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AI adoption calls for complete overhaul of digital and energy infrastructure

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Artificial intelligence is continuously reshaping contemporary life, affecting our experiences of humanity, creativity and culture while also raising concerns about safeguarding human identity and values.

We are developing knowledge systems that remain partially understood and unpredictable, necessitating regulations for human control and containment.

This oped highlights the unprecedented speed of AI-technology adoption, the massive increase in data generation, the rising demand for data centers, and the energy needed to support exponential computing.

It also emphasizes the significant capital expenditure required to establish a robust digital and energy infrastructure amidst the ongoing climate crisis.

Data growth began modestly with social media in 2010, expanded with streaming and content creation in 2015, and rapidly escalated with the launch of ChatGPT at the end of 2022.

Today, AI is integrated into many applications, and people are becoming more aware of the substantial energy required to power these advanced AI models.

> ***Significant investments and energy consumption are necessary to train AI, with the expectation that these costs will yield benefits.***
>
> *Lina Tayara*

For instance, while a Google search consumes a baseline of energy, Language AI (like ChatGPT) uses 10 times that amount, Image AI (such as DALL-E) consumes 320 times, and Video AI (like Sora) requires a staggering 10,000 times.

This situation calls for a complete overhaul of our digital and energy infrastructure.

Amazon's global capital expenditure is projected to exceed $50 billion this year, while Meta is increasing its expenditure to accommodate the sharp rise in usage across its applications, including WhatsApp, Facebook and Instagram.

WhatsApp alone boasts a user base of over 2.8 billion worldwide, with video content driving adoption trends.

While the internet provides a low-cost technological solution for ecommerce, AI technology comes with high expenses that need justification through its ability to solve complex problems.

Significant investments and energy consumption are necessary to train AI, with the expectation that these costs will yield benefits.

Advocates believe that AI's capability to process vast amounts of data rapidly will lead to energy efficiencies and solutions for pressing issues like disease and climate change.

A report by Google and the Boston Consulting Group suggests that AI could potentially reduce global greenhouse gas emissions by 5 to 10 percent by 2030.

It highlighted applications such as optimizing fuel-efficient routes for drivers and pilots to minimize contrail clouds, the highly polluting trails left by airplanes.

However, generative AI skeptics in the finance sector argue that claims regarding potential economic benefits are exaggerated and primarily serve the interests of Big Tech. They anticipate that AI has about 18 months to deliver on its promises

before investors lose interest.

The competition for AI dominance also involves a race to construct the necessary digital infrastructure, which is becoming an emerging concern.

> ***Energy is the most crucial factor driving large tech companies to seek new locations for their mega-scale AI training workloads.***
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Energy is the most crucial factor driving large tech companies to seek new locations with powered land and green energy for their mega-scale AI training workloads.

The demand for cloud services and AI tasks requires large campuses and higher densities that legacy markets cannot accommodate due to land, power, and grid limitations.

Consequently, the trend of hyperscalers assessing locations with stable and cost-effective energy will remain significant in 2025, with various countries competing to attract them.

The Nordic region, with its cool climate and abundant renewable energy, holds a considerable advantage.

With a limited pool of investors possessing both technical expertise and substantial capital to support the trillion-dollar digital transformation and energy transition, development will likely be limited to a select few private and public funds with a clear vision and strategy.

It is anticipated that hyperscalers including Meta, Amazon, Microsoft, Oracle and Google will invest over $1 trillion in data and energy infrastructure.

Saudi Arabia's Project Transcendence aims to secure $100 billion in funding, positioning the Kingdom as a potential hub for growth, partnerships, and a rising contender in the AI-enabled digital and energy infrastructure landscape.

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