BCS INTEGRATED SOLUTIONS

COVID 19 – THE LASTING LEGACY

WINTER 2020

iXConsulting

CONTENTS

EXECUTIVE SUMMARY

If there is one thing the coronavirus has proven, it is that when faced with a truly urgent imperative, both the public and private sectors can adapt at astonishing speed and scale. Central to that response has been the data centre which has been the engine room enabling the health response, the mass home working effort, maintaining degrees of business continuity as well as keeping disparate families in contact. It has certainly raised challenges, some of which will have a lasting legacy.

These issues will not go away when the virus eventually does, we will face challenges of productivity, social mobility, climate change and inequality that were already there, and that will in many cases have been exacerbated. What Covid 19 has demonstrated is the many ways in which technologies can contribute to addressing those challenges – but it is now time to treat those challenges as imperatives too and deploy these ideas at scale.

From the current survey it is encouraging that the reaction which we recorded earlier this year at the beginning of the COVID-19 pandemic regarding future demand levels for data centres, has been partially reversed in our latest findings. Indeed, nearly two-thirds of our respondents believe that the next year will see an increase in demand, up on the 40% recorded in Spring, and now back in line with the long-term trending average. Over the past six months, just over 90% of our developer and investor/funder respondents have reported an increase in their portfolio of technical real estate, the fourth successive survey that a similar proportion has been achieved. It appears that the caution exhibited by respondents in the early part of the year in the face of the raging pandemic has largely been overcome, with 85% of developers and investor respondents stating that they expect to see a further expansion in their data centre portfolio over the coming year. This represents a significant recovery from the 45% reported six months ago and sits above the long-term average of around 70% monitored during the decade.

However, some commentators are hypothesising that the full impact of the pandemic will not hit our industry until 2022, so what of the future? In the coming months, we'll finally see 5G move from concept to reality, bringing with it huge data capacity, high speeds, and low latency. This next-generation connectivity is set to mark the beginning of a new technological era, changing the way we live and work. 5G will power vibrant new use cases that span across network, client, and cloud – spurring the convergence of computing and communications that will enable exciting use cases ranging from virtual and augmented reality and gaming, to smart cities, connected cars, and intelligent data analytics.

The key component for the above will be the infrastructure to support and optimise these new technologies. According to market analyst, Gartner, around 90% of enterprise data is currently processed within centralised data centres. Whilst in the foreseeable future we can expect the massive demand and growth in enterprise cloud computing – public, private and hybrid – to remain the major driver for growth in the data centre industry as a whole workloads will eventually shift towards the network edge. This will lead to rising demand for much smaller 'micro' data centres in closer proximity. We at BCS have already been thinking about what this infrastructure could look like, how it could be rapidly deployed and where. This is the year that our industry showed its resilience, agility and relevance, this will be the lasting legacy of the pandemic for our sector.

James Hart
CEO

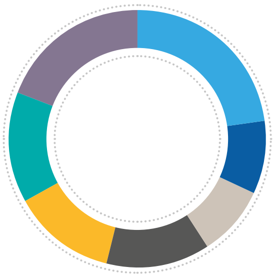
BCS INTEGRATED SOLUTIONS

INTRODUCTION

Welcome to the 21st data centre survey undertaken by independent research firm, iX Consulting and sponsored by BCS, offering integrated solutions through IT asset consultancy.

At the time of taking the survey, much of Europe was placing itself into another period of lockdown to slow the onslaught of the second wave of COVID-19. Many European countries once again saw their entire retail and leisure industries forced into closure, with only essential shops remaining open and, in some countries, night-time curfews being enforced. A strangely familiar routine to that encountered in March/April but would have only been believed to be the script of a Hollywood blockbuster just 12 months ago.

WHAT IS YOUR PRIMARY RELATIONSHIP WITH THE DATA CENTRE INDUSTRY?



Our previous survey – After the Pandemic, New Normal, New Thinking - was undertaken at the end of Q1 this year, just as the pandemic was seriously starting to impact Europe. Whilst the familiarity of a second wave of lockdowns may drive less uncertainty than the first wave, the restrictions imposed continue to bite on all aspects of the data centre economy and undoubtedly make the day-to-day aspects of work that much harder. However we have also seen the development of a number of vaccines that should lead to the end pf the spread of this global pandemic. As we go to print the questions remains: “How long will it take to get full functionality back across the world again?”, and “What are the longer term effects of the pandemic on the world economies?”.

There is no doubt that data centres and the telecoms industries have been the most important sectors keeping businesses functioning during the pandemic. Not only have they provided the basic platform for global e-commerce when physical shops were shut down, but also provided the digital backbone to move the millions of workers from an office environment to one “at home”. Imagine the last nine months where software had to be loaded onto computers locally using disks posted to you by your IT team; your home internet was 1000 times slower (not just at peak times but all the time!) and you could either be on the phone or online, but not both at the same time! That was the reality only 20 years ago, and it’s easy to see that the consequences on global markets of a pandemic back then would have been at another level of devastating.

So undoubtedly, digital infrastructure is more important than ever before. But lockdowns and uncertainty have seriously affected global economies, and as data centres and their occupiers are an integrated part of the global ecosystem, the sector cannot escape the effects of the downturn in global growth.

It is against this backdrop that our latest report reflects the views of data centre professionals spanning 38 European countries. These thoughts, reactions and opinions come from users and owners of technical real estate covering some 4.2 million square metres (45 million square feet) of technical real estate. Our respondents come from an ever-broadening range of industry professions, including all those involved in the design, funding and building of data centre real estate, as well as managed service providers, infrastructure suppliers, consultants and end-users; each providing their unique insight into the industry and its prospects.

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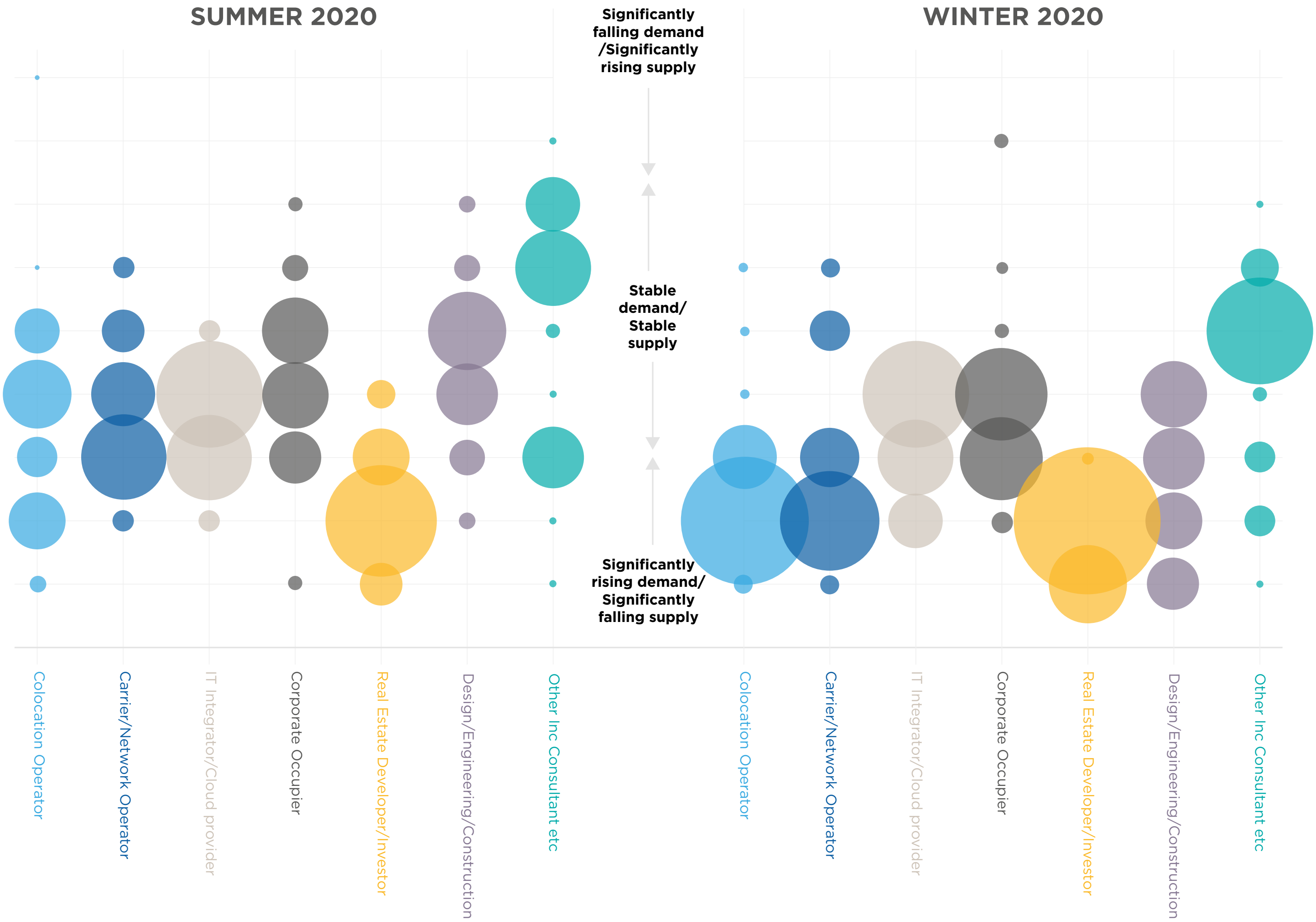
THE SUPPLY DEMAND BALANCE



- The reaction which we recorded earlier this year at the beginning of the COVID-19 pandemic regarding future demand levels for data centres, has been partially reversed in our latest findings. Encouragingly, nearly two-thirds of our respondents believe that the next year will see an increase in demand, up on the 40% recorded in Spring, and now back in line with the long-term trending average.
- A further 28% of our respondents indicate that demand levels will remain stable, whilst only 2% indicate that they believe demand will fall over the coming year.
- Once again, developer and investor respondents remain the most positive regarding potential levels of demand for data centre space, with unanimous agreement that the coming year will see an increase, up from the near 90% who expressed the same sentiment six months ago.
- In addition, most colocation providers also remain buoyant, with almost nine-in-ten predicting increasing demand levels in the next 12 months.
- Network carriers were significantly more optimistic than was the case six months ago; around three-quarters now expect to see a rise in demand contrasted to just 36% earlier this year.
- Integrators also saw a shift in positive sentiment, with 55% expecting a rise in demand, up from just over a third recorded earlier in the year.
- Corporate occupiers remain our most cautious group of respondents overall, although we have tracked a near doubling of those expecting a rise in demand in the coming year from 20% to 37%. Many end users report that they see stability in both the demand and supply sides; around half indicated that they expect demand will remain stable with only a small number – some 6% - see a fall during the next year: this is a similar profile to that reported six months ago.

OWNERSHIP AND MANAGEMENT MAKE-UP

The latest survey provides further establishment of the trend for the majority of our colocation operators, IT integrators and cloud provider respondents to own or manage their own data centre assets. These occupiers are infrastructure-focussed businesses, typically selling products underpinned by their ability to deliver quality services supported by a framework of connecting networks. Hence, they would be expected to have the main share of data centre stock under their own management allowing them the necessary control and flexibility to respond promptly to demand requirements.

In addition, the nature of this infrastructure vendor is typically seeking business advantage in new centres/markets, hence the bias towards a model of operating their own facilities, effectively retaining full control of what they will build and where. Indeed, in our latest survey we see that around three-quarters of this group now report that 80% or more of their data centre portfolio is internally controlled.

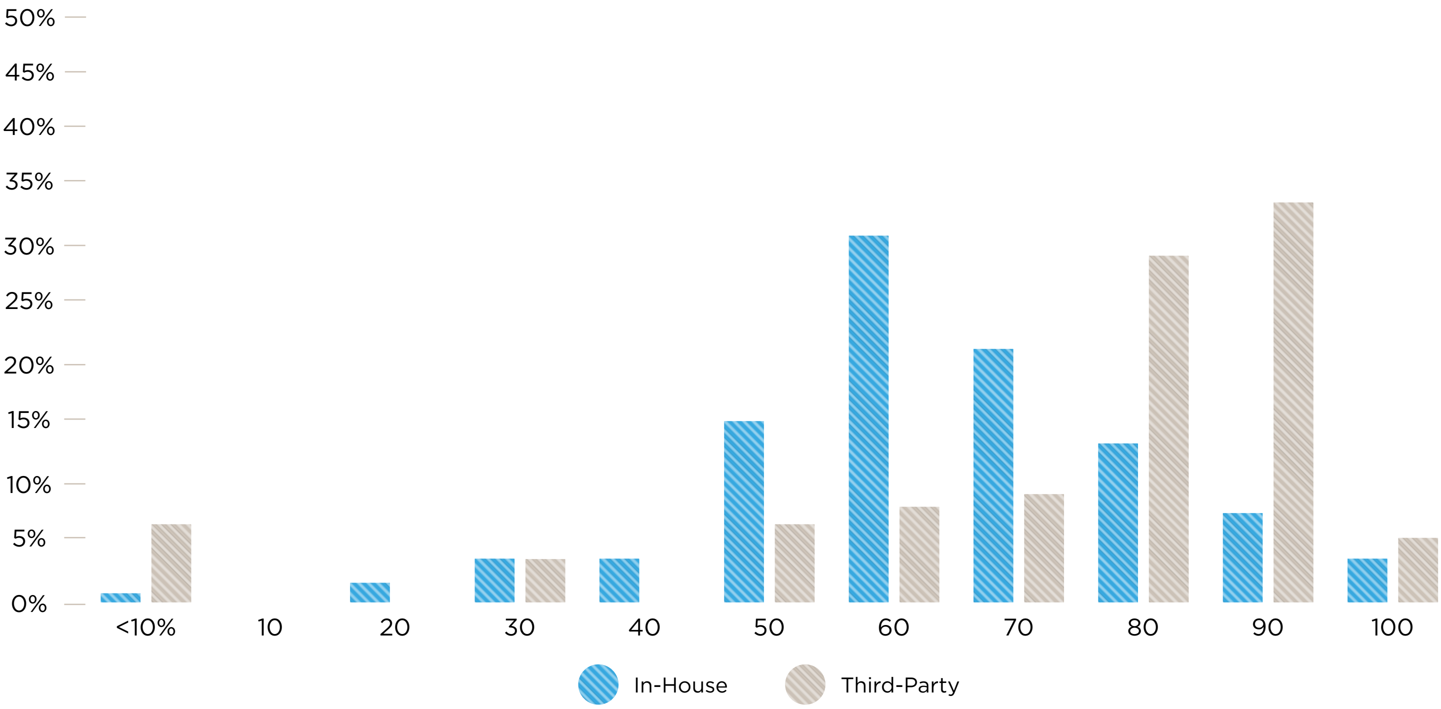
In contrast, end-users maintain a shift of control and management of their data centre infrastructure over to third-party providers. Our latest survey indicates that around four-fifths of enterprise end-users outsource at least 80% of their data centre portfolio, representing a small uplift on the three-quarters noted in our summer report and double the two-fifths recorded by us a decade ago.

The push and pull factors that have contributed to this strategy of outsourcing continue to be strong. CAPEX savings and an OPEX model for occupation often favour end-users financially, as well as providing flexibility to both upsize and downsize in response to demand. In addition, end-users can benefit from innovation in data centre design and operations that a larger third-party specialist can offer, which may not be available to them otherwise. Indeed, as the data centre has established itself as a mainstream real estate asset, this trend towards renting space from data centre "landlords" is undoubtedly firmly entrenched in an end-user's occupational profile.

As we have identified in recent surveys, the pattern of utilisation of internal and external solutions continues to vary. For all users of third-party data centres, the requirement to maximise efficiencies, allied to the need to keep flexible contracts to facilitate a response to business demands, has resulted in higher overall utilisation rates, with 71% of respondents indicating that over 80% of their technical footprint was being actively used; a proportion similar to that recorded earlier in the year.

Conversely, the proportion of respondents reporting that over 80% of their in-house technical footprint was being used stood at just 28%. Whilst this is a marginal increase on the 24% recorded six months previously, it indicates the starkly contrasting use efficiencies between the different occupational models.

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



Amongst service/infrastructure providers, utilisation rates in self-managed facilities average 64%, rising to 77% in externally managed facilities. For corporate occupiers, a similar profile of utilisation exists; in-house facilities reported utilisation rates at 66% whilst rates for third-party managed facilities stand at around 74%.

EXPANSION

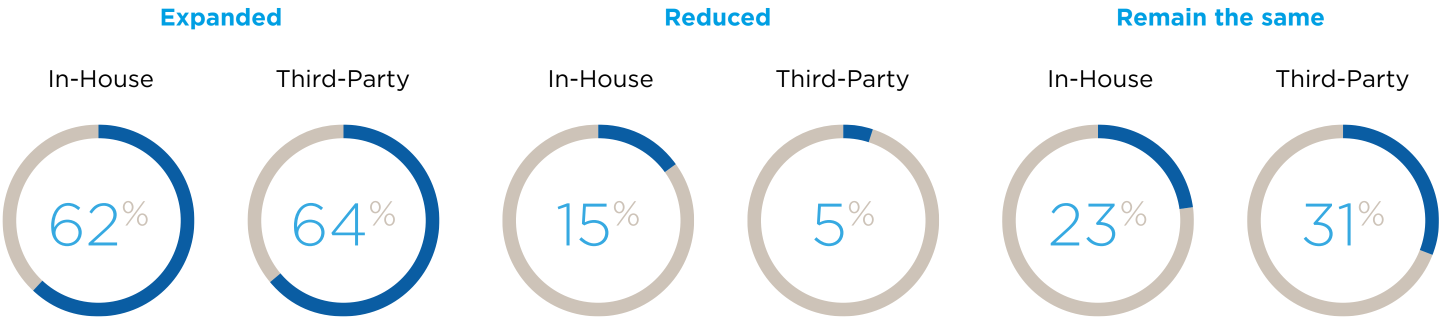
During the past six months, our survey indicates a small decline in expansion rates of in-house technical space amongst our respondents. Whilst 62% indicated that they had expanded their in-house managed capacity – down from the 67% recorded in our spring survey - we also monitored a small increase in those reporting ‘no change’; 23%, up from 17%. The number who indicated that they had reduced their in-house technical floor space, now standing at around 15%, is down fractionally from 16%.

Conversely, the proportion of respondents who indicated that they have expanded in their externally managed space has risen marginally; up to 64% from the 62% reported six months ago. This goes hand-in-hand with a marked drop in the number of respondents reporting a reduction in their third-party portfolio from 11% to 5%.

For corporate respondents, further evidence suggests a continued desire to utilise outsourced data centre solutions, with almost half reporting that they had reduced their in-house technical footprints over the past six months whilst around four-fifths indicated that they had expanded their third-party maintained estates.

This demand for third-party solutions in turn drives the need for colocation and other service providers to add to their supply pipeline. The sector continues to respond to this, with over 80% of colocation operators, IT integrators, carriers and network providers reporting that they have expanded their own facilities over the past six months.

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



HOW DID THEY DO IT?

Of those who expanded their data centre portfolio, around three-fifths reported doing so through a self-build solution; no change on those reporting the same earlier in the year. In addition, we have recorded a fall from 27% to 19% in popularity for the option of purchasing or leasing space from a development partner.

Notably, several respondents indicated the increase in floorspace of more than one facility over the period through different methods, indicating a more flexible approach to taking on space and the willingness to use the best route to market dependent on circumstances and specific dynamics of local markets and demand profile.

Once again, colocation is cited by respondents as the most popular route for expansion. Of those who expanded their third-party footprint over the period, around three-quarters chose to do so by taking space from a colocation provider, significantly ahead of alternatives such as utilising the services of a carrier/network operator or IT integrator.

EXPECTED CHANGES

Encouragingly, we have noted a more positive sentiment towards expansion plans in the year ahead from respondents. Whilst the impact of the COVID -19 pandemic will undoubtedly linger for many years, it appears that respondents are now more encouraged regarding the levels of expected demand for data centre services in 2021.

In our latest survey we have seen a rise in the proportion of respondents expecting to increase their third-party managed data centre space during 2021, up from 24% recorded earlier in the year to 33%. In addition, the proportion of respondents suggesting that they expect to increase their in-house technical floor space over the next 12 months has more than doubled since our last survey, up from 21% to 49%.

The expected rise in demand for both internal and external solutions has largely taken place at the expense of those respondents who identified as undecided six months ago - down from 37% to 12% for in-house demand and 47% to 17% for external solutions.

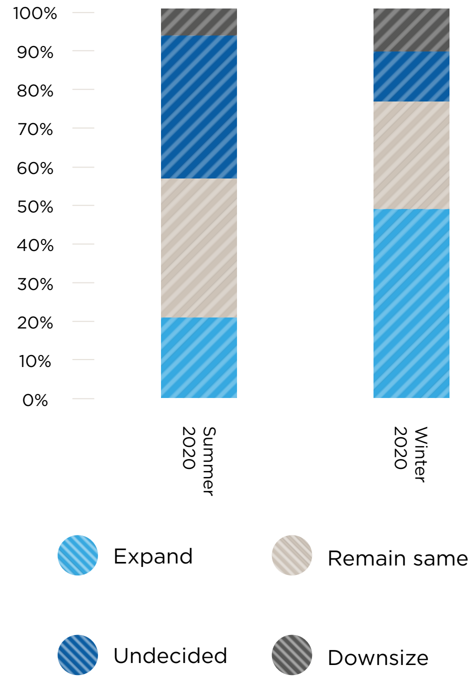
The shape of expansion for both these occupier profiles appears to be weighted towards the second half of the year, but nevertheless is a strong bounce-back in sentiment since the end of Q1 and sits above the long-term trend line. If these views do indeed come to fruition, it would be a remarkable accolade for the sector against the backdrop of what has happened across the world during 2020.

This increase in expected demand for in-house facilities appears to be headed by service provider respondents; around 70% of them reporting that they are expecting to see growth in taking space for themselves over the coming year. In contrast, just one-fifth of corporate respondents suggested that they would be looking to increase self-managed data centre space in the next 12 months and an equal number would in fact reduce their footprints. Two-fifths reported that they would choose to retain the same levels during the year.

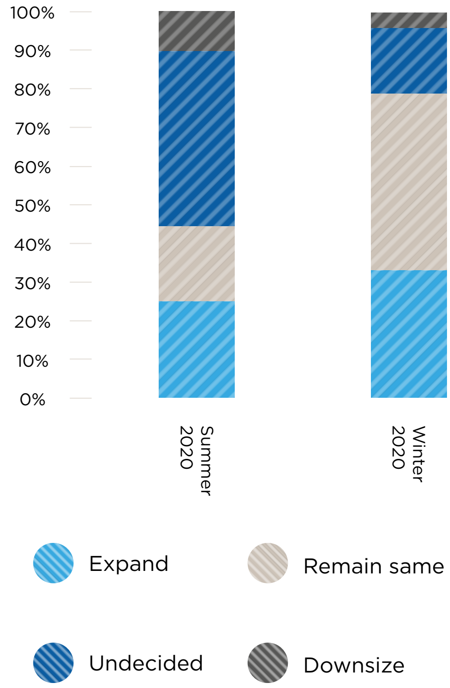
Unlike their relatively limited approach to in-house expansion plans, over 60% of our corporate users stated that they intended to expand their operations with an external infrastructure partner during 2021. Amongst the integrators, carriers, colocation and cloud providers, around 24% reported an intention to expand their third-party managed estate, with 56% suggested they would retain the same exposure.

Whilst the evidence suggests that end-users are increasingly choosing to place their IT estate with a specialist data centre provider, it is likely that a significant proportion will continue to adopt a hybrid mix of both in-house and third-party managed solutions. The benefits of a third-party solution of flexibility, scalability and access to a potentially enhanced infrastructure that may not be accessible to them through a self-build/managed approach are still prevalent, but a competitive advantage that in-house managed solutions can still offer through greater control over selected aspects of their infrastructure, remains strong.

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



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



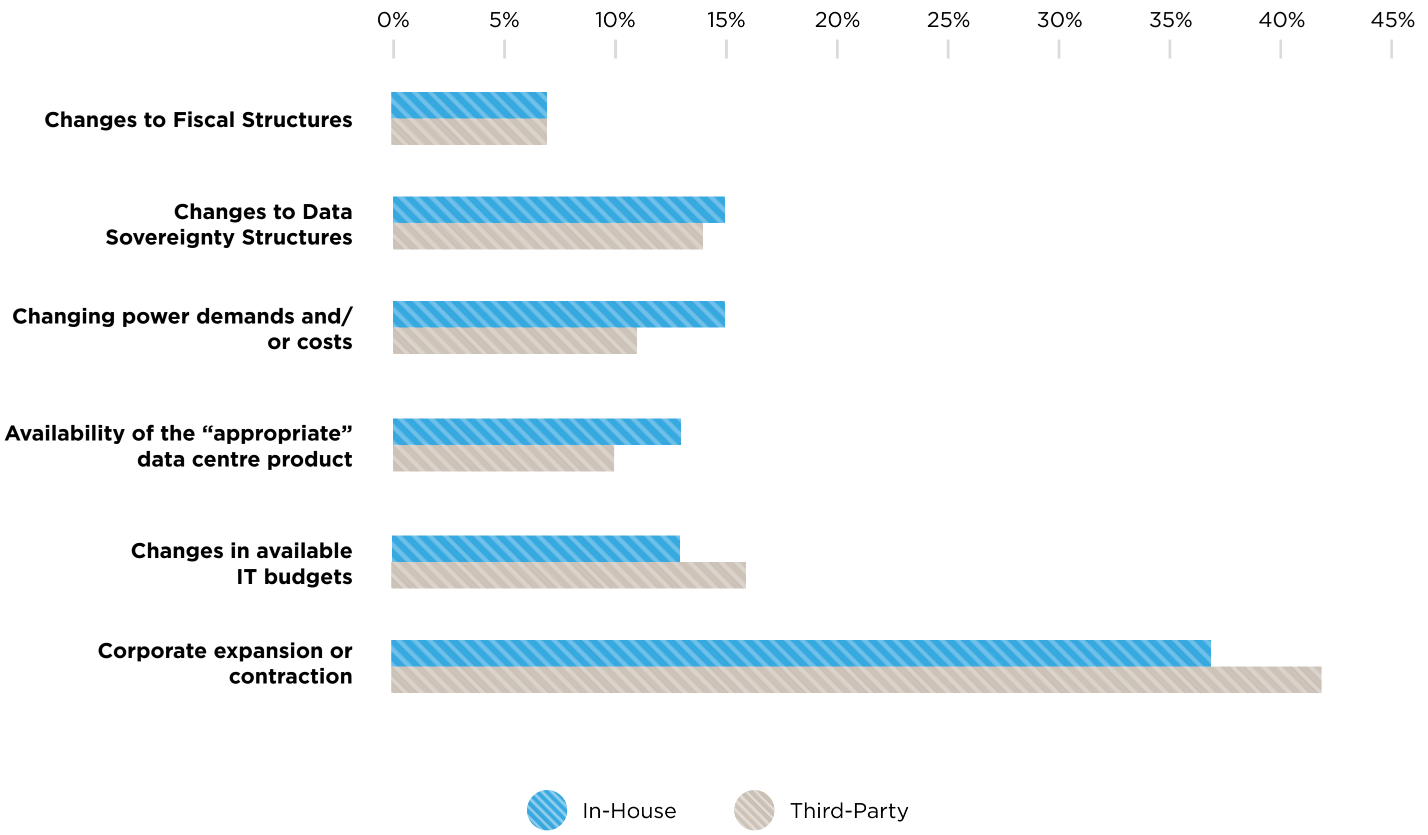
DRIVERS OF CHANGE

Once again corporate expansion or contraction has been identified as the single most important factor driving changes to both in-house and third-party technical floorspace, with around two-fifths identifying this as the number one priority in our latest survey, marginally down on a long-term average of around 45%, but in line with our findings in our preceding survey.

Whilst changing business demand levels are likely to continue to underpin the traditional core drivers of demand for IT infrastructure, there are several other factors that our respondents also consider as having an important impact on demand. Changes in available IT budgets, is noted as having risen in importance in recent years with around 14% of respondents citing it as a key influence.

This survey has seen the influence of data sovereignty rise in importance, with 15% of respondents citing it compared to 10% earlier this year. Despite this recent jump, it may be surprising that as an issue it has not scored more highly on our surveys given the continued lack of clarity regarding Brexit and the resulting data flow conditions after the transition period comes to an end on December 31st this year. Whilst the UK nor the EU has indicated that they intend to restrict the flow of personal data between them, there are concerns regarding data transfers between the EU to the US which have been protected by the now-invalid Privacy Shield.

WHAT FACTORS ARE/WILL BE DRIVING THESE CHANGES?



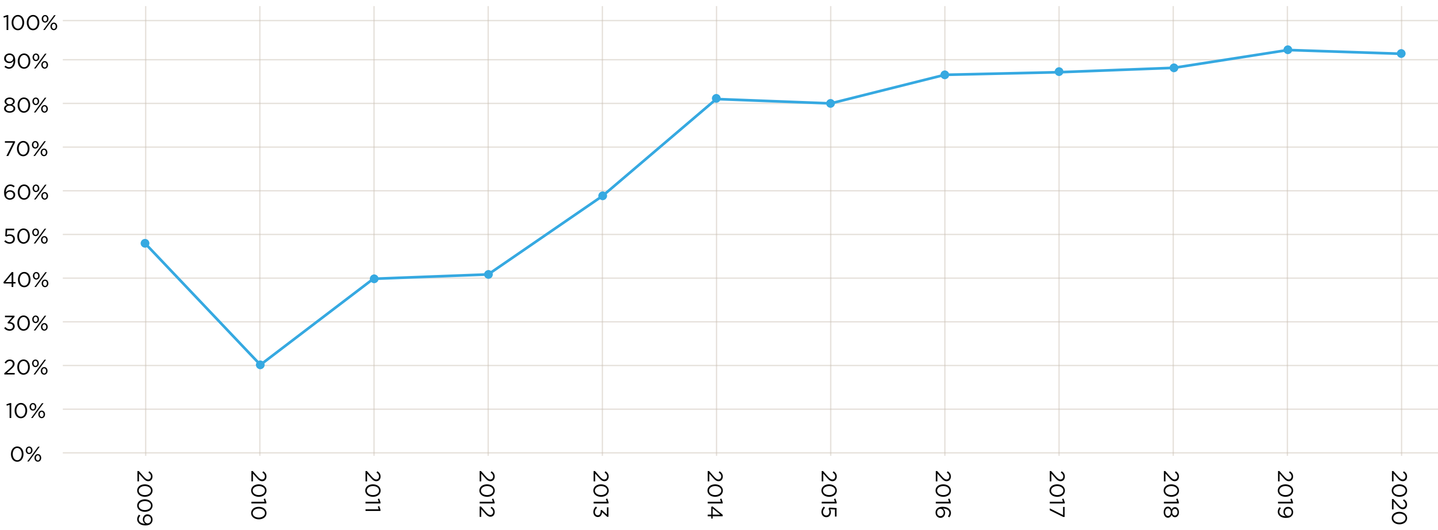
The relative popularity of changing power demands has seen little change since the last survey. Once again, the factor was cited as more important to respondents looking for in-house data centre space. This is perhaps not surprising as for those using a third-party provider solution see it as a given responsibility of those providing such services rather than the end user.

SUPPLY PIPELINE – TAP STILL TUNED ON

The provision of new data centre supply is a vital component of the European data centre market, not just to ensure there is enough product to satisfy levels of demand, but to ensure that it is the right type of product aligned to changing IT strategies and practices. The ongoing health of the data centre market can be followed through monitoring the sentiment of those involved in the delivery of new space to the market.

Despite the challenges posed by the pandemic and the significant obstacles to the data centre industry across Europe over the past six months that it has created, according to our surveyed respondents, it does not appear that these have resulted in any significant slowdown in the delivery of new technical real estate. Over the past six months, just over 90% of our developer and investor/funder respondents have reported an increase in their portfolio of technical real estate, the fourth successive survey that a similar proportion has been achieved.

PROPORTION OF DEVELOPERS EXPANDING DATA CENTRE PORTFOLIO IN THE PAST YEAR



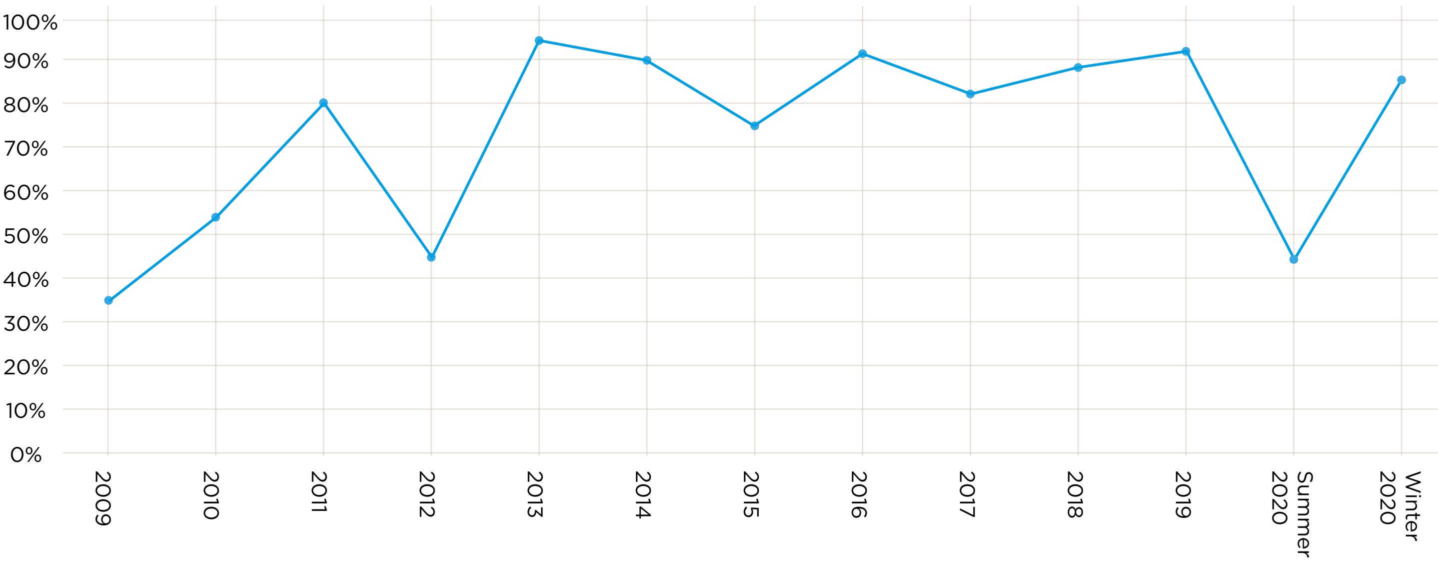
The most favoured route to portfolio expansion amongst our respondents remains via build activity – around three-quarters reporting they have used this route, up on the two-thirds indicating this six months ago. Most of the remaining respondents grew through acquisition/merger with a small number reporting using both routes. It should be noted that the relative size of individual transactions involved is not reported in these overall totals, it is based on number of individual respondents, but nevertheless should give a good indication of industry sentiment.

SHORT TERM DELIVERY

The significant drop in expectation regarding new supply of data centre space that we noted in our previous survey has, to a large extent, been reversed in our latest survey. It appears that the caution exhibited by respondents in the early part of the year in the face of the raging pandemic has largely been overcome, with 85% of developers and investor respondents stating that they expect to see a further expansion in their data centre portfolio over the coming year.

This represents a significant recovery from the 45% reported six months ago and sits above the long-term average of around 70% monitored during the decade. Notably, the last time we recorded a similar deep "v" shape in our respondent's confidence graph was when the Eurozone Debt Crisis hit back in 2012.

PROPORTION OF DEVELOPERS EXPECTING TO EXPAND DATA CENTRE PORTFOLIO



This upturn would indicate that developers have quickly re-established a belief in the strength of the fundamentals of supply and demand across the European market. We must be cautious not to conclude that the uncertainty caused by COVID-19 is all but over, however it is a real fillip to the industry to see that sentiment amongst developers over predictions for the coming year has bounced back to seemingly healthy levels.

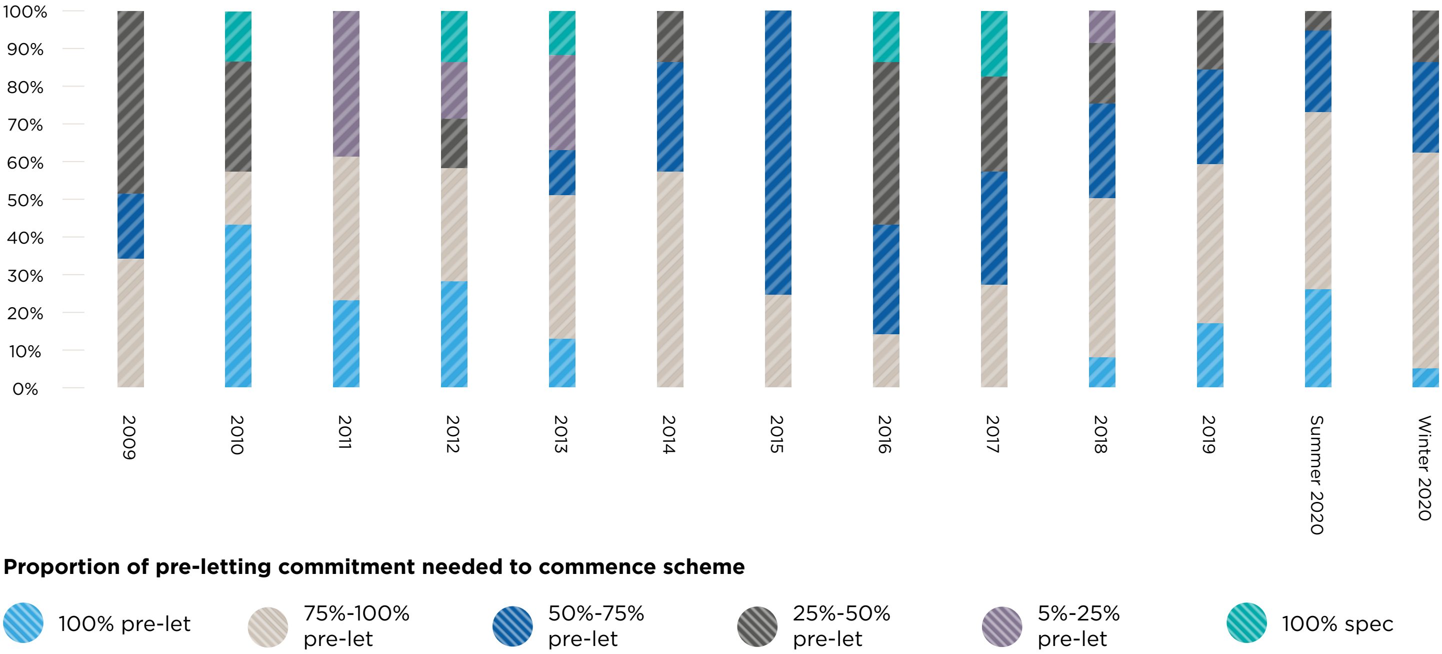
The two factors of supply and demand remain at the very top of the list of importance to decision-making in respect of drivers of expansion or contraction amongst these respondents. Identified demand and the lack of supply have constantly been ranked as the number one and two drivers of expansion by developers since we began the survey over a decade ago.

One other area of note is that data sovereignty has been cited by 17% of developers as an important contributory driver, representing a significant jump from the 8% monitored in our last survey. This may well be an acknowledgement that concerns exists over the looming impact of Brexit which as at the time of both survey and analysis has yet to see a trade agreement between the UK Government and the European Union agreed and uncertainty around data flows between the mainland and the UK continues.

CAUTIOUS CONFIDENCE

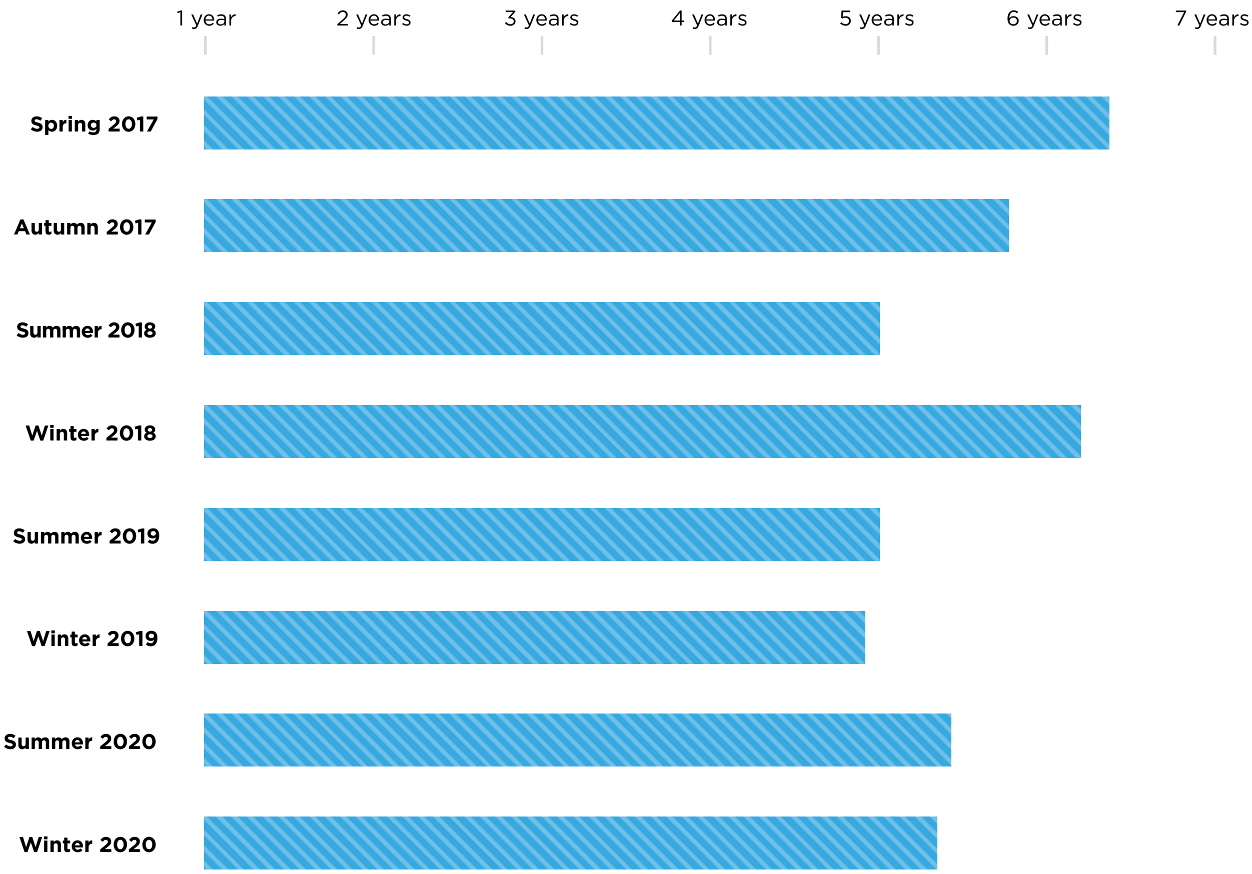
Further evidence that our European developers and investors are feeling less cautious, to some degree, around the prospects for their markets comes to light when examining the level of risk which builders will support in order to give the green light on a development phase. The days of "build it and they will come" are a distant memory, with construction and fit-out works now planned as a series of stages rather than as one continuous process, relying on the use of prefabrication and a rigorous supply chain for speed to market and cost control. However, there are still areas in a scheme where developers must analyse their risk profile against the support of funding and perceptions of demand.

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



In our latest survey, we have monitored a slight decline in the proportion of pre-letting required to secure the development of a phase of a scheme; just over 60% reported that they required a pre-let of at least 75% before they would break ground, a fall on the 72% recorded last time, although above the long-term average of 49%. In addition, only 5% recorded that they need 100% of the scheme pre-let before they would be prepared to commence works. This is a considerably reduction on the near 25% who required the same in our spring survey.

DEVELOPER EXPECTATIONS ON LEASE LENGTH



There is some evidence of greater developer confidence in our latest survey with respondents comfortable with a shorter-term certainty, and more positive with regard to future demand levels. Some 47% stated that a five-to-seven-year period would be the minimum lease length acceptable for a wholesale transaction. This is a decline on the 59% who reported the same earlier this year. In contrast there has been arise in the proportion who would accept a shorter lease period – 48% stated that they would be comfortable with a three-to-five-year term, up from 41% in our preceding survey.

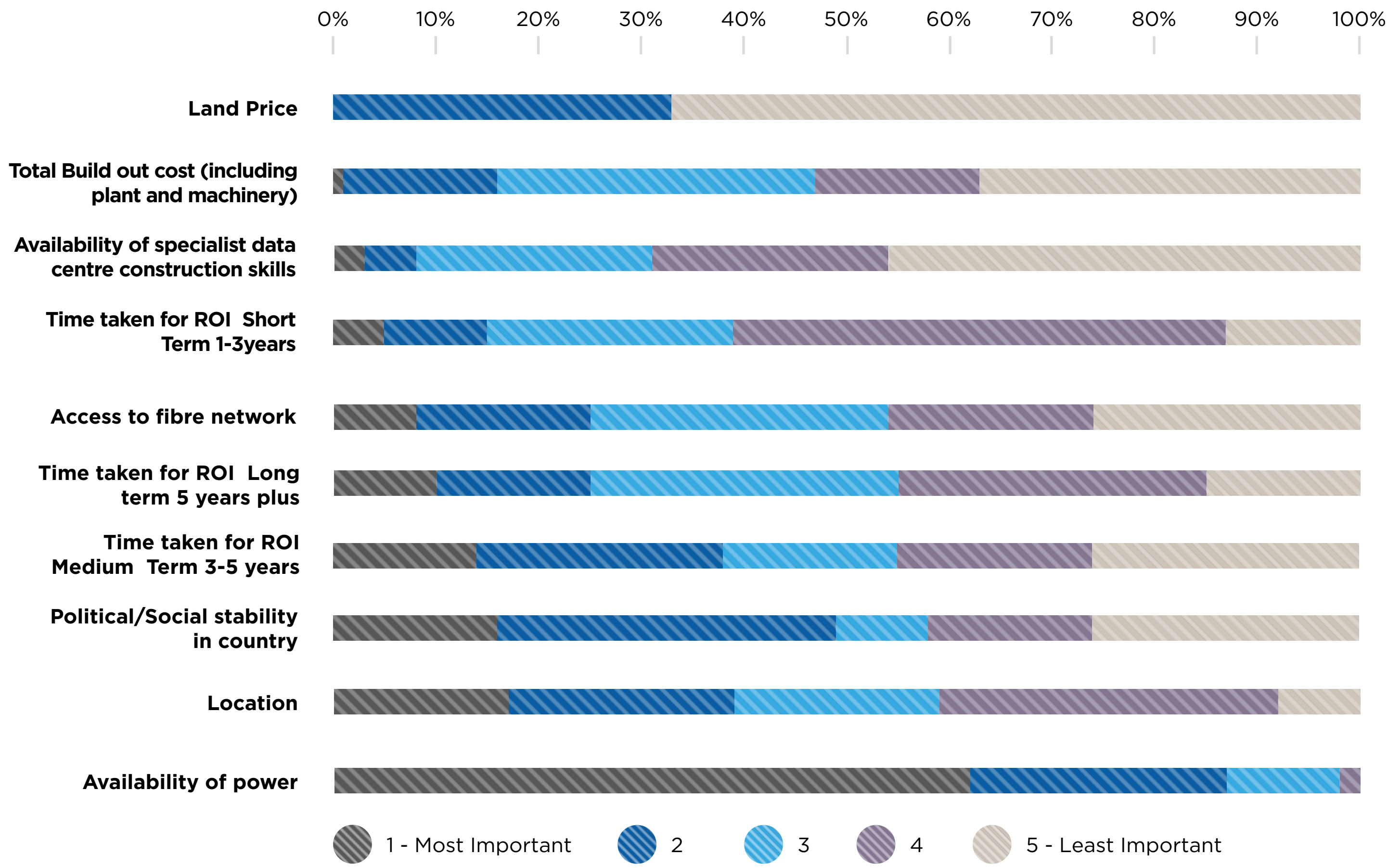
RANKING OF CHOICE FACTORS FOR NEW DATA CENTRE

There are many different factors that go into the successful development of a data centre, and identifying single drivers is not meant to try and reduce this complexity but instead highlight the changing order of these and their influences. For our respondents, the single most important factor for choosing a data centre across Europe continues to be the availability of power. Nearly two-thirds cited it as such in our latest survey, although a decline on the 72% who did so earlier in the year, it is still a significant proportion. Indeed, for our developer and investor respondents, some 81% rank it as the top factor, underscoring how important they see the power question is for their business.

A year ago, we noted a significant shift up the rankings for political/social stability. Our latest survey provides further evidence that this now firmly established as a major factor of importance, with almost half of our respondents ranking it as one of their top two choices. Given the general sense of unease and turmoil which seems to have characterised global geopolitics in the last couple of years - the UK's exit from the European Union, political unrest in Hong Kong, China-US trade relations, as well as the COVID-19 pandemic – this may not be surprising.

Location remains as the second most popular factor, with almost two-fifths of all respondents ranking it at least in their top two choices; similar to the outcome six months ago and close to the long-term average.

DRIVERS SEEING DATA CENTRE CHOICE



Once again for our developer and investor respondents, the highest rated factors following power availability are factors such as total build-out cost, availability of specialist data centre construction skills and land price, all of which have a direct impact on development costs and speed, and ultimately profits.

INVESTMENT FINANCE

The attraction of the data centre sector for investors has grown in recent years and we have seen the increased popularity via the considerable growth in both direct and indirect investment activity. Strong demand levels from cloud, service providers and enterprise looking to tap into their ecosystems have increasingly caught the interest of investment funds and private equity firms, especially those seeking alternatives to traditional real estate assets.

Whilst in the past, some institutional investors have struggled to understand the sector and the relationship between the layers of owner, operator and occupier, there are increasingly more market commentators and analysts that help funds characterise and benchmark projects, allowing it to be seen as a more straightforward long-term real estate investment. Given the current levels of projected growth in data traffic, the infrastructure and services ecosystem supported in the data centre proves very attractive.

A wave of new investors has joined the market for data centres in both a direct and indirect manner in the last ten years. Amongst them are investment houses and pension funds looking to capitalise on the industries strong growth credentials. Opportunities to expand in the market come in several guises from standalone data centre providers picked off by larger funds, to multi-national footprint telcos separating their network and real estate assets. An example of the latter saw CenturyLink sell 57 facilities in 2017 to a consortium of investment firms that created Cyxtera Technologies, followed by Brookfield Infrastructure Partners' purchase of 31 AT&T data centre and colocation operations establishing Evoque Data Center Solutions to own and operate the assets at the end of 2018.

The structure of Real Estate Investment Trusts (REITS) has favoured the sector playing a key role in some of the most significant merger and acquisition activity in the market. Late last year we saw one of the largest deals play out when Digital Realty bought Dutch colocation company Interxion for a reported US$8.4 billion, followed by purchases of Altus IT, a Croatian data centre provider and Greek data centre operator Lamda Hellix.

In an attempt to delve deeper into the characteristics of investment and M&A activity, for the second survey in succession we questioned our investment respondents on the sources of finance that have either received or provided over the past year. The results are on a per/respondent basis, not gross monetary unit.

Some 28% reported that they had raised equity finance through their existing shareholder base in the last year, whilst around one-third indicated that they had sourced finance from specialist technology-focused funds. A further quarter of respondents reported securing bank debt funding over the period. Two-out-of-three respondents had secured finance from a multitude of sources, highlighting that over the life cycle of data centre project it is likely that many forms of both debt and equity finance are used, much like the traditional real estate asset classes.

NEW ENTRANTS FIND PLANNING PROBLEMATIC

In our previous survey we started to gauge the experiences of those of our developer and investor respondents who have entered the data centre industry in Europe for the first time. This was in response to the arrival of several new notable operators, mostly from North America and Asia, whose home markets are characterised by different methods of working, planning regimes, labour legislation and building standards. It should be noted that although this respondent base is not large in number, their views do provide a broad overview of the differences and difficulties that can be faced in the design and build process across European markets.

For the second survey in succession the planning system has been cited as the single most difficult area for new entrants into Europe. One-in-two of our respondents ranked it as the top area of concern, whist over four-fifths placed it in the top two positions.

The differing layers of complexity of planning systems across a variety of national regional and local authorities makes this perhaps unsurprising, particularly given the more complex nature of issues that a data centre presents. Power consumption and environmental impacts are at the forefront of challenges for the industry and can add a layer of convolution to the planning process given these are often politically sensitive issues.

This survey has also seen little change regarding Contractual approach/Project admin which was ranked the second highest area of difficulty by respondents and unsurprising given the varied contract and labour laws across the European nations. Interestingly 17% cited Design/Management approach as causing the highest level of concern, which may reflect regional and national variations in shortages of appropriately skilled design staff. This is generally an area of concern to the industry.

Finally, our respondents ranked Construction Methodology and Design & Build Standards at the lowest levels of concern when entering a new market. This may reflect the greater degree of consistency around design and build standardisation across the word in the delivery of technical real estate, which has undoubtedly been enhanced through the easy movement of professionals across regions.

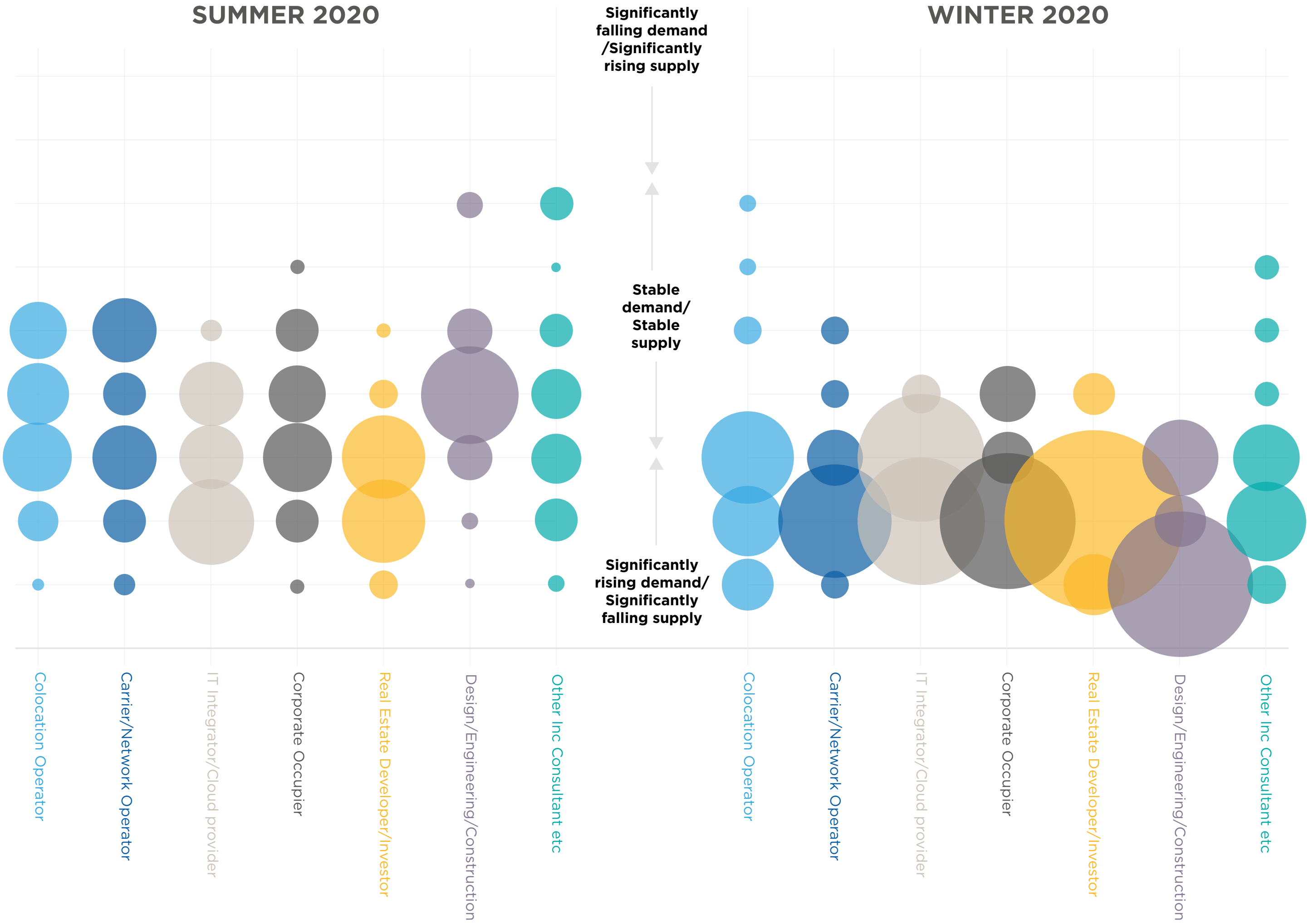
THREATS TO THE INDUSTRY – SHORTAGE OF SKILLS

The issue of a skills gap can often be controversial and political, particularly around the technical sector, and the data centre sector is arguably front and centre when it comes to requiring an advanced technical workforce, whether it is at the design and build stage or operational side.

Why are skills sometimes hard to measure and to manage? Because of ever-changing and new technologies and practices which frequently require training that is not taught in universities or through a general apprenticeship programme. As technology advances, there is a need for reskilling or upskilling, with consideration on technologies which are influencing the sector such as on digital skills, analytics and artificial intelligence.

What is apparent to our respondents, however, is that a lack of suitably qualified professionals is a potential threat to the market's ability to supply and operate the necessary technical floorspace to meet the ongoing growth in demand. We questioned our respondents on their views to try and gauge their perception of the depth of the skills gap and its effect on the health of the industry.

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



- Across our respondent's groupings there is widespread concern over a skills shortage in the industry. Some 93% of respondents believe that the coming year will see a decline in supply of staff, an rise on the 76% who reported this in the spring.
- In addition, 84% believe that this will be accompanied by a rise in demand for such staff, further exacerbating the problem.
- Developer respondents express the highest degree of concern, with near universal agreement that that the coming 12 month period will see a fall in supply of staff whilst the demand for those skill sets rises; an increase on the 82% who held the same view six months ago.
- Interestingly, those respondents who identified themselves as working in Design, Engineering and Construction (DEC) roles were slightly less apprehensive than developers, albeit 73% suggesting falling supply whilst predicting rising demand. The remaining 27% indicated that demand for skilled workers would remain stable whilst supply fell.
- Colocation providers also expressed a high level of concern, with 86% predicting increasing demand levels for skilled workers against a falling supply in the next 12 months.
- Integrators expressed a greater sense of concern than was the case six months ago, with almost universal agreement (95%) that supply would fall over the period, with 55% indicating that this would go hand-in-hand with rising demand, and 45% of these believe that demand would stabilise.
- Corporate respondents expressed the widest range of opinions amongst our groupings. Over two-fifths believe that rising demand of skilled staff would be met with falling supply, whilst almost half thought demand would remain stable.

WHO IS IN SHORT SUPPLY?

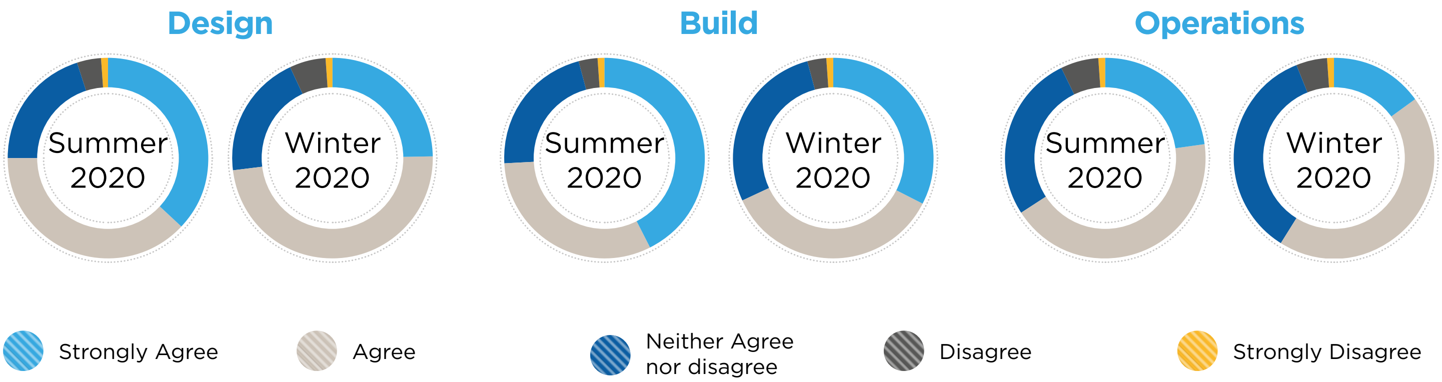
The results of our latest survey suggest that there is agreement amongst respondents that there are general shortages across the board amongst design, construction and operational professionals within the European data centre industry. Respondents identified design professionals as being subject to the most serious shortages – 74% stated this view compared with 69% for build professionals and 59% for those staff involved with operations of data centres.

Whilst the view on design professionals has remained largely unchanged over the past six months, there appears to be some marginal easing in those expressing concern about construction professionals. However, there is a small degree of polarisation of opinion, with notably a similar proportion of respondents (5%) across all three disciplines who disagree that such a skill shortage exists; the same level recorded in our last survey.

In the past year, respondents have reported being impacted directly as result of shortages across all roles of the design, build and operation of data centres. Drilling further down, we have found that within design, nearly 50% of those surveyed cited experiencing a shortage of data centre architects within the last 12 months, and 59% stated that they had experienced shortages of suitably qualified quantity surveyors, site managers and site engineers over the period.

Within the operational employment vertical, almost two-thirds of respondents stated that they have had direct experience of shortages of operations and network engineers/technicians over the last year, with a slightly lower proportion seeing a shortage of infrastructure specialists in the same period. In addition, Mechanical & Electrical project managers were also highlighted as a major area of concern with three-quarters of respondents acknowledging this shortage.

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

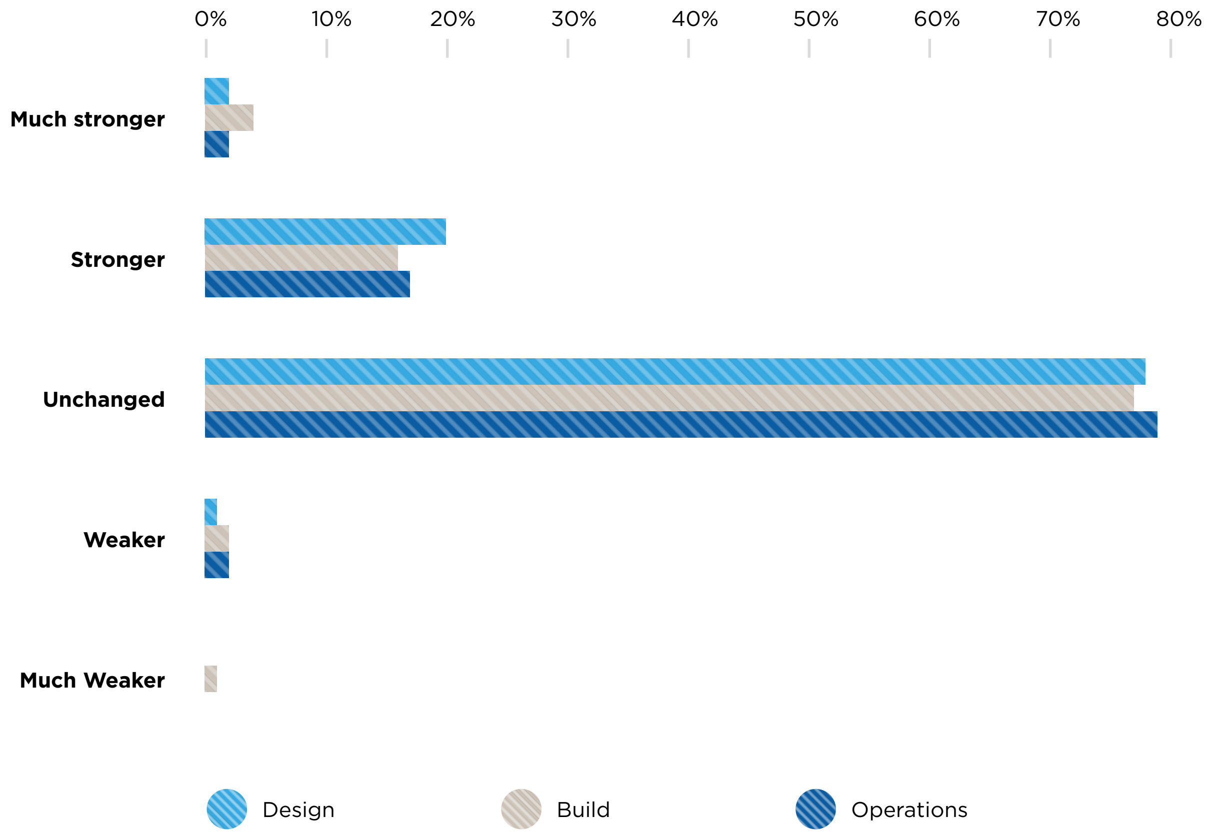


COVID-19 – DEEPENS STRENGTH OF FEELING

Whilst our survey has been tracking the question of skills shortages over the past five years, the disruption caused by COVID-19 over 2020 is crucial to understand particularly if it is exacerbating an already-identified threat to our growing sector. In some way, the free movement of labour across the European Union would have eased pressure on skills shortages allowing identified gaps to be filled where necessary for short term problem solving. The global shut down and restriction of movement of personnel may well have aggravated further the dearth in skilled labour, particularly away from the Tier 1 centres in more remote destinations.

However, we have found that there is considerable agreement amongst respondents across all three verticals of design, build and operations that they do not believe that the current pandemic has altered their view on skills shortages to any greater or lesser extent, with just less than four-fifths indicating this, whilst one-fifth saw their views strengthening in the wake of COVID-19 threat.

HAS YOUR OPINION ON SHORTAGES OFF SKILLED STAFF CHANGED AS DIRECT RESULT OF COVID-19 PANDEMIC? IF SO TO WHAT DEGREE?

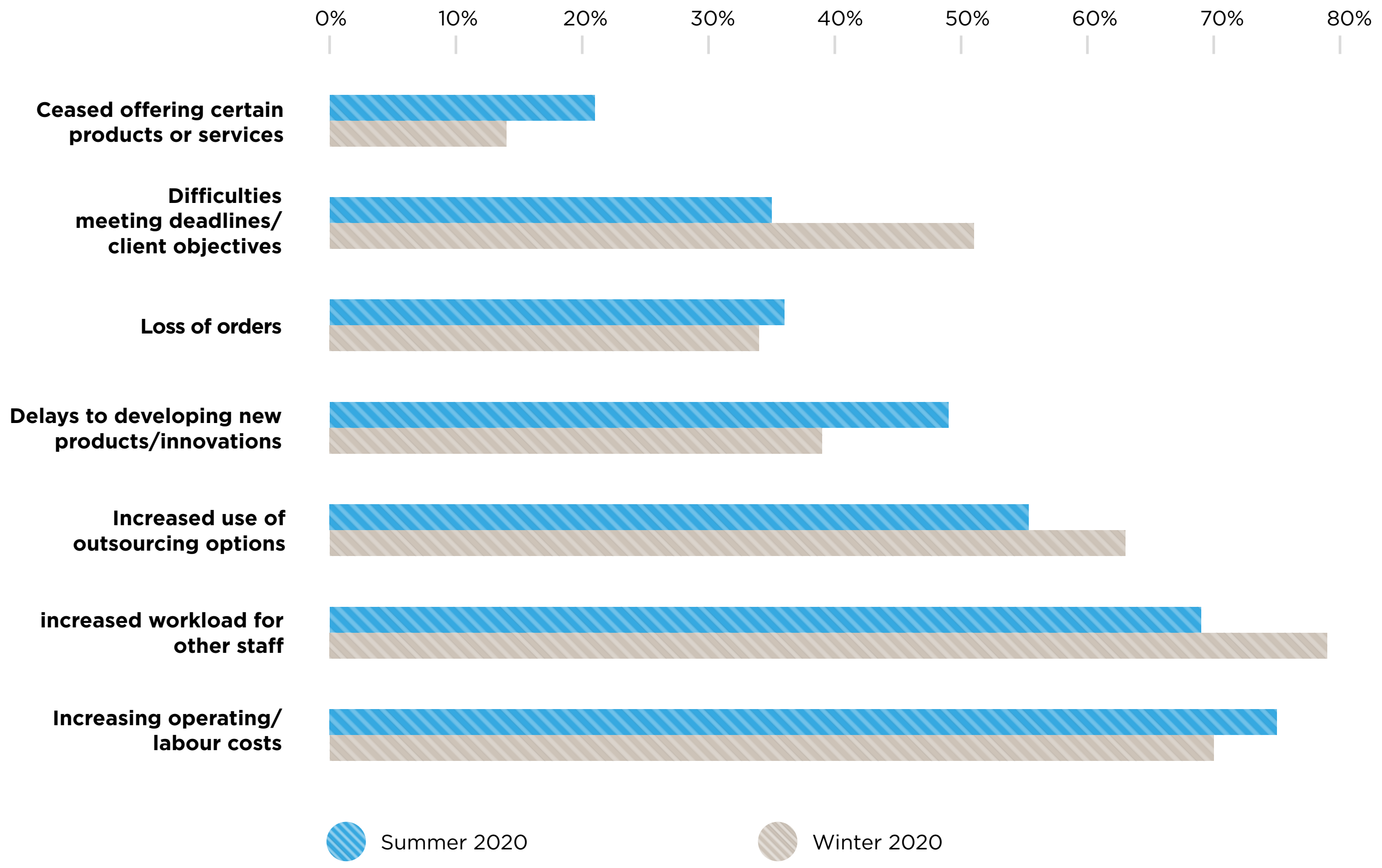


Amongst Integrators and cloud providers around 12% thought their viewpoint had become firmer whilst around 5% on average across all skillsets thought it had weakened. Regarding operations, this proportion jumps to 17%. This may suggest selected respondents have had some recent localised success in attracting skilled staff to their facilities. In addition, amongst corporates, almost one-in-ten believed their view on skills in respect of construction professional shortages has softened.

IMPACT OF THESE SHORTAGES

Whilst skills shortages are of concern for the long-term growth profile of the industry, there is little doubt that such shortages are having an effect on our respondents now. Indeed, it is noted that almost all responding cited multiple impacts immediately. For the third successive survey the top two highest ranking impacts that have been cited by our respondents are an increased workload placed on their existing staff (79%) and increasing operating/labour costs (70%), whilst 63% indicated that this has led to an increase in the use of outsourcing options over the past 12 months.

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



The increased pressure on existing staff created by a greater workload has in turn led to problems in resourcing existing work, with just over half stating that they had experienced difficulties in meeting deadlines or client objectives. The more extreme consequence of this has led to lost orders – almost one-third of respondents reporting that this had been the case for them.

In addition, over one-third stated that shortages had led to delays to developing new products/innovations but a smaller proportion (14%) indicated that they had ceased offering certain products or services because of this shortage.

So there appears to be convincing evidence that the issue of skills shortages is of concern to the European data centre industry. As a collective, there appears now to be a responsibility to build more awareness around the employment opportunities in our arena and make sure that the skills debate that surrounds all industries involved in new technologies includes a strong data centre voice. For an industry that is so critical to the advancement and prosperity of all economies, it's paramount that it not only attracts and retains the skills levels to operate, but in fact becomes a leading industry-of-choice for the best workforce in order to truly fulfil its long term potential.

COVID-19

The events of 2020 continue to pose unprecedented challenges to the European data centre industry. The disruption to everyday life caused by the COVID-19 pandemic has been immense, with a series of radical protective measures adopted by governments to alleviate and lessen the impact of the health crisis, leading to widespread economic, living and working disruption. It is against this background that the data centre industry has had to operate and respond over the past nine months.

At the time of publication, more positive news has emerged on the development of vaccines to stop the spread of the pandemic. However, there are many questions around the global distribution and utilisation of these vaccines and with or without firm strategies in place the immediate effects of COVID-19 are likely to be felt throughout 2021, whilst the economic ramifications could leave a more permanent footprint in many countries.

There is little doubt that the pandemic has illustrated how important the data centre industry is. The growth in the use of connected devices, servicing home working and education, as well as telemedicine and the increased use of entertainment streaming services has required considerable effort on behalf of the service and infrastructure providers. These trends, of course, were already emerging, but the impact of the pandemic has helped accelerate their implementation and acceptance. The flexibility and ability of the data centre to both innovate and respond rapidly to these dynamics has served the global economy well.

IMPACT ON BUSINESS

As with all sectors, for data centre operators working and running a business during the pandemic has created its own set of challenges. The requirement to deliver an efficient service maintaining uptime levels, whilst ensuring the correct safety protocols for its staff and customers, must be met. Generally, this appears to have been accomplished, with anecdotal evidence of a combination of shift/split-team working, limited numbers of essential staff on site and non-essential staff working from home.

This has, of course, led to a limited programme of essential work and maintenance being undertaken in these facilities during the strictest lockdown restrictions, easing through the summer months as these lifted, but likely returned again following the reaction to the second wave.

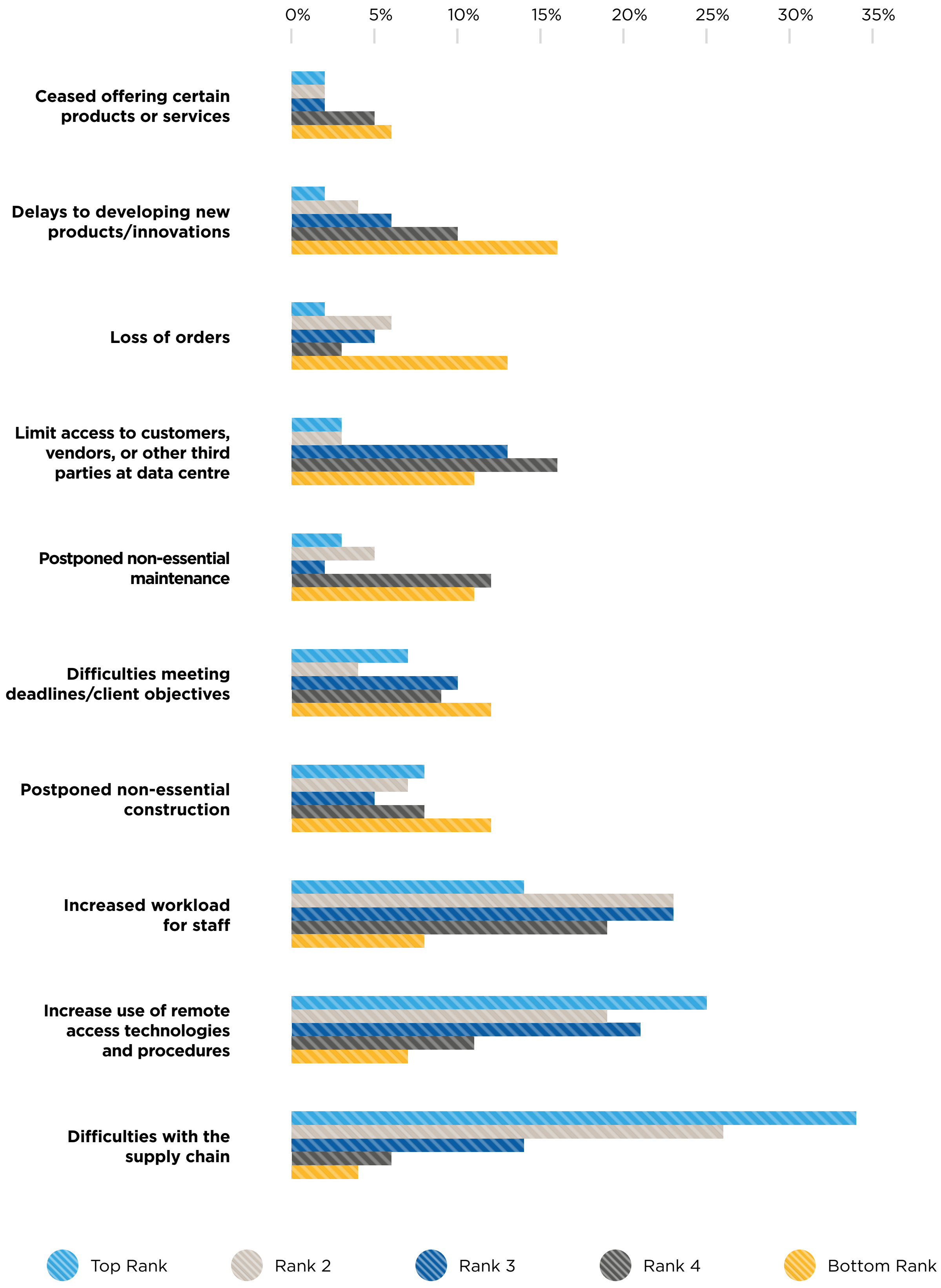
One factor which appears to have become more concerning to our respondents over the past six months has been, difficulties with the supply chain which was cited highly as a pain factor, with 34% placing it at the top of their list, up from 24% recorded in our previous survey. Whilst amongst colocation operators, carriers and integrators, this proportion has remained un-changed at one-third, it is still their top ranked factor of most concern. It should also be noted that the nature of the data centre industry is increasingly global and securing source material for builds, fit outs, replacement parts et al is rarely just a domestic operation. The supply chain for most is international which has undoubtedly exacerbated the difficulties in securing the necessary materials as movement of people and consequently goods has faced restrictions.

The second most highly ranked impact amongst our respondents is the increased use of remote access technologies and procedures. It is not surprising that this is as highly rankled as it is, given that in most cases only essential staff have been allowed to work on site. As a result of access to the data centre being limited to essential staff, it is not surprising that our respondents have also cited increased workload for staff as a notable impact. Indeed some 14% ranked it as the top ranked impact.

Amongst our corporate respondents, this factor was rated top by 38%, in line with that indicated six months ago and once again, stressing the increasingly vital nature that IT roles play within enterprises. Factors such as limiting access to customers, vendors, or other third parties at the data centre and postponed non-essential construction and maintenance also reflect the requirement to limit personnel in facilities. Once again almost half of our developer respondents placed the postponement of construction work as their top ranked outcome, just after supply chain concerns, roughly in line with the sentiment recorded at the start of the pandemic.

One notable change over the past six months has seen loss of orders dimmish as an important impact amongst respondents. In our last survey, there was perhaps more concern as to the future direction regarding economic prospects and potential market growth which led to the postponement or cancellation of orders. Our latest survey provides a little evidence that these fears are reducing and suggest a general reappearance in real and perceived demand levels across the industry.

COVID-19 – DIRECT IMPACTS ON BUSINESS



IMPACT ON DATA CENTRE EXPANSION

In our previous survey, a significant proportion of respondents indicated that they were extremely cautious as to what challenges the pandemic would have on their data centre expansion plans. This was entirely understandable, as the virus took hold across the world and the consequences of lockdown, restrictions and a global halt on travel were yet unknown. Then, almost three-quarters indicated that they expected the pandemic would curtail their plans for expansion.

Encouragingly, the industry response over the course of the year appears to have introduced a level of optimism amongst respondents, with this proportion now falling to around two-fifths. A further 29% chose to adopt a wait and see position, whilst those who did not expect the pandemic to curtail their plans has risen significantly from 9% to 31%. Whilst the balance of opinion continues to favour a negative effect on data centre expansion across Europe in the coming year, the momentum has swung significantly towards a more benign environment, one that could possibly move further into positive territory as news of multiple successful vaccines and timelines on roll-outs across the world continue.

It should be noted that the highest degree of caution remains with our end-user respondents - just over half of whom have reported that they have curtailed expansion plans. The service provider community appear to be a little more polarised, with around one third indicating they expect to see expansion plans curtailed, whilst another third who don't, and a third undecided.

For developers, the perceived threat to expansion programmes seems to have lessened, with just over 10% stating that it would impact on their plans, down from a quarter recorded in our early-2020 survey. This would suggest that sentiment over future demand patterns is moving in a more positive direction with developers confident that the challenges seen during the year have been adequately met and that the industry can continue to perform well moving forward.

COVID 19 – CURTAILED DATA CENTRE EXPANSION PLANS

RISING IMPORTANCE OF LOCATION

In the face of the widening spread of the pandemic, the issue of data centre location appears to have become more important to our respondents. In our last survey some 58% indicated that location was rising in importance. This has now risen to 64%, with the increase primarily as a result of those who had previously stated no preference, now falling on the side of rising importance.

Amongst end-users, the view has remained relatively un-changed, with around half agreeing whilst many of the remainder adopted a neutral viewpoint. Once again, the highest degree of assent came from our developer and investor respondents with 86% - up from 72% earlier in the year – agreeing that the issue of data centre location is now more important.

Whether the latest results are driven by actual experience amongst respondents or perceived fears is unclear. The varying degree of lockdown and restrictions that has been seen across Europe may well have exposed some facilities to either operational or, at the very least, access challenges. Indeed, supply chains have been tested, not just around the construction and pre-fabrication routes, but also at the operational and maintenance layers.

These supply chains would also include labour, where restrictions on travel will have been felt the most. Future-proofing facilities is a topic that has always featured high on the concerns amongst data centre owners and occupiers. Considering the experiences of 2020, there may well be some different metrics around the future-proofing question for our respondents to consider.

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

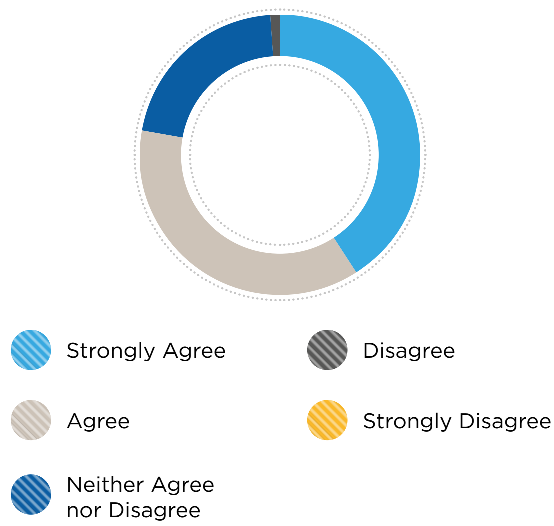
FUTURE SUPPLY CHAINS DISRUPTIONS LIKELY

The ability to source the raw materials it requires in an efficient and cost-effective manner is vital to business, and the data centre industry is no different. Any disruption to supply chains vital for the development and fitting out process is therefore of fundamental concern. We have already seen that supply chain difficulties have ranked as the number one impact on business amongst our respondents during the pandemic. The concern amongst our respondents is that further disruption could well impact on the supply pipeline moving forward, with 89% reporting that they expected to see further disruptions.

Differing levels of concern on this issue exist amongst our categories of respondent. For those charged with delivering new space there is almost universal agreement amongst developers, designers, engineers and construction professionals that further supply chain disruption is likely, although as we have already noted, developer's levels of concern over the pandemics threat to their expansion programmes has lessened over the past six months, suggesting that they are, to some extent, meeting the challenges of supply chain disruption.

In contrast amongst our end-users, there is a notable difference with just two-fifths expecting to see further supply chain difficulties, and most of the remainder (55%) neither agreeing nor disagreeing. This could reflect that a significant proportion of our corporate respondents are now one step away from immediate supply chain problems as they have come to rely on third-party providers more and more.

COVID-19 - RECENT RE-EMERGENCE OF RISING INFECTION RATES HAS LED TO CONFUSION AND IS LIKELY TO LEAD FURTHER DIFFICULTIES WITH THE SUPPLY CHAIN IN THE FUTURE.



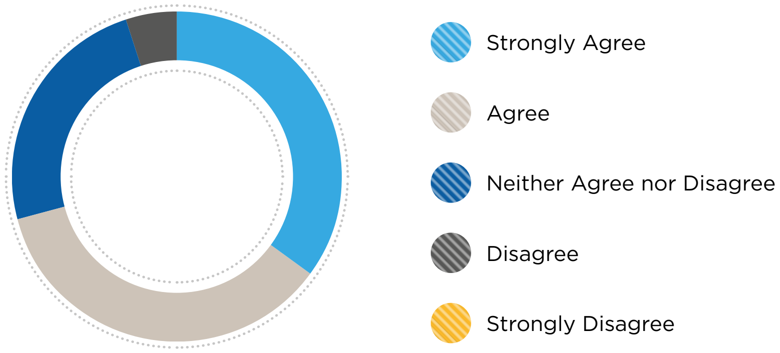
Although it is difficult to judge, the easing of restrictions during the summer across Europe may have allowed an acceleration of the flow of materials and goods to try and ease any bottlenecks that had formed, releasing pressures on key areas of the industry. Indeed, whilst Lockdown 2.0 has been enforced across most of Europe once again, there are measurably fewer restrictions other than pure capacity issues. There is little doubt, however, that the threat of supply chain disruption remains an area of concern amongst the industry.

A BRIGHT BUT CLOUDY OUTLOOK

It has been widely reported that the severe restrictions that have been experienced across the world during the lockdown period, have led to substantial changes in working patterns with a large-scale shift to home working as well as online retailing and the increased use of steaming services for home entertainment requirements. These trends have been facilitated, in a large part, by the secure foundations of cloud-based services that have been developed over the last decade and this acceleration of use has been supported through the development of flexible and agile products that meet end-users needs.

When asked whether they now intended to spend above and beyond what had been previously planned on such cloud products and services, nearly three-quarters of our respondents reported they would do so, with just 5% indicating that they would not, whilst the balance suggested budgets for these products would remain as previously planned.

COVID-19 – WE INTEND TO SPEND SIGNIFICANTLY MORE ON CLOUD-BASED PRODUCTS THAN HAS BEEN PREVIOUSLY PLANNED.



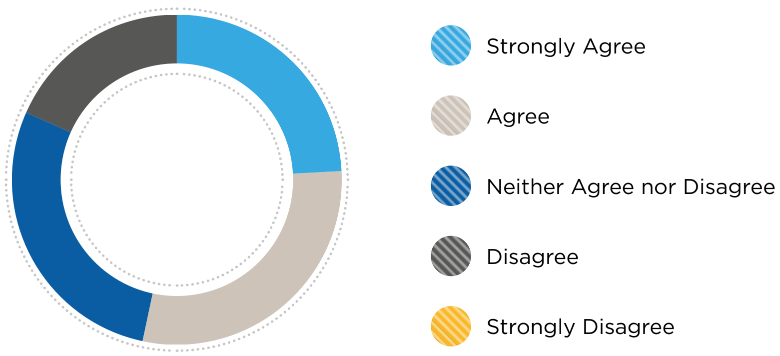
Amongst operators the proportion expecting to alter their budgets to increase spending on cloud-based products is marginally lower at around 70% but with little disagreement and a slightly high proportion (27%) who indicated budgets on these products would be un-changed.

DEMAND FOR "HYPERSCALE" DATA CENTRES WILL BE MAJOR DRIVER

In recent years we have seen substantial growth in the number of hyperscale data centres being developed, as the ever-increasing demand for cloud services drives the need for scalable and flexible infrastructure. Just over half of our respondents agreed that the requirement for such hyperscale facilities would be the biggest driver of data centres in the coming years, with around one-quarter adopting a neutral position.

Whilst hyperscale data centres may prove to be a dominant driver for growth in the industry, they are unlikely to do so in isolation. For some time, it has been suggested that the widespread introduction of 5G networks and the demand for IoT will be game-changing, requiring a large number of smaller Edge data centres to address latency issues and therefore by necessity must be located within proximity to where IT services are being delivered. The growing need for powerful analytics will still require the services of centralised, hyperscale facilities and this would suggest that the two architectures are likely to remain important drivers of technical real estate moving forward.

COVID 19 – DEMAND FOR "HYPERSCALE" DATA CENTRES WILL BE THE BIGGEST DRIVER OF NEW DATA CENTRES DRIVEN BY THE NEED FOR SCALABILITY AND FLEXIBILITY



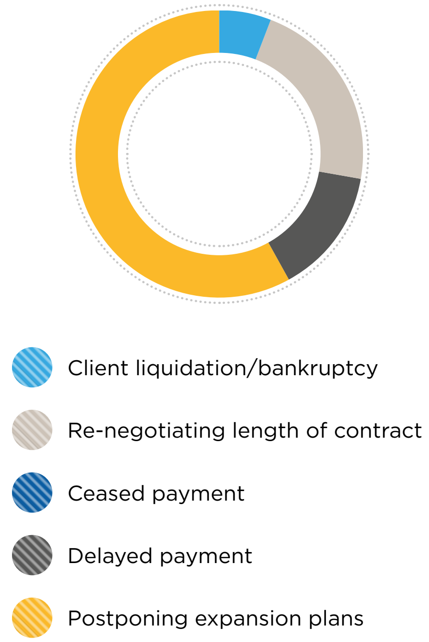
CLIENT IMPACT ON OPERATORS

Although in general the data centre and service providers have seemingly performed well during the past six months, they are not immune to the likely economic fallout from the pandemic. It has been widely reported that a number of sectors have been deeply impacted by falling economic activity; retail, hospitality and travel have had well publicised difficulties as a result of the social distancing and lockdown measures introduced to combat the spread of the pandemic.

Areas of the data centre industry that rely on these sectors for demand will undoubtedly also suffer, although the innovative nature of service providers and product developers may well mean that opportunities for new services will fill the holes left by this falling demand. Unsurprisingly, the top-rated impact that our respondents experienced with their clients as result of COVID-19, was the postponement of expansion plans; 58% noting this. Postponement of course does not necessarily mean cancellation and it may well be that for many expansion plans will be revisited as positive news about falling infection rates and the introduction of widespread vaccination programme continues to emerge.

The next largest reported impact was the attempt to re-negotiate length of contract or lease. Just over 20% of our operators reported that clients had discussed this course of action. In addition, a further 14% have reported delayed payments. For our operator respondents, one of the major challenges they face is the potential risk to income streams via customer default. For some there is anecdotal evidence that it has been in their interest to seek to alleviate the chances of default by acting before this occurs, either through the offer of deferred payments or even payment holidays. Notably, only 6% reported the worst-case scenario, namely clients entering administration or liquidation.

COVID-19 – DATA CENTRE OPERATORS - CLIENT IMPACTS



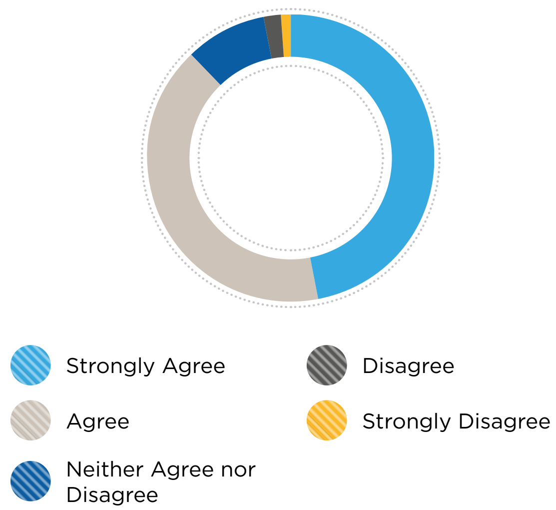
THE PARADIGM AROUND COVID-19 HAS SHIFTED

Much has been speculated about the level of transformative impact that the COVID-19 pandemic may have. A chance for a major re-boot in the way we work, shop and play. There is plenty of copy and comment about what it means for the future of the office, commuter transport, high street retail etc. all of which are important and weighty issues and will in some way impact the data centre industry.

Whatever the long term impact of these and other substantive issues, there is little doubt that our respondents believe that there has been a significant change in underlying fundamentals and one in which their business strategies have to take into account via the ability to offer more flexible working practices. Some 88% share this view with very similar response profiles across all our respondent categories.

These results suggest that in the long-term a more flexible approach to working, is likely to be more firmly entrenched in the economy. To a large extent, the data centre industry has enabled this changing dynamic though the innovative nature that is entrenched in its foundations. We have noted the growth in cloud services and their impact on our lives whether that be changes in the way we shop, learn, entertain, work or access healthcare. All of these activities are set to grow further in the future. The challenge to the data centre industry and its occupiers is to continue to provide the flexible and supportive infrastructure to meet this growth and encourage further changing requirements.

COVID-19 – THE PARADIGM AROUND COVID-19 HAS SHIFTED. WE NO LONGER SEE IT AS A SHORT-TERM EVENT, INSTEAD IT IS SEEN AS A WORLD-CHANGER AND ONE IN WHICH OUR LONG-TERM STRATEGY HAS TO NOW TAKE INTO ACCOUNT A CONSTANT NEED FOR MORE FLEXIBLE WORKING PRACTICE.



MEET THE EXPERTS

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

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