European Commercial – October 2020

SPOTLIGHT
Savills Research

European Data Centre
2020: a tipping point for the industry

savills

● Homo digitalis ● Covid-19 ● Green shadow ● Growing asset class ● Benchmark

In one minute on the internet

6,659 PACKAGES SHIPPED

69,444 USERS APPLY FOR JOBS

347,222 STORIES

52,083 USERS CONNECTED

1,000,000 CONSUMERS SPEND ONLINE

404,444 HOURS OF VIDEO STREAMED

The Homo digitalis bloom

Just 10 years ago, the first iPad was released. At the time, the idea of having a tablet device was great, but its actual usefulness was less clear. Today smartphones and tablets are so commonly used that we tend to forget how we managed without it. In 10 years, the tablet market was propelled into the mainstream. From Q2 2010 to Q2 2020, 1.6 billion tablets have been shipped worldwide.

As of 2020, 59% of the global population is connected, against 26.6% in 2010. According to Global Web Index, internet users spend 6.43 hours online each day on average, equating to approximately 100 days per year. With an eight--hour sleep a day, that means we currently spend more than 40% of our waking lives using the internet, clicking, swiping, liking, tweeting, both creating and using data simultaneously.

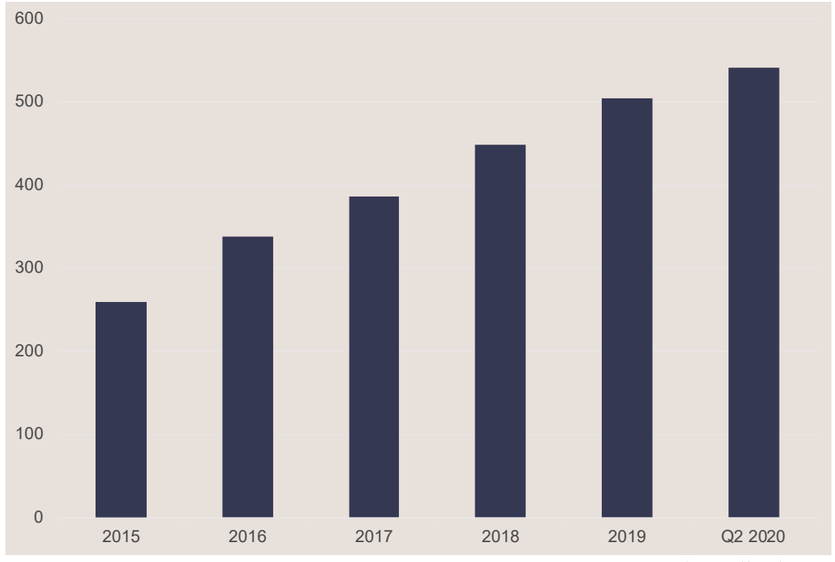
As Covid-19 moved the world online, the amount of data generated has surged impressively.

According to Domo, in 2020, in one minute 400,444 hours of video are watched globally on Netflix, 42 million messages are sent on WhatsApp, $1 million is spent shopping online, Amazon ships 6,659 packages and Zoom host 208,333 users. Internet users generate 2.5 quintillion (18 zeroes) bytes of data every day.

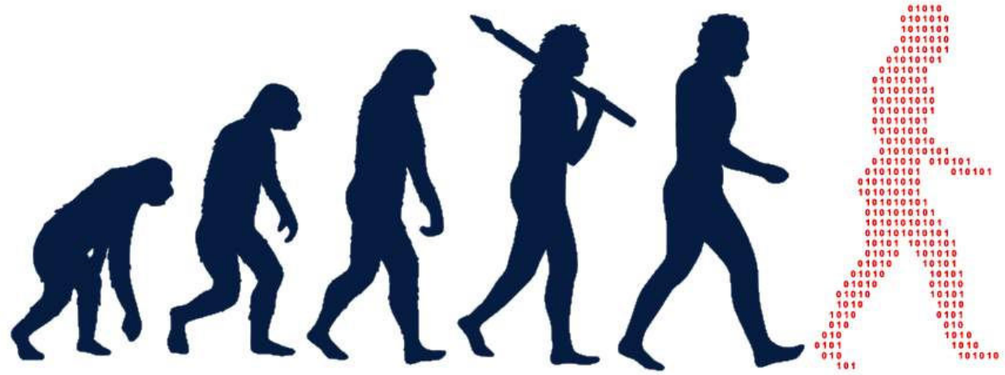
Besides, the amount of data collected in industry and commercial business is also increasing at an unprecedented rate triggered by the rise of the Internet of Things (IoT), artificial intelligence (AI), augmented reality (AR) and blockchain. According to Cisco Systems, by 2023, machine-to-machine (M2M) communications could represent 50% of the 14.7bn connections expected. In comparison, these M2M communications represented 33% of the 6.1bn connections in 2018.

To accommodate this explosive rise in demand for storage capacity, the number of global data centres is rapidly expanding. The number of hyperscale data centres worldwide more than doubled between 2015 and Q2 2020 from 259 to 541 according to Cisco Systems. Whilst, this is generating many opportunities for operators, developers and investors, it also raises some challenges for the whole industry's market players, including sustainability of such growth, cybersecurity and data sovereignty, connectivity from core to edge to avoid latency, reliabilities and outages, rapid innovation and induced obsolescence.

Number of hyperscale data centres worldwide



Source: Cisco Systems



Covid-19, a tipping point for the data centre industry?

With the enforcement of mobility restrictions to contain the spread of the Covid-19 virus, internet traffic increased substantially. In March, internet service providers (ISP) reported varying rates of traffic growth ranging from 35% to 90% within the EMEA region. Whilst despite the congestion, the internet has held up surprisingly well overall, the number of outages recorded on the continent rose steadily from March to June and latency increased, as reported by ThousandEyes Cisco.

As connectivity became the X-factor for health, education and business continuity, the capacity and the resilience of broadband and data storage infrastructures came to the fore, as never before. The fear of a potential network breakout particularly caught public bodies' attention leading to intervention measures. Mid-March, the European Commission asked streaming providers to cut back on quality definition to avoid infrastructures' saturation. The Commission also set up special reporting to monitor the internet traffic situation in each member state to be able to respond to capacity issues.

More generally, the Covid-19 situation underlined the importance of continued network investment. In September, the Commission Recommendation on Connectivity, invited member states to work together to accelerate the rollout of 5G and fibre networks. The deployment of 5G technology is calling for some restructuring of the data centre network architecture. Many of the IoT applications that 5G will enable, require a huge volume of data to be processed at the edge to avoid latency and work efficiently. Hence, the need to bring computing power closer to the point of connectivity and the end-user will drive demand for edge data centres in secondary and tertiary markets.

Cloud infrastructures also played an important role in enabling businesses and governments to quickly apply solutions to respond to the crisis. According to Snow Software, who surveyed 250 IT leaders globally in June this year, 82% of respondents said they had ramped up their use of the cloud to enable remote working. Although three-quarters of the poll reported a direct increase in spending on cloud infrastructure services, 66% will continue to use cloud services once employees return to the workplace. Furthermore, 45% of respondents plan to accelerate the pace of their cloud migration. With the unprecedented cloud shift likely to become pivotal for many companies and institutions, demand for cloud data centre facilities will continue to grow for the foreseeable future.

The massive increase of the online population, including children and first-time internet users, opened large gateways for cyber-attackers to exploit. Since the start of the Covid-19 pandemic, the WHO reported a fivefold increase in cyber-attacks on its workforce. European policymakers, including the European Commission, the EU Agency for Cybersecurity (ENISA), the CERT-EU and Europol joined forces to guarantee safer cyberspace. Whilst cybersecurity has always been a major concern for data centre managers, it will certainly escalate into the top operator considerations.

Rising online population, rising outages, government intervention, 5G and edge growing cloud appetite, and cybersecurity concerns are trends that were already well underway before Covid-19. However, the exacerbating factor of the pandemic has brought the data centre industry to a tipping point, which will require rapid restructuring, organisation and coordination amongst all market players.

Data centres' green shadows

The green impetus

The exponential growth in data traffic comes at the cost of significantly higher energy demands. Over the past 10 years, data centres have been pinpointed by environmentalists for its massive carbon footprint that rivals the aircraft industry. Last year, loud public outcry and multiplying voices clamouring over the effects of climate change and several extreme heat-waves in Europe and the rest of the world have acted as a wake-up call for many major authorities, which have decided to take actions. In this wake, the EU Commission announced in February this year that the data centre industry should become climate neutral by 2030. As part of the European Green Deal initiative unveiled in November last year, this call points the start of future initiatives aiming at driving the industry towards a class of climate-neutral data centres.

Indeed, data centres are energy voracious; they are estimated to consume between 1% and 3% of the world power. According to the latest research from Swedish researcher Anders Andrae, by 2025, data centres will use 20% of the world's energy, corresponding to 5.5% of the global carbon footprint. Hence data centres will amount to ICT's largest share of global electricity production at 33%, followed by smartphones (15%) networks (10%) and TV (9%).

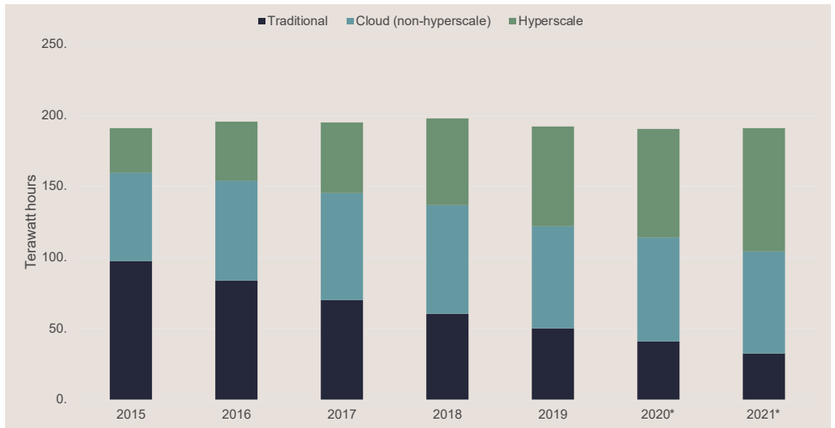
The green false pretence

The overall exponential energy appetite is triggered by a growing need from companies and consumers for more digital services and devices, which in turn, require more data centre facilities. Yet, new generation data centres require less energy than they used in the past. The amount of computing done in data centres more than quintupled between 2010 and 2018. Whilst at the same time, the amount of energy consumed by the world's data centres grew by only 6%, thanks to improvements in energy efficiency. Revealed in March this year, data from the IEA (International Energy Agency), confirmed that energy demand from global daten centre decreased over the past few years and should continue.

Over the past decade, the industry has moved away from corporate-owned data centres towards third party commercially operated data centres. The latter ones are much better placed to optimised energy efficiency, notably using hyperscale or cloud datacentres, since their operators have strong business incentives to waste less energy. Indeed, facilities with more efficient energy usage are more attractive to end-users and directly result in lower cost of operations. Hence becoming energy-efficient makes commercial sense as much as environmental sense.

Whilst the industry is increasingly accused of its impact on the environment, data centre companies have been proactively seeking innovative ways to decrease data centres' environmental footprint. Internet giants and large cloud companies such as Google, Microsoft, Facebook and eBay played a leading role in investing in green energies and technologies. There are notably among those that are committing to use renewable energy in their data centres. Co-location data centre operators are rapidly following the same path.

Energy demand in data centres worldwide



Source: IEA / *forecast

Different shades of green

There are many means and steps to green the industry. The straightforward and easiest way is to avoid fossil fuels. Data centres are well-placed to benefit from renewable energy sources due to their stable power consumption. Expanded availability of such energy has reduced its price. Besides, to attract data centre operators, local authorities often grant them lower and fixed price options. Hence, the use of renewable energy can offer the stability of electricity costs, especially at a time of energy price fluctuations. Some data centre companies, most notably cloud data centres are already operating using 100% renewable energy, resulting in lower emissions of carbon.

Another obvious step is to increase the efficiency of the data centre operating system. A few metrics exist to quantify this efficiency but, since 2007, the power usage effectiveness (PUE) indicator, has become the most commonly used across Europe. Introduced in 2006 by Green Grid, PUE is the relation between the amount of power entering a data centre and the power used to run the computer infrastructure within it (including cooling, heating, ventilation, power conversion/distribution, lighting and utility plug systems). The hypothetic optimum PUE is 1.0, meaning that 100% of the energy is efficiently used. According to the European Commission, in 2017 the average PUE in the Nordics was 1.71, in Northern Europe 1.72, in the UK and Ireland 1.83, and in Southern Europe 2.00. Nowadays, Google and Microsoft claim to build data centres for PUEs of 1.2 or better.

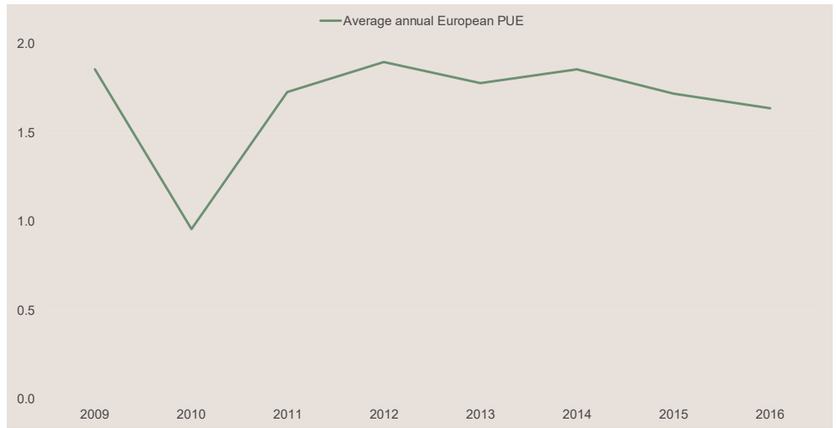
In recent years, a few shortcomings were brought to the fore regarding the PUE metric. One is that it does not take into account the possible reuse of the heat produced by the servers. Yet, recycling waste is a worth exploring way to win green credentials. Some data centres have implemented ingenious systems to reuse some sources of energy. In Switzerland, IBM uses the heat produced by its data centre to heat a local swimming pool. In France, Qarnot computing has built a data centre made up of "computer heaters" installed directly in homes to heat them using the heat produced by computer calculations.

In the first place, a forward-thinking approach is to anticipate energy efficiency from the start when conceiving and designing a new data centre, notably by adopting the latest building technologies and using sustainable sourcing of materials. Green building labels, including notably BREEAM and LEED have adopted new auditing methods specifically for data centres.

Furthermore, improving technology is slowly enabling IT equipment to operate at higher temperatures ironically suggesting that by harnessing the latest technologies could help improve data centres' environmental footprint.

A lot of progress has been made by the sector to create and embrace these different shades of green, powered by a lot of investment, which according to the latest data from IEA on energy demand from global data centres, already born fruits. But much more will be needed to face the anticipated surge of digital needs in the next 5-10 years. At the epicentre of technology, the data centre industry is better placed than any other property types to address the green issue quickly and successfully.

Average European PUE



Source: European Commission

Data residency, sovereignty & localisation

Data residency, data sovereignty and data localisation are terms that often bring confusion for businesses managing data across borders. Yet, with the rising popularity of cloud computing and Software as a Service (SaaS) solutions, these three concepts need to be clearly distinguished and considered cautiously.

Data residency is where a business specifies that their data is stored in a geographical location of their choice for policy reasons, frequently to take advantage of a better tax regime. Data residency usually implies that a certain amount of data processing is done within the chosen country's borders.

Data sovereignty refers to the country's laws where the data is stored. In the EU, the General Data Protection Regulation Act (GDPR) law became applicable to all member states in May 2018. The main goal of the law is to protect the EU's citizens' privacy and information. Hence, GDPR rules apply to all companies (including non-European ones) that have data from organisations or people residing in the EU. Additionally, the GDPR provides for the free flow of non-personal data within the Union to enhance the competitiveness of its digital economy. Importantly, it also allows for the flow of data to third-party countries if the receiving country's laws comply with the GDPR's rules.

Data localisation is the most stringent concept of the three. It refers to legal obligations requiring that data created within a country's borders remain in situ. With GDPR opening the data market within the EU, a very small amount of data is concerned by data localisation obligations. Yet, depending on data subjects (finance, health, telecoms), some EU members have their own nation-specific legislation, which heightens complexity for data centre operations.

How does data governance impact the data centre industry?

To compete for data sovereignty business, cloud and SaaS cloud providers need to offer multiple data centrre locations based on local regulatory requirements. Over time, this has enabled an improved footprint of non-European cloud providers in the EU and somehow, a more widespread distribution of data centres across the region.

However, for developers and operators, imperatives imposed by nation-specific legislations do not necessarily fit the specificities of the data centre business model, including good connectivity, availability of energy (notably green energy), construction costs and land usage to name a few.

Taking a hybrid data storage approach can solve many of the challenges posed by data sovereignty. Organisations with their own private on-premises environments or using national data centre facilities overcome these challenges without losing the benefits of cloud services. Yet, the multiple data storage solution comes at a higher cost.

In spite of the GDPR tending to unify data laws across the Union, some European countries have their own nation-specific data legislation. This lack of cohesion brings complexity and legal costs for data centre operators for which obligations and liabilities are increasingly engaged. Organisations can be fined up to 4% of annual global turnover if they break the GDPR.

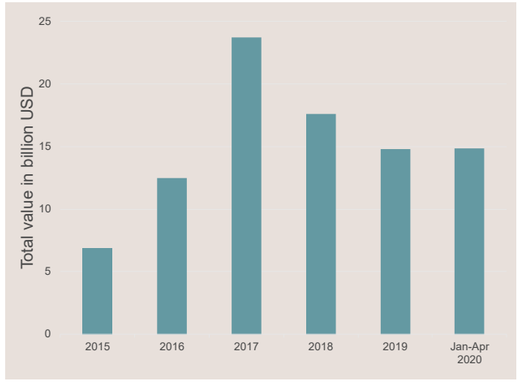
Bubbling data centres'ecosystem

The surging demand for cloud and colocation services has triggered a hunt fight for scale and global footprint within the industry, notably between giant IT companies and smaller market players. Since 2015, consolidations amongst service providers have been increasing with a peak recorded in 2017 when Digital Realty acquired DuPont Fabros for $7.6bn. Digital Realty and Equinix, the world's two leading colocation providers account for 35% of the total deal value recorded since 2015.

2020 will set a new record with the acquisition in March from Digital Realty of the Dutch data centre company Interxion for $8.4bn. This is the largest ever data centre M&A transaction. The 53 Interxion European data centres (mainly based in the FLAP) provide Digital Realty with a leadership position in the EMEA. According to Synergy Research Group, a few other potential multi-billion dollar deals are pending closure.

Additionally, due to the rise of edge computing, an ecosystem of modular data centre operators has emerged in the past few years, including companies like Vapor IO, EdgeConneX, EdgeMicro, DartPoints, DataBank, Baselayer and Switch. M&A within this ecosystem has already started notably attracting traditional large colocation market players. In 2018, Compass Datacenters acquired EdgePoint Systems. Last year, in order to address 5G network transformation, Intel bought Smart Edge for $27m.

Global Data centre M&A activity



Source: Synergy Research Group

Data centre, a growing asset class

Whilst Covid-19 has brought data centres in the spotlight this year, investors interest for the sector has been growing over the past five years. In the last Emerging Trends in Real Estate Europe survey released at the end of last year, data centres were in the top 10 sectors to invest in, following logistics facilities and residential-based assets classes. The fundamentals of the sectors are strong and solid with a flourishing demand set to grow dramatically in the next five years. As data centre migration is a highly complex process, tenants usually occupy the premise for a long period, generally for approximately 10+ years. Hence, the sector offers a long-term income stream and security.

Nevertheless, high barriers to enter the market are restraining private capital's exposure in the sector. Firstly, particularly high infrastructure costs mean that data centres are expensive to build. Secondly, for non-specialists, they are also complex to manage and require scale to achieve profitability. Thirdly, due to the speed of technological development, obsolescence is another concern involving expensive maintenance and upgrading costs.

As a result, most of the existing data centre stock is owner-occupied, predominantly by a few specialised public REITs, which have been dominating the European market. This includes notably the US-based Digital Realty and Equinix REITs and the Asian Keppel DC REIT. The strong concentration of market players has had a catalyst impact on the market liquidity and transparency, dampening the opening of the market to private capital.

Yet over the past three years, non-specialist private institutions have slowly entered the data centre investment market, including general REITs (Schroder European REIT), investment managers (Catella APAM), institutional investors (AXA) and more recently sovereign wealth funds (GIC, PFA) and infrastructure funds (Brookfield Infrastructure Partners, EQT Infrastructure), often through joint venture partnerships or entity deals.

2020 will mark a clear step towards improved liquidity for the data centre asset class. Investment activity within the sector, which was initially mainly fuelled by new development activity and M&A is evolving towards sale and leaseback options. This will unlock the market by providing investors with data centre acquisition opportunities. This month Digital Realty revealed their plan to sell a European portfolio of 11 data centres of an approximate €600m value. In January, they sold a 10-data centre portfolio based in the US to Mapletree for $557m.

As already mentioned in the previous section, this year Digital Realty also acquired 53 European data centres through the M&A of Interxion. Other significant transaction includes the acquisition by the Danish pension fund PFA of 20% of DATA4 (AXA). In August, EQT Infrastructure fund has announced the acquisition of EdgeConneX, a leading global edge data centre provider, a transaction which is expected to close in the final quarter of the year.

Yields are attractive compared to other asset types, reflecting the liquidity premium. Prime core European yields range between 5% and 7% depending on the quality of the asset and on location. As the market is rapidly maturing and in the face of pent-up demand, we expect strong yields compression in the next 1-2 years. According to The FTSE Nareit, the data centre sector delivered a total return of 32.5% year-to-date through the end of August.

European data centre benchmark

To identify the best places in Europe where to develop, operate and ultimately to invest in data centres, Savills conducted a benchmark based on various parameters related to security, natural resources and energy supply, broadband infrastructure, costs induced, demand and existing supply, ICT human resources and data centre capital market.

Data centres come in all shape and size ranging from hyperscale facilities that house thousands of servers to mobile micro-data centres that provide remote storage. Most importantly, different types of data centres serve different purposes, imply different data usage, need different operating systems and strategies, hence require different locations. Whilst there are many types of data centre, for the purpose of this benchmark, we divided them into two categories: hyperscale and cloud-scale data centres and traditional and cloud data centres.

Hyperscale and cloud-scale data centres have specific and heavy workload requirements such as mining, 3D rendering, cryptography and other technical or scientific computing tasks that are processed by specialised system configurations. They are primarily designed to optimise performance and cost. Hence as long as strong connectivity and security can be achieved, they can be located in rural areas, notably where energy supply is high and provided at low cost. As a result, security, natural resources and energy supply, broadband infrastructure and energy costs have been heavily weighted for this category of data centres in our benchmark.

On the other hand, traditional and cloud data centres generally perform more diverse and lighter tasks. These notably include a large amount of data streaming, which impose extremely low latency. Hence, they need to be located in closed proximity to end-users, where broadband and network infrastructures are dense. For these reasons, we gave more weight to the demand and supply and broadband infrastructure metrics for the traditional and cloud data centres benchmark.

Methodology

This research covers 21 European countries including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden and the UK.

The analysis used to develop the European data centre benchmark draws on 25 indicators gathered into seven categories: Security, natural resources and energy, broadband, costs, demand and supply, talent and capital market.

The data used for the index was collected at a national level. Where possible these indicators use the latest annual data available, past five-year growth and five-year forecasts, to ensure the index incorporates a forward-looking view.

The various indicators have been ranked and weighted across the 21 countries in two different ways allowing us to present two different sets of results; one dedicated for cloud data centres and one for traditional data centres.

The benchmark results do not determine the exclusive attractiveness of a given country to prospective data centre market players; it purely provides a macro guide for investors, operators and developers to incorporate as part of their specific strategy.

Metrics	Category	Unit	Date
Loss from natural disasters	Security	Million €/'000/Capita	1980-2017
Political stability index	Security	Index	2018
Cybersecurity index	Security	Index	2018
Average annual temperature	Natural resources & Energy	Celsius	2019
Total renewable water resources	Natural resources & Energy	M3/Capita/Year	2017
Total primary energy supply	Natural resources & Energy	GWh/'000 Capita	2018
Availability of green energy	Natural resources & Energy	GWh/'000 Capita	2018
FTTP penetration rate	Broadband	% of households	2019
FTTP rural penetration rate	Broadband	% of rural households	2019
Average download speed	Broadband	Mbps	2018
Number of network fabrics	Broadband	Number	2020
Estimated latency	Broadband	Km to Gadheim	2020
Electricity price (including taxes)	Costs	€ per Kwh	H1 2019
Corporate income taxes rate	Costs	%	2018
Estimated hourly labour costs	Costs	€	2019
Connected population	Demand & Supply	Thousands	2019
Population forecasted growth	Demand & Supply	%	2020-2025
Use of cloud services by individuals	Demand & Supply	% of population	2019
Number of business enterprises	Demand & Supply	Number	2017
Use of cloud computing in enterprises	Demand & Supply	% enterprises	2018
Number of colocation data centres	Demand & Supply	Number	2020
Total workforce as % of population	HR	% of total population	2020
Persons with ICT education	HR	% workforce	2019
ICT employment growth	HR	%	2020-2025
Data centre investment volume	Capital market	€	2014-2019

Benchmark results

Hyperscale and cloud-scale data centre

TOP 5	
Iceland	63.6
Sweden	50.9
Norway	50.0
Denmark	45.7
Netherlands	45.2

The Nordics and the Netherlands top the rankings. The Nordic region is characterised by its high reliability of energy supply, notably renewable energy, with some of the best-performing grids in Europe. Electricity prices in the Nordic countries are very competitive, amongst the lowest of the 21 countries benchmarked. Strong connectivity, high security and a large pool of cloud users add to the attractiveness of the region. However, the long distance to the epicentre of the EU, particularly regarding Iceland, can be a drag for some developers and operators.

In the Netherlands, strong broadband connectivity, dense infrastructure, and large cloud adoption are the prevailing metrics of the ranking result. Additionally, a short distance from major data consumption basins enables low latency.

Source: Savills Research

Traditional and cloud data centre

TOP 5	
UK	65.7
Germany	58.2
France	52.7
Sweden	52.4
Netherlands	51.6

The UK, Germany, France, Sweden and the Netherlands are the best-graded countries particularly thanks to the solid network infrastructure in place, large data consumer pool, high cloud penetration rate from both end-users and enterprises and good connectivity. Germany, the UK, the Netherlands and France have the highest number of co-location data centres according to Cloudscene. The four countries account for 74% of the data centre investment volume accumulated between 2014 and 2020, with the UK alone, attracting most investors interest (40%).

Source: Savills Research

Next data centre milestones

The Covid-19 pandemic has highlighted how vital data centres are. Following lockdown restrictions and social distancing measures, the use of connected devices skyrocketed. Whilst existing infrastructure held up surprisingly well, the number of outages and latency increased, attracting some governments' attention.

Consequently, the rollout of 5G and fibre networks is likely to accelerate in Europe. The deployment of 5G technology is calling for some restructuring of the data centre architecture, notably at the edge of networks. This will increase the need for data centres in tier 2 and tier 3 cities.

New developments which have been delayed this year due to lockdown restrictions may eventually be facilitated by local authorities in the future, thanks to accelerating building permit process, tax incentives or reduction in energy costs.

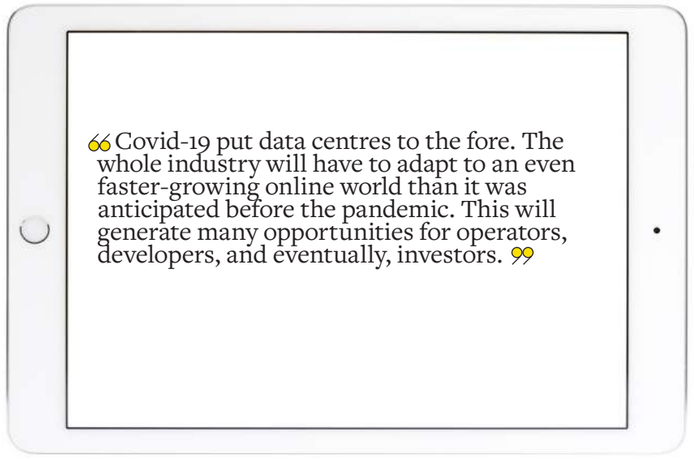
With homeworking, eLearning and telemedicine adoption unlikely to cease, at least totally, the demand for data storage, which was already expected to increase massively before the pandemic, will now surely balloon. This will benefit largely to cloud and colocation service providers and exacerbate consolidation and M&A strategies.

Large data consumption pools will continue to attract developers and operators' attention. We expect further development in the UK, Germany, France and the Netherlands and some expansion in other significant markets such as Spain, Italy and Poland. Meanwhile, the Nordics countries will stay high in the panel of the top European destinations for hyperscale data centres.

Solid fundamentals will continue to attract an increasing range of investors. To circumvent the lack of transparency and the high level of specialism required in the market, partnerships, JV and entity acquisitions will be increasingly used by private investors to enter the data centre market. At the same time, we expect consolidation strategies amongst the major market players to lead towards more sale and leaseback opportunities. As the sector will grow as an asset class, we anticipate prime yields to harden in the next 1-2 years.

Although evolving fast towards green energy, much more will be needed to face the anticipated surge of digital needs in the next 5-10 years. As the EU Commission is urging to green the industry and with ESG credentials growing high in the investors' agenda, a more pronounced focus will be given to sustainable data centre facilities.

Paradoxically, technology poses both opportunities and threats to the industry. Fast-evolving technologies enable but also oblige the sector to quickly adapt - at an important investment cost. Quantum computing which remains based on an experimental approach for now, would bring a revolution in the data centre industry.



Source: Savills Research

European Data Centre - 2020: a tipping point for the industry

Savills Commercial Research

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