BCS INTEGRATED SOLUTIONS

AFTER THE PANDEMIC – NEW NORMAL, NEW THINKING

SUMMER 2020

iXConsulting

CONTENTS

EXECUTIVE SUMMARY

Welcome to our Summer 2020 survey, undertaken at a time of unprecedented circumstances which gives us unique insights from our industry at a potentially era defining time. No industry is escaping the impact of Covid-19, a black swan event that some in the scientific community are now saying was predictable with Ebola, MERS, Swine Flu, Sars and Bird Flu being the indicators. Furthermore, it is now widely believed that these types of events will happen with increasing frequency.

At the outbreak, disaster recovery plans and their implementation were severely tested with a large proportion found wanting. Mass homeworking saw our digital infrastructure under pressure with collaborations tools, streaming and social media to the fore. The good news is that so far it has withstood the challenge.

The responses to our survey have been highly illuminating. One of the most dramatic sentiment changes has been in the predicted expansion of in-house data centre space, with only 21% of respondents expecting an expansion over the coming 12 months. This is the lowest proportion recorded since the inception of the survey over a decade ago and significantly below the long-term average of this measure which stands just shy of 50%. Is this an indicator of cutting floor space and moving to a more flexible model to cope with changing working patterns? There is also some caution over the immediate activity in the sector. Our latest survey provides some evidence that the results of the global pandemic causes concerns amongst our developer and investor respondents. When queried about their expectations on portfolio expansion in the coming year, only around half indicated that they would expand over that period; a substantial fall from the 92% recorded 6 months ago.

Despite the overall decline in economic confidence, it is significant that the proportion of end-user respondents who expressed their intention to expand operations with an external infrastructure partner over the next 12 months, has remained close to the long-term average of 42%. This provides evidence that the appetite for third-party managed IT real estate solutions could remain relatively buoyant, despite the coming global economic downturn. With reported latency issues and variable download speeds, this sentiment is further underlined by the opportunities of the potential changes to working patterns and how our digital infrastructure is delivered. Technology is being harnessed to address the challenges of lockdown; we are accelerating towards a cashless society; track and trace is being implemented; remote GP surgeries are the norm. Disaster recovery processes will be revised and plans for further intermittent lockdowns will be developed as home working will be more prevalent. Access to accurate and reliable information together with enhanced customer service and support will become paramount. Will these be the accelerating factors in the increasing adoption of the Edge?

There are and will be other challenges. For instance, difficulties with the supply chain was cited high as a pain factor, with 24% placing it at the top of their list. The difficulties in sourcing materials from domestic suppliers who are in lockdown is problematic in itself, but in a high-value industry where supply chains are increasingly global, there are significant challenges when movement is restricted, or priorities given to movement of essential medical equipment. Looking into the near future, solutions to these challenges will require new thinking which we at BCS have been developing and successfully implementing with our clients. Will this be the new normal or a paradigm shift that sees technology being utilised to its full potential? There are many hurdles to face but opportunity exists. It is down to us to shape the opportunity and grasp it.

James Hart
CEO

"THERE IS NOTHING PERMANENT EXCEPT CHANGE"

Heraclitus

Welcome to the 20th European Data Centre Survey – Summer 2020 edition undertaken by independent research company iXConsulting and sponsored by BCS, who offer integrated solutions through IT asset consultancy.

Our survey capture work was undertaken during April and May this year; arguably one of the most extraordinary periods of modern global history over the last 100 years outside of the World Wars. The global impact of the Covid-19 pandemic on every citizens' daily lives is unparalleled, changing our everyday interactions and likely to leave a permanent legacy on the way that we live and work.

WHAT IS YOUR PRIMARY RELATIONSHIP WITH THE DATA CENTRE INDUSTRY?

Our latest survey assesses the initial response of the European data centre industry, although the true consequences of this particular coronavirus may not be realised for some time, as different governments react in different ways and economies assess the true scale of what has been effectively a three month halt in global business.

Much of our survey work over the past eleven years has seen an industry driven by the tremendous rise in technology applications and the subsequent explosion in the amount of data generated, transmitted, processed, and stored. Our survey findings have reflected a broad confidence among data centre practitioners over the years whether they provide the broad infrastructure or layered services on top of the infrastructure – both benefiting from a more sophisticated service designed to meet end-users needs.

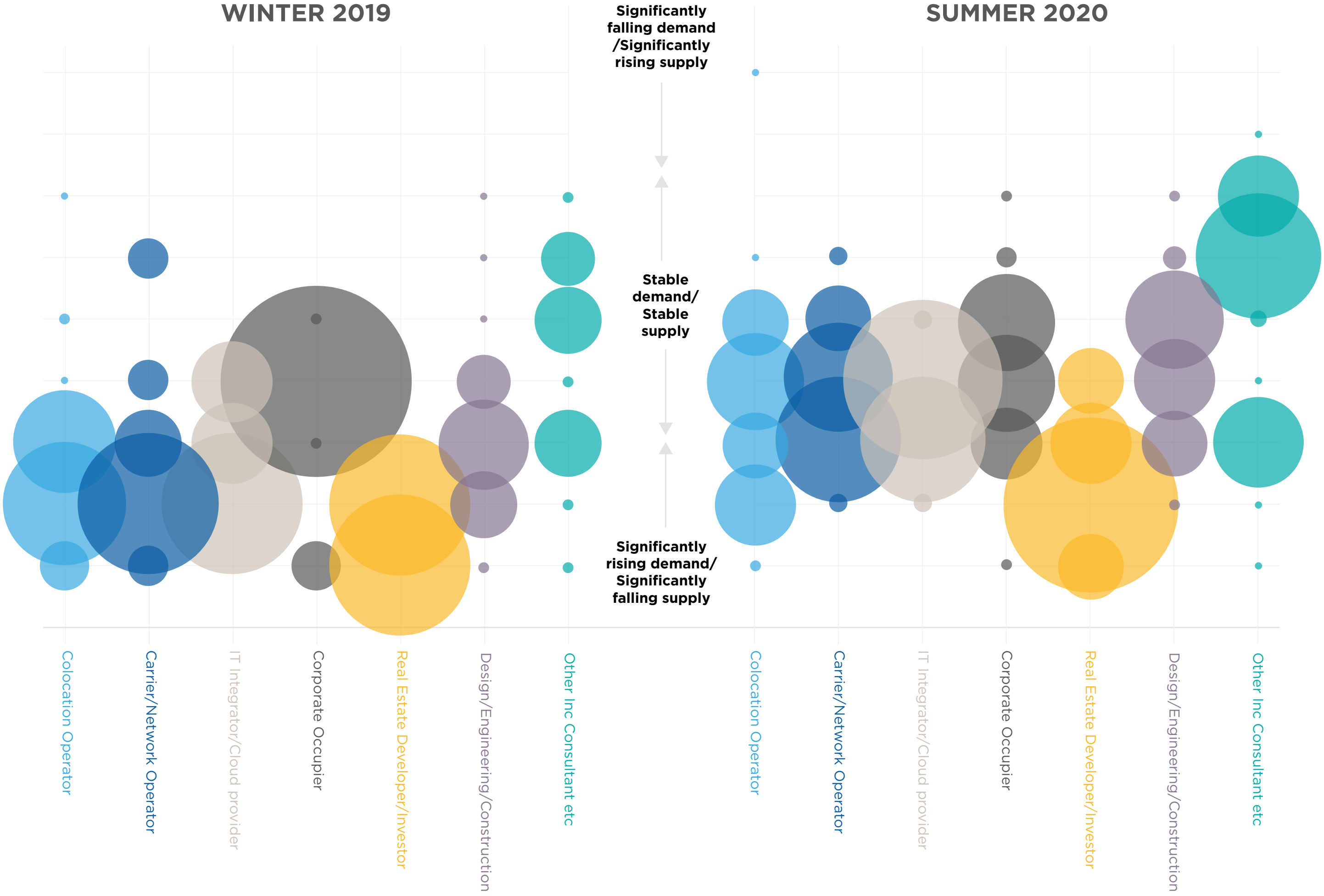
This has led to an underlying element of optimism that has broadly characterised the industry over the decade, although not without expectations in relation to sub-elements of supply and demand. Results from our latest survey undoubtedly introduce a greater degree of caution and acknowledgement that global uncertainty now exists in relation to economic prospects, which in turn will result in challenges for the data centre industry.

Nevertheless, alongside potential seismic change there is opportunity and the challenge for the European technical real estate sector is to identify and grasp those opportunities. The ongoing digital transformation of society may be accelerating towards more complex technologies including greater automation and artificial intelligence solutions, but also solutions to address a "new" way of working. For example, a major outcome of the crisis has been a huge uplift in the degree of home working/schooling and its reliance on IT infrastructure and cloud services. The rate at which this has been adopted through necessity has been extraordinary.

Microsoft CEO, Satya Nadella, revealed that its Teams usage alone had increased two-fold in a few months to more than 75 million daily active users, while the platform saw 200 million meeting participants in a single day in April. In addition, meeting-platform rival Zoom recorded 300 million daily meeting participants and Google's Meet platform reported 100 million in the same month.

Our survey reflects the views of a wide variety of professionals working in the European data centre industry, including owners, operators, developers, and investors of facilities, design and construction specialists, those providing services and products to facilities, consultants and end users who may own and run their own buildings, or occupy a third-party's space. In all, the research includes the views of participants who either occupy or control over 40 million square feet (3.9 square metres) of technical real estate across 35 countries in Europe.

THE SUPPLY DEMAND BALANCE



- Since we began this survey over a decade ago, there has been a strong view from respondents that the market is characterised by rising demand levels allied to falling supply. Whilst that view still holds amongst many the number has fallen from two-thirds in our Winter 2019 survey to two-fifths this time.
- 92% of respondents believe that demand is either maintained or increasing, a fall from the 97% seen in Winter 2019. In addition, 8% of respondents are forecasting a fall in demand over the next 12 months, over double the number recorded 6 months earlier.
- As has been the trend over most of past decade, the developer and investor respondents remain the most confident in terms of market sentiment with nine-out-of-ten suggesting that demand will be rising over the next 12 months. For the first time however, a proportion of this group - some 12% - expect to see some decline in supply over the same period.
- Most suppliers of data centre services are less positive around the balance between supply and demand in the market, with less than half seeing rising demand. Most still expect demand to remain stable at worst, albeit for the first time, a very small minority of colocation operators expect demand to fall.
- IT Integrators and cloud providers are more benign in their outlook, with 45% believing the coming year will be characterised by stable demand and stable supply.
- Corporate respondents continue to be cautious compared to the suppliers and owners, with around 72% indicating that they expect demand to remain stable at best over the coming year. In addition, 6% of corporates reported that there may be a fall in demand, a relative leap from the near-zero recorded in Winter 2019, but still significantly below the 10% seen 12 months earlier.

OWNERSHIP AND MANAGEMENT

For suppliers of data centre services – colocation operators and IT integrators/web hosting providers – the desire to manage their own facilities, remains a crucial element of their business model with nearly four-fifths reporting that 80% or more of their data centre portfolio was internally managed; in line with the long term average.

Maintaining this proportion allows these providers to respond in a flexible and time-efficient manner when satisfying changing client demands, without the potential cost limitations or delays which may result from having to deal with an underlying third-party provider of space.

In contrast, corporate respondents continue to appear to find outsourcing to a third-party provider an attractive option. Around three-quarters of end users indicated that at least 80% or more of their portfolio is externally managed, albeit this reflects a marginal decrease from the four-fifths monitored six months earlier.

The reality of our more IT-intense business world is that whilst respondents find a third-party solution attractive - not least because of the CAPEX savings it offers and access to otherwise costly enhanced environments – business risk demands can dictate solutions, with many corporates choosing to adopt a blended approach of both internal and external solutions for their data centre needs.

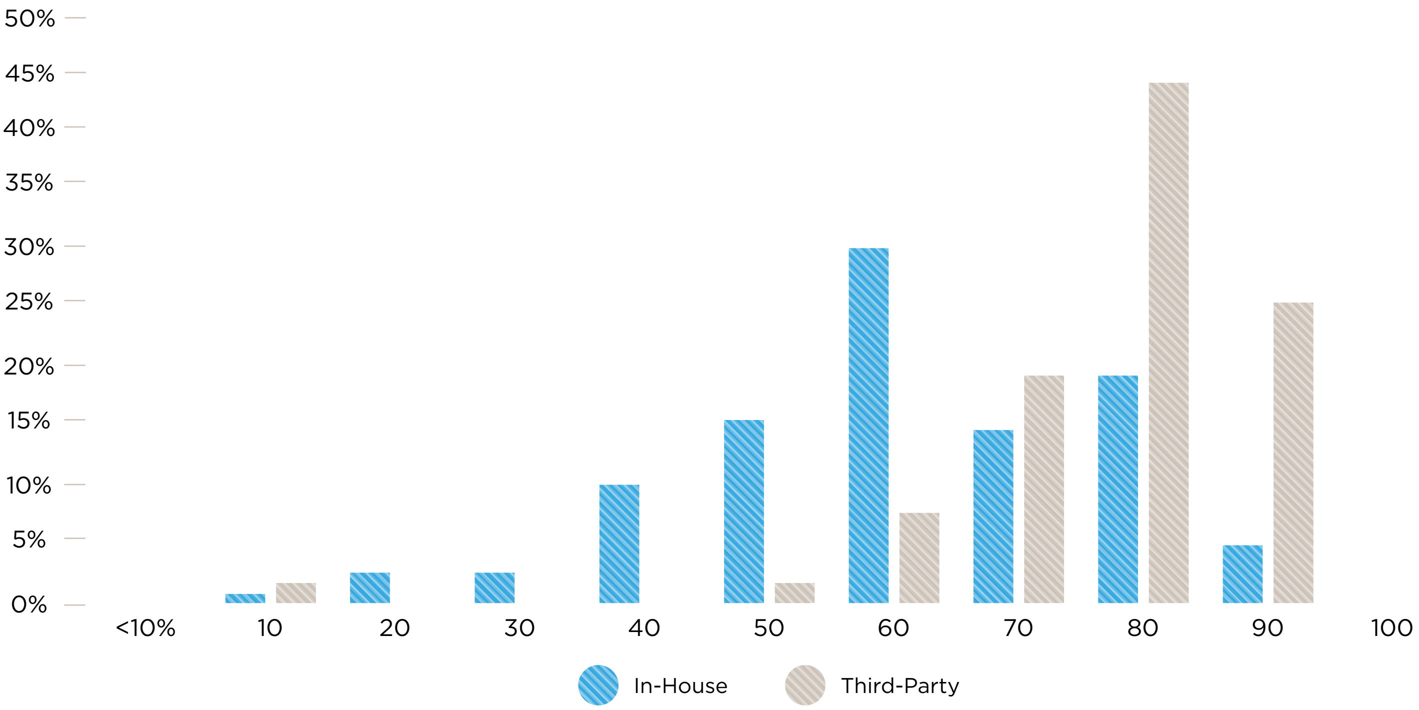
THIRD-PARTY UTILISATION RATES HIGHER

The desire for both service providers and users to maximise the utilisation of their data centres whilst maintaining flexibility for growth has been a constant feature of our findings since the survey began over a decade ago. This requirement is particularly true for occupiers with a large proportion of third-party managed space as they seek to balance the costs associated with taking and using space as well as planning for expansion space.

The average utilisation ratios of third-party users continue to exceed those for internally managed solutions. Six months ago, our survey reported that almost 60% of respondents reported that they utilised over 80% of their outsourced technical footprint compared to 28% who utilised the same percentage of in-house managed facilities. The latest respondents reported a continuation of this, with the proportion of those having utilisation rates of externally managed solutions of 80% or more rising to just under 70% whilst the rates of +80% of in-house utilisation have fallen marginally to 24%.

Amongst corporate occupiers, the requirement to maximise efficiencies in externally managed data centres – minimising expensive under-used space - has meant that this proportion is even higher at over 75%, whilst contrasted to 62% reporting this high utilisation for in-house managed facilities.

HOW MUCH OF YOUR CURRENT DATA CENTRE SPACE IS ACTIVE AND BEING USED?



In contrast, average utilisation rates of their own facilities amongst colocation operators, carriers, integrators and cloud providers tend to be marginally lower at around 60%, a proportion which would allow them the flexibility to respond quickly to rapid changes in demand. As with other users, service providers are driven by a need to maximise value for money regarding their third-party space, maintaining relatively high utilisation rates at about 70% in these facilities.

EXPANSION CONTINUES

For our third survey in a row, around two-thirds of respondents indicated that they had increased their in-house managed data centre capacity in the preceding six months. At the same time, however, there has also been a rise in the number of respondents reporting that they have reduced their in-house technical floor space; up to 16% compared with 11% previously. Notably, much of this examined period occurred prior to the months where Covid-19 rose in prominence in Europe.

Amongst our service provider respondents, colocation suppliers continue to lead the way in terms of expansion, with around four-fifths indicating increases of their own stock over the last six months, a similar proportion to the preceding survey period. This level of expansion suggests that - at least prior to onset of the pandemic - the expectation amongst providers was that they would need to continue to provision space to respond to growing levels of demand from end-users.

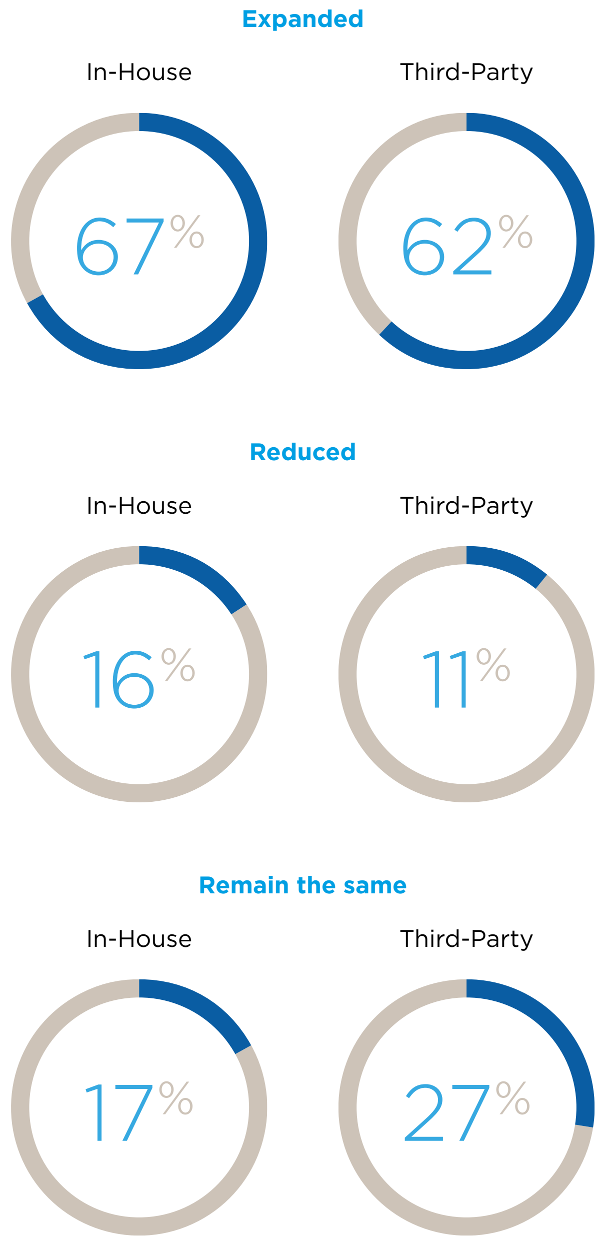
Amongst our corporate respondents 16% indicated an increase in their in-house technical floor space over the past six months; a marginal decrease from 18% recorded in our last survey. At the same time, we have seen a rise in those who reported that they had reduced self-managed stock; just over half reported that this was the case.

The monitoring of third-party expansion patterns over the past six months points to a continued expectation of high levels of demand for data centre services. Around 62% of our respondents indicated an increase in their externally managed solutions over that period, compared to the 61% tracked against the same measure in Q3/4 2019.

Amongst our end-user respondents however, we have seen a marked uplift to 68% stating that they had expanded their third-party data centre portfolio over the last six months period, compared to 58% reporting the same in our preceding survey.

This reflects the ongoing popularity of external solutions for corporate respondents. In fact, given the use of cloud-based voice and data applications have become even more popular during the current pandemic, as enterprises look for solutions to service the changing work patterns, it would be very surprising if this upturn was not reflected again in our next survey.

HOW HAS YOUR TOTAL FITTED TECHNICAL FLOORPACE ALTERED OVER THE PAST SIX MONTHS



HOW WAS EXPANSION ACHIEVED?

The choice of routes to expansion of self-managed facilities in our latest survey show only small differences in those recorded six months previously. The self-build route was again the most popular practice to expansion, with 58% of respondents using it, slightly below the 60% recorded last year.

The option of purchasing or leasing through a development partner was chosen by 27% of respondents, whilst 15% reported that they have reduced their facilities through the decommissioning of a legacy facility; the majority of these were enterprise end-users.

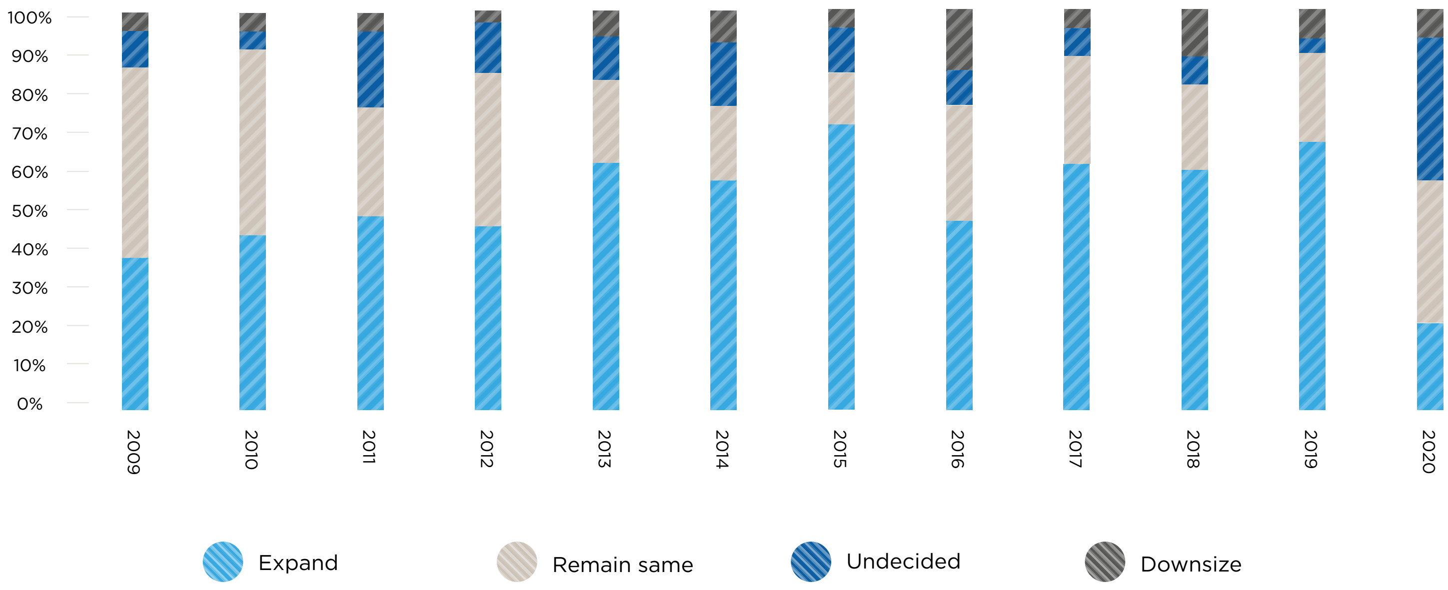
In terms of externally managed expansion, taking space from a colocation partner remains by far the preferred option with some 78% of respondents saying that they had chosen this route, followed by IT integrators, carriers and network providers. This overall total does disguise the fact that many respondents will have chosen a multi-supplier route.

COVID-19 UNCERTAINTY IMPACTING EXPANSION

The extent to which the impact of Covid-19 has created uncertainty across data centre owners is, unsurprisingly, illustrated in respondents' indications of immediate expansion plans. Whilst there is a considerable level of panic amongst global economic commentators that currently underpins some ominous projections for European and Global economies, the following results – whilst important to acknowledge – are illustrative of an industry that we would argue is moving into a period of caution rather than decline.

One of the most dramatic sentiment changes has been in the predicted expansion of in-house data centre space, with only 21% of respondents expecting an expansion over the coming 12 months; the lowest proportion recorded since the inception of the survey over a decade ago and significantly below the long-term average of this measure which stands just shy of 50%.

WHAT ARE YOUR CURRENT EXPECTATIONS FOR CHANGES TO YOUR 'IN-HOUSE' TECHNICAL DATA CENTRE AREA?

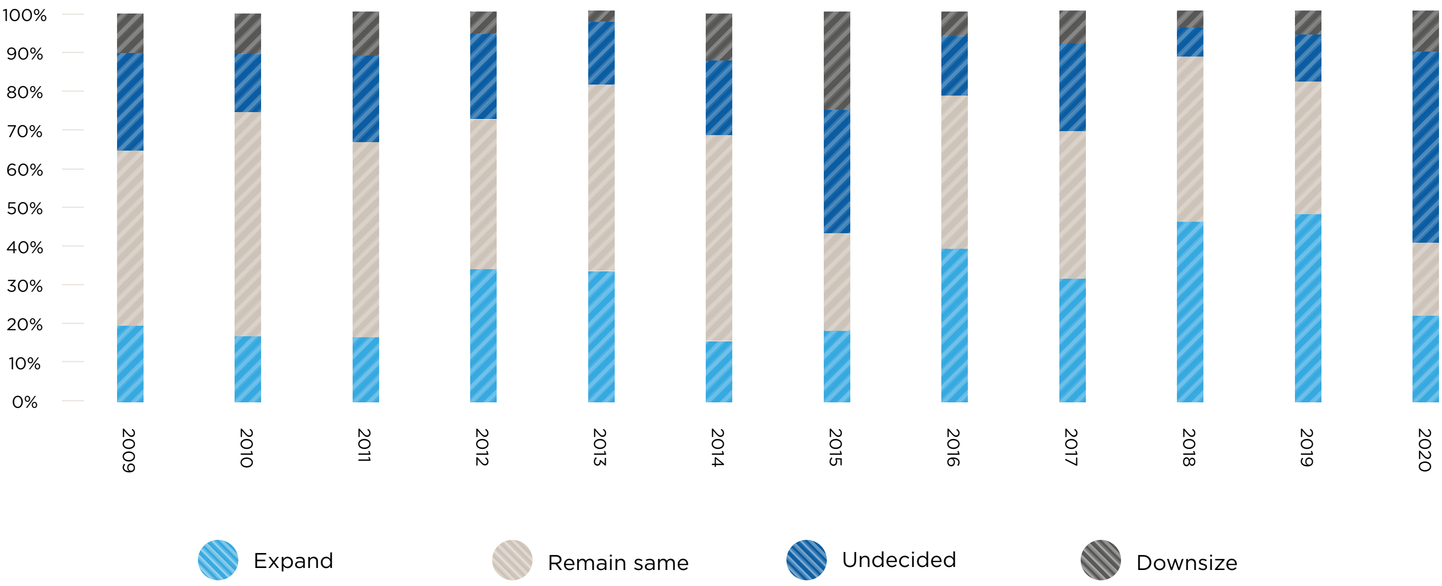


Similarly, respondents' attitudes toward third-party managed space fares only marginally better, with just under a quarter reporting their intention to expand over the coming year. This represents a reduction on the 49% stating expansion intentions just six months ago – another significant drop in such a short space of time.

These falls can be tracked across all respondent groupings, although colocation operators and carriers have the greatest amount of confidence in expansion of in-house managed space, with around one-third of them continuing to record an intention to grow over the next 12 months.

Notably, the number of respondents looking to reduce their data centre estate has continued to remain relatively low and close to the long-term average monitored during the last decade for both in-house and third-party managed space. For instance, the proportion of respondents intending to reduce their in-house space has risen from 6% to 7% in the last 6 months, whilst those reporting that they would reduce their externally manged space has risen from 6% to 10%.
These falls can be tracked across all respondent groupings, although colocation operators and carriers have the greatest amount of confidence in expansion of in-house managed space, with around one-third of them continuing to record an intention to grow over the next 12 months.

WHAT ARE YOUR CURRENT EXPECTATIONS FOR CHANGES TO YOUR 'THIRD PARTY' TECHNICAL DATA CENTRE AREA?



So the caution adopted by respondents has been illustrated by the considerable rise in the number who either remained undecided or who have declared that their portfolio will remain the same, an indication of a much more considered industry view – a wait and see approach. It is a marked rise, however, with the proportion undecided about in-house levels increasing from fewer than 3% to 37% in six months whilst those undecided about externally managed space levels rising from 11% to around 47%. Meanwhile, respondents reporting that their portfolio would remain the same rose from 26% to 36% for in-house managed facilities.

Amongst end-users, just 5% indicated that they would look to enlarge their internally managed space. This of course should be set against a long-term trend of corporates moving towards outsourcing solutions for their IT requirements. It may be that the latest results suggest that the pandemic could accelerate this trend than would otherwise have been seen.

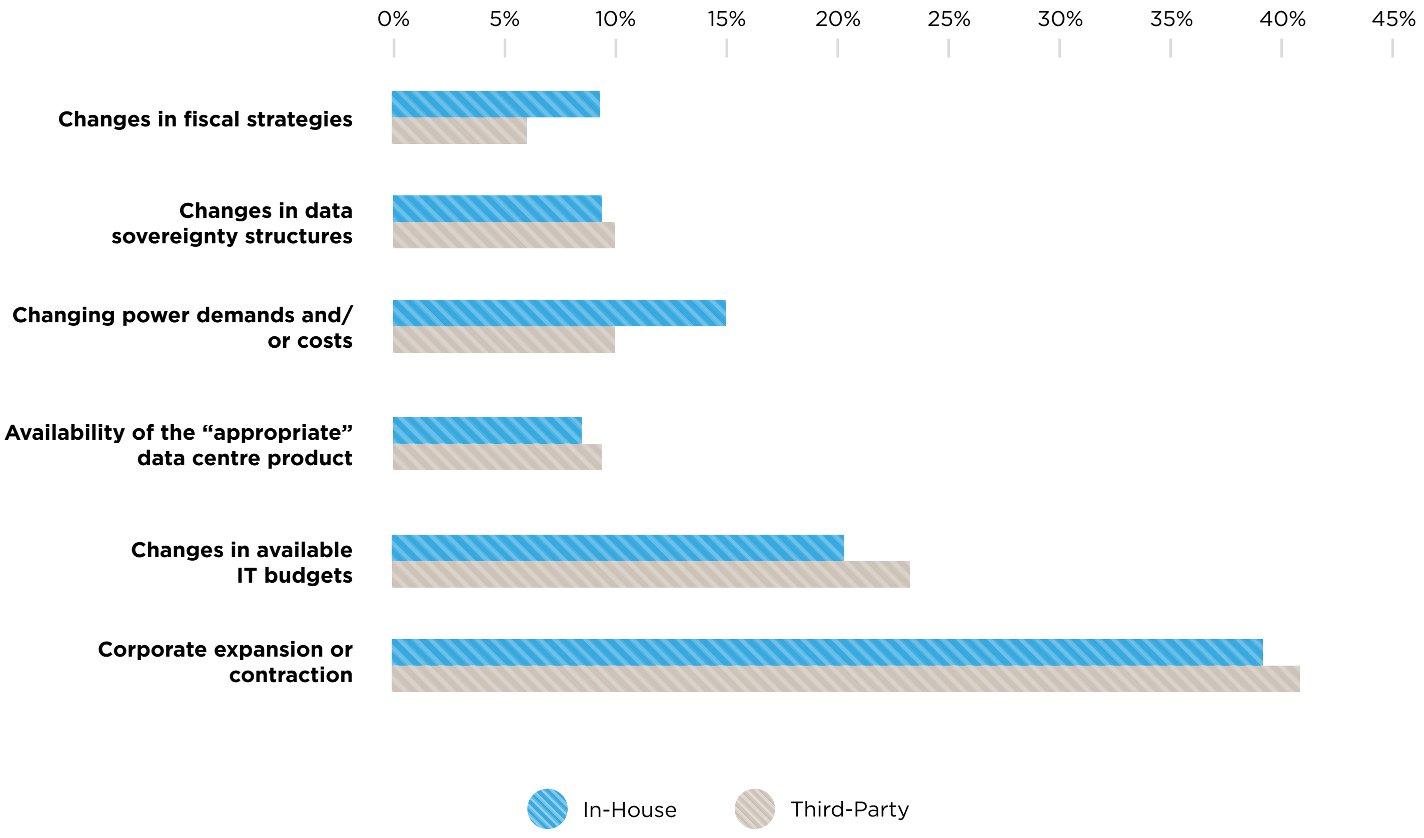
Despite the overall decline in economic confidence, it is significant that the proportion of end-user respondents who expressed their intention to expand operations with an external infrastructure partner over the next 12 months has remained close to the long-term average of 42%. This provides evidence that the appetite for third-party managed IT real estate solutions could remain relatively buoyant despite the coming global economic downturn.

DRIVERS OF CHANGE

Within the context of current events, it is perhaps not surprising that corporate expansion or contraction remains by some distance the most highly ranked factor driving change in both internally controlled and third-party data centres. Given the forecasts surrounding a global economic recession, or even a depression in some countries, the direct link between a company's growth and its strategy to support its business-generating IT infrastructure becomes even more pronounced.

In our latest survey, some two-fifths of respondents suggest that corporate expansion or contraction is the most significant factor, for both in-house and externally manged facilities. In both instances this represents a marginal uplift on the same measure recorded at the end of 2019.

WHAT FACTORS ARE/WILL BE DRIVING THESE CHANGES?



Once again budgetary issues are ranked as the second most important driver with just over 20% of respondents citing them as a significant reason for change in line with the long-term average of 21%. Bearing in mind the predicted loss of income associated with a global recession, it is likely that budgets for IT (and all other operational costs) will come under increasing scrutiny and may play a rising role in the drivers of change in data centre portfolios in the near future.

There appears to be a more pronounced differential between the 10% who reported power demands as an important driver of changes to externally operated space, compared to the 14% reporting that this is the case with in-house facilities. This may reflect the fact that whilst power is always important, those utilising third-party facilities consider it as an integral part of the data centre offering provided by an operator - and less of a concern - than when dealing with their in-house managed space.

The influence of data sovereignty and fiscal structure on data centre footprints remains relatively low occurring amongst our respondents, albeit in both cases representing an uplift on that recorded in our Winter 2019 survey. The question is whether this subject may climb our respondents' list of concerns as BREXIT negotiations come to a climax in November this year; the outcome of which could have some significant consequences on the current free movement of data between the UK and EU.

THE PAST YEAR

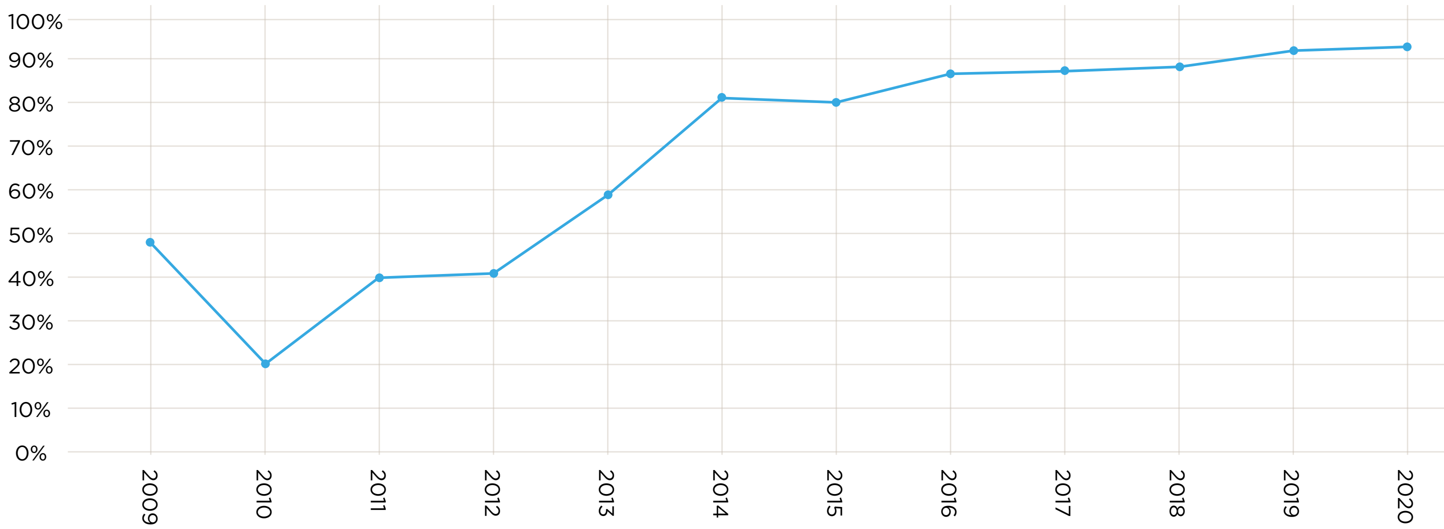
The past 12 months has seen developers and investors continue to grow their portfolio of technical real estate, through build programmes, mergers and acquisition. There is evidence that investors and funders have remained positive towards the market, supporting finance to developers as well as the other owner occupiers amongst the colocation operators, carriers, integrators and cloud providers.

Indeed, published activity over the course of 2019 (pre-pandemic) and in the first half of 2020 (mid-pandemic) provides evidence of some significant M&A activity within the European data centre sector, not least the announcement by American company Vantage Data Centres of a $2 billion war chest to purchase in Europe, starting with the 55MW greenfield site in Offenbach, Germany, in addition to developing sites in Berlin (64MW), Milan (32MW), Warsaw (64MW) and Zurich (40MW) and its most recent reported purchase of the 72MW NGD facility in Wales.

Notably, Digital Realty Trust's October 2019 announcement of its intended acquisition of Interxion closed in March 2020 for a reported $8.4 billion, providing evidence that the company retains faith that the pandemic will not derail the industry for long, as well as making the company the second-largest data centre owner in Europe.

Our latest survey continues to reflect the willingness of data centre companies to increase their portfolios of data centre environments. For the fourth survey in a row the proportion of developer and investor respondents reporting an expansion in their portfolio of technical real estate over the preceding 12 months has remained above nine-out-of-ten, and at 93% is the highest recorded level in over ten years.

PROPORTION OF DEVELOPERS EXPANDING DATA CENTRE PORTFOLIO IN THE PAST YEAR

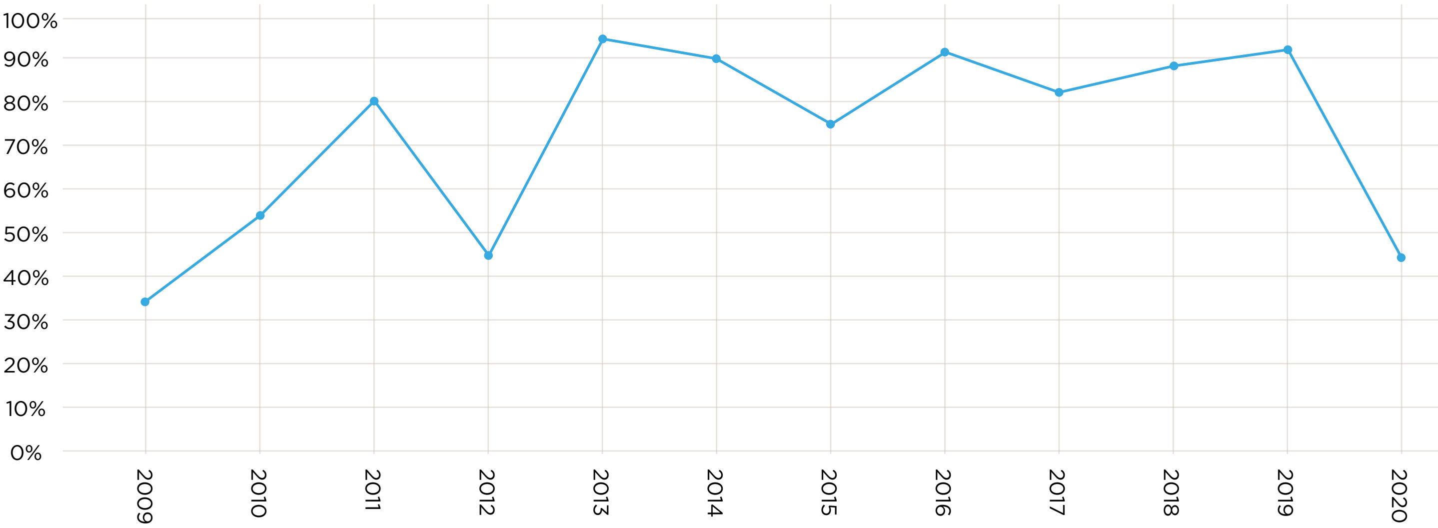


Once again, most portfolios have been expanded through building activity. Over two-thirds of respondents were involved in development activity whilst around one-third expanded through acquisition or merger. It should be noted that these totals reflect the numbers of responses and do not reflect the size of those transactions.

DEVELOPER CAUTION ON EXPANSION

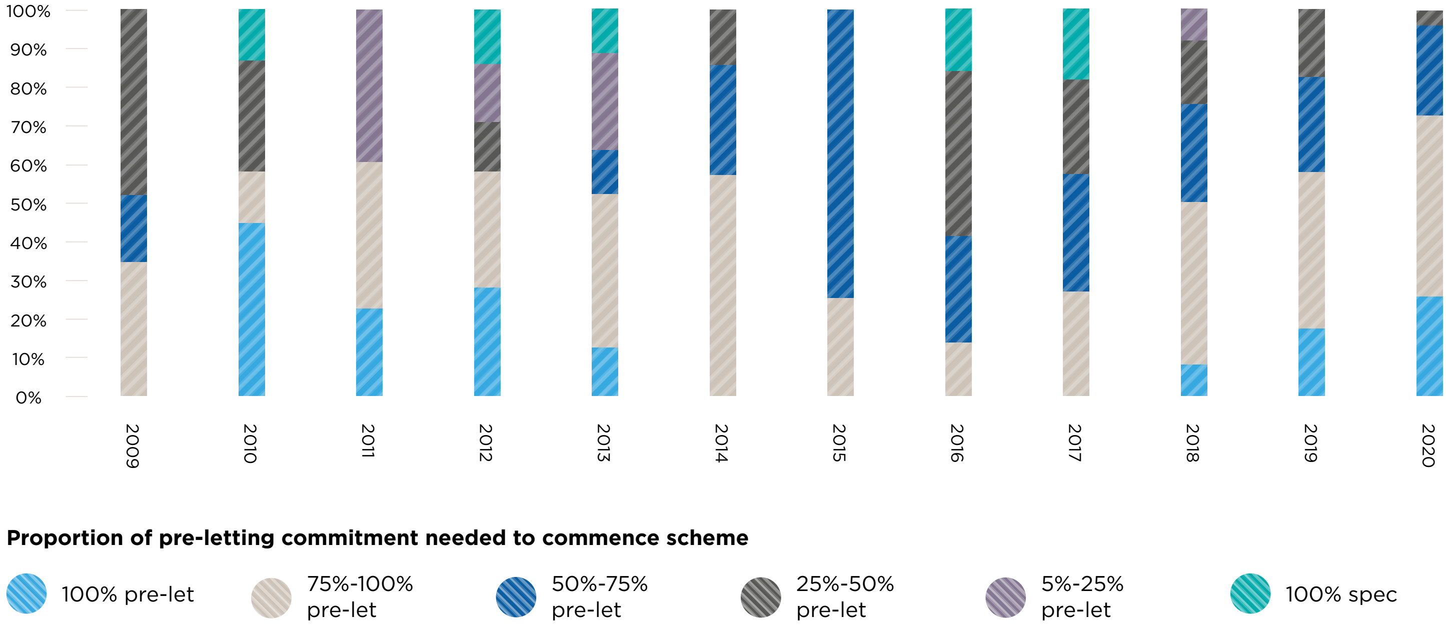
There is some caution, however, over the immediate activity in the sector. Our latest survey provides some evidence that the results of the global pandemic causes concerns amongst our developer and investor respondents. When queried about their expectations on portfolio expansion in the coming year, only around half indicated that they would expand over that period; a substantial fall from the 92% recorded six months ago and well below the long-term average. Significantly, this is the lowest recording in some eight years, and the steepest decline that we have recorded since the survey began.

PROPORTION OF DEVELOPERS EXPECTING TO EXPAND DATA CENTRE PORTFOLIO



Unsurprisingly, this fall in confidence has also been demonstrated through the proportion of pre-letting required to secure a scheme development. Nearly three-quarters of respondents reported that they required a pre-let of at least 75% before they would break ground, representing an uplift of a quarter on the measure six months ago. Of these, nearly a quarter stated that they would require a 100% pre-lease commitment before build commencement, the highest level we have monitored since 2012 and well above the long-term average of 15%.

IF IT IS YOUR INTENTION TO DEVELOP MORE TECHNICAL SPACE DURING THE NEXT 12-18 MONTHS, ON WHAT BASIS WILL THAT BE?



One further indication of concern amongst these respondents is the search for greater security through a longer lease term than had previously been the case. When questioned about this for a wholesale transaction, 59% reported that a five-to-seven-year timeframe was the minimum lease period that they would accept, a rise from the 42% recorded six months ago.

In addition, whilst around half of respondents indicated a shorter three-to-five-year period would be acceptable six months ago, this proportion has fallen to just over two-fifths.

DRIVERS OF CHANGE

Since we began our survey work over a decade ago, identified demand and the lack of supply have constantly been ranked as the number one and two drivers of expansion amongst developers. These fundamentals have driven the steady growth of the European data centre market, and despite the global difficulties caused by Covid-19, the latest survey suggests there is little change.

The desire to diversify a portfolio has remained constant at 17% of respondents over the past six months, and changes in fiscal structure were cited around 10% – also remaining un-changed since our latest survey. In contrast, data sovereignty was cited by around 14% of respondents six months ago as a driving factor behind expansion, whereas now it has fallen significantly to just 8%.

RANKING OF CHOICE FACTORS FOR NEW DATA CENTRE

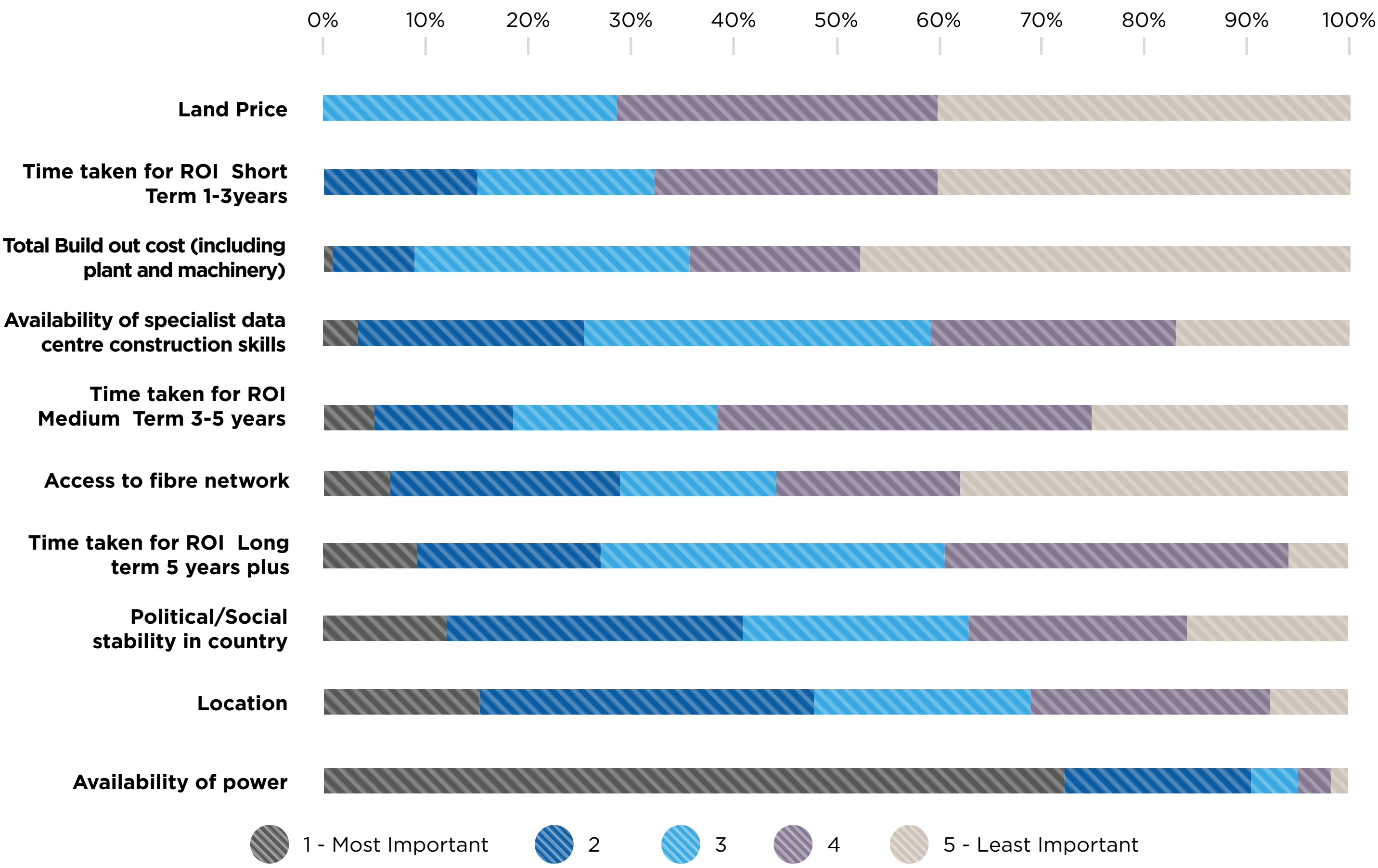
The continuing importance of obtaining a secure and cost-efficient source of power is the single most important issue identified by our respondents regarding the choice of a new data centre. The availability of power continues to be a trend we have monitored since beginning our survey work more than a decade ago. Our latest analysis shows that 72% of respondents cite it as their top ranked factor, albeit a small decline over the past six months, down from 76%.

Amongst our developer and investor respondents the importance of power is rated as even more crucial, with just under 90% ranking it in their top position.

Location continues to be cited as the second most popular factor with over half of all respondents ranking it in their top two choices, a proportion which remains relatively unchanged on our last survey.

Over much of the last ten years, political/social stability has been ranked near the bottom of the list of factors, although this appears to have changed slightly over the last two years, moving up the ranking with around two-fifths now citing it as one of their top two factors; a rise on the near 25% reported in Winter 2019.

DRIVERS SEEING DATA CENTRE CHOICE



During much of this period there has been uncertainty over issues such as the UK's exit from the European Union, the Chinese/US trade row, and the Hong Kong riots. Now, with the spotlight on a country's response to the Covid-19 and its impact on business models and global supply chains, we would expect to see this factor move up the rankings over the next few surveys.

Once gain although power availability and location remain top areas of concern, developer respondents also rank total build-out cost, availability of specialist data centre construction skills and land price more highly than is the case with other respondents.

INVESTMENT FINANCE

As the European data centre industry has expanded and matured over the past two decades, it has become increasingly popular amongst investors as an asset class. This attraction is not only underpinned by the ongoing global growth in data traffic driving demand for the services the industry supports, but also a better understanding of the relationship between the suppliers and occupiers of data centre space.

In addition, other supporting aspects - such as better research and analysis for example - have also evolved and helped to provide better understanding through visibility of the industry, all of which aids the growth in popularity for investment focus both on direct and indirect investment.

Indeed, in PWC's latest Emerging Trends in Real Estate Europe 2020, data centre ranked 8th and 6th for investment and development prospects respectively, from a list of 25 different asset classes, ahead of more-established sectors such as Hotels, Business Parks and Retail Parks.

Raising finance across all forms of real estate is dependent on a whole raft of circumstances in respect of the status of an enterprise, or the stage that it finds itself raising capital in. In addition, as the investment market matures, then the more avenues and layers of that market are developed and can be explored by investors, including secondary positions in debt financing, re-financing and M&A activity.

The sheer level of capital required by developers for data centre projects means that one single source for the entire finance is unlikely, and therefore multi-source investment is needed, supported by avenues such as syndicated bank lending.

Whilst debt financing provides access to funding without the need to release equity ownership, and is more prolific for refinancing projects, investment through equity can catalyse projects where risk profiles may only suit a stake in the final project. Over their life cycle, data centre projects are likely to encounter forms of both debt and equity finance.

Indeed, one-in-three respondents cited securing finance from more than one type of source over the last 12 months. Amongst our respondents, one-third reported that they had raised equity finance through their existing shareholder base in the last year, whilst one-quarter indicated that they had tapped specialist technology-focused funds for their route to raising finance. A further quarter of respondents reported securing bank debt funding over the period.

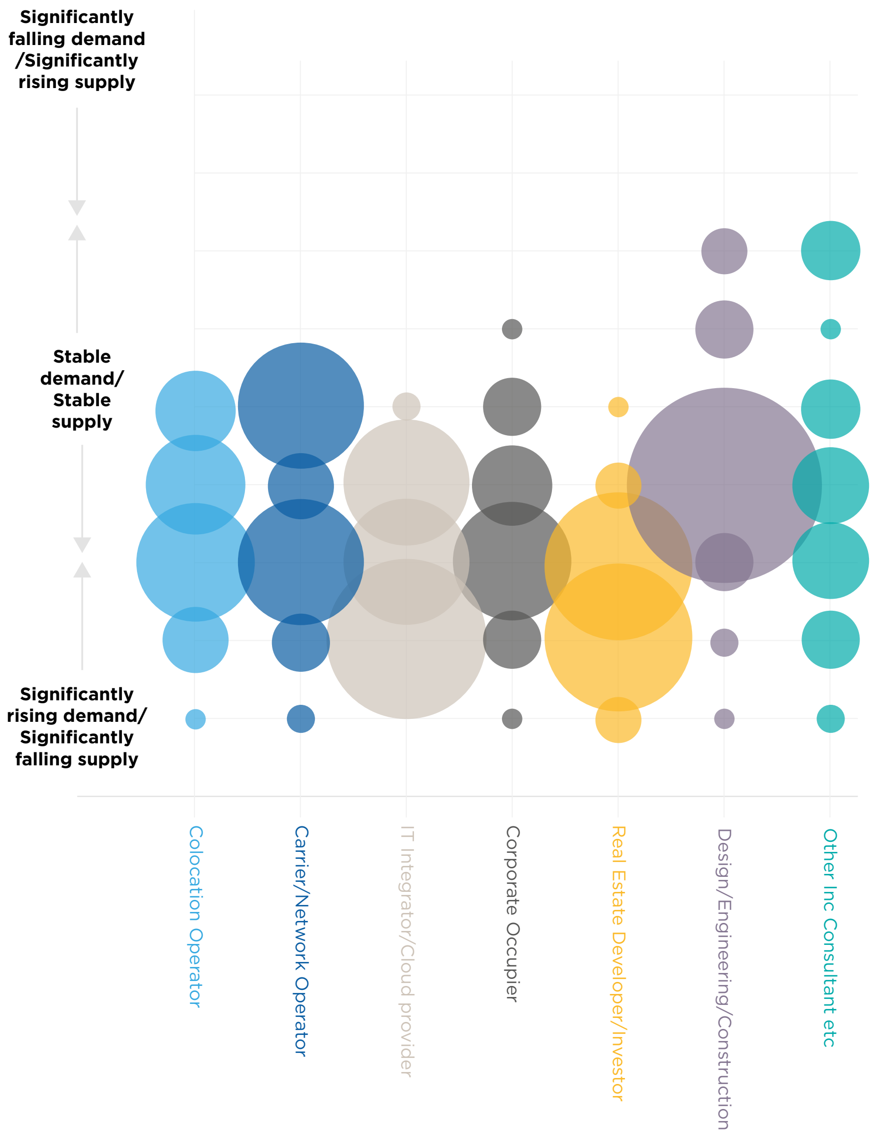
DESIGN AND BUILD CONCERNS REMAIN

With the growth in data centre demand worldwide, the draw on sufficiently qualified professionals available to the industry in the fields of design and build has also significantly increased. Over the past five years, our survey has monitored potential stumbling blocks to the continued growth of the industry that may be the result of this lack of qualified resource.

One year ago - the last survey where our entire respondent base was surveyed on this – around 64% of respondents expressed their belief that there was a potential shortage of both design and build staff across the European data centre industry. In our latest survey, the inadequate supply for both types of professionals has risen to 75%. This suggests that the problem is becoming recognised amongst not only our data centre owner base, but the wider professional audience.

From our latest survey, we can see that levels of concern increased amongst respondents who are directly involved in the building process, with around 90% involved in design/engineering or construction stating they believed there was a dearth of both design and build personnel.

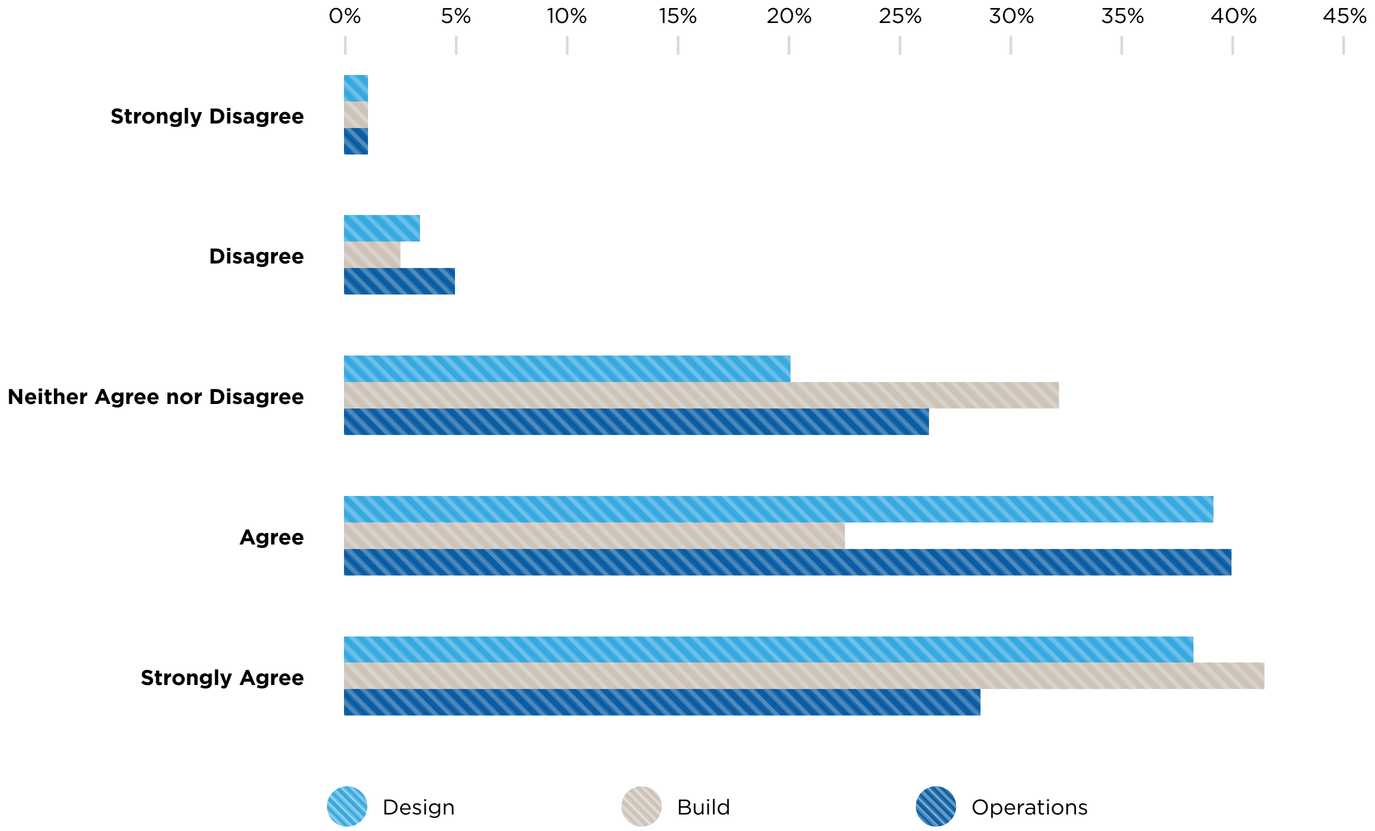
WE WOULD LIKE TO KNOW HOW YOU CURRENTLY PERCEIVE THE DATA CENTRE SUPPLY/DEMAND BALANCE



A further area of concern amongst respondents is the availability of operational staff. Again, almost three–quarters of responders believe that shortages amongst these professionals is making it increasingly difficult to run facilities. Notably, amongst service providers, this proportion falls to around 70% and with end-users this falls to just over 60%.

Given the direction of travel of these trends over the past five years, it seems likely that this will remain a major area of concern in the medium term. Indeed, the pandemic can only exacerbate this problem, as mobility of specialist workforces and professional resource between European markets has come to a grinding halt, and the pace at which quarantines are lifted will differ from country to country potentially exacerbating the problem.

WITH REGARD TO THE DESIGN/BUILD/OPERATIONS OF DATA CENTRES IN EUROPE WE BELIEVE IT IS INCREASINGLY DIFFICULT TO SOURCE SUFFICIENTLY SKILLED DESIGN PROFESSIONALS TO DELIVER OUR CURRENT PROJECTS



ROLES SHORTAGES INDUSTRY WIDE

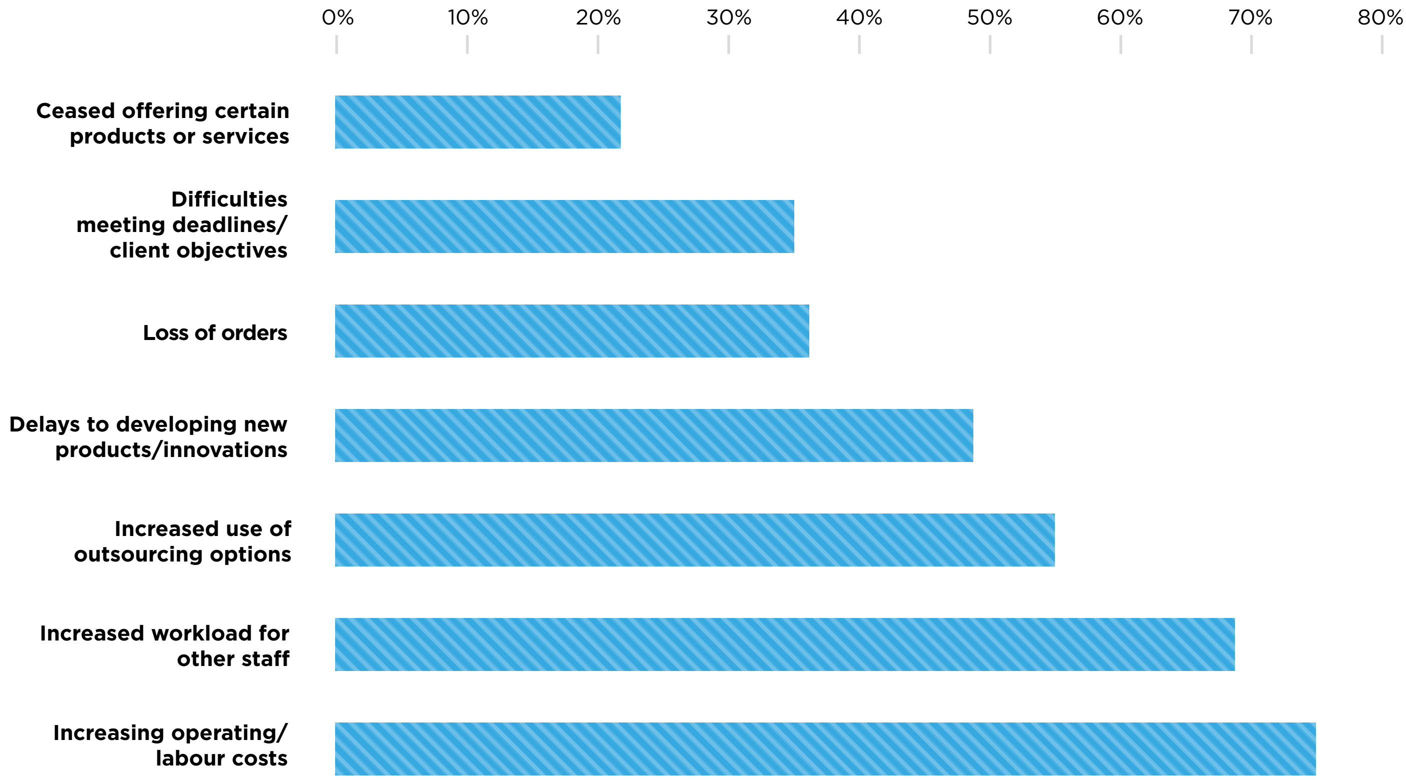
According to our respondents, the labour shortages are not confined to any specific roles. Indeed, there is widespread acknowledgement that shortages are across the industry with many respondents identifying multiple roles as concerning.

There has been little change since our last survey in the numbers of DEC professionals stating they had experienced shortages of quantity surveyors, site managers and site engineers during the previous 12 months; two-thirds expressing this concern. Within the operational sphere, just over half of respondents indicated that they have had direct experience of shortages of operations and network engineers/technicians over the last year, with a marginally lower proportion seeing a shortage of infrastructure specialists over the same period. The highest levels of concern - albeit marginally – was within the Mechanical & Electrical project manager roles.

SKILL SHORTAGES IMPACTS

There are several real consequences of the lack of suitably skilled individuals to fill technical roles around the European data centre industry. Shortages in the design and build skill set has a real impact on the ability of suppliers to deliver suitable stock to the market whilst operational roles can cause difficulties in terms of both delays in availability and, of course, rising costs.

IN THE PAST YEAR WE HAVE EXPERIENCED THE FOLLOWING AS A DIRECT RESULT OF SKILL SHORTAGES



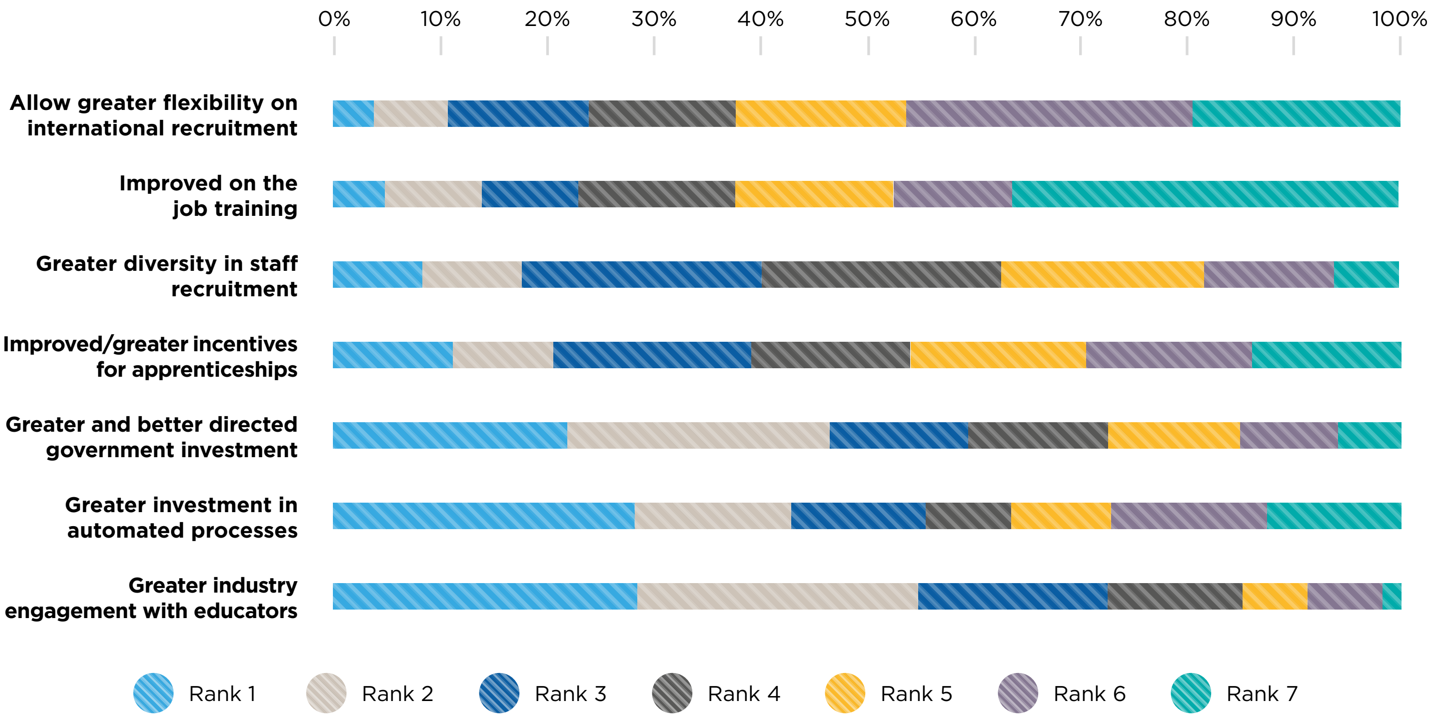
When questioned about what consequences they had experienced as a direct result of this skilled staff scarcity in the past year, respondents cited multiple factors. For the second survey in a row the highest ranking impacts noted by our respondents are an increasing operating/labour costs (74%) and greater workload placed on their existing staff (67%) - albeit a reversal of the order recorded in our survey six months ago. Some 55% also indicated that this has led to an increase in the use of outsourcing options over the past 12 months.

In addition, almost half stated that shortages had led to delays to developing new products/innovations and 20% indicated that they had ceased offering certain products or services because of this shortage. Furthermore, just over one-third stated that they had experienced difficulties in meeting deadlines or client objectives whilst a similar proportion believed that such shortages had led directly to lost orders.

POSSIBLE SOLUTIONS

For the second survey running, greater industry engagement with educators is ranked as the top factor to address this identified skills shortage. This is particularly important given the tremendous competition for suitably qualified STEM staff from a wave of different technology sectors across the wider economy. Early engagement with the industry at the educational level is needed to encourage the next generation of potential data centre professionals through providing clear routes to jobs and career advancement that exist in many of the competing industries.

PLEASE RANK THE AREAS WHICH YOU BELIEVE NEED TO BE ADDRESSED TO HELP RESOLVE CURRENT SKILL SHORTAGES ACROSS THE INDUSTRY AND INDEED IN THE CONSTRUCTION, ENGINEERING AND DESIGN INDUSTRIES AS A WHOLE



Two factors which previously scored rather low amongst only DEC professionals in our Winter 2019 survey, have now risen the rankings to the position of second and third taking results from our wider respondent base. Almost a fifth of our respondents chose greater and better directed government investment as their top ranking which is almost twice the proportion of DEC professional responses monitored just six months ago, whilst over a quarter ranked greater investment in automated processes as their highest ranked factor.

With many governments having to provide massive financial support for their economies in the wake of the Covid-19 pandemic, our respondents' results may reflect their desire for the industry not to be forgotten in the crisis. Indeed, data centre infrastructure has undoubtedly been the foundation that has allowed global enterprises to carry on working-from-home in the face of the pandemic rather than facing shut-down. Every work application used remotely relies on a data centre infrastructure to perform as seamlessly as if in an office environment, notwithstanding the exponential rise in users of online meeting platforms.

The ongoing importance of encouraging a greater diversity in staff recruitment is illustrated by its ranking as either number one or two in importance by just over a quarter of respondents, although this is a small decline on almost 30% who did so last time. This fall should not take away from the fact there is an understanding by a significant part of the industry that it needs to attract the best possible staff by encouraging all candidates from a deep and wide range of backgrounds into all aspects of the industry.

Two factors which are ranked near the bottom are greater flexibility of international recruitment and improved on the job training. Whereas the movement of labour has had a relatively higher profile in our survey over recent years, it may be that restrictions on international movement that have been put in place during the Covid-19 pandemic have dampened respondents' attitude towards this, with a realisation that working under the current regimes will face restrictions and localised working practices. It remains difficult to see, however, how the shortage of a skilled workforce across Europe can be overcome without a free movement of labour, particularly to areas of emerging data centre markets.

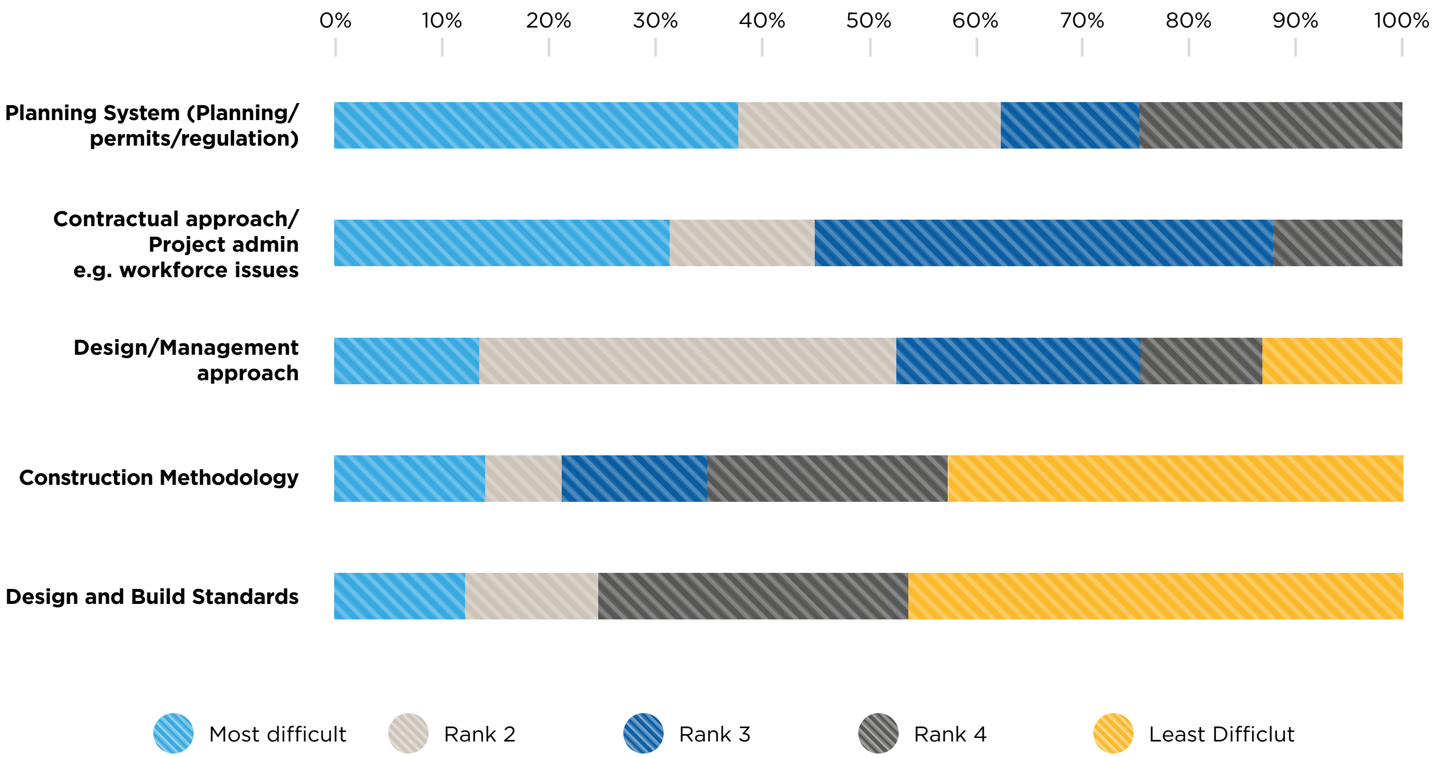
CHALLENGES TO ENTRY

In recent years there have been several notable examples of new entrants to the data centre market in Europe. These operators, mostly from North America and Asia, can have unique experiences of methods of working in their domestic markets along with different standards. Whilst it is acknowledged that these represent a relatively small proportion of our current respondent base, their views on the differences in approach to the design and build process encountered in a new market are certainly of interest in order to view the attractiveness of the European market to outside investment.

The area in which these respondents had most difficulty operating within the European data centre market was the Planning System, ranked as the top area of concern by almost two-fifths of these respondents and in the top 2 positions for nearly two-thirds.

This is perhaps unsurprising to anyone who has been involved in planning, even in their own country of expertise. Planning systems are typically driven by national policies with decentralised decisions implemented at a local level through a variety of planning frameworks. Some systems are more transparent than others, whilst considering the high-power consumption and environmental impact of a data centre scheme adds an additional layer of complexity.

NEW ENTRANT TO THE EUROPEAN DATA CENTRE MARKET PLEASE RANKING OF DIFFICULTY TO MANAGE



Likewise, Contractual approach/Project admin was also ranked highly as an area of difficulty amongst these respondents. Again, this is perhaps unsurprising given the varied contract and labour laws across the European nations where some offer less flexibility and cause greater costs than others.

Design/Management approach, Construction Methodology and Design and Build Standards was ranked lowest, which could suggest that within the design and build process there is more uniformity across the global data centre market in terms of process and standards. This may well reflect a professional industry that has seen the global mobility of methods of practice and skillsets over the last decade.

RAW MATERIALS MORE COSTLY

The cost of raw materials is another area which has the potential to cause concern for those charged with the supply of data centres in Europe - particularly at this time where international movement of both people and goods has been severely interrupted.

With just over half of total respondents agreeing that this was a potential problem area, it suggests that the cost of raw materials is seen as an important factor to monitor for the industry. However, any immediate concerns around the effect of Covid-19 on them appear not to have yet emerged, as we have seen little movement in this index over the past six months.

It should be noted that amongst those most directly involved in the build process – real estate developers, investors, design/engineering and construction professionals - this proportion is significantly higher at almost two-thirds; but again a similar proportion to that recorded last year. It may be that any impact on our pricing index from the international "lockdown" will lag the immediate crisis, only becoming clearer once the true long term effect has been to supply chains.

INFLATION IMPACTING EUROPEAN RAW MATERIALS

POWER - THE ONGOING CHALLENGE

The sourcing and consumption of power is an ongoing challenge for the data centre industry. Not just ensuring there is sufficient supply to meet ever-growing needs, but increasingly fulfilling commitments to 100% clean and renewable energy across data centre estates and driving down the carbon footprint of the industry.

The results of our latest survey suggest that demand for power will not diminish in the foreseeable future. Over 80% of respondents reported that they expect their power consumption levels to rise over the next three years, a proportion which has risen marginally since the last survey. This pressure on data centres to provide more raw power to the racks means that it becomes even more important to explore cutting-edge innovations to maximise efficiencies across all aspects of the operational data centre and address the impact of the industry on the global carbon footprint.

OVER THE NEXT THREE YEARS, WE EXPECT OUR DATA CENTRE POWER CONSUMPTION TO:

Over the past two decades, the global data centre industry has grown and evolved to provide the critical infrastructure supporting the evolution of an increasingly technologically-driven society. Digital innovation has both promoted and serviced an exponential growth in demand for a range of applications allowing us to shop, bank and stream at the click of a button, as well as drive different ways to communicate with family, friends, customers and colleagues on a multitude of devices. In addition, the rise of Artificial Intelligence across all aspects of business and society will undoubtedly continue to exponentially change the way we go about our daily lives.

One of the core strengths of the data centre industry has proven to be its ability to innovate and adapt at a rapid rate in response to changing demand. This ability continues to serve the industry well as society seeks to deal with the unprecedented threat of the current pandemic and the outcomes of social isolation policies and protective measures put in place by governments.

Across Europe there has been a major uplift in voice and data traffic since March as home working, home schooling and home entertainment become increasingly familiar concepts to vast numbers of the population, undeniably made possible by the move over the last ten years to a more cloud-based consumption model.

In addition, governments, hospitals and other key-industries have all become reliant upon digitized services like never before, as they have got to grips with new challenges around staffing, supply chains, communication and access to sites/equipment as countries have gone into lockdown.

Underpinning all these activities is the resilient data centre infrastructure, responsible for keeping the lights on for governments and organizations, delivering all these services that have quickly become the normal during the pandemic. Whilst the industry may well suffer short-term impacts as non-essential demand reduces due to a shortage in liquidity in the global financial markets, it could be reasonable to assume that the industry will also benefit in the longer term as enterprises start to factor in a pandemic preparedness into business continuity strategies.

In the following section we have asked our respondents to gauge the impact of the pandemic on their own businesses. Once again it should be noted that the responses given were all generated during April/early May in Europe, when lockdowns were at their more stringent and prior to any lifting of restrictions on issues such as travel and return to work for non-essential staff by governments.

IMPACT ON BUSINESS

The day-to-day challenge for data centre operators is to try to maintain uptime whilst ensuring the health and safety of its staff, contractors and customers. To that end, activity to a large extent has been limited to essential work and maintenance only in these facilities. As was the case across most organisations, providers implemented a work from home policy where possible for non-essential staff, with essential teams working in split-shifts for protection.

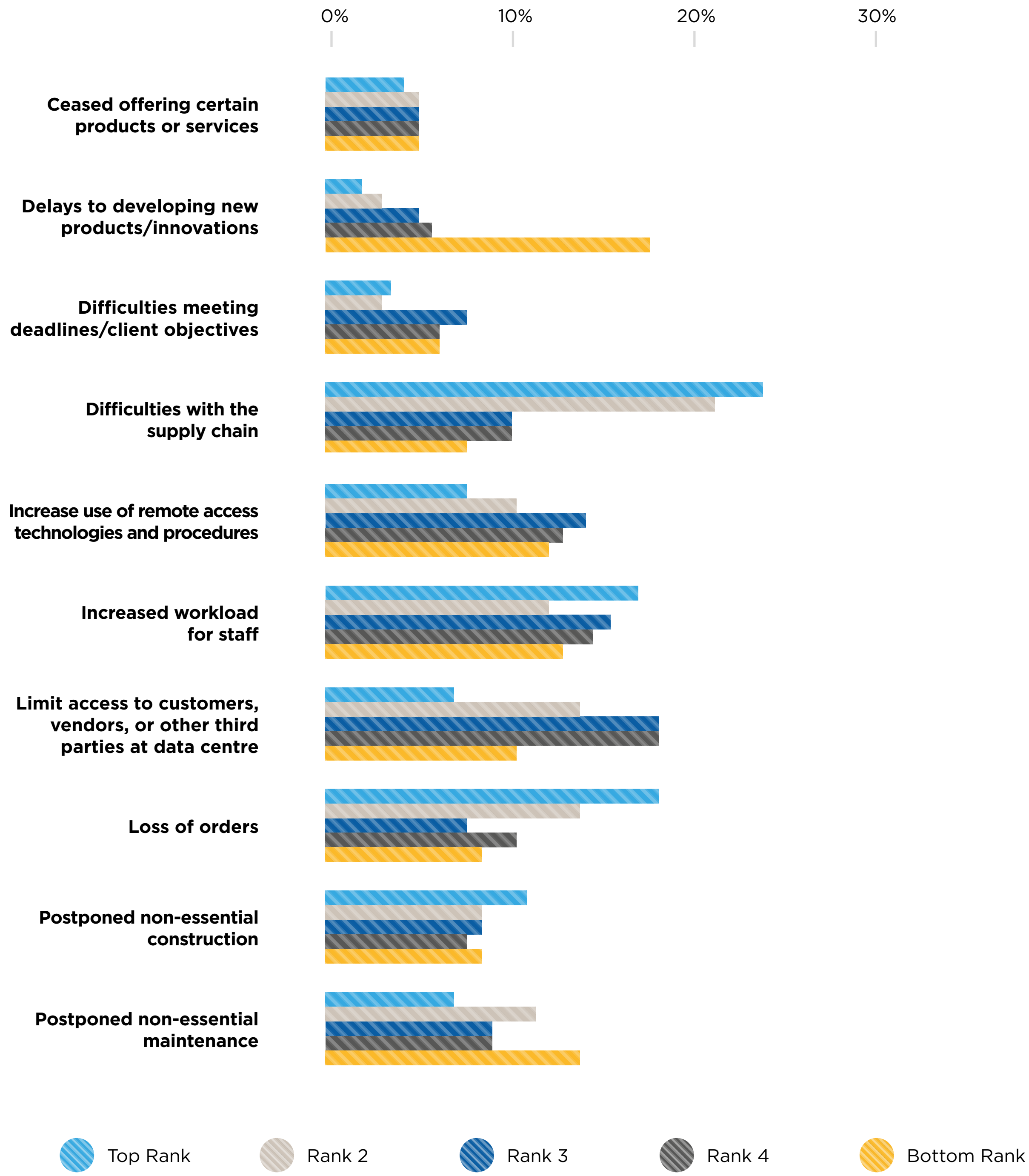
Amongst our respondents, difficulties with the supply chain was cited high as a pain factor, with 24% placing it at the top of their list. Indeed, amongst colocation operators, carriers and integrators, this proportion rose to just below a third.

Obviously, the difficulties in sourcing materials from domestic suppliers who are in lockdown is problematic in itself, but in a high-value industry where supply chains are increasingly global, there are significant challenges when movement is restricted, or priorities given to movement of essential medical equipment. For example, according to the Network Telecom Research Institute, only one of the top 10 Global Fiber Optic Cable manufacturers is based in Europe, one in the US, with eight in Asia.

Loss of orders was the second most highly cited outcome faced by our respondents. This is not unexpected given the widespread closing down of the economy as governments introduced un-paralleled measures such as lockdowns to keep the population safe. Whilst the hope is that orders will re-appear once the situation eases, the malaise within the economies of all countries suggests that most are going to suffer significant recessionary periods which could of course impact negatively on non-essential demand.

Other highly ranked factors included increased workload for staff. Again, this is unsurprising as staffing issues have continued due to illness or self-isolation, leaving a smaller number to undertake the workload. Amongst our corporate respondents, this factor was rated top by over 40%, highlighting the increased importance these roles have played within enterprises.

COVID-19 – DIRECT IMPACTS ON BUSINESS



Limiting access to customers, vendors, or other third parties at the data centre and postponed non-essential construction and maintenance are all factors reflecting the need to minimise risk for working staff, and unsurprisingly almost half of our developer respondents placed the postponement of construction work as their top ranked outcome.

The importance of innovation within data centres is illustrated by the fact that the increased use of remote access technologies and procedures is highly ranked. This is seen as a positive addition, in that these tools allow work to take place remotely, limiting physical access to facilities and protecting the key staff. It is likely that these practices are increased, becoming the norm as the industry moves forward.

IMPACT ON DATA CENTRE EXPANSION

Whilst the data centre industry appears to have been resilient in its response to the Covid-19 crisis – and indeed has proved itself to be a key-industry in ensuring the continuation of work and essential communications - it will, of course, not remain unaffected by the resulting economic fallout.

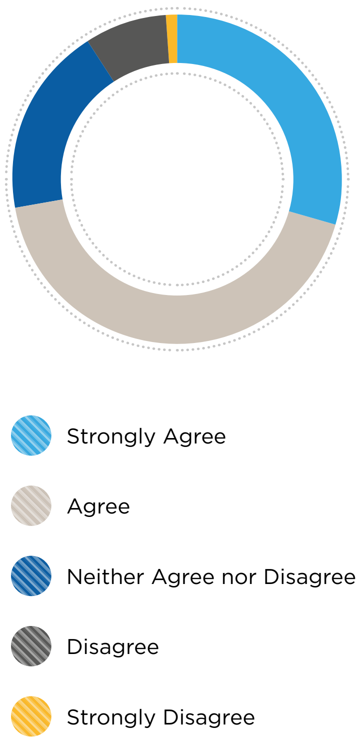
Almost three quarters of respondents expressed that the impact of Covid-19 was likely to curtail data centre expansion plans in the coming twelve months whist one-in- ten suggested that they would not be changing their projected data centre expansion programmes, the rest adopting a wait and see stance.

This concern is not held universally across our respondents, with at least a quarter of colocation operators, carriers and IT integrators, for example not expecting to see any curtailment. It may be that these suppliers are more confident in their current demand pipeline or that there will be new interest from businesses who found that their IT strategies were not sufficiently robust to respond adequately to the pandemic.

For others, economic concerns may not be the primary driver in curtailing planned expansion. We have already noted the difficulties that respondents may experience with supply chains. Being able to import materials or equipment necessary for building and fitting-out facilities could continue to remain problematic, particularly as restrictions are lifted and all industries compete to bring their supply chains back up to speed.

Interestingly despite these concerns, just a quarter of our developer respondents said that it would impact on their expansion programme. Even though many have postponed non-essential construction, this may suggest that they are confident in their ability to pick up quickly as lockdowns ease.

COVID-19 – CURTAILED DATA CENTRE EXPANSION PLANS

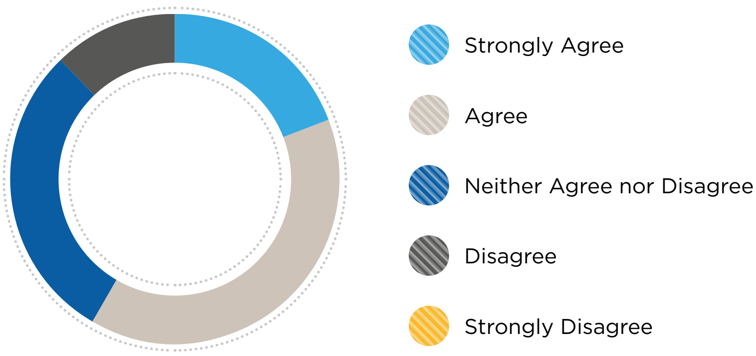


INCREASING IMPORTANCE OF LOCATION

The question of location of a data centre facility has been placed in sharp focus, with 58% of respondents agreeing that the issue of data centre location is more important during the pandemic, although end-users (51%) are slightly more ambivalent on the issue.

The highest degree of agreement came from our developer and investor respondents (72%) which may reflect concerns around differing policies Governments across the world have had to the coronavirus pandemic through restricting contact between people. This will have impacted data centre owners in different ways and effected strategies for working practices, in addition it may have exposed some facilities in more isolated areas to greater pain from supply chain issues.

COVID-19 – CRISIS HIGHLIGHTED THE IMPORTANCE OF LOCATION FOR DATA CENTRE



LACK OF DATA CENTRE ACCESS HUGELY PROBLEMATIC

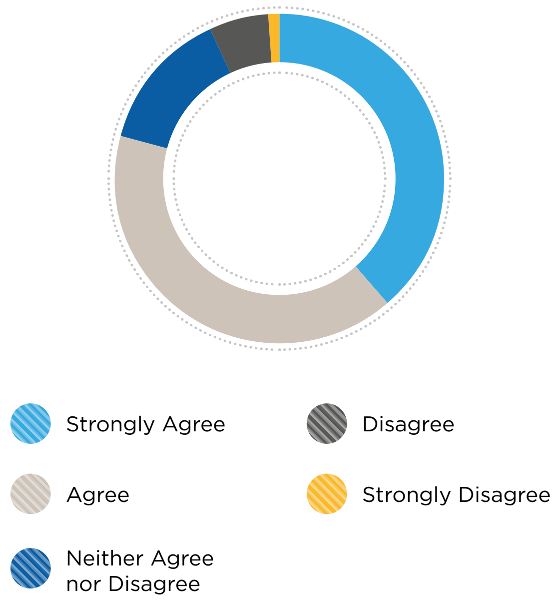
A crucial element of critical infrastructure is resilience; the capacity to keep data centres fully functional. Given the current situation, the ability to meet this challenge as well as ensuring mission critical staff are protected, has undoubtedly tested all areas of the data centre industry.

Many operators have introduced a variety of measures to meet this challenge. Both staff and customers require access to facilities, but limited access reduces footfall and potential risk. Whilst standard hygiene procedures have been implemented across IT estates, some providers have trained teams in fever screening, whilst customers and operational teams are often kept separate and operational teams split into multiple shifts working individually to limit contact.

Whilst services such as remote hands have been increased in order to limit customer travel, restricted access to data centres during the crisis has proven to be a major problem for a considerable number of respondents; 82% of whom have stated that this has been the case.

For corporate occupiers, this problem was more amplified with over 90% experiencing difficulties with access. This is not surprising given the increasing reliance by end-users on outsourced solutions in recent years and therefore their forced compliance with the restricted access protocols (either total or part) by their service provider hosts.

COVID-19 LACK OF DATA CENTRE ACCESS HIGHLY PROBLEMATIC



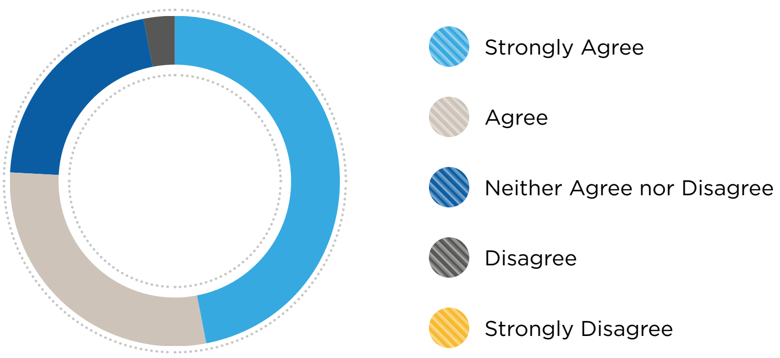
OPPORTUNITY FOR CLOUD-BASED VOICE AND DATA SYSTEMS

What the pandemic has bought into focus is how cloud deployment is critical to enable enterprises to be flexible, agile, and adaptable with their workloads and the support they can give to enable remote workforces. Without doubt the applications that are being run by cloud providers are seeing record usage and without these applications it is likely that the economic situation would have been considerably worse for many organisations and enterprises.

Around three-quarters of respondents agreed that the impact of lockdown will see an acceleration in the move to cloud-based voice and data systems because of shortcomings in corporate in-house IT systems being exposed by the pandemic. Just 3% expressed their disagreement with this, although interestingly this rises to 6% amongst our end-users.

The large-scale cloud infrastructure service providers, such as Amazon Web Services, Microsoft Azure and Google Cloud, have undoubtedly been the beneficiaries of increased workloads and application deployments in the current crisis, and are probably set to continue their engagement with enterprises and individuals in the future. Enterprise could also look to more personalised public, private or hybrid cloud offerings as they work out the consequences of the new commercial environments they find themselves in.

COVID-19 – LOCKDOWN CREATES OPPORTUNITY FOR GREATER CLOUD-BASED VOICE AND DATA SYSTEMS



Whilst it would be naïve to think that the data centre industry will survive the pandemic with few consequences, these should be confined to immediate operational and workflow issues, rather than longer term supply or demand problems. Indeed, if nothing else, the data centre industry has proved its reliability and dependability during the crisis and should expect a long term rise in demand as enterprise's business continuity strategy takes into account pandemic planning, utilising the role of data centres away from their own office environment.

MEET THE EXPERTS

If you would like to hear more, please get in touch.

James Hart
CEO, **BCS Integrated Solutions**

P +44 (0) 345 204 3300
M +44 (0) 790 968 2452

Scott Shearer
COO, **BCS Integrated Solutions**

P +44 (0) 345 204 3300
M +44 (0) 781 085 0027

Paul Ryan
Senior Consultant, **iX Consulting**

P +44 (0) 2079525353
M +44 (0)7971 551 335