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CIO Viewpoint

Can technology be sustainability's white knight?

Investment Solutions

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Technology stocks are having a tough time, with the tech-heavy Nasdaq down 25% year-to-date. Yet looking beyond cyclical concerns, technology will play a vital role as an enabler of the sustainability transition. Finding ways to harness its gains will be crucial for investors as the transition unfolds.

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The scale of the sustainability challenge is intimidating. Emissions must be halved by 2030. Clean hydrogen production must increase sevenfold every year to meet net zero targets.[1] We must return 20% of agricultural land to nature in the next eight years, while feeding a growing population. As our economy moves from a take-make-waste model to a circular, lean, inclusive and clean (CLIC®) one, systems, processes and productivity must all change. Current high food and energy costs are acting as a catalyst. Innovation will be key. And technology will be a powerful enabler across the value chain.

One way of thinking of the key challenge ahead is the need to improve our energy productivity. This requires a threefold response: transforming our energy mix, and the efficiency of both the materials and services we use. While tech firms do not themselves produce greener power, cement or steel, they have a vital role on the latter two fronts, in helping achieve efficiency gains that can save both costs and resources. Computer modelling, robotics and 3D printing can make manufacturing less resource-intensive. Drones and advanced image analysis can help firms measure emissions and track leaks. Connected sensors and blockchain technologies can optimise production and supply chains.

Many industries are already employing software, electronics, chips and cloud computing in these ways, providing structural growth drivers for tech firms. Shifting from in-house servers to the cloud can cut CO2 emissions by around 60 million tons a year, estimates consultancy Accenture[2], and cut IT costs 30-50%[3]. Aviation, construction and automobile industries are using software to model forces and visualise new products. Insurers are using blockchain-enabled smart contracts to offer climate cover to African farmers. Supermarkets are drawing on AI-based forecasting to better attune ordering and deliveries to demand.

Key takeaways

- Tech firms will be powerful enablers in the sustainability transition, via improving the efficiency of the materials and services we use
- The energy transition will also require technological advancements. Technology can also improve inclusion in areas like financial services, agriculture, education and healthcare
- Increased use of electrical devices, e-waste, and energy-intensive blockchain technologies pose their own environmental problems
- We assess the alignment and resilience of investments to the sustainability transition, launch strategies to capture its upside potential, and fund green investments in early-stage solutions or mature ones that need scaling up

1 Hydrogen for net zero, Hydrogen Council and McKinsey, November 2021
2 The Green Behind the Cloud, Accenture, September 2020
3 Source: OpsRamp 2020 Survey, The Emergence of Cloud-First Enterprises

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Precision agriculture is cutting fertiliser use through better targeting; vertical farms run using internet-enabled sensors and automation can use up to 95% less water than traditional farms[4]. Nor are efficiencies limited to products: tech firms are also crucial in making service efficiencies, via platforms that help in the sharing economy, including via renting expensive items, and selling used clothing.

So digitalisation and dematerialisation could be key drivers of product and service efficiencies. In some fields, these trends have not only helped lower emissions, they have already generated huge share price gains, and blurred the line between tech and other sectors: cars in the case of Tesla, and retail in the case of Amazon. And tech firms also have a less obvious role to play in the net zero transition, via improving the energy mix. Solar panels and wind turbines rely on in-built sensors, and electric vehicles have roughly twice the value of semiconductor content of non-electric cars. Unlike fossil fuel-based systems, renewable energy needs internet-connected smart grids to manage flow and maximise resources. The energy transition will also require vast improvements in battery and long-duration energy storage and green hydrogen production, where advances are often driven by technology start-ups. These advances are typically non-linear: electric vehicle and renewable energy uptake today were unthinkable twenty years ago. Hydrogen manufacture may be the next to fall down the cost curve.

For all the popular concerns about technological advances leading to job losses, tech firms also have an important role to play in making the sustainability transition more equitable. Product and service efficiencies and the increasing affordability of connected devices and systems could be of particular benefit to developing countries, across areas as diverse as agriculture, sanitation, healthcare, finance and education. One example is mobile payment apps that are helping make financial services more inclusive. Another is a platform developed by one artificial intelligence company that can predict dengue fever outbreaks three months in advance with 81-84% accuracy, which has been tested in Malaysia, the Philippines and Brazil.

Cash-rich tech giants are themselves stepping into the early-and mid-stage funding space: Alphabet, Meta Platforms, Shopify and Stripe are investing alongside the Gates Foundation in a new Frontier Fund to scale-up technologies for carbon capture and storage[5]. With their capital-light models, tech firms are often minimally exposed to climate transition risks. By our estimates, calculated with our technology partners SYSTEMIQ, the median CO2 investment ratio for software and services firms is 50 tons of CO2 emitted per USD million invested, versus over 3,000 tCO2e/USD million for oil and gas companies. Still, we must consider the exposure of tech companies. Many smaller firms do not publish emissions or other key sustainability data. Meanwhile, electrical devices are responsible for 27% of human-generated greenhouse gas emissions[6], and blockchain technologies can be hugely energy intensive. E-waste is another significant problem, with an estimated USD 60 billion of electronics discarded globally to date, according to UN estimates. A single email has roughly the same carbon footprint as a small plastic bag.

Yet even if the digital revolution came at an environmental cost, investors are now wondering if technology can help us solve the climate crisis. In our current investment positioning, we favour quality over growth stocks. We seek quality companies, which look well placed to maintain their margins, that generate solid cash flows, have low debt levels and predictable profits. Structurally, the crucial role of tech firms could be as enablers and accelerators, as companies across industries seek to integrate their solutions. To integrate technology investments into a sustainable portfolio, we take a threefold approach: assessing the alignment and resilience of investments to the transition; launching strategies that capture its upside potential; and funding green investments in early-stage solutions or mature ones that need scaling up, which can help overcome a 'green premium' in costs. In this way, technology can be harnessed to meet sustainability goals, reduce climate risk and drive investment returns.

[4] Source: Aerofarms

[5] Frontier (frontierclimate.com)

[6] Source: Bill Gates, How to Avoid a Climate Disaster

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