



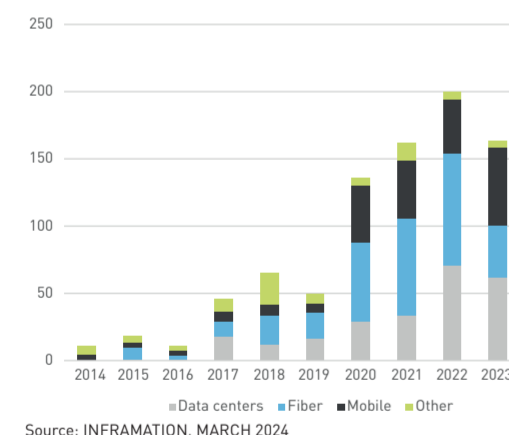
Digital infrastructure — the next chapter

Gaining technology-agnostic exposure to technology megatrends

Where does digital infrastructure go from here?

Digital infrastructure such as data centers, fiber networks and mobile towers provide the backbone that supports many of the technological innovations that are happening. A few years ago, these investments only accounted for a small portion of the global infrastructure deal flow. They have now grown into one of the largest infrastructure sub-sectors, with over USD 600 billion of investments in the last 4 years (see Figure 1).

Figure 1: Digital infrastructure deals closed (USD billions)



The COVID-19 pandemic put a spotlight on the importance of digital infrastructure, the long-term thesis for data growth and high speed connectivity was suddenly pulled forward. This led to a surge in investments that have both positive and negative ramifications.

On the negative side, some of these new investments came just before the supply chain disruptions and rapid rise in interest rates. Since their business models are often growth platforms, some had to revise down their original business plans due to the changing macro factors. A few markets have also seen widely reported cases of unsustainable infrastructure competition (e.g. UK fiber¹). But we are seeing a silver lining.

On the positive side, the surge in digital investments has also accelerated the maturation of the sector. Their business models have now been stress tested by both the pandemic and high interest rates, and risks are now better understood with the market becoming more rational. We are seeing a reset in expectations and an end to the previous land-grab mentality.

We believe that digital infrastructure is entering its next chapter of development, which will be driven more by fundamentals and less by speculation. Inevitably, hype will always be a part of an industry that is exposed to cutting edge technologies. It therefore important to not be caught up in the hysteria². Sophisticated investors should be able to look past the sensationalism and identify opportunities based on real consumer and commercial behavior.

Artificial intelligence – a bigger story than just data centers

One topic that has gotten a lot of buzz recently is artificial intelligence (AI), especially around its positive effect on data centers. We actually think there is a bigger story here. For those who have followed the sector for a while, the generative AI is simply a continuation of an ongoing investment theme – e.g. AI already made headlines in 2016 with the success of google's AlphaGo program³.

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To us, the more important takeaway from the success of ChatGPT is that it provides further validation to the long-term digitalization investment thesis – that the world will continue

to innovate and keep coming out with new applications and technologies. Aside from AI, internet-of-things (IoT), industrial automation, blockchain, and virtual reality will all play a part in building the digital economy of the future. Digital infrastructure will sit in the center as the enabler of these innovations across all industry sectors.

Digital infrastructure's unique value proposition

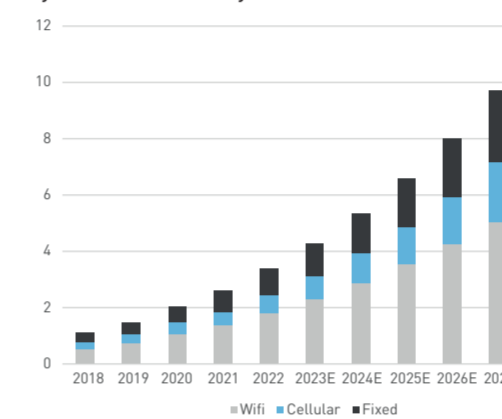
Digital infrastructure shares similar characteristics as other infrastructure sectors. These assets provide essential services to society, have high upfront costs, long assets lives, and high barriers-to-entry. However, they also have some other distinct attributes.

First, digital infrastructure is exposed to many of the same tailwinds that tech investors are focused on. All the buzzwords that we previously mentioned including AI, IoT and virtual reality are relevant to both traditional tech investors and also to digital infrastructure investors.

What sets digital infrastructure apart is that although they are exposed to the same technologies, they actually take minimal technology risk, as the infrastructure itself tends to use mature technologies and business models⁴. Digital infrastructure simply provides the basic building blocks that enable these transformational technologies to be commercialized.

Digital infrastructure investors therefore have the luxury of being technology-agnostic while still being exposed to these technology megatrends. They do not need to worry about picking the “winner” across different software, chip technologies, algorithms or start-ups – risks typically associated with more direct tech investments. As long as investors have conviction that the world will remain innovative and will continue to develop new technologies, demand for data processing and high-speed internet connectivity will also remain strong (see Figure 2).

Figure 2: Global data consumption by network (Terabytes)



Source: PwC Global Telecom Outlook 2023–2027, September 2023

Second, digital infrastructure tends to be less cyclical and therefore less exposed to economic shocks. The feature became obvious during the COVID-19 pandemic, when internet usage and demand for digital infrastructure increased even when the global economy came to a standstill. This makes the sector an attractive way to diversify a portfolio.

Third, compared to other investment themes such as decarbonization and deglobalization, digitalization relies less on government support and subsidies. This does not necessarily make digital infrastructure better or worse than the other sectors, but it is another source of diversification, as the industry is less exposed to political factors.

That is not to say there is no public support for the sector, as there has been broad brush policy that focuses on expanding broadband access. One example is the US's Broadband Equity Access and Deployment Program (BEAD) program, which provides USD 42 billion to expand high-speed internet, which opens up some unique opportunities.

Key themes across digital infrastructure sub-sectors

Each digital infrastructure subsector and business has their own specific qualities. Some interesting investment themes include:

Fiber networks: favorable dynamics such as video conferencing and digitalization of services are driving demand. Growth is moderating but risks are better understood. Enterprise fiber servicing corporate customers and fiber-to-the-home (FTTH) networks that are bridging the digital divide are interesting themes; investors can also find potential consolidation plays in some markets (e.g. UK, Germany, France).

Mobile towers: benefits from the rollout of 5G which requires a denser network of towers infrastructure. Business models are mature

but opportunities are sometimes limited due to high industry concentration across a handful of players, but investors can also find more niche investments or explore similar businesses such as small cell / distributed antenna system (DAS) that provide more localized wireless coverage.

Data centers: AI is currently supporting the growth of hyperscale data centers whose customers include large tech companies (i.e. Microsoft, Google etc.). In the medium term, colocation data centers that support other enterprises located in areas of strong economic activity may also benefit, as some large companies begin to develop their own AI models. The scarcity of land and energy means the focus is now on non-traditional markets (i.e. outside of Northern Virginia and FLAP-D⁵), especially with access to cheap renewable energy.

Others: The digital economy ecosystem will require comprehensive high speed internet coverage, distributed infrastructure near end users (i.e. “edge”), and the widespread usage of connected devices. Potential investments could include fixed wireless access (FWA), satellites, smart meters, edge data centers and other smart urban infrastructure.

Value creation from asset management

Compared to other infrastructure sectors, digital infrastructure investments tend to be more growth-oriented just given the underlying demand dynamics. For example, global data consumption is growing at a 30% CAGR, while global energy demand is only growing at a 1% CAGR. Digital infrastructure is also more exposed to infrastructure competition, the service offering and focus on client acquisition and retention is critical to drive revenues.

Investors therefore need to have strong focus on asset management in order to maximize the value of their assets. This includes actively scrutinizing and adjusting (if needed) capex plans, management teams, capital structures, product offering and pricing, sales strategies or evaluate bolt-on acquisitions that can support the broader growth strategy of the company.

This has become even more important now, as inflation and higher financing costs have led to cost overruns and a slowdown in investments. For example, large-cap telecom companies in the US and Europe reduced their 2023 capex by 10-20% compared to prior years.

As the broader industry is going through some short term retrenching, this opens up

opportunities for nimble and savvy investors who can deploy capital into attractive businesses that are able to execute on growth plans despite challenges in the macro environment.

Digital infrastructure's ESG attributes

Digital infrastructure is critical for societies to tackle the digital divide⁶, as rural and underserved communities tend to have slower internet speeds, which deprives these populations from accessing remote work opportunities, health care, and education.

In addition, upgrading legacy copper networks into fiber supports decarbonization, as fiber systems use 7 times less energy than copper cables. BT in the UK has already stopped selling copper lines in its Openreach network, while France will retire its copper network by 2030.

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Network densification also supports decarbonization with more distributed energy, smart meters, EV charging, and virtual power plants. Combined with IoT devices and AI analytics, digital infrastructure can lower energy consumption across residential, commercial, industrial and transportation sectors via demand forecasting, streamlining of operations, and predictive analytics that reduces unscheduled outages.

Finally, investors should be mindful that AI-focused data centers have significant demand for electricity and grid capacity. Energy efficiency will become paramount in the design of new data centers, and investors should focus on regions that have abundant renewable energy. Infrastructure investors can also play a role here in providing more sustainable energy solutions to digital infrastructure.

FOOTNOTES
¹ UK allnets face tough year in crowded broadband market, May 2023
² Refer to “Is AI just another fad for digital infrastructure?” in our 2024 infrastructure outlook, December 2023
³ How Google's AlphaGo Beat a Go World Champion, March 2016
⁴ New technologies sometimes require a redesign of the infrastructure – e.g. AI-focused data centers may need new architecture that requires increased power usage. In our view, the incremental risk can be mitigated through modular designs and robust contracts with counterparties (e.g. customers and suppliers).
⁵ Frankfurt, London, Amsterdam, Paris and Dublin
⁶ Bridging the Digital Divide, UBS Asset Management, June 2023 link