments

Printers - a positive story for most regions

As in previous years we asked printer and supplier participants to describe the economic situation of their company for 2016 and prospects for 2017². We describe these as the drupa Barometers of economic confidence. In terms of 2016, 42% of printers described their business as in a 'good' economic state, whilst 11% described it as 'poor'. So a positive net balance of 31%, up from a positive net balance of 25% for 2015 and it is that 'net balance' that we show in Chart 1 below and that is used in many of the subsequent charts.

As always printers and suppliers tend to be a little more optimistic about the coming year than works out in practice, so in every case both globally and regionally, the actual result is lower than the

forecast from the previous year. In most cases the difference is modest though in a few it is more striking eg Africa, Middle East and Asia. In all cases prospects for 2017 are more positive with the global forecast showing a net positive balance of +46%, though the scale of the leap forward seems unlikely in some regional cases eg Africa. Regionally North America remains decisively the most optimistic region, whilst Africa is the first region to report a net fall in confidence since this report series began in 2013.

² Numbers of printer participants by market sector and region are given in the Appendix. Supplier participants reporting for a region may or may not be based in that region. As most suppliers serve multiple markets in most cases there is no attempt to analyse by market.

drupa Printer Barometer 2017 - economic confidence

% net balance positive v negative

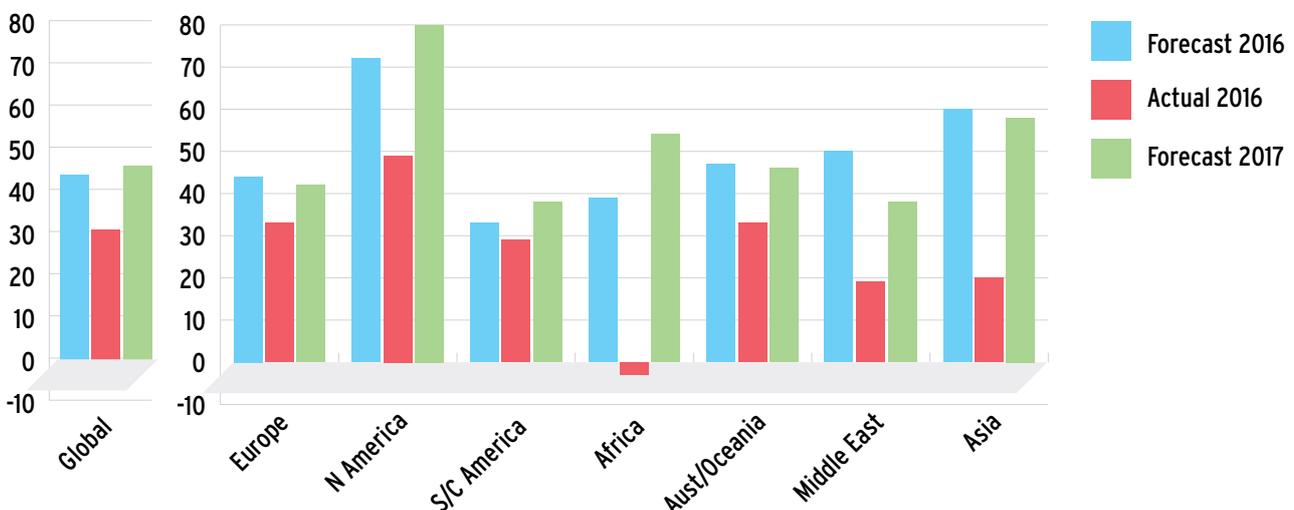


Chart 1 How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

In terms of end market sectors, those serving the Packaging and Functional sectors are more confident both in terms of 2016 and prospects for 2017 than those serving the commercial and publishing sectors. Nevertheless there is a positive net balance in all sectors globally. However regionally the picture is more complex. For the current year in terms of the commercial sector, Germany³ and North America show high confidence levels (both +41%) whilst Africa is struggling at -8%. For publishing again Germany and North America are powering ahead at + 40%

and + 43% respectively, whilst the Middle East is struggling at -14%. For packaging Europe as a whole is thriving at +44%, North America even better at 52% whilst Africa is lowest by far at 0%. In terms of the Functional sector, confidence remains high in Europe +37% and in the Rest of the World at a lower level +26%⁴.

3. For reasons of consistency, Table 1 shows the result for Europe (significantly lower).

4. The regional sample for functional printers is too small to report separately on separate regions except Europe.

Printers economic assessments globally by market

% net balance positive v negative

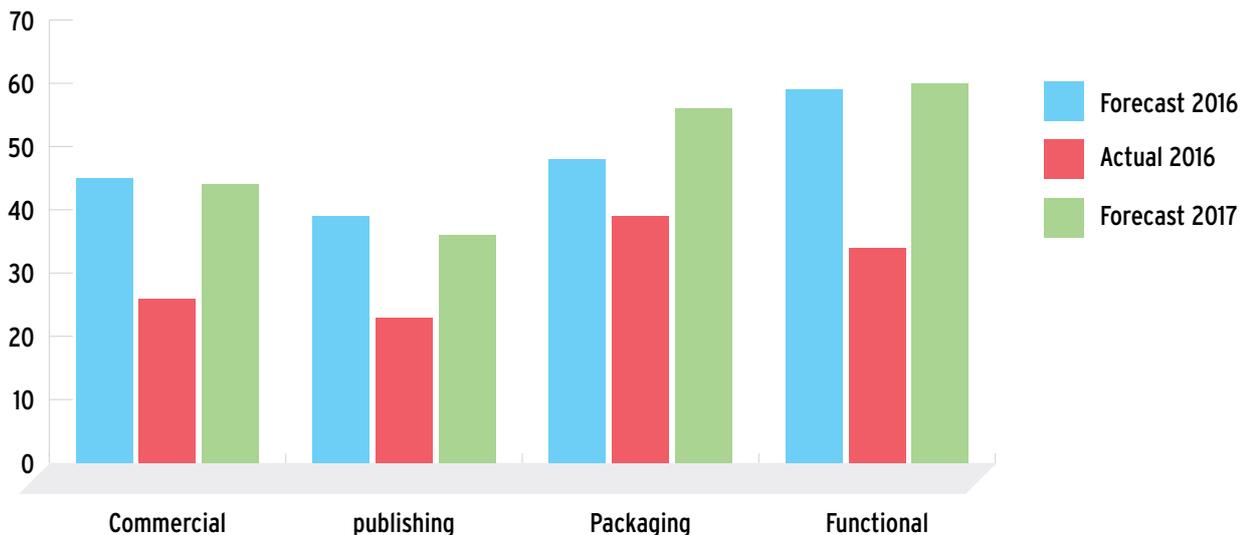


Chart 2 How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

Printer economic assessments by region by market

% net balance positive v negative		Actual	Forecast
		2016	2017
Europe	Commercial	27	40
	Publishing	23	27
	Packaging	44	54
	Functional	37	53
N America	Commercial	41	72
	Publishing	43	57
	Packaging	52	87
S/C America	Commercial	29	42
	Publishing	22	56
	Packaging	38	32
Africa	Commercial	-8	58
	Publishing	21	47
	Packaging	0	77
Aust/Oceania	Commercial	25	38
	Publishing	0	50
	Packaging	45	64
Middle East	Commercial	0	57
	Publishing	-14	0
	Packaging	20	40
Asia	Commercial	28	44
	Publishing	30	65
	Packaging	22	70

Table 1 How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

A similar positive story for most suppliers

Again the suppliers give a largely positive story⁵, with 56% reporting their company in a 'good economic condition and just 6% stating it was in a 'poor' state, a positive net balance of 50% - the same as last year. Again the picture was somewhat more patchy at a regional level eg

Africa and the Middle East faced more difficult trading than forecast last year. Nevertheless confidence for next year remains reasonably high in all regions.

5 Numbers of participants by region are given in the Appendix. Participants reporting for a region may or may not be based in that region. As most suppliers serve multiple markets in most cases there is no attempt to analyse by market.

drupa Supplier Barometer 2017 - economic confidence

% net balance positive v negative

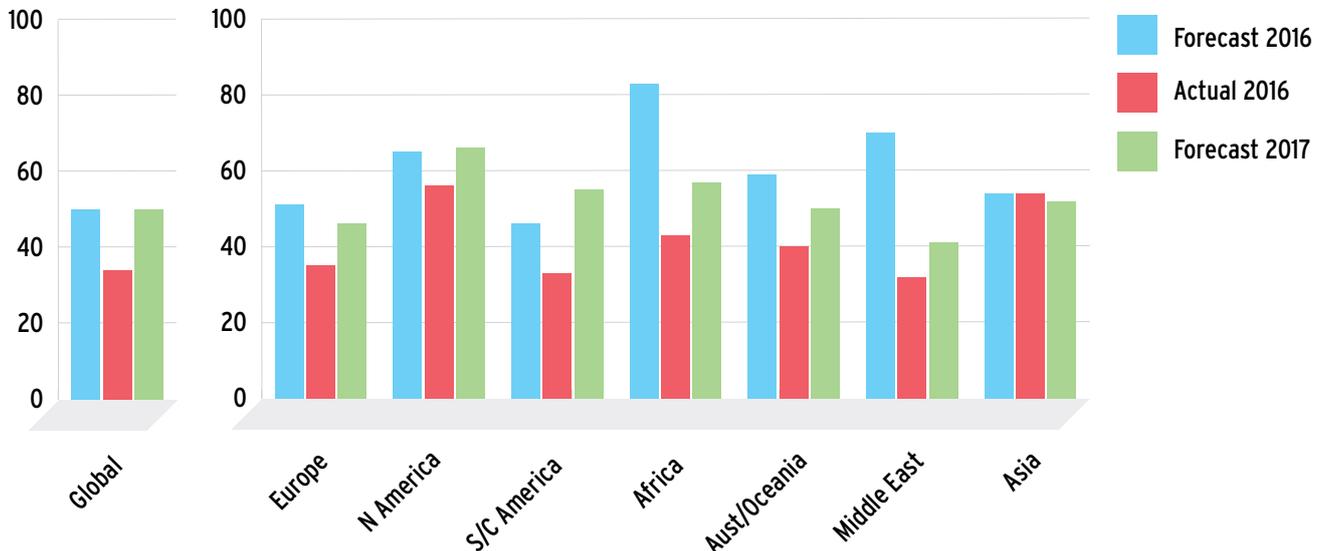


Chart 3 How do you rate the current economic situation of your company? and What are your expectations of your company's economic situation for the next 12 months?

Financial performance measures

Printers face plenty of challenges

Chart 4 shows the pattern of previous years is broadly repeated, with revenues, margins, utilisation and paper/substrate prices⁶ all showing a minor improvement in net balance against last year, whilst prices worsened a little. So despite a few minor tweaks to the pattern this year, the broad picture remains valid of printers increasing utilisation and thereby raising total revenues to offset reducing prices and margins.

⁶ A paper price increase is viewed from the perspective of a printer for this purpose ie an net balance decrease is good news.

Global printer financial performance measures

% net balance positive v negative



Chart 4 How have your company's revenues, prices, margins, utilisation and paper/substrate prices changed over the last 12 months?

The picture is more complicated at a regional level. Europe, North America, Australia/Oceania and Asia all follow the global pattern, albeit North American and Asian utilisation were higher than

the rest. However South/Central America and Africa reported net positive price increases whilst the Middle East reported a severe reduction in both prices and margins.

Printer financial measures by region 2016

% net balance positive v negative

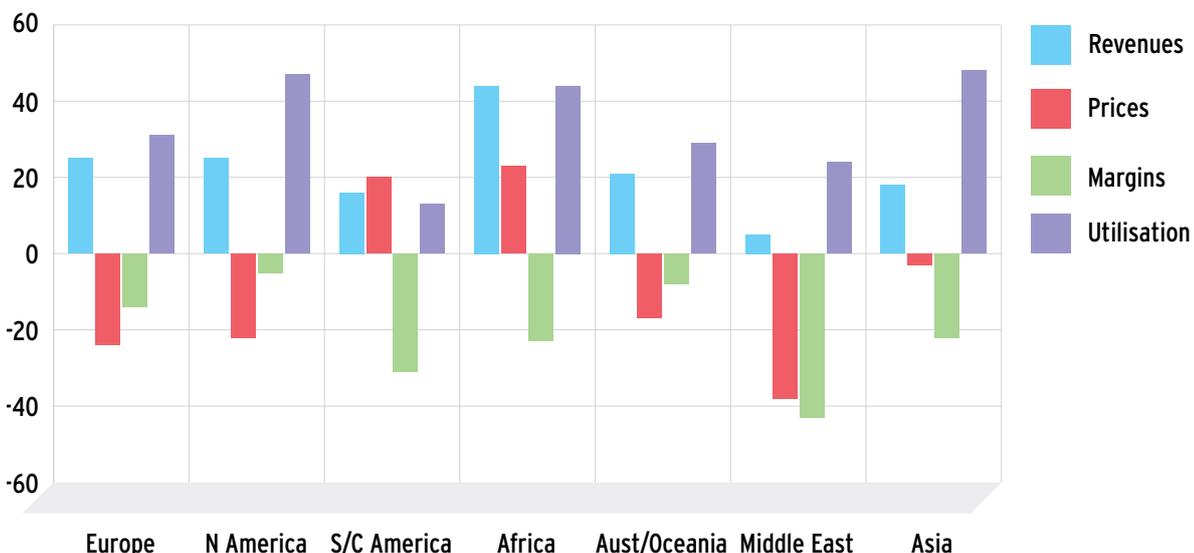


Chart 5 How have your company's revenues, prices, margins and utilisation changed over the last 12 months?

But even that regional analysis is insufficient to see the varying prospects for the different market sectors in each region. So this year we have added additional charts to allow this to be analysed

separately by revenues, prices and utilisation⁷.

⁷ A missing bar on the chart means 0% net balance except for Functional where the sample size is too small to report reliably outside Europe.

Printer revenues net balances by market by region

% net balance positive v negative

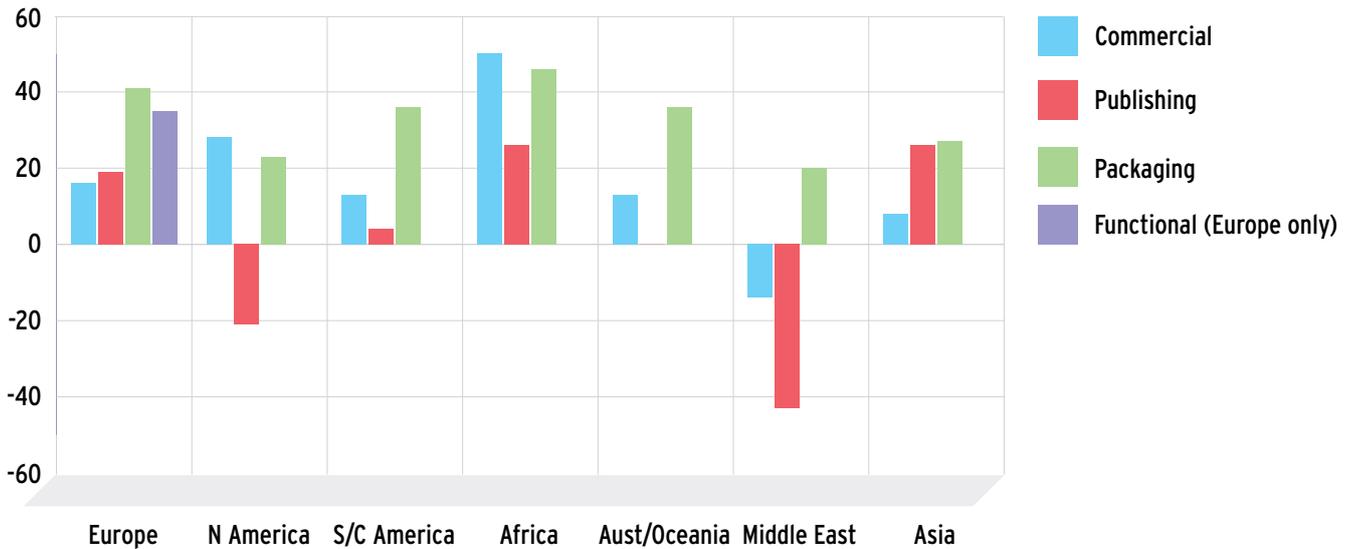


Chart 6 How have your company's revenues changed over the last 12 months?

Printer prices net balances by market by region

% net balance positive v negative



Chart 7 How have your company's prices changed over the last 12 months?

Printer utilisation net balances by market by region

% net balance positive v negative

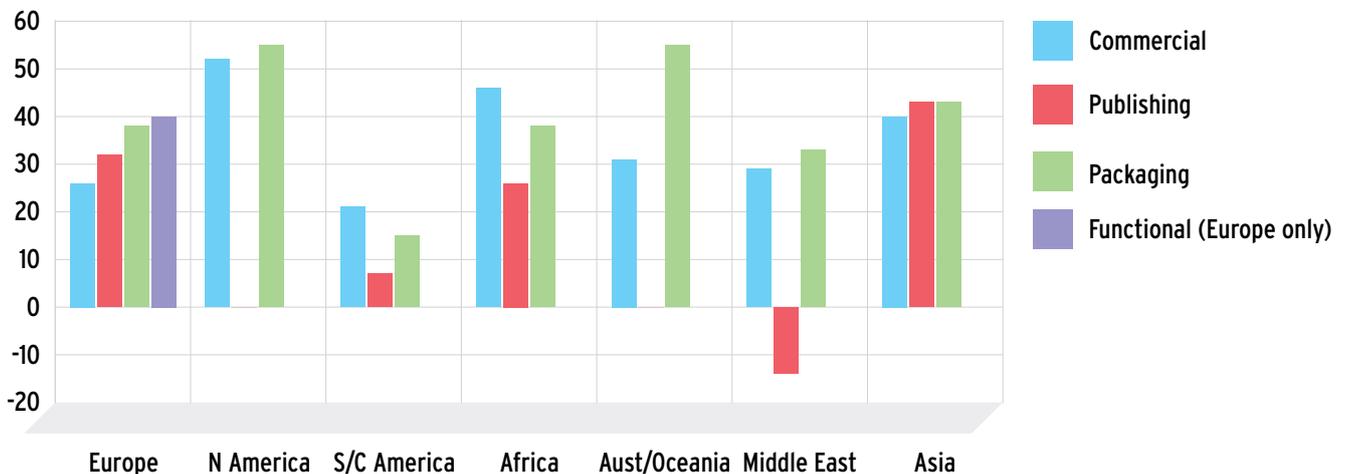


Chart 8 How has your company's utilisation changed over the last 12 months?

The European pattern follows the global pattern whilst North America shows a soft publishing market with revenues falling and utilisation flat. South/Central America shows small net gains on all three measures whilst Africa shows strong gains on all three. It is striking that this African result is despite the poor economic confidence measures for this region. The Middle East shows poor trends in most markets and this will be a repeated theme in this year's report, reflecting the broader troubles that region faces.

Employee numbers continue to climb - a 9% positive net balance globally, with the range between North America at +21% and South/Central America and Australia/Oceania at 0%. Given the squeeze on margins it is surprising to see once again such a positive net balance, although the suspicion must be that extra staff are being recruited in the main to cope with ever shorter run lengths and increasing numbers of orders.

One striking figure is that despite a positive global net balance amongst publishing printers of +7%, European publishing printers reported a negative net balance in overall employees of -8% and

North America -21%. The impact of digital media is clearly changing those regions whose markets are more advanced in digital publishing.

Whilst the overall employee numbers continue to climb, there is a modest but sustained downturn in administration employees globally (-2% net balance) with a range of -7% South/Central America to +13% Australia/Oceania. Globally the commercial market shows a net balance decline of -5%, Publishing -12% and Packaging +1% and Functional +8%. The global net balance increase of 9% for production staff again splits into a consistent pattern for the different sectors with Commercial +6%, Publishing -2% (North America -29%), Packaging +18% and Functional +29%.

Whilst the % of printers exporting both globally (49%) and regionally (ranging from 29% Australia/Oceania to 59% North America) has not changed significantly, the pattern of growth regionally varies considerably with a terrible figure for the Middle East.

Trends in export regionally - % net balances positive v negative

Europe	N America	S/C America	Africa	Aust/Oceania	Middle East	Asia	Global
32	26	3	0	29	-50	31	26

Table 2 How has your export trade changed over the last 12 months?

Supplier financial performance over time

% net balance positive v negative

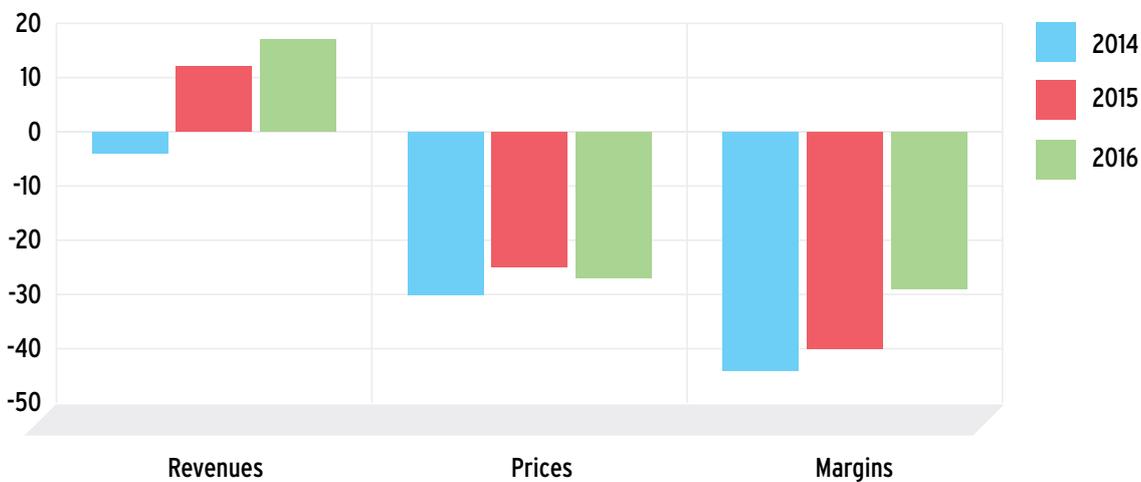


Chart 9 How have your company's revenues, prices and margins changed over the last 12 months?

Globally the suppliers pattern is similar to that for printers, with revenues up 17% (the best net balance in three years) but prices down -24% (the lowest negative net balance) and margins down -27% (the best i.e. least negative, net balance in three years). However the pattern is very mixed across the regions as shown in chart 10, with

Europe and Asia reporting increasing revenues and falling prices and margins whilst South/Central America and the Middle East are reporting flat revenues but still suffering falling prices and margins⁸.

⁸ A missing bar on the chart means 0% net balance

Supplier financial performance measures - net balances

% net balance positive v negative



Chart 10 How have your company's revenues, prices and margins changed over the last 12 months?

Manufacturing capacity showed a positive net balance of 15% (down from 24% last year) with Europe ahead at +27% and the rest of world showing more modest growth. In terms manufacturing utilisation, again Europe set the pace with a net balance at 13% compared with a net balance of 2% for the rest of the world.

Employee numbers were flat globally, but this masks significant variations regionally from 22% up for Asia and 2% up for Europe to -16% for South/Central America and -18% for the Middle East.

The mix of revenues is encouraging with all service types reported as increasing except spares/servicing, an encouraging increase in training (the first in three years) and consumables continuing to show strong growth.

Supplier mix of services

% net balance positive v negative



Chart 11 Overall for your region(s), how has the proportion of revenues changed over the last 12 months?

Financial market conditions

Suppliers face the greater challenge

Given that the slow and patchy recovery from the 2007/8 global economic crisis should have effected printers and suppliers alike, it is striking to report how very different the two groups of participants report global financial market

conditions. For the third year running, suppliers globally report a distinctly more negative set of financial conditions. Indeed printers reported an improvement for all topics, except average debtor days where they like the suppliers reported a worsening.

Global financial market conditions - net balance

% net balance positive v negative

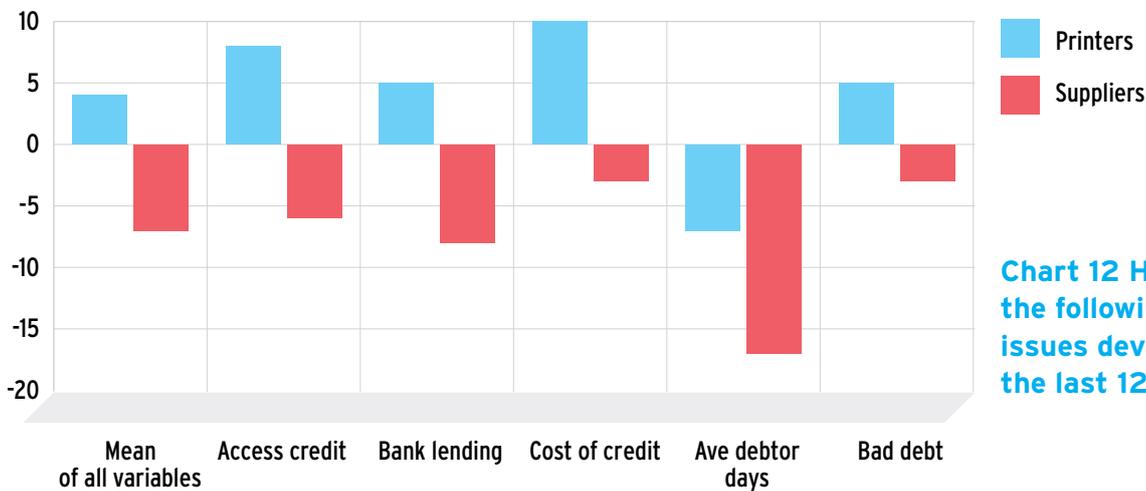


Chart 12 How have the following financial issues developed over the last 12 months?

At a regional level the picture is more consistent between suppliers and printers for South/Central America, Africa and the Middle East but inconsistent for the remaining regions.

Regional mean financial market conditions - net balance

% net balance positive v negative

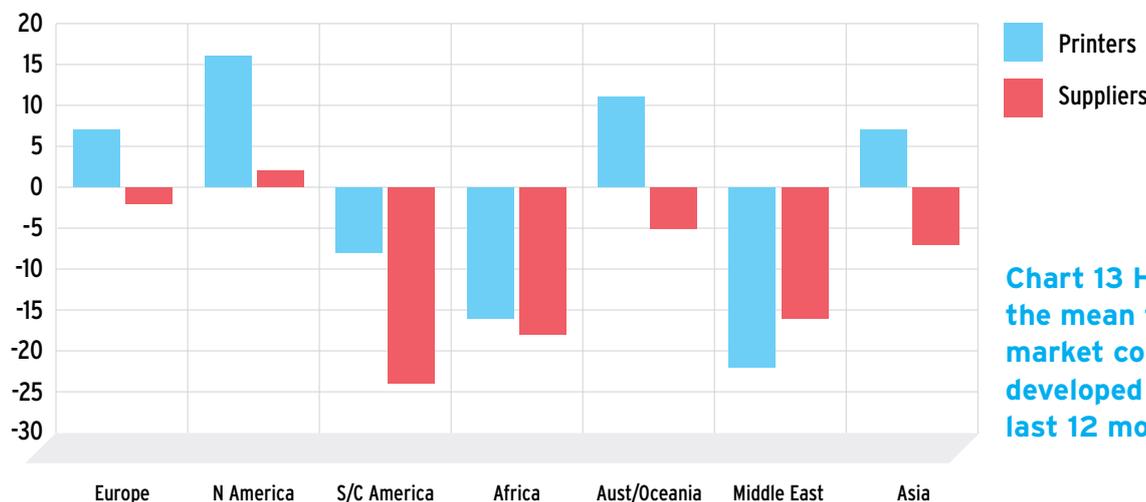


Chart 13 How has the mean financial market condition developed over the last 12 months?

Printer operational measures demonstrate strategic changes

This is a remarkably diverse industry in terms of its core print technologies with only two classes of print technology not scoring at least a 10% penetration in at least one of the markets, the exceptions both being mono digital - see the table in the Appendix for detail. Chart 14 shows the

reported changes in print volume by print process. Clearly digital toner cutsheet colour presses are the big winners in terms of print volume in 2016. Yet as you shall see, it is not the winner when we report on 2017 press investment plans.

Changes in print volume by print process 2016

% net balance positive v negative

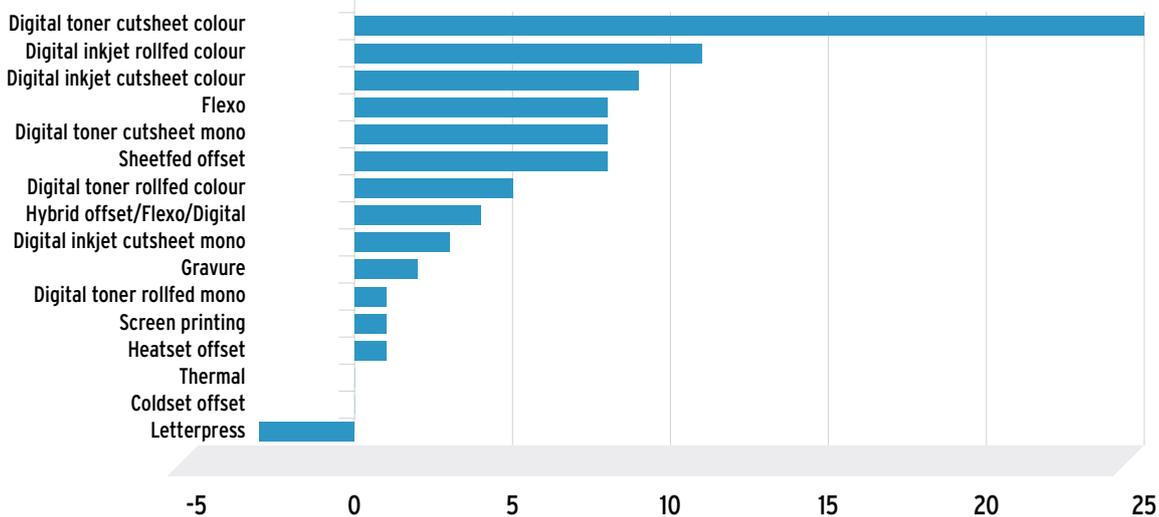


Chart 14 How has your printing volume has changed in the following technologies over the last 12 months?

To get a better sense of those print technologies that are winning volume share in the core market sectors, the next chart shows the net balance reported by print process by market sector - excluding any for which there was less than a 10% change in print volume for that process in

the year. We can see that the growth in Sheetfed offset is from Publishing and Packaging, and that of Flexo from Packaging and Functional. For the digital technologies it is more widely distributed but in most cases Functional plays an increasingly important role.

Print volume 2016 % change by print process

% net balance positive v negative (excl <10% in any sector)

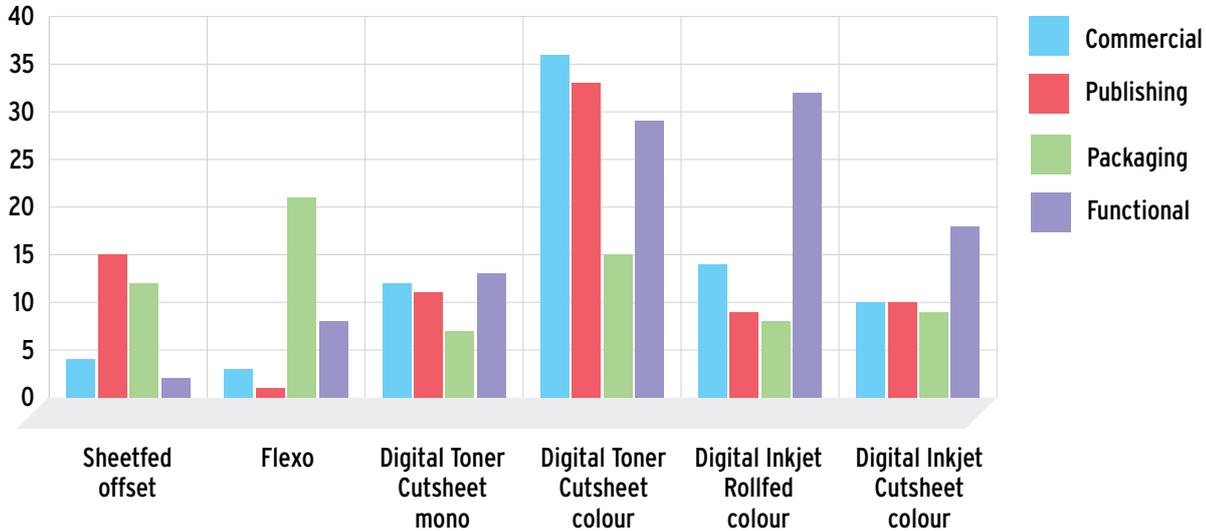


Chart 15 How has your printing volume has changed in the following technologies over the last 12 months?

Changes in conventional print work mix 2016

% net balance positive v negative

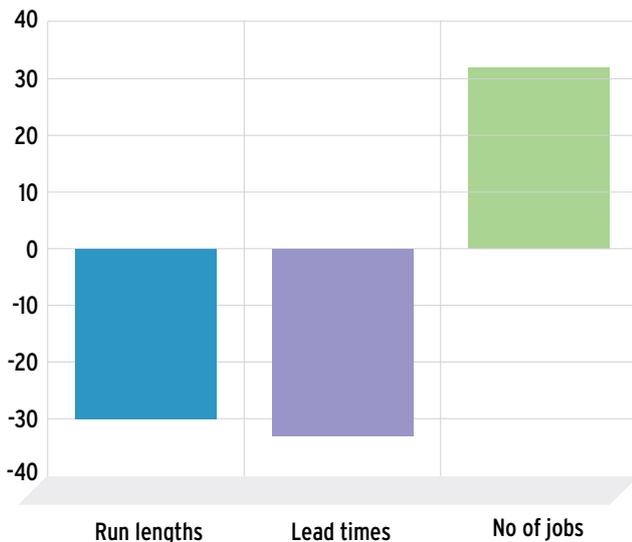


Chart 16 Across conventional (i.e. non-digital) print production how has the mix of work changed in the last 12 months?

For conventional ie non-digital print, the trend to shorter run lengths, shorter lead times and an increased number of jobs has been clear since 2013. Interestingly the two regions that had resisted this trend to now, Africa and the Middle East have now joined the majority (run lengths down -28% Africa and -24% Middle East). There had been a slowdown in the rate of increase in the number of jobs, (net balance globally +35% 2013, +28% 2014, +25% 2015) but this has been reversed this year, up to +32%.

Trends in digital print

Last year we commented on the fact that whilst conventional print still dominates in terms of volume ie is the cash generator for most, there

has been a sustained rise in the proportion of turnover converting to digital print. Interestingly this trend has been reversed this year. The shift is small and may be a blip, but it will be interesting to monitor.

Digital print as proportion of turnover - globally

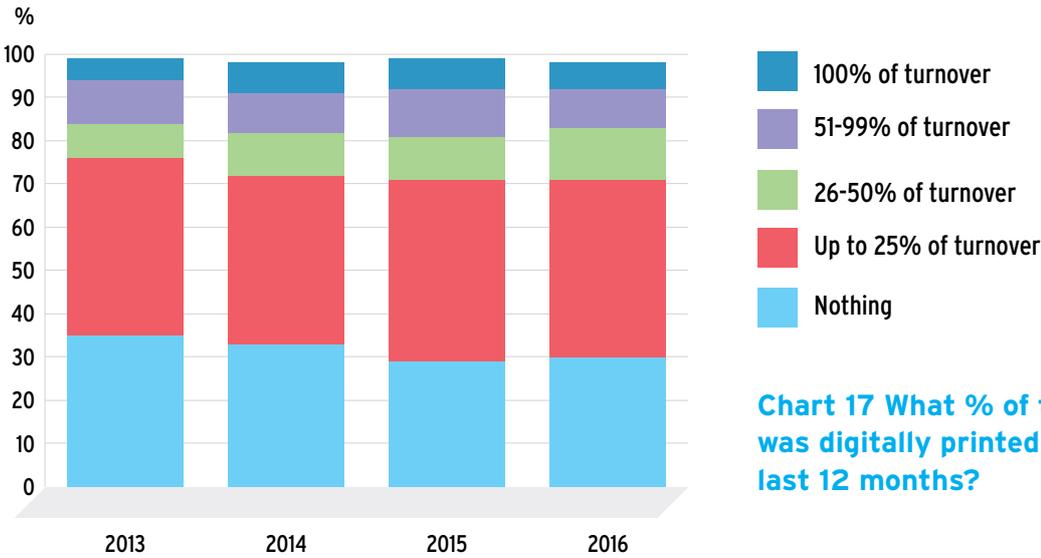


Chart 17 What % of turnover was digitally printed in the last 12 months?

Examined by market sector, digital print is now impacting on packaging, although from a low base, whilst it is now the core process for

functional and represents a very substantial part of the commercial market.

Digital Print as proportion of turnover - by market

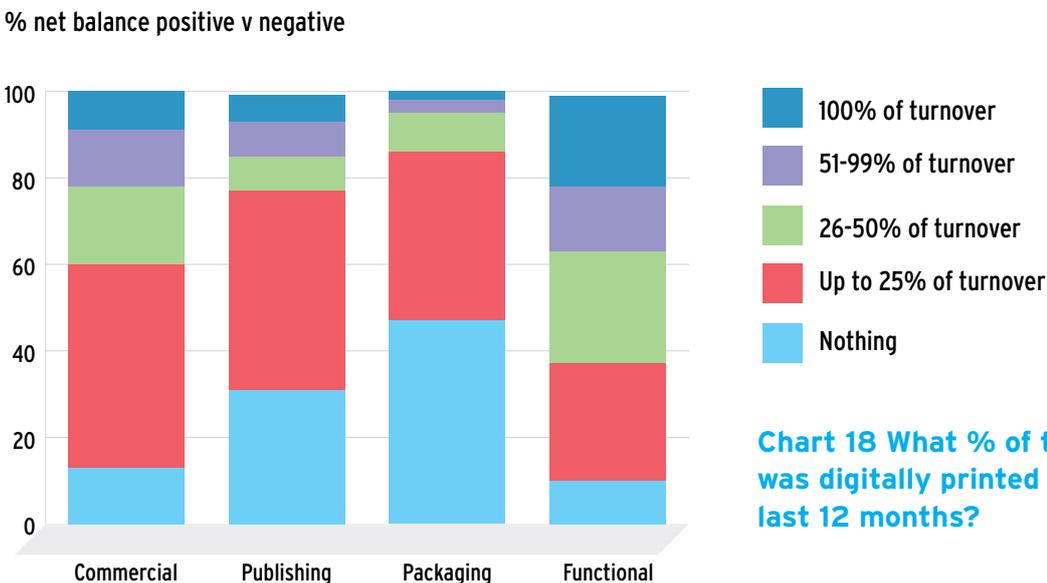


Chart 18 What % of turnover was digitally printed in the last 12 months?

Most observers would accept that variable data is the best added value component of digital print. Yet the proportion of digital print that is variable by value stubbornly refuses to rise. In 2013 19% of printers using digital print reported more than 25% of their digital print was

variable, while the figure for 2016 has dropped to 18%. Drill down into the market sectors and a different picture emerges, with functional and commercial printers exploiting this key advantage.

% Printers reporting more than 25% of digital print by value was variable

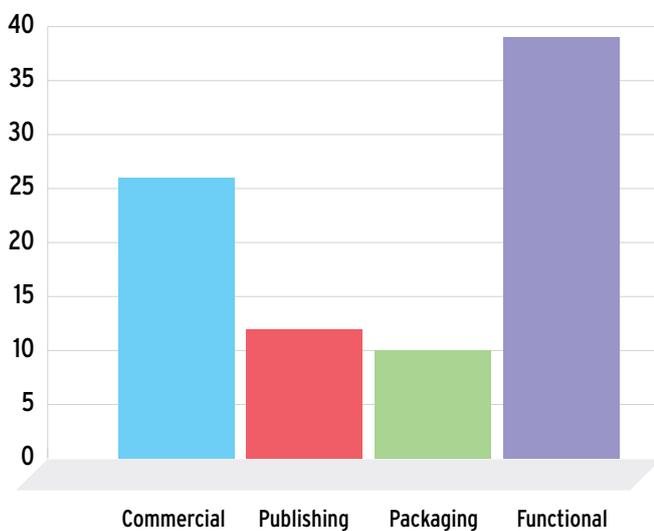


Chart 19 What % of your digital print by value was variable over the last 12 months?

Web to Print installations fall

For the last two years we have commented that the proportion of printers globally with web to print installations had almost stalled. This year we must report a decisive fall globally (2014 25%, 2015 26%, 2016 23%). The reduction is not universal eg the Middle East and Asia grew, but in most regions there was a decisive reduction

eg North America and Australia/Oceania. Whilst we must wait for next year to see if this is a blip, we suspect that it is not and that in many markets as Web to Print matures, there are those who have worked out how to best exploit the technology and those for whom it has proven a disappointment and have put aside the effort.

% Web to Print/Storefront Installations

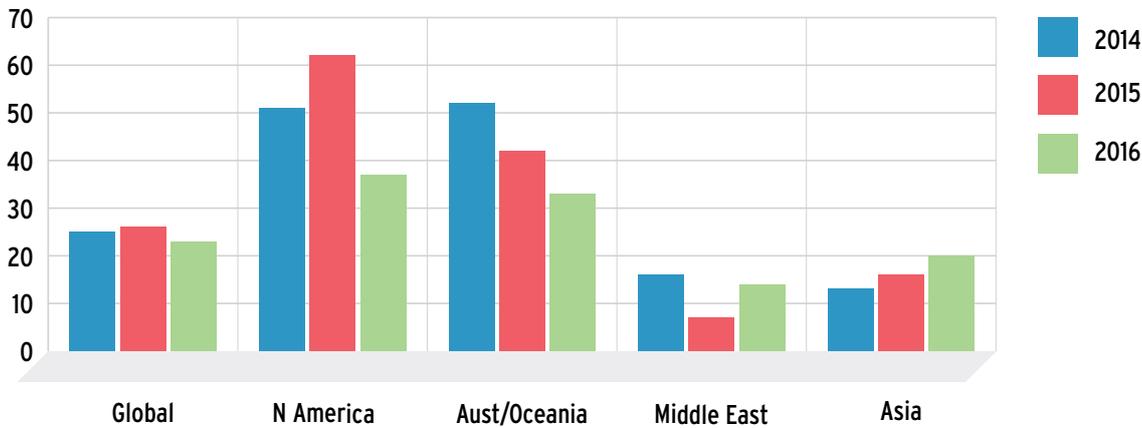


Chart 20 Do you have Web-to-Print or a digital storefront?

This is supported by the following chart that shows the proportion of printers in the different market sectors that have a web to print / storefront installation and win more than 25% of their turnover from that source. Note the decisive lead in Web to print turnover levels that

commercial printers in North America reported did not stop the % with web to print installations from declining.⁹

⁹ The North American sample size was insufficient to show for the other sectors.

Printers with W2P generating 25%+ turnover from Web to print

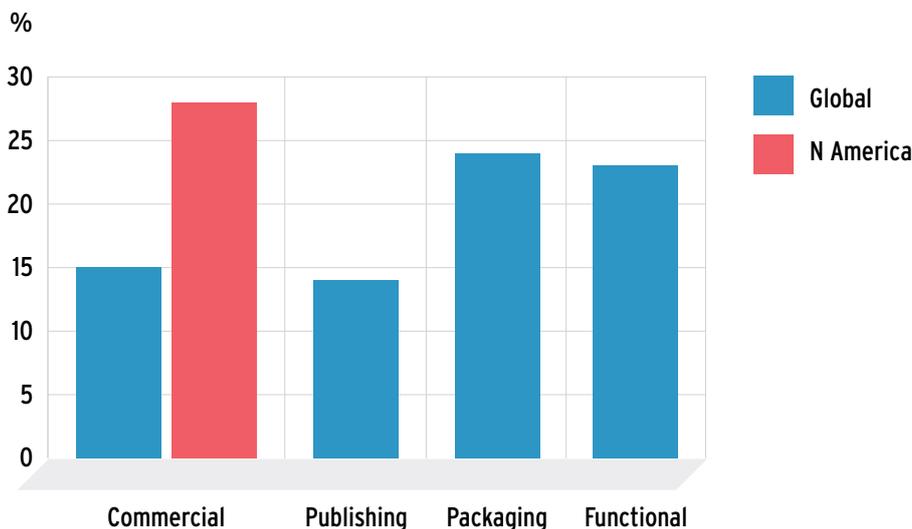


Chart 21 For those with Web to Print, what % of total turnover by value was handled via this service?

Finally in this section we must report no change in the proportion of printers earning a significant proportion of turnover in non-print activities. There were 27% of printers reporting over 10% of such turnover in 2013

and there were 27% in 2016. The proportion is slightly lower for Publishing 18% and Packaging 25%, slightly higher for Commercial 29% and decisively higher for Functional 41%.

Capital Expenditure

Printer capital expenditure trends

% net balance positive v negative

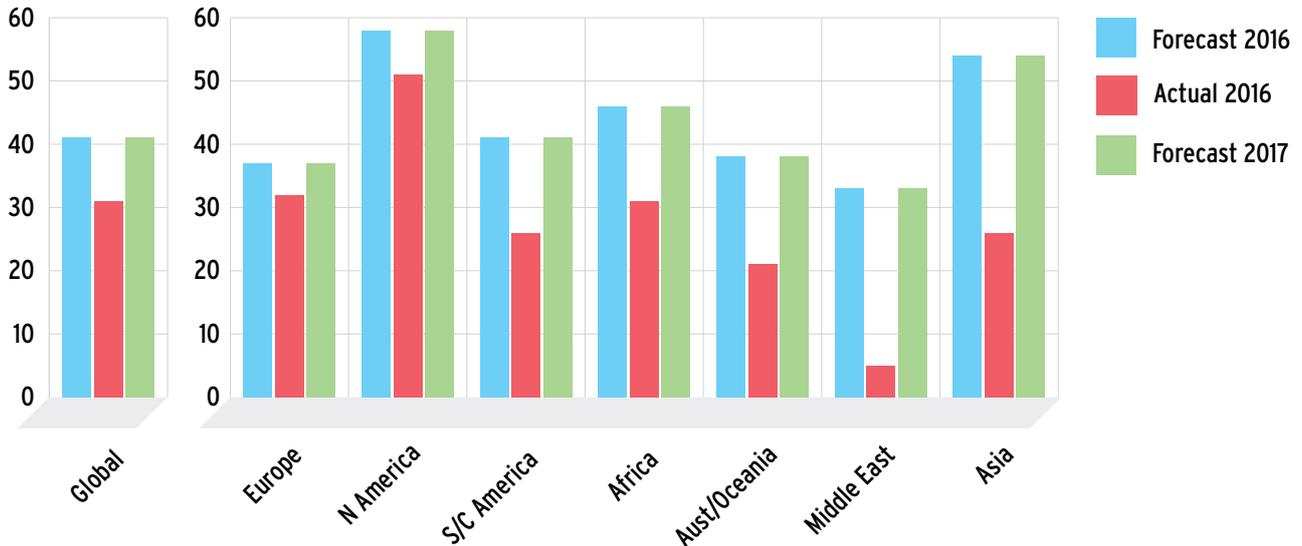


Chart 22 How has capital investment changed over the last 12 months? And over the next 12 months?

The drupa expert panel printers are ambitious for their businesses and know they must invest for a successful future. Hence they attended the very successful drupa in Spring 2016. As always their ambition for investment 'next year' tends to be reigned back in practice, with actual expenditure patterns lagging somewhat

behind forecasts. Yet in all regions except the Middle East we see expenditure growing. Looking at the same data from a market sector viewpoint, it is clear that those in Functional and Packaging print are more confident in a return on investment than those in publishing print.

Capital Expenditure change by sector 2016

% net balance positive v negative

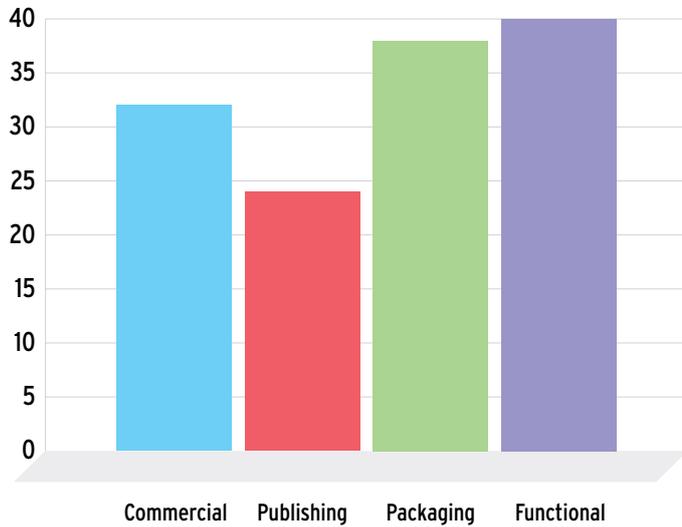


Chart 23 How has capital investment changed over the last 12 months?

Looking at the focus of investment, it is interesting to note that Finishing has become the top priority for the first time and more

attention is being given to PrePress/workflow/MIS as printers struggle to handle an ever increasing number of jobs of lower value.

Targets for capital expenditure 2017

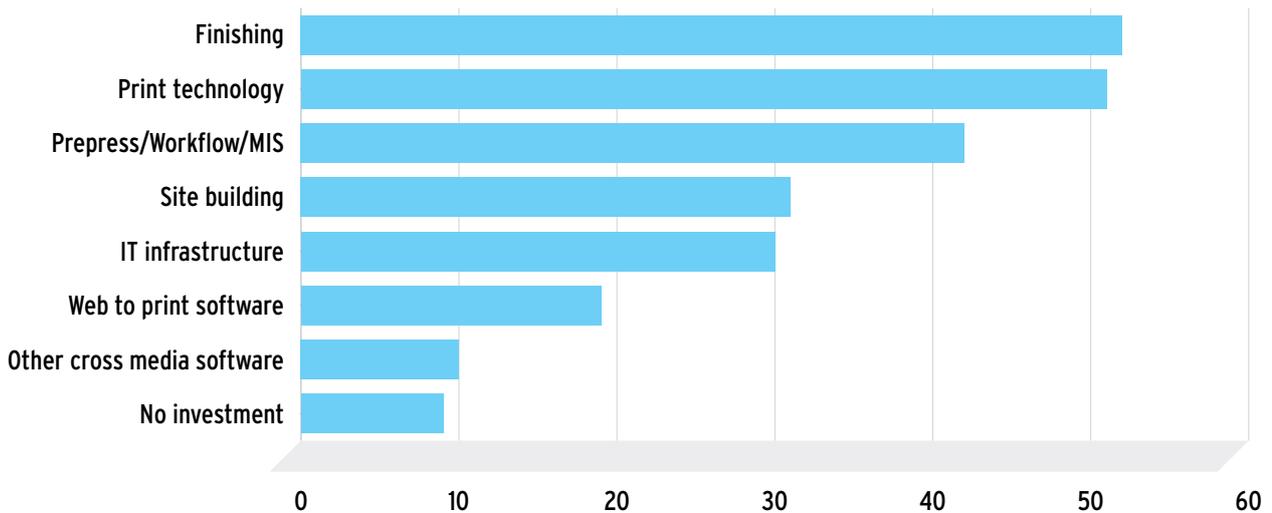


Chart 24 In which areas does your company plan capital investment in the next 12 months?

Print technology investment plans

Last year Digital toner cutsheet colour led the race for press investment by 10% but whilst showing high growth in volume terms [see chart 14], it is now down to second place in 2017 investment plans behind Sheetfed offset with Inkjet colour (sheetfed and rollfed) lying in equal third with Flexo.

Main press capital expenditure plans 2017

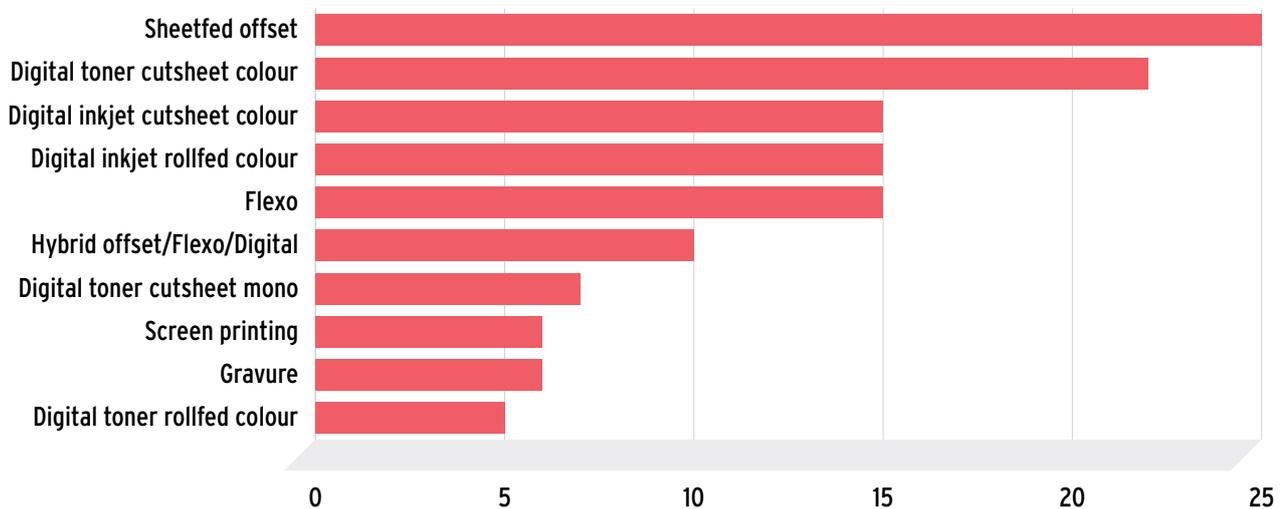


Chart 25 In which of the following printing technologies do you plan to invest in the next 12 months?

Looking at market sectors the picture is more complex. Table 3 gives a full breakdown. It is interesting to note that virtually all print processes should enjoy at least investment in at least one market sector. But whereas last year Digital toner cutsheet colour led in all

markets except Packaging, it does so this year just in Commercial and Sheetfed offset now leads in Publishing, Flexo retains pole position in Packaging and Digital inkjet rollfed colour leads in Functional ie a different print process in each market sector - a first for this report.

Planned print investments by market 2017 - top 4 per market in red

%	Commercial	Publishing	Packaging	Functional
Sheetfed offset	26	30	29	11
Heatset offset	3	6	1	2
Coldset offset	3	9	2	0
Gravure	3	3	11	2
Flexo	5	5	32	13
Screen printing	5	5	7	15
Letterpress	4	1	1	2
Digital toner rollfed mono	1	2	2	4
Digital toner rollfed colour	4	5	6	7
Digital toner cutsheet mono	8	10	4	4
Digital toner cutsheet colour	31	24	14	20
Digital inkjet rollfed colour	17	12	14	36
Digital inkjet cutsheet mono	6	4	4	13
Digital inkjet cutsheet mono	18	14	12	27
Thermal	3	2	2	11
Hybrid offset/ flexo/ digital	8	7	14	11

Table 3 In which of the following printing technologies do you plan to invest in the next 12 months?

Ambitious capital expenditure plans from last year have had to be cut back in some regions in light of challenging market conditions eg South/Central America, Australia/Oceania and

the Middle East. And it is in these same regions where plans for next year are understandably more cautious.

Supplier capital expenditure by region

% net balance positive v negative

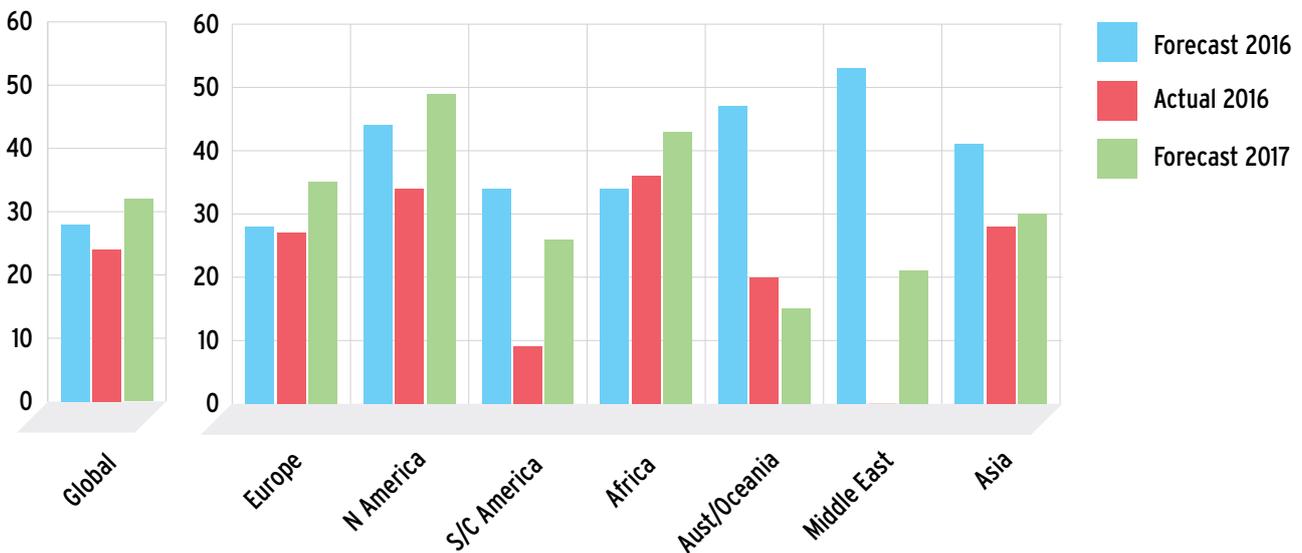


Chart 26 How has capital investment changed over the last 12 months? And what about the next 12 months?

Developing sales channels has become the prime reason for investment (46% this year) whilst the other options fall well behind - all clustering around 29-30% (manufacturing or enhancing new products, developing new services, raising efficiency/reducing capacity). Lowest is Research and Development at 20%, but at least this has climbed up from the 16% low in 2014. So primary research has gone up by 15% globally and secondary research by 24%¹⁰. Partnerships are a relatively low risk way of development, so 42% of participants reported having entered into a strategic technical partnership in the last 12 months (up from 34% in 2014).

As to market development plans for next year, new products were most common (41%) followed by upgraded products (37%), new services (32%) and upgraded services (23%).

Supplier marketing and customer support

Supplier participants expect expenditure on marketing to continue to climb (+32% net balance). Yet with challenging market conditions in many regions, the marketing spend has to be used carefully. We asked which customer support tools the participants use and how their use will change in 2017. Product training and trade shows are the most important elements with online content and educational material showing increasing importance.

¹⁰ Primary R&D is to develop new technologies/processes in principle. Secondary R&D is to develop commercial applications from primary research or new or updated equipment/services.

Use and growth of supplier customer support tools

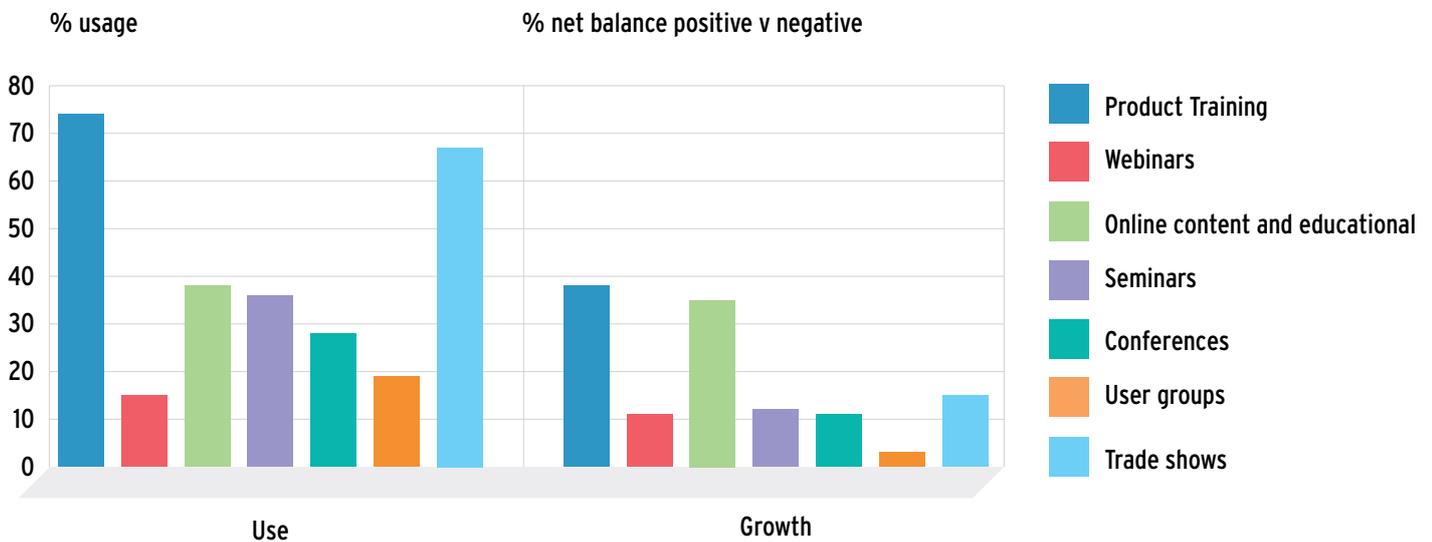


Chart 27 Which customer support elements do you use? How is investment to change over the next 12 months?

Strategic challenges for printers and suppliers

Addressing top-level strategic constraints to growth, we see very similar results for both sample groups. Strong competition and lack of sales are followed by a lack of the right skills.

Constraints to growth for printers and suppliers

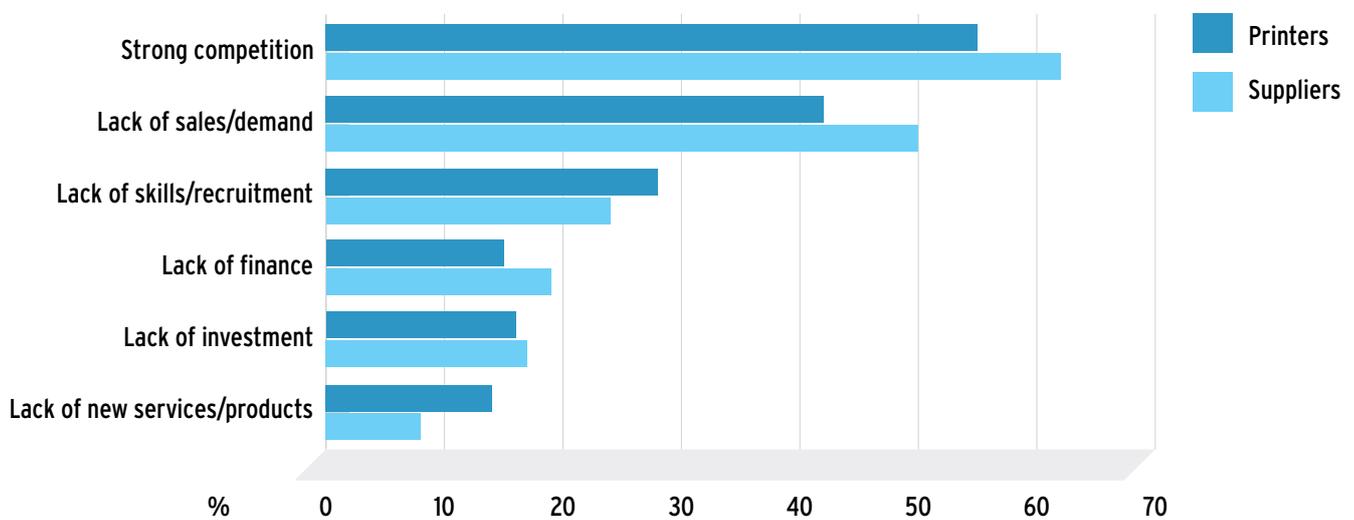


Chart 28 What are the top two constraints to growing your revenues in 2016?

Drilling down in the reasons for a lack of sales, the issues become different for the two groups with finding new customers the top challenge for printers and competitive pricing the top for suppliers. Interestingly whilst a lack of customer knowledge was reported globally at a modest 22%, in certain regions this was viewed much

more important - Africa 43%, Australia/Oceania 40%, North America 36% and the Middle East 35%. We also asked if access to Internet was a factor limiting growth and whilst not so for most regions (global average 9%) it was a significant factor for Africa at 21%.

Top sales constraints 2017

Printers	%	Suppliers	%
Finding new customers	59	Competitive pricing	58
Lack of good sales staff	37	Lack of demand	40
Lack of demand - conventional	30	Lack of customer knowledge	22
Lack of added value services	21	Customer access to finance	21
Lack of demand - digital print	10	Lack of new products/service	15

Table 4 In which of the following printing technologies do you plan to invest in the next 12 months?

In terms of drivers for improving profitability amongst printers there was global agreement that reduced staffing with improved productivity and adoption of new print technology were key steps, followed by new finishing technology. As a commentator, my concern is that this ducks the issue of HOW greater productivity will be

achieved when run lengths and job value are decreasing and the number of jobs is increasing. The obvious if difficult step is automation, yet new prepress technology is a lowly fifth in order of priority. We will explore this more fully in next year's survey.

Printers internal drivers for profitability

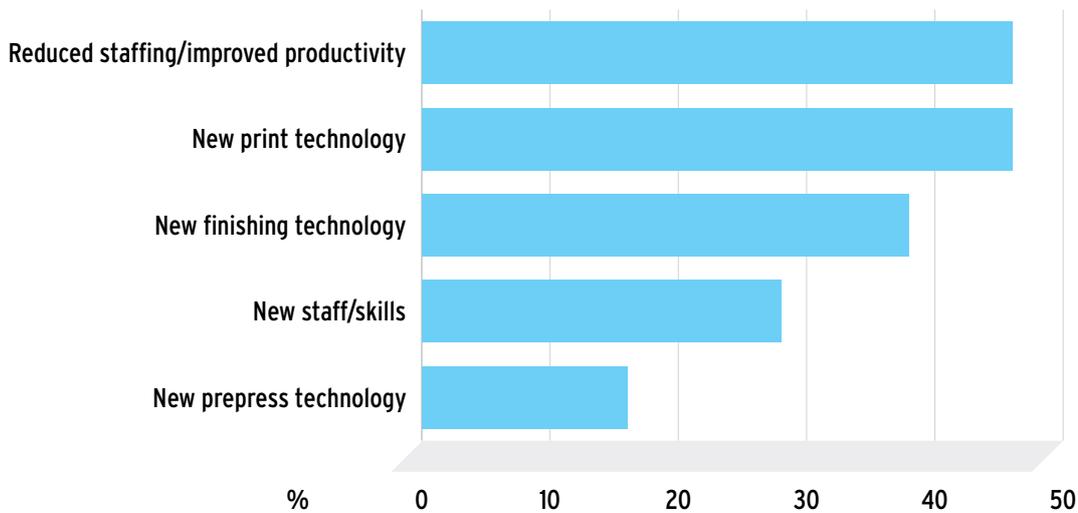


Chart 29 Choose two key internal (i.e. non-sales factors) driving profitability over the next 12 months?

For suppliers it is harder to distinguish between internal and external actions. Asked for the top two profit drivers for next year, new products

were most common (51%) followed by new sales channels (44%).

Supplier drivers to profitability

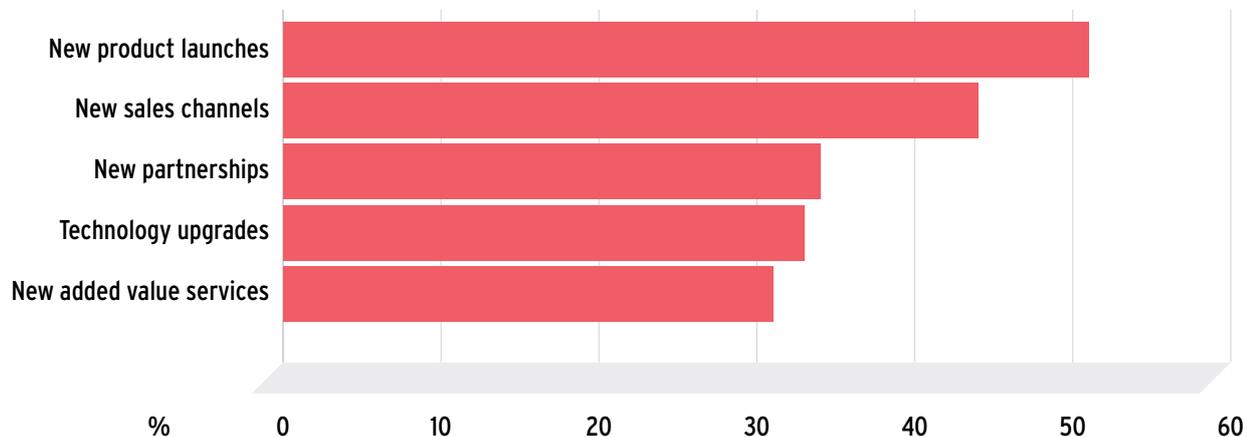


Chart 30 Choose two key factors driving profitability improvement over the next 12 months?

Environmental concerns

It is important to note that we asked what are the prime environmental concerns of 'your customers'. For printers' customers, Accredited papers/substrates is the No 1 concern. In those regions where such schemes are less established eg Middle East and Asia then use of Recycled

paper takes priority. Curiously in North America concern for Accredited papers fell decisively from 47% to 31% but so did use of Recycled paper from 55% to 37%. To balance this, the same region reported greater interest in Environmental accreditations, up from 15% to 29%.

Printers - customer environmental concerns

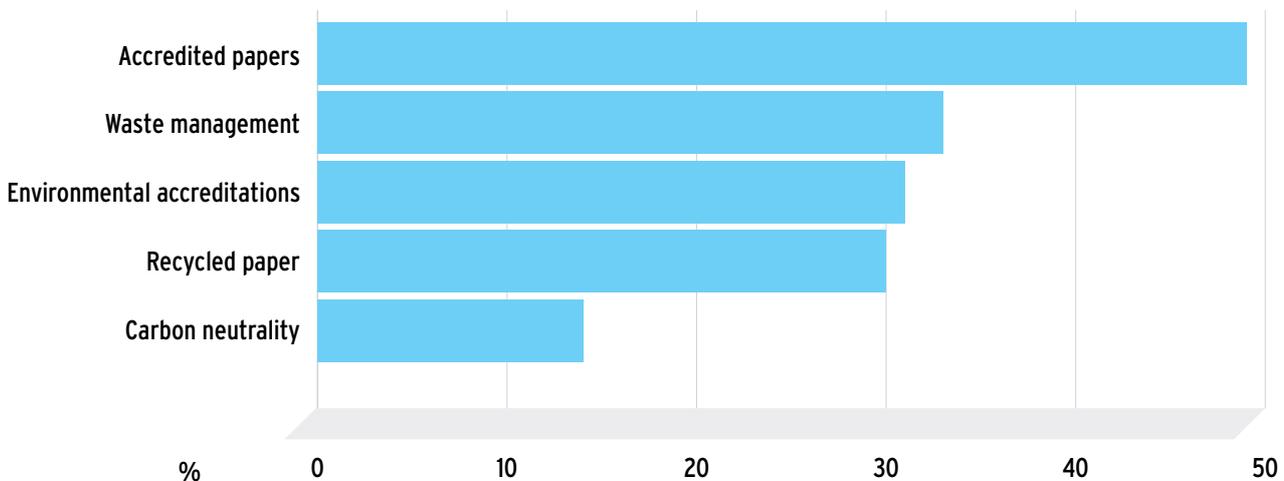


Chart 31 What are key factors driving customers' environmental specifications and demands in 2016?

For suppliers, the No.1 priority is competitive advantage ie printers being seen to be doing something by their own customers. After that waste reduction is the top practical issue

followed by corporate policy and compliance issues; understandable as many suppliers are major multi-national corporations with complex legal responsibilities.

Supplier - customer environmental concerns

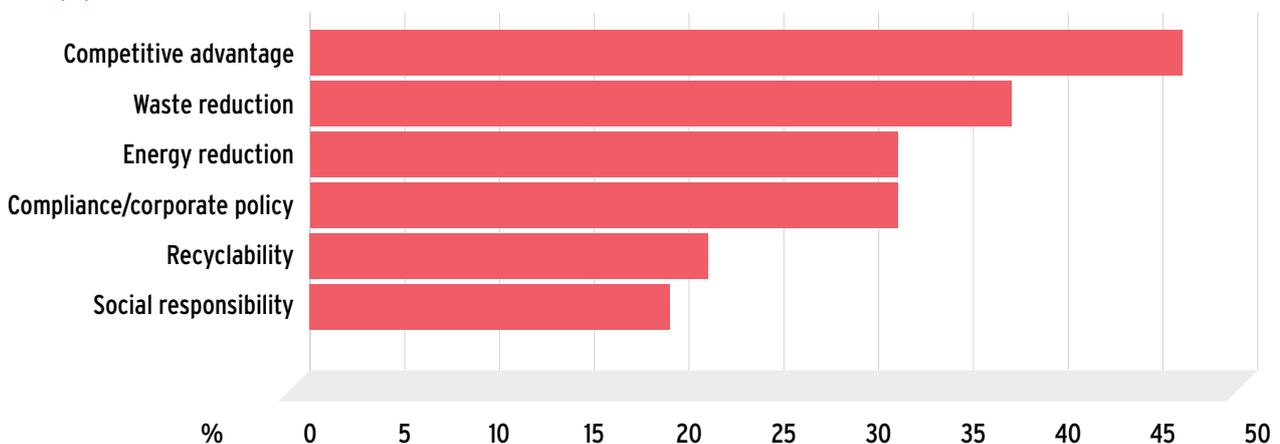


Chart 32 What are the two key factors driving customers' environmental specifications and demands in 2016?

Market specific trends for printers

Commercial printers

Given the strategic impact of digital communications on most commercial markets, it is essential for commercial printers to embrace those new print technologies that enable print to complement digital communications. Our drupa Global Insights report - Touch the future: Applications that can create growth, published in November 2015 and available via the drupa website explored this topic in more depth. So it is very disappointing to report that globally few commercial printers are adding to the range of added value services that they offer. We now have data over four years and the proportion of companies offering most of the services has not shifted significantly, indeed in some cases there is a small reduction. The one notable exception

is wide-format print, which has increased steadily from 37% in 2013 to 50% in 2016.

In prior years North America reported substantially higher adoption of these services and again this year its results are decisively ahead. Yet even here this year's results show a significant dip in participation in a number of services eg the already commented on Web to Print down by 23% against last year and website build/analysis and customer database management both down by 6%. More representative of the rest of the world is Central and South America where Internet based services are not yet as universal and/or are limited by cultural behaviour eg Middle East and related print services are less developed.

Commercial printers - in-house added value services

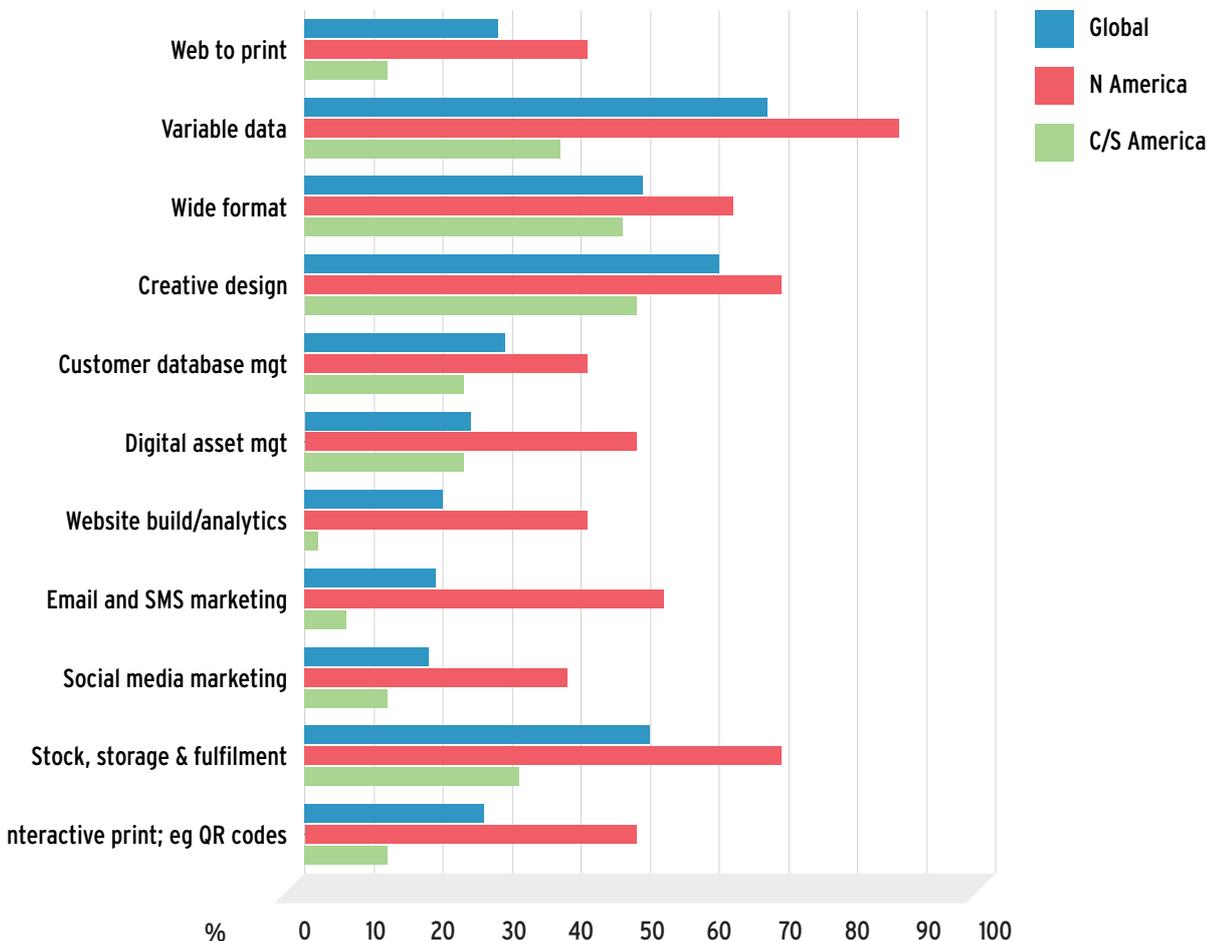


Chart 33 Please indicate which of the following capabilities you have in-house.

Turning to multichannel or cross-media services in particular, the pattern is the same - a high level of participation in North America, good levels in Europe and Australia/Oceania

and patchy elsewhere. Again this probably represents a broader lack of development of 3/4G services in the other regions at this stage.

Commercial multi-channel services

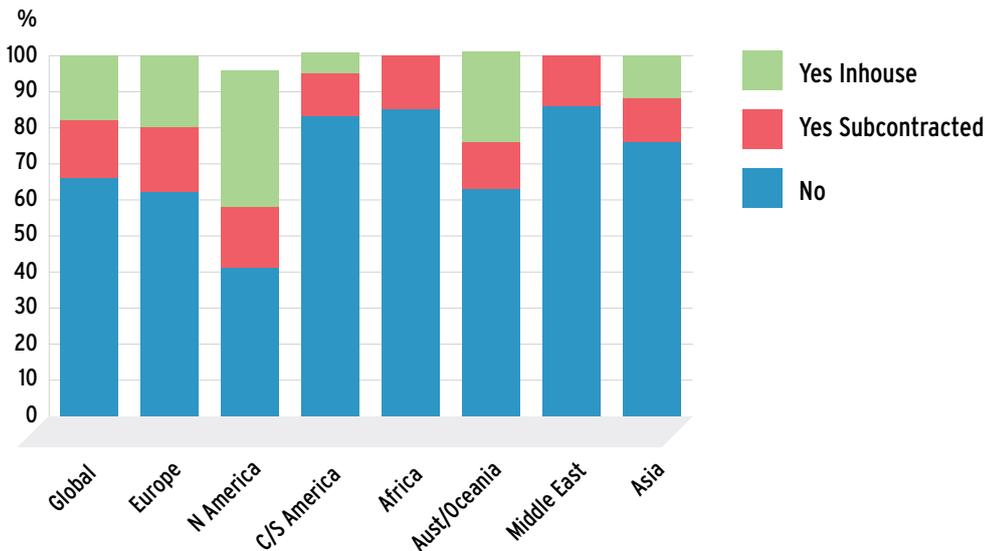


Chart 34 Do you offer multichannel/cross media services?

Yet intriguingly the actual level of demand for these services is reported by those who offer the service as lower in North America than either globally or in Europe. It may be that given

the greater number of participants in North America, the business that is there is being shared out more widely.

Demand for multi-channel services

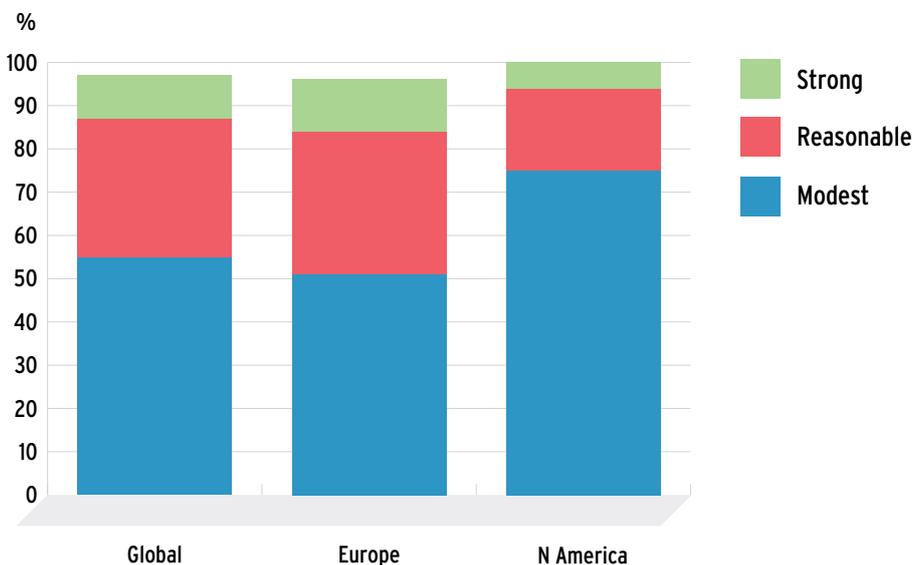


Chart 35 How strong is demand for these services?

Publishing Printers

The earlier economic confidence barometer clearly demonstrated that it is the publishing printers who have lost the most through the impact of digital communications. The actual number of titles lost to online only editions of titles is so far very small but the proportion of

titles that have online editions is substantial and the vast majority of newspaper or magazine printers in the developed regions report continuing circulation reductions. It is only in books that there is some evidence that the growth in e-books is slowing. Once again North America provides a lead indicator with a significantly higher impact of digital media.

Impact of digital media on publishing printers globally

Balance of each column gave no answer

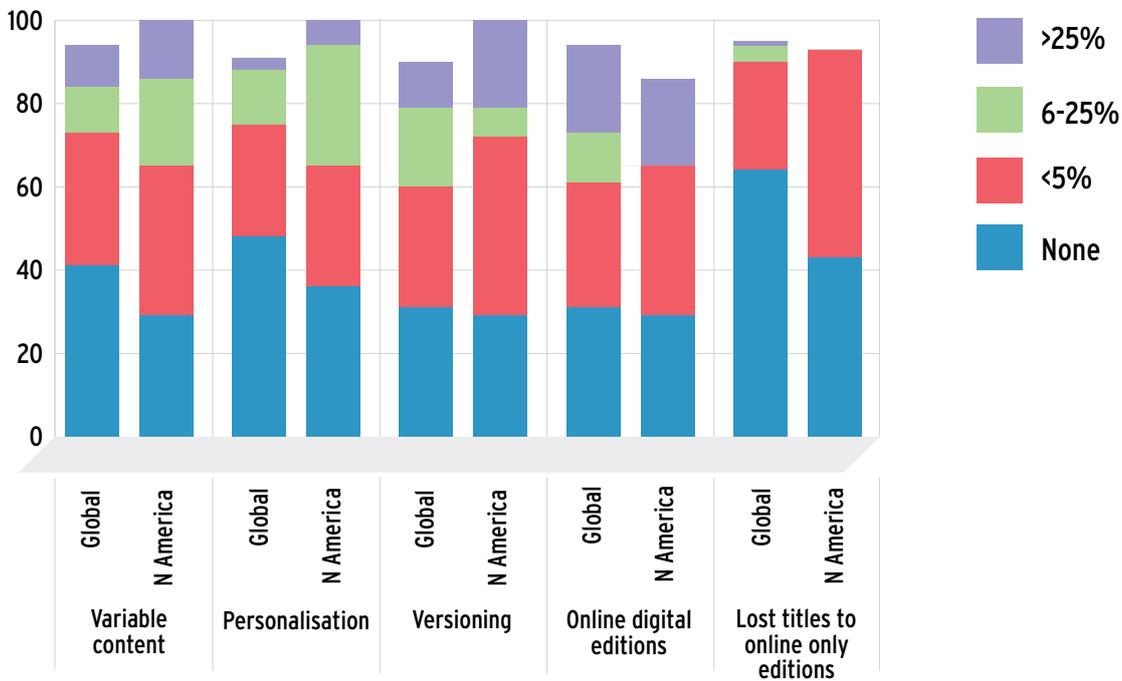


Chart 36 What % of the publications that you print [now or in the past 12 months] have the following elements, online editions, or been lost to online only editions?

So what can publishing printers do in response? One option is to develop fresh revenue streams. Certainly a majority of publishing printers offer prepress and creative design and many offer storage and fulfilment. But relatively few

printers outside North America (once more) are adopting the new services that have emerged as a result of digital communications eg digital asset management.

Publishing added value services

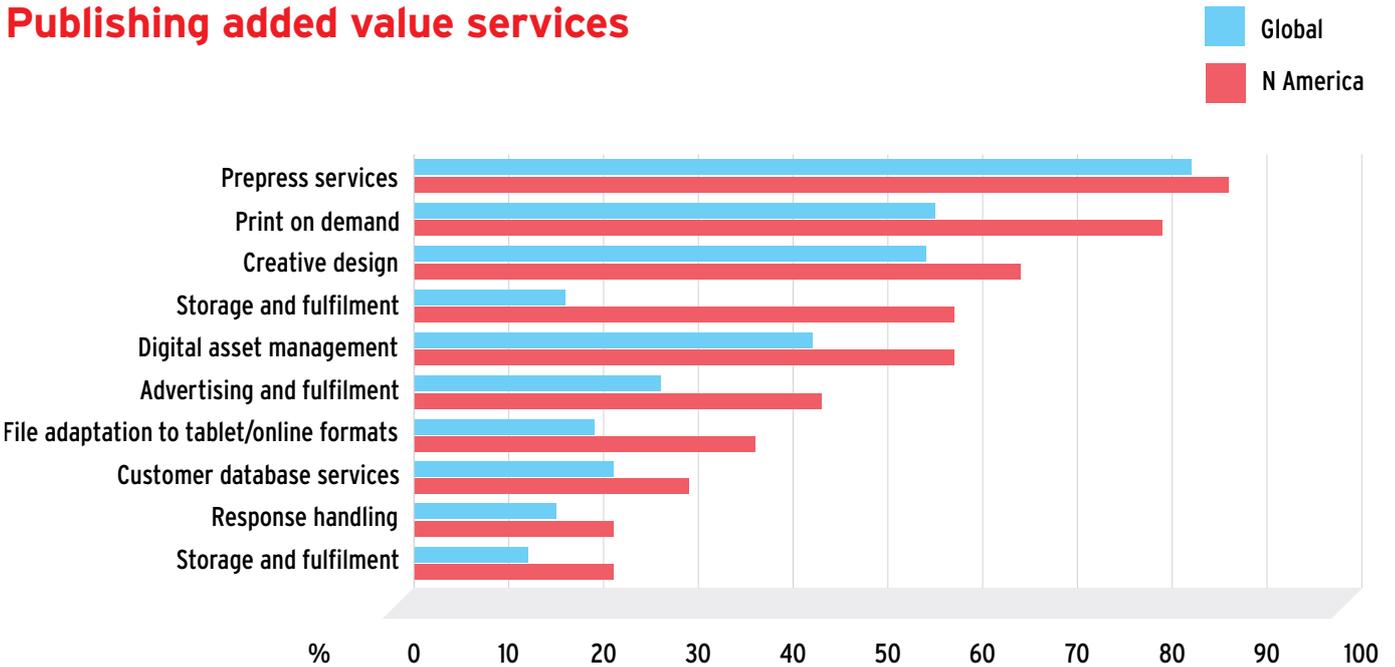


Chart 37 Please indicate which of the following services you offer in-house.

Packaging printers

We should first establish the mix of packaging applications served bearing in mind that respondents on average served 1.6 applications. Most packaging converters would wish to see an increasing proportion of SKU's with an added value feature of one form or another. Chart 38 shows this is true only for a minority of SKUs with little evidence of growth as a % of total SKUs.

Mix of packaging markets served

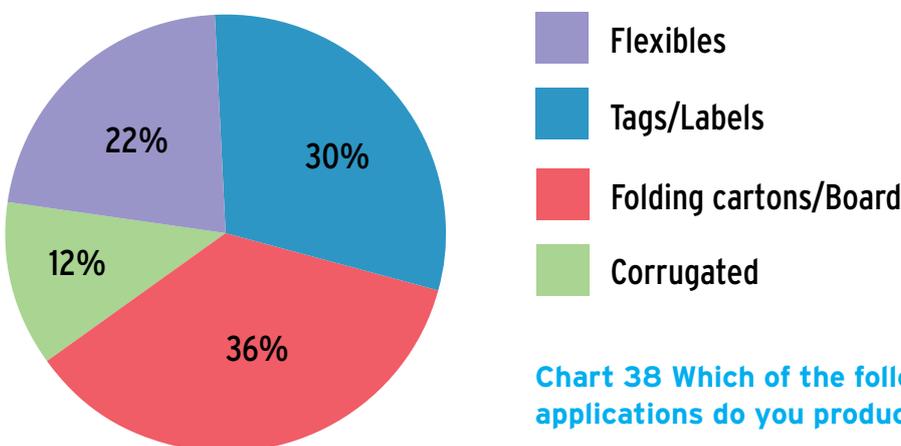


Chart 38 Which of the following packaging applications do you produce?

Added Value SKU's

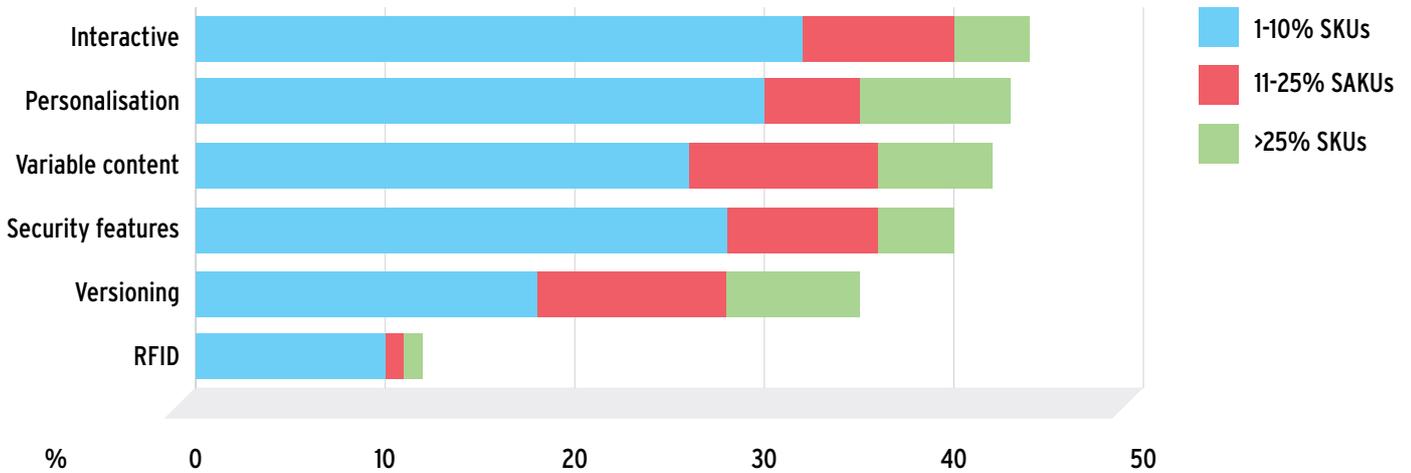


Chart 39 Does any of your package/label printing have the following elements?

It is in the transition to digital print where there is increasing evidence of an impact, albeit relatively modest to date. Globally a third of packaging converters are now offering digital print, up from 24% in 2014. In the developed regions the

proportion is even higher - Europe 37%, North Americas 42% and Australia/Oceania 45%. 18% of those offering digital print report strong demand for such services, the same as last year. (We did not ask this second question in 2013.)

Digital packaging and demand strength

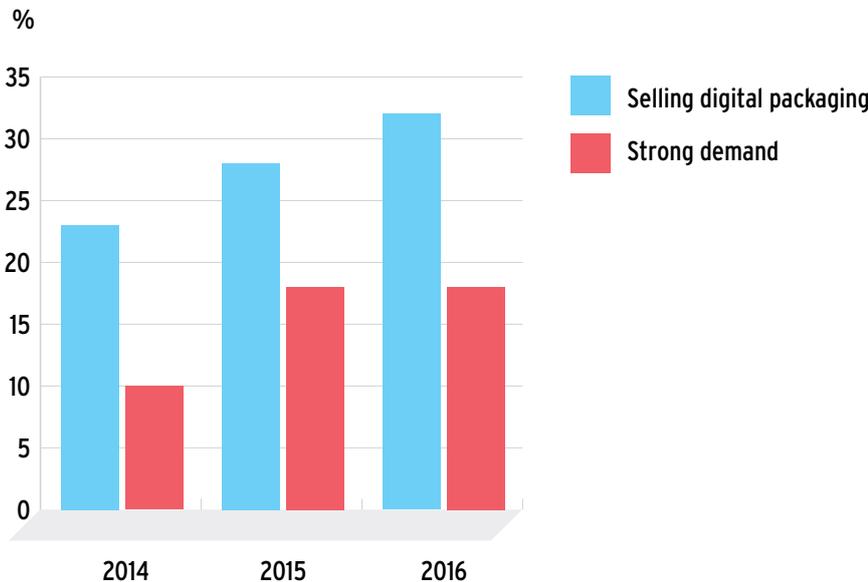


Chart 40 Do you offer digital print? And if you do, how strong is the demand?

We can see from chart 41 that the attraction of digital print so far is largely for tags/labels and to a lesser degree folding cartons.

% SKUs specifying digital print

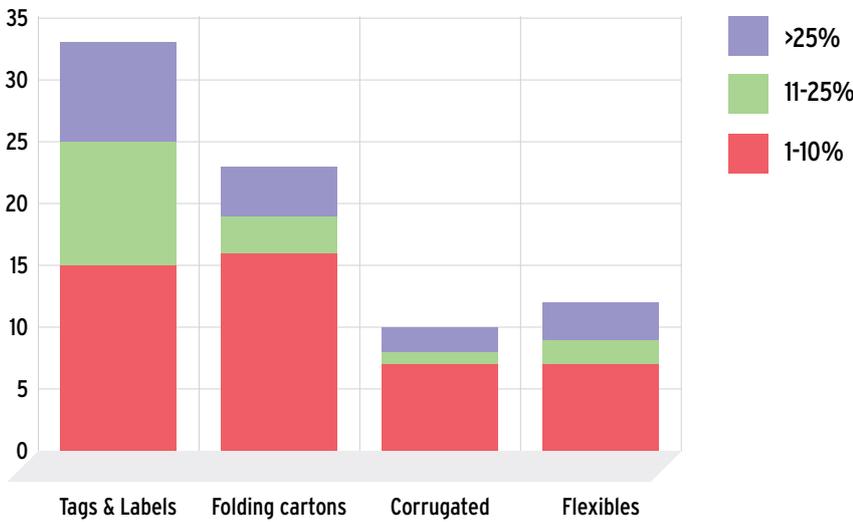


Chart 41 What % of SKUs (Stock Keeping Units) specifies digital printing?

Functional printers¹¹

On average, our panel of functional printers serve 1.8 markets with textiles and ceramics most common. 61% had a printing origin to their company with 24% coming from another manufacturing industry and 15% from some other background.

¹¹ Described in the survey as Industrial/Decorative

Type of markets served by functional printers

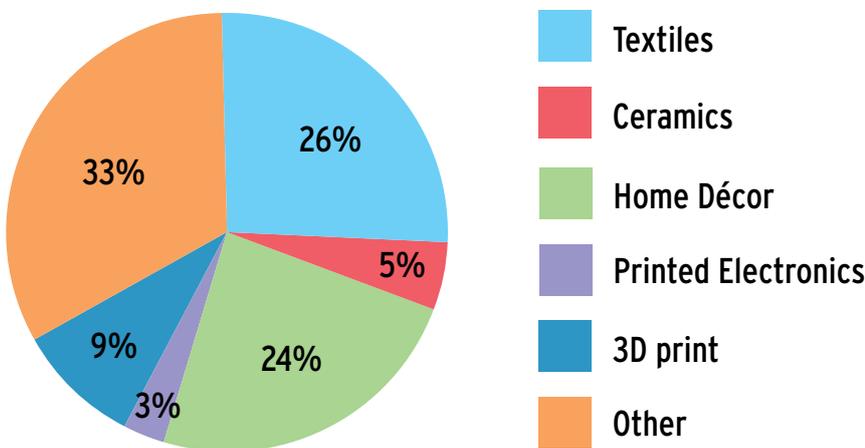


Chart 42 Which of the following industrial/decorative applications do you produce?

Given the healthy condition of this market, it is not surprising to see it is of increasing importance to those printers who have other

interests. So chart 43 shows a rapid increase in the proportion of turnover that is functional print.

Functional print as % of company turnover

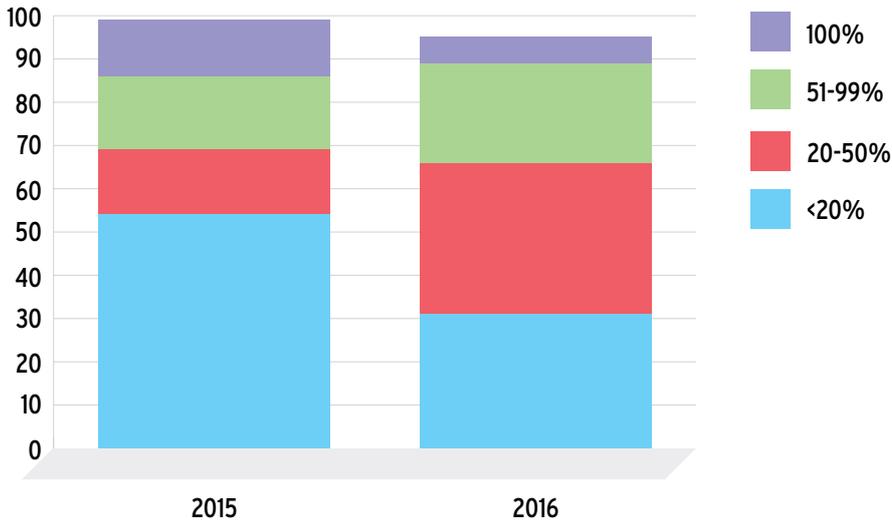


Chart 43 What % of your company turnover did these markets represent in the last 12 months?

It is clear from chart 44 that digital inkjet has rapidly taken over as the dominant print technology at a cost to screen print.

Functional print - primary print process

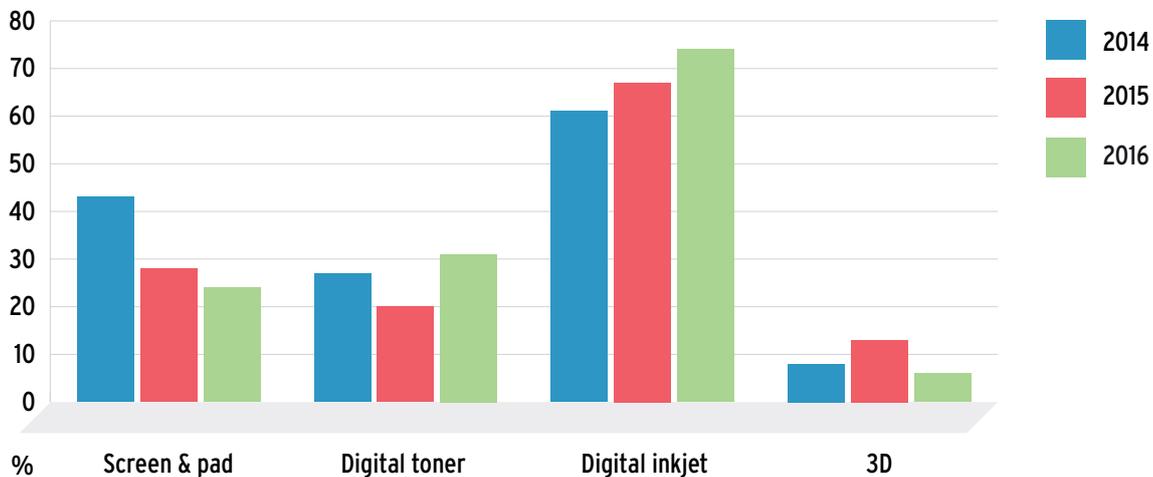


Chart 44 What print processes do you primarily use?

In conclusion

You do not need to be an optimist to work in print...but it helps. The double whammy of the extended 2007/8 global recession and the more strategic impact of digital communications, hit the global print industry really hard. There were dire predictions for the rapid decline of the industry. Yet in contrast, drupa held in Spring 2016 was acknowledged by all to be a great success showcasing a strong and vibrant industry.

The statistical evidence of that buoyancy has followed in the results in this report. Nothing too dramatic but for printers there is consistent improvement in revenues to offset reductions in pricing and margins and strong capital investment plans to give confidence. Whilst for suppliers, improving revenues and margins coupled with again strong investment plans show a positive future.

So we can say that globally print is on the up again - not universally of course but in most market sectors and in most regions. Whilst Functional and Packaging print are in expansive mode, Publishing print is in a more defensive mode with Commercial print somewhere in-between. In regional terms, the Middle East has chronic problems undermining performance and Africa and South/Central America remain fragile.

All print companies must continue to adapt and meet the market challenges head on. This will mean a ruthless approach to efficiency and automation and at the same time learning new skills and developing new added value services. Nevertheless it is pleasing to report that overall, print has got its 'mojo' back.

Appendix

drupa expert panel participants by region

	Printers	Suppliers ¹
Europe (including Russia)	552	220
North America	59	61
South & Central America	104	58
Africa	39	28
Australia/Oceania	24	20
Middle East	21	34
South/East/Central Asia	65	69
Global Total	839	331
¹ participant reporting for a region who may or may not be based in that region		

Printer site annual turnover

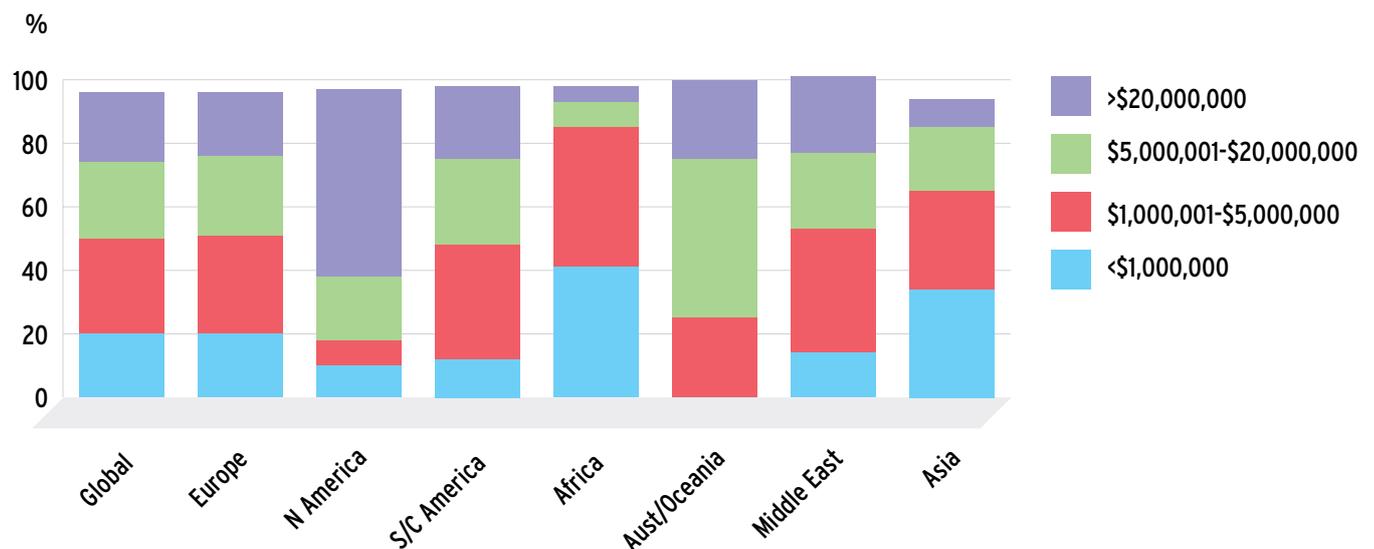


Chart 45 What was the annual turnover at your site in 2015?

drupa printer participants by market

	Commercial	Publishing	Packaging	Functional ¹
Europe	310	232	254	76
Rest of World	173	131	176	34 ²
Total	483	363	430	110
¹ Described in the survey as Industrial/Decorative				
² Too small a sample for deeper analysis				

Current print technologies by market sector and in total

% present	Commercial	Publishing	Packaging	Functional	Total
Sheetfed offset	73	72	60	34	64
Heatset offset	9	19	9	3	10
Coldset offset	9	19	6	0	10
Gravure	4	4	19	10	9
Flexo	9	5	47	11	22
Screen printing	10	10	18	24	14
Letterpress	19	13	18	10	15
Thermal	6	4	6	13	5
Hybrid offset/flexo/digital	8	4	7	6	6
Digital					
Digital toner rollfed mono	6	4	3	5	5
Digital toner rollfed colour	8	10	14	10	10
Digital toner cutsheet mono	41	38	15	23	29
Digital toner cutsheet colour	66	55	26	40	46
Digital inkjet rollfed colour	27	16	14	52	21
Digital inkjet cutsheet mono	9	4	5	5	6
Digital inkjet cutsheet colour	21	12	13	39	16

Print % volume change 2016 by print process by market and in total

% present	Commercial	Publishing	Packaging	Functional	Total
Sheetfed offset	4	15	12	2	8
Heatset offset	0	1	3	0	1
Coldset offset	0	1	1	0	0
Gravure	1	0	6	-2	2
Flexo	3	1	21	8	8
Screen printing	2	-2	1	3	1
Letterpress	-4	-4	-2	-3	-3
Thermal	0	0	2	5	0
Hybrid offset/flexo/digital	4	4	6	6	4
Digital					
Digital toner rollfed mono	2	1	2	5	1
Digital toner rollfed colour	6	6	6	5	5
Digital toner cutsheet mono	12	11	7	13	8
Digital toner cutsheet colour	36	33	15	29	25
Digital inkjet rollfed colour	14	9	8	32	11
Digital inkjet cutsheet mono	3	4	3	6	3
Digital inkjet cutsheet colour	10	10	9	18	9

Glossary

Commercial printer	Direct Mail, Business forms, Security, Wide-format, Trade finishing for commercial work
Publishing printer	Newspapers, Magazines, Catalogues and Books, Trade finishing for publications
Packaging printer	Labels, Cartons & Carton Board, Flexible Packaging
Functional printer	Industrial/Decorative - Printed electronics, 3D, Ceramics, Textiles, Wall coverings
Digital cutsheet mono	Single colour Electrophotography/Toner machines with sheetfed paper supply
Digital cutsheet colour	Multiple colour Electrophotography/Toner machines with sheetfed paper supply
Digital rollfed mono	Single colour Electrophotography/Toner machines with reel-fed paper supply
Digital rollfed colour	Multiple colour Electrophotography/Toner machines with reel-fed paper supply
Digital rollfed inkjet	Mono and colour Inkjet machines with reel-fed paper supply. Category includes all formats.
Digital inkjet cutsheet mono	Single colour inkjet machine with sheetfed paper supply
Digital inkjet cutsheet colour	Multiple colour inkjet machines with sheetfed paper supply
Hybrid offset/flexo/digital	Multiple print processes included in the same machine
SKU	Stock Keeping Unit (an individual item/product with a unique reference identifier)
VDP (Variable Data Printing)	A form of digital printing in which elements of text and graphics can be changed from one sheet to another.
Web to Print	E-commerce system for the ordering and submission of print jobs online