

WINTER 2024 ISSUE

ASSUMPTIONS



TECHNOLOGY

TECHNOLOGY'S INFLUENCE ON DEVELOPING ECONOMIES/ECONOMIC DANGERS OF CYBERSECURITY/AI'S INFLUENCE ON JOB MARKETS/THE END OF SNAPCHAT'S STREAK/CHINA'S LEAD IN EV/DIGITALISATION OF CONSUMER MARKETS/EVOLUTION OF SUSTAINABLE TECHNOLOGY/AMAZON'S DELIVERY OF SUCCESS/THE TECHNOLOGICAL DIVERGENCE: EUROPE VS AMERICA

ASSUMPTIONS

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EDITORS' NOTE

Welcome to the Winter Edition of Assumptions!

This issue explores technology's transformative impact on global economies—from job and consumer markets to stock trends and beyond.

This is a very special edition of Assumptions as it features insights from our brand new Junior Editors. Join us as we look to explore the future of tech and its role in reshaping our world.

Happy Reading!

***Arun Pillai &
Prarthak Sharma***

EDITORS IN CHIEF



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HOW TECHNOLOGY CAN PULL SUB-SAHARAN AFRICA OUT OF POVERTY.

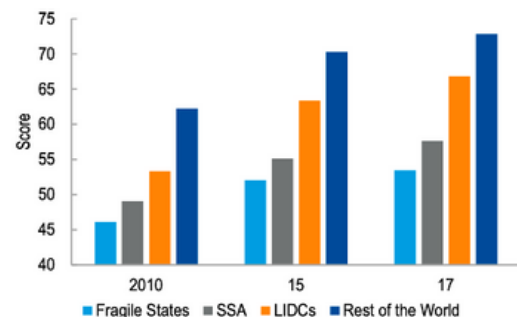
BY SAM POWELL

As the catalyst for the Industrial Revolution, sparking unprecedented economic transformation by revolutionising productivity, innovation, trade, and more, technology stands as a pivotal driving force in facilitating growth. However, while countries like China and India have leveraged technology as a means for growth, in Sub-Saharan Africa, a region containing 7 of the 10 poorest countries by GDP per capita, technological investment remains far behind. Looking forward, how could further digitalisation in these struggling nations lead to potential success stories in Africa, and what other obstacles must be overcome?

The Current Situation:

To assess relative technological development across countries, the IMF's Enhanced Digital Access Index (EDAI) considers many variables influencing a country's digital connectivity. It includes access to the internet and physical technology, as well as a country's digital depth - the extent to which day-to-day activities, transactions, and communications are digitalised. Whilst rising, Sub-Saharan Africa's (SSA) EDAI ranking lies consistently below the rest of the

World, a testament to high connectivity costs, with the price of one gigabyte of mobile data averaging at ~10% of monthly per capita income.



With only 26% of people in SSA regularly accessing the internet, the contribution of digital technology to GDP remains low. The region continues to suffer high opportunity costs of potential job creation and improvements to efficiency. As such, organisations like the World Bank have been investing heavily in digital development projects in recent times to improve digitalisation to transform the area.

The Benefits of Advancing Technology :

The benefits of technological improvement are numerous, with multiple studies showing each 10%

increase in internet penetration results in 1-2% increases in GDP. Furthermore, in Nigeria and Tanzania, extreme poverty fell by 7% after a World Bank project increased internet exposure to 70% of the population, while labor force participation rose by 8%. So, what are the main mechanisms behind this?

Firstly, firms. Businesses in SSA that digitalize their operations, such as using e-commerce, bring in over double the revenues compared to operating without. This results from being able to access new regional or even international markets, with a boom in mobile money payment solutions in the region, such as M-Pesa in Nigeria, facilitating this by allowing consumers to make online purchases without a traditional bank account. Over 75% of Nigerians over 15 years old have made a mobile payment in the last year, and this figure is projected to rise. Even simple measures, such as communicating with suppliers and sellers via email cause marked increases in a business's efficiency, thereby reducing costs. Additionally, as internet penetration has increased, more service sector businesses have started up, which frequently provide more added value than traditional industrial firms. These service sector businesses also provide increased employment opportunities for women, who take up jobs at a much higher rate than men in this sector and are the reason for increases in the labor force participation rate.

Countries have also been leveraging technology to address other key issues such as gaps in healthcare and education, which the IMF estimates cause a loss of over 50% of an individual's lifetime potential output. In Kenya, online education services promoting literacy and writing along with digital, financial, and technical skills have been improving human capital, especially impacting rural areas where there are fewer schooling opportunities.

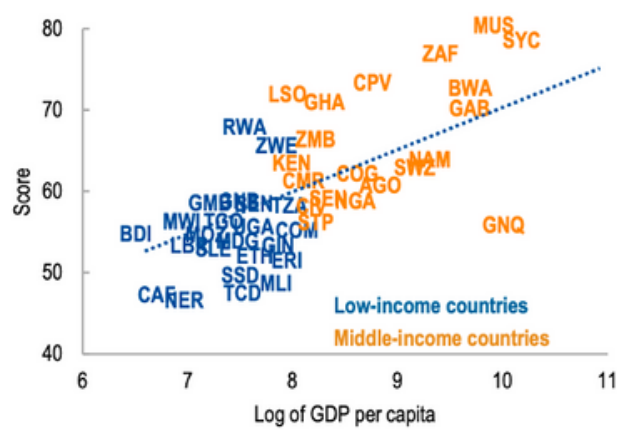
Programs like this offer an opportunity to completely transform education in Sub Saharan Africa, where one third of 12-14-year-olds have no access to education. Coupling higher digital literacy rates with business growth is essential for SSA to plug gaps in the labour force and become more competitive to increase exports in our digitalised world.

Technology is also linked to increases in trust, such as reducing corruption. Take taxes for example, which can be paid online in minutes, compared to previous waiting times of over 100 days. Digitalised tax systems in Kenya and Tanzania have reduced corruption as well as bureaucracy by removing the opportunity for bribing corrupt tax officials, creating a more secure fiscal environment. In addition, technology allows businesses to respond to crises more efficiently, for example COVID-19 where people were able to work from home, keeping firms in operation. Along with other instances, technology has increased investor sentiment in the region, as businesses become more efficient, resilient and less vulnerable to corruption, leading to greater FDI prospects. This opens up opportunities to firms wanting to sell internationally. Since production costs for MNC's, which would be made up from purchasing goods from African producers, account for a small percentage of the total cost of production, considering transport advertising etc, even if African producers could offer competitive, low prices, the overall cost savings to MNC's would be small and as a result most prefer to source from more established markets such as China, where there is less risk of supply shocks. Therefore, it is incredibly important for SSA producers to increase their reliability and global reputation, which implementing technology will facilitate.

Barriers to Technological Advancement:

Currently, there are still many barriers preventing a digitally flourishing SSA, and while much progress

has been made in reducing the cost of technology and internet access, major issues still hold the region back. Developing physical digital infrastructure, like improving the reliability of electricity services, connecting countries like Sudan and Central African Republic to submarine cables and expanding broadband access to rural areas, in addition to creating a population with the human capital required to effectively utilise new technologies will require time to achieve. This of course is coupled with other challenges in the area separate to technology, such as disease, political instability, debt, famine and conflict, all of which must be addressed for any long-term success. Low GDP, as shown, is a strong indicator of low EDAI and deprived nations lack the required government revenue to invest into creating a more sophisticated digital economy and as such, continued international cooperation and investment will be needed into the future. Yet, while there may well be a bumpy road ahead, the potential for technology to revolutionise productivity, job creation and innovation south of the Sahara should burn a bright light at the end of the tunnel.





CYBERSECURITY ATTACKS: THE INVISIBLE THREAT THAT COULD CHANGE EVERYTHING

BY LILY JENKINS

In 2024 there were over 1 billion records compromised by online hackers, 7.78 million cyber-attacks on UK businesses, and over 70,000 cases of identity theft to UK residents up and down the country. This barely captures the growing toll that online hacking is taking on the UK economy and its residents. Economists now claim that “oil is no longer worth more than gold, but data now leads the way” signifying the immense worth of data and the serious risks posed if it’s misappropriated. The UK government reported that in 2016 cybercrime’s cost to the economy was £14.8 billion in 2016-2017 yet in 2024 it cost £27 billion. This staggering rise represents an impending threat to national economic stability, it has paralyzed business operations, created a tax on growth, and crippled public trust.

The disturbing 70% rise in Ransomware attacks is a key contributor to this and should be a critical issue for every citizen. Ransomware attacks are a type of cyberattack where malware or malicious software (software intentionally designed to harm the user or

Network) is used to encrypt data and render files or whole networks inaccessible. The hacker often demands a ransom, mostly in cryptocurrency, in exchange for restoring access. The Cybersecurity and Infrastructure Security Agency reported that the average ransom paid often exceeded \$200,000 highlighting both the significant power and potential danger of these attacks. Ransomware attacks frequently impact everyday citizens through ripple effects, such as sharp declines in stock prices and sectoral impacts, highlighting the need for greater public awareness of these threats. These attacks take various forms and while the 2024 Microsoft CrowdStrike attack, which impacted many summer holiday goers, was not a direct Ransomware attack, it was driven by the same underlying causes.

The attack stemmed due to the distribution of malicious software targeting CrowdStrike customers, the same cause of most Ransomware attacks. In July 2024, ‘the biggest IT outage’ linked to CrowdStrike and Microsoft disrupted businesses worldwide, by the time the error was identified it had already reached millions of devices internationally.

Microsoft reported that 8.5 million devices were hit, exposing the sweeping global influence of CrowdStrike's software. These devices experienced a devastating 'blue screen of death' leaving critical sectors like healthcare and finance paralysed as servers were abruptly taken offline. The graph below depicts the rapid rise of outages reported after the breach.



Building on this, on September 23rd, 2024, CrowdStrike testified in a US House of representatives hearing which signifies the severe and widespread damage that infiltrated every area of the company. The outage resulted in the cancellation of over 10,000 flights around the world, leaving thousands of holiday goers stranded and significantly disrupting holiday plans due to a cybersecurity breach through malicious software. Additionally, CrowdStrike shares plummeted by 11% after the incident. The outage inflicted significant losses, costing Fortune 500 companies an estimated \$5.4 billion in revenues and gross profit, with insurance covering only 10-20% of these losses, this compounded the financial impact. While all industries were severely impacted, the healthcare and banking sectors were hit the hardest with estimated losses of \$1.94 billion and \$1.15 billion. The CrowdStrike breach emphasises the critical need for strong cybersecurity and indicates the plaguing global consequences for the victims of the ever-evolving world of tech.

When considering the victims of advancing cyber technology, the recent NHS Ransomware attack should spring to mind and serve as a reminder that everyday citizens are increasingly affected by and at risk of these cyber threats.

In September 2024 the NHS was targeted by a Ransomware attack that encrypted innocent people's patient records and medical services meaning 1,693 procedures were postponed and emergency services were delayed. The government was quickly compelled to act due to the recent surge in Ransomware attacks and their significance on the UK residents and economy. The Cybersecurity and Resilience Bill, hastily released on September 30th, aims to tackle Ransomware attacks and mitigate their severe impacts. It confronted the looming nightmare of these attacks and mandated tighter reporting and response protocols. Additionally, it enhanced requirements for companies to implement strong cybersecurity standards. However, it's not only the government taking steps to curb the dangers of technological hacks, but cybersecurity company Swivel Secure who specialise in advanced authentication to combat these threats. Yet, enhanced technology also means hackers are enhancing their methods to trap unsuspecting victims.

One growing threat is the rise of watering hole attacks, which pose a major online danger to both companies and individuals alike. These attacks involve hackers targeting a specific group by compromising websites the victim is likely to visit and waiting on the site like a predator at a watering hole. The UK was the second most targeted country in the world for cyber-attacks with watering hole attacks contributing to a substantial number of these attacks. With only 31% of UK businesses taking cyber risk assessment in 2024, leaving them more vulnerable than ever of becoming victim to watering hole and Ransomware attacks. This directly impacted the citizens that engage with and trust these businesses as demonstrated by Cutout.Pro's catastrophe. On February 27th, 2024, a CSV file of Cutout.Pro's data was shared on BreachForums. This comprised almost 20 million unique records and was a 5.93GB leak. It included the emails, addresses and names of 19.98 million people, despite cutout initially denying it. The cyberattack triggered an economic decline for the company, with the resulting reputational damage proving nearly irreparable.

Its stock value also took a significant hit due to widespread outrage over the security breach. This indicates that cybersecurity breaches are leaving businesses in financial, reputational, and legal fallout.

2024 has revealed that the disruption of these cybersecurity breaches and attacks is increasing, yet efforts to prevent them are on the decline. The rapid advancement of technology and AI is posing a detrimental danger to businesses worldwide and the innocent civilians who trust them with their data and finances. Cybersecurity breaches, if not soon managed, will be an unstoppable threat and all industries should be deeply concerned. While some companies may be deterred from properly implementing correct preventative security measures due to financial commitment, it is essential to protect your business from these persistent attacks.



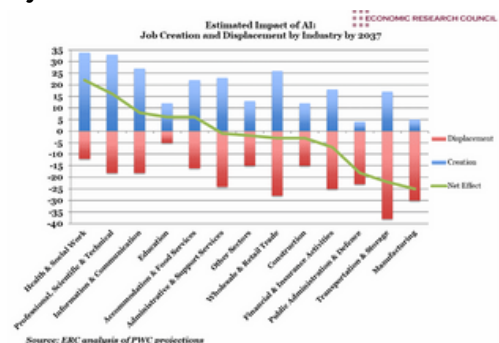
BY OLLY HUGHES

In an evolving labour market where artificial intelligence continues to make astounding advancements, students may question whether the time and cost associated with a university education is worthwhile, given the risks of AI-related job disruption. However, while there is some truth in these concerns, university education remains a valuable investment: not just for securing employment, but also for thriving in a world reshaped by AI.

The 'Issue'

McKinsey global institute says that AI has the profound impact to deliver an additional global economic activity of around \$13 trillion by 2030, or about 16% higher cumulative global GDP compared with today. This amounts to 1.2% additional GDP growth per year. If delivered, this impact would compare with that of other general-purpose technologies through history such as steam engines, semiconductors or the electric motor. However, this growth will mainly come from the substitution of human capital to limit costs and increase productivity. According to another study by Goldman

Sachs this substitution could replace the equivalent of 300 million full-time jobs. Representing 9.1% of all jobs worldwide. Furthermore, potential job losses will not be evenly distributed across different sectors of the economy. Researchers from the University of Pennsylvania and OpenAI found some educated white-collar workers earning up to \$80,000 a year are the most likely to be affected by workforce automation, due to their vulnerability to generative tools offered by AI. Many of these jobs may be graduate prospects for current students that will not exist in the future. Nonetheless, following the core economic principle of Schumpeter's 'Creative Destruction' we should not fear the innovation of new technology and should instead embrace its inevitability.



Technical Value

Economically, university education provides a strong foundation in critical thinking, adaptability, and specialized skills that will be crucial in the workforce, regardless of AI advances. In majors like economics, students learn far more than just theories and formulae; we gain insights into decision-making, statistical analysis, and economic modeling which are all skills that have the potential to complement AI, rather than being replaced by it. Many tasks, especially those involving creativity, strategic thinking, and problem-solving, are unlikely to be exclusively performed by AI. In fact, AI's presence in the workplace could even enhance the economic value of some degrees, particularly those that teach us how to harness technology rather than being displaced by it. Economists will likely play a critical role in shaping policies around AI's integration into the economy, helping society navigate the impacts of job displacement and wealth redistribution. These responsibilities require a level of ethical, theoretical, and analytical training that a university education inspires. These ideals are difficult to replicate as AI will never truly understand the human condition, it cannot relate to our experiences and is only able to approach problems after a human has provided it with the necessary information. By fostering these valuable skills, the university equips students not only for current jobs but for roles that have yet to emerge, providing adaptability in a rapidly changing world.

Soft Skills

Despite AI's efficiency in processing information, it lacks the ability to engage with clients on a personal level, interpret complex emotional cues, or adjust flexibly to unforeseen circumstances. These are soft skills that are deeply human and are often honed through university education. For instance, in financial services, an analyst might use AI to quickly generate financial reports, with many firms implementing their own proprietary AI (such as JPMorgan's 'LLM Suite' used to assist 140,000 employees), but it's the analyst's personal insight and

understanding of the client's unique situation that make the final recommendation valuable. While generative AI can assist by analysing vast datasets and suggesting insights, it falls short in interpreting subtle aspects of client concerns or addressing sensitive matters with the necessary empathy. This gap highlights the need for university-developed skills like emotional intelligence and ethical reasoning which are developed through sports, social events and even parties. These soft skills enable professionals to exercise judgment that goes beyond algorithmic predictions. Furthermore, as the financial sector navigates ethical and regulatory challenges surrounding AI as more firms focus on machine learning, human professionals play a vital role in ensuring that technology is used responsibly. Policymakers, consultants, and analysts with strong interpersonal skills are essential for interpreting data not just through a statistical lens but with an understanding of human motivations, cultural factors, and societal impacts. University education instills these ethical considerations and equips graduates to balance AI's analytical power with a humane approach to decision-making, fostering leadership that is both effective and empathetic.

Lifelong Learning

It's unrealistic to think that a university education alone will be enough for an entire career. However, what university can do is lay the foundation for lifelong learning. Many university programs, particularly in fields like economics, emphasize learning how to learn: a skill that is indispensable in the face of constant technological advancements. An economics education, for instance, emphasizes critical thinking, problem-solving, and data literacy, which will all be relevant even if the specific tools we use change over time. AI might alter the way we perform our jobs, but it also provides opportunities for those who are prepared to continuously upgrade their skills. University education instils this mindset, encouraging students to stay curious and adapt as they go. Learning in a structured academic setting

also provides access to mentors, networks, and resources that promote intellectual growth and resilience. These connections can be invaluable, as graduates navigate future careers that may be volatile or disrupted.

In conclusion, rather than viewing AI as a threat, I see it as a force that will redefine work in ways that demand human insight, ethics, and creativity. The future is always unpredictable, and many experts even forecast that AI and machine learning will create more occupations than it replaces. University prepares us not only for a career but for lifelong adaptability and purpose, allowing graduate workers to face the approaching AI driven labour market in the face of substitution or opportunity.

IS SNAPCHAT'S STREAK OVER: CAN A TURNAROUND BE ACHIEVED AFTER SPIEGEL'S STRATEGIC ERRORS?

BY LAVINA SHAH

Once the go-to app for sending disappearing photos, Snapchat's stock is now facing a vanishing act of its own. Coined as the underdog of social media giants, with approx. 400 million daily users, 'Snap' is recognised for its colourful interactive filters and sharing real-time location features. Being popular with teenagers and young adults, Snapchat's user base has grown consistently over the years, but its growth rate has slowed compared to its peak in earlier years. It faces challenges in maintaining engagement as competition from other platforms, like Instagram and TikTok, intensifies and threatens the company's ability to maintain its position as one of the world's leading social media innovators. Due to increased online communication during Covid, revenue growth through the pandemic led to Snap posting its first quarterly net profit in 2021, yet since has made continuous losses.



(Photo caption): Snap's share price has plummeted almost 90 percent since its pandemic peak in late 2021, wiping more than \$110bn from its market capitalisation

Along with strategic mistakes, Snap has struggled considerably in the rise of TikTok and Instagram; Meta has since adopted many of Snap's features transferring the once 'unique selling point' across other apps. Zuckerberg, through Facebook (now Meta), attempted to buy Snapchat in 2013.

Back then Snapchat was growing rapidly, and Zuckerberg saw potential, offering the company \$3 Billion but Spiegel (Snapchat's CEO) rejected it. Since then, apps under Meta like Facebook and Instagram later adopted several features that were initially popularised by Snapchat, such as Stories, and are currently a central feature on Instagram. Now Snapchat's value dwindles in comparison with Meta's empire, Snapchat is now valued at \$17.7bn, just over 1 percent of Meta's \$1.5tn market capitalization.

As if a lack of advertisers and the boom of its rival's commercial success wasn't enough, the stock price is now 2/3 of what it was back in March 2017 when Snapchat released its initial public offering information. Via an IPO, Snapchat went public with a stock price of \$17, hitting a peak of \$83 in 2021. Since then, the stock has been fluctuating heavily with local peaks but with a large overall downward trend. Currently, the stock price stands at \$11.3, having reduced by over 85% from its ATH, lower than its launch price on its IPO. This is quite a shocking fall which heavily discourages investors from seeing a future in snapchat.

Meanwhile, investors are anticipating the next move from Spiegel, as he strives to persevere through all the challenges to push Snap to the forefront of augmented reality (AR). The focus on AR has cost Snapchat a lot of money and is divided internally, where many employees questioned whether the expenses were justifiable given the struggles of Snap's core ad business. Spiegel's first mistake was how late the company's focus shifted to monetization after prioritising user engagement for so long. Yet, the major blow to the stock price was the downturn in advertising. Snapchat's ad products have struggled to offer the same level of targeting precision and ROI that platforms like Facebook and Instagram can provide. Spiegel failed to fix Snapchat's measurement tools and ad performance, which made it harder to justify ad spend on the platform.

Consequently, Snapchat has faced difficulty in attracting major advertisers, especially brands that prioritise data-driven ad strategies, which would, in turn, boost revenue.

Is the turnaround possible? While Meta has become a dominant player in the AR space, Snapchat still has a strong chance to compete by doubling down on AR, albeit with a differentiated strategy that plays to its unique strengths. Snapchat's AR technology is already well-established and is inherently social, encouraging user engagement by allowing people to interact with their environment, rather than just viewing content in isolation. This is what separates Snapchat from the Meta empire. Snapchat can expand its AR capabilities in ways that Meta hasn't fully explored, particularly in social commerce. For instance, Snapchat has already introduced shoppable AR Lenses, allowing users to try on makeup, shoes, and other products virtually before purchasing. This AR-driven shopping experience could be a huge growth area which is much-needed for the company right now.

Last Christmas Snapchat created a new avenue of growth by partnering with Amazon to launch Snapchat+ membership gift cards. This boosted Snapchat+ subscriptions, a paid package that provides the user with more features that enhance the social aspect of the app. Last year with just one retail partner, Snapchat+ memberships rose from 5 million in September, to 7 million by the end of Q4. Due to the fruitful result, Snapchat is issuing more gift cards this year across more stores e.g. Walmart and Target. Although this isn't a major stream of income, it demonstrates that the company is beginning to acknowledge the monetisation issue and is keen to encourage more partnerships. Strategies that can capitalize on Snap's unique features like these are proving to be successful and a more long-term solution to the falling share prices.

Snapchat must continue to uphold safety regulations to avoid cutting engagement and legal penalties which can deter advertising partnerships. A positive shift is achievable if Snap realigns its focus on making its features safer and more attractive. The company needs to use AR in ways to accentuate its social communications edge and regain its profitable position with advertisements. As a company that generates 90% of revenue from ads, Snapchat needs to invest in more robust data analytics and AI-powered targeting tools to help advertisers reach specific audiences. If Snapchat continues to focus on personalised AR experiences and capitalizes on the intersection of AR and commerce, it can still carve out valuable space in the growing AR market, even in the face of Meta's massive resources.

IS BYD LEADING THE RACE IN ELECTRIC CARS?



BY MANAV BASRA

When searching for innovation within the electric car industry one has to look no further than China, the world's largest EV market. The country's car manufacturers are exploiting the nation's vast natural resources and advantages in chemical and battery production to make advancements in electric vehicles which other countries cannot sustain. Tesla has not produced a new electric vehicle model in China since 2019, whereas domestic producers have released more than 100 models this year alone.

China's largest electric vehicle producer, BYD, recently dethroned Tesla, with the Chinese car manufacturer's quarterly revenues exceeding Tesla for the first time. BYD sold 1.1 million cars in the three months to September (an increase in sales of 24%), resulting in their quarterly revenue outstripping Tesla's by \$3 billion. BYD has secured its position as the market leader by introducing longer-range models at lower prices, while Tesla's product range has become outdated with the company's recent focus on automation proving unsuccessful to date.

High levels of vertical integration within BYD's production have given them a competitive advantage against others in the industry, resulting in higher gross margins than Tesla, as well as other Chinese rivals. This vertical integration has been one of the cornerstones of BYD's success, with the vast magnitude of their production meaning they benefit from economies of scale and their in-house battery production capabilities reducing costs. In contrast, Tesla sources most of its batteries from other companies such as Panasonic Energy and LG Energy.

However, despite BYD's recent success, with their market value rising roughly 55% YTD, a backdrop of rising protectionism and geopolitical tensions may stifle future growth. China's recent dominance in the EV market has led to the EU implementing significant import tariffs on Chinese vehicles. This is the consequence of European carmakers begging for tariffs, due to poor performance. Volkswagen for example has had to close factories in Germany for the first time and lay off tens of thousands of workers due to a loss of market share. Extensive Chinese subsidization of cars, means that EU producers are

unable to compete on price, which has meant the bloc has had to resort to protectionist measures. BYD's market dominance has meant the carmaker has been hit with EU tariffs of 17% on battery-powered vehicles, on top of the already existing 10% tariff. I would argue that in the short-term this is unlikely to significantly impact BYD's upward trajectory as the vast majority of their sales are within their domestic market, with overseas sales only accounting for 7.8% of total monthly sales in September. However, in the long-term, these tariffs may play a more significant role in hindering BYD's growth as analysts expect BYD to soon focus on growing their international sales. With the newly elected US President Donald Trump vowing to implement tariffs of 60% or more on China, BYD's position at the forefront of the EV market may prove to be short-lived.

BYD's rise to the top is not only due to the firm's incredible growth but also due to Tesla's decline. The recent US election has meant Tesla has reclaimed its \$1 trillion market cap for the first time since 2022. Nevertheless, the recent performance of Tesla's stock price has masked the poor sales and product showcases of the company in 2024. Tesla's Q2 net income fell 45% this year and more recently the company missed its Q3 revenue expectations (although it should be noted that the Q3 earnings release was viewed positively by investors due to high earnings per share). The company failed to impress at its recent 'cybercab' event where it unveiled plans for a fleet of autonomous robotaxis as well as household Optimus Robots intended to be 'the biggest product ever of any kind'. The two-seater taxis as well as the humanoid robots are supposed to eventually be available for less than \$30,000. The event left investors unimpressed due to a lack of detail on the technology behind the autonomous vehicles and how Tesla aimed to reduce their cost. Following the event Tesla shares fell 9% and at the time this left

Tesla as 2024's worst performer on the S&P 500. This downward trajectory has only recently reversed on the back of changed investor sentiment as a result of upgraded forecasts for next year and Elon Musk's bet on Donald Trump paying off, which has caused Tesla share prices to rise more than 50% over the last month.

Has the US election offered Tesla a lifeline? Maybe Elon Musk will be able to suggest policies within the new Whitehouse administration that benefit Tesla, but investors may worry his oversight in the Department of Government Efficiency will reduce the time he can devote to growing the company. I would argue that it may have just provided a temporary relief from Tesla's downward trajectory unless the company changes its focus. If Tesla does not soon provide updates on its release of a more affordable electric car, unofficially known as the 'model 2' I feel as though Tesla's product lineup will simply become more outdated compared to its Chinese rivals. If autonomous vehicles are the direction Musk chooses to take Tesla, he has a long way to go. The partnership between Waymo (owned by Alphabet Inc.) and Uber has already yielded success in the realm of autonomous taxis, with the companies providing ride hailing services in Phoenix, Arizona, Los Angeles and San Francisco, with new services planned for Austin and Atlanta.

Tesla in comparison are not expected to release a full Cybercab fleet until 2026 and are awaiting regulatory approval, which they may not be granted given Tesla's self-driving technology relies on cameras and machine learning, which may not meet safety standards, whereas Waymo employs remote sensing technology.

Despite my trepidation about Tesla's future success, there is just as much uncertainty about BYD's growth moving forward and Elon Musk isn't someone to underestimate. The recent US election may potentially be the start of another period of rapid expansion for Tesla. But the longer Elon Musk focuses his efforts on automation, the more ground BYD and other Chinese rivals will make in the electric vehicle race.

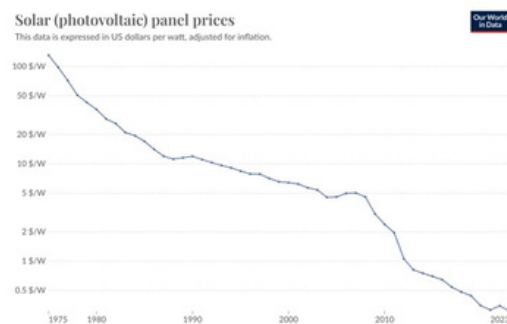
POWERING THE FUTURE: THE EVOLUTION OF SUSTAINABLE TECHNOLOGY

BY RAANIYA MAJID

Energy markets have undeniably always had a pivotal role in global economic performance. Historically the oil industry has been at the forefront of these effects, as seen through the impact of the Iranian Revolution, Arab-Israel War, the inflation during the 1970s oil price shocks or more recently, the Russia-Ukraine War's impact on living standards. However, recently, global energy needs previously served by fossil fuel industries are now being replaced by renewable technologies. This shift is not merely a technological one, but an economic one as well, with far-reaching implications for both industries and economies alike.

In the past 10-15 years, significant progress has been made in wind and solar energy, both seeing rapid cost reductions as a result of sustained investment into research and development. Figure 1 illustrates this trend for solar panels; price per watt declining, making solar energy increasingly accessible. A key driver in the reduction of costs for solar panels has been economies of scale and new panels types, such as bifacial

panels which increase efficiency of panels and expand their geographical feasibility into regions previously considered unattractive for harnessing solar energy like the UK, particularly the South-West, in comparison to sunnier regions like the Middle East and Southern Europe. Already, UK's installed solar capacity has increased by 18,000% since 2010, alongside solar PV capacity growth of 5.3% in 2022, whilst installed base solar power is estimated to nearly triple from its 2023 estimates of 15GW to 43GW by 2028.



Similarly, increasing size and capacity of turbines has helped halve prices of wind electricity generation in the past 15 years.

As a result, onshore and offshore wind now accounts for 28% of UK electricity generation in 2023. Floating offshore wind is the latest development in this ongoing progression of technologies. The prospect of floating offshore wind technology provides an opportunity for the UK to further establish itself at the forefront of innovation in offshore wind. To date, offshore wind has been led by fixed bottom foundations, where the foundation is built directly on the seabed, working better in shallower waters. However recent developments of floating offshore wind, where the platform floats on the sea but is anchored to the seabed via cables, more suited for deeper waters, for use in UK and further locations like Japan, Korea and Taiwan which previously have been unsuitable for fixed foundation technology are promising. Already, the UK has a number of small pilot projects, believed to account for more than a third of installed global capacity, demonstrating a gap in the market. Industry leaders believe floating offshore could account for more than half of the 100 gigawatts target set by the UK government for offshore wind power generation by 2050, a promising prediction.

While solar and wind dominate discussions on renewables, nuclear energy and green hydrogen also have promising futures, particularly in meeting firms needs to diversify energy sources. Nuclear energy, with zero carbon emissions, is increasingly seen as a viable option for companies like Amazon and Google to power data centers requiring reliable, high-capacity energy sources. Nuclear's potential impact on technology sectors, particularly in powering data-intensive applications like AI, could be transformative. However, strict regulatory hurdles and high upfront costs remain a significant barrier to wider adoption in the industry. Green hydrogen, produced through electrolysis powered by renewable sources, offers another promising pathway to decarbonize sectors that are hard to electrify, such as heavy industry and shipping. By leveraging solar and wind farms, green hydrogen production can reduce

dependence on fossil fuels.

However, this technology also faces substantial challenges; the land, labour, and capital costs associated with hydrogen production, as well as high transportation and storage expenses, limit its scalability. Hydrogen infrastructure is still in its infancy, requiring both private and public sector investments to bridge these gaps. Meanwhile other approaches to decarbonisation e.g. CCS (carbon capture storage) and DAC (direct air capture) are also being pursued, but to date, are yet to achieve commercial viability.

Transitioning to a renewable-based economy is not without challenges. Renewable sources like solar and wind require heavy land and labour investments which can drive up costs and strain local economies, whilst green hydrogen's storage and transport needs pose economic and logistical hurdles. Addressing these challenges would require sufficient support from the government for each industry and its supply chain, "priming the pump", which could be done via CFD Auctions, by providing tax credits for hydrogen infrastructure or grants for nuclear research to reduce regulatory delays.

Whilst ensuring our planet has a future is essential, accommodating the global transition towards renewables has implications for economies relying heavily on fossil fuels. This is particularly relevant for highly specialised economies such as Venezuela and Angola whose exports are largely comprised of crude oil/petroleum products (95% and 89% respectively), whilst these products make large proportions of total GDP. As demand for oil declines, these economies may face budgetary shortfalls, potentially destabilizing social programs heavily funded by oil revenues. For example, under Hugo Chávez, Venezuela used oil revenues to fund the Bolivares Missions, a series of social programs aimed at improving literacy, healthcare, and overall productivity.

Shifting away from oil will therefore require economic diversification and development of new revenue sources, but will ultimately insulate such economies from supply-side shocks as suffered from in the past. Conversely, this transition provides opportunities for countries investing in renewable technology and infrastructure such as China. Whilst known for its large contribution to carbon emissions, China's leading role in manufacturing of solar panels, and looking to the future, equally in wind turbines, positions itself to overtake European manufacturers and overall benefit economically from the shift towards renewables as demand grows, thus exemplifying how the rise of green industries could reshape international economic power dynamics, with nations investing greenly reaping long-term economic rewards.

However, it is worth noting the impact the political landscape in the US, recent election of Trump, will have on global progress towards implementation of sustainability given his plans. His vow to pull out of the Paris Accords (once again) does not bode well for other progress Biden made through legislations such as the Bipartisan Infrastructure Law, the CHIPS and Science Act as well as the Inflation Reduction Act, a policy which provided significant incentives for green initiatives. Will Trump's plans to reverse/loosen climate regulations deter US firms, already wary of the costs of implementing sustainability plans, to abandon them completely?

Furthermore, if a global leader such as the US pulls out of such commitments, other nations, particularly high emitters such as Russia and India might follow suit, potentially stalling global climate action at a critical phase. However, influential figures such as Elon Musk's continued advocacy for electrical vehicle policy adoption and sustainable energy could counteract political opinions, encouraging green technology investment. The commercial success of Tesla and similar companies illustrates the economic viability of sustainable industries, potentially inspiring

other sectors to follow suit.

As the global economy shifts towards sustainability, industries and economies must adapt to new realities. The economic benefits extend beyond environmental gains, also including reduced vulnerability to fossil fuel price shocks and the creation of new jobs and industries. However, there still remains opportunities for countries like Britain to lead efforts in sustainability, particularly looking to COP29. As the British Energy Secretary stated, "The only way to keep the British people secure today is by making Britain a clean-energy superpower, and the only way we protect future generations is by working with other countries to deliver climate action." The path to a sustainable future has challenges, but the economic and environmental rewards make this journey worth taking.



THE NEW ERA OF CONSUMER MARKETS: DIGITAL TRENDS UNVEILED

BY AKSHAT JAKOTIAH

In the last 20 years, consumer markets have evolved remarkably. The primary catalyst for this advancement is the rise of digitalisation. Shopping is no longer confined to physical stores - rather, it has evolved into a seamless blend of online and offline experiences, defined by personalisation, convenience, and instant gratification. This shift has introduced a new era where the use of technology has enhanced interactions, which are at the forefront of consumer engagement.

An appropriate starting point in exploring the digitalisation of consumer markets would be to consider the impressive rise of Amazon. Since its founding in 1994, the company has grown meteorically and has tried its hand at a wide range of markets, starting as an online bookstore. Amazon started gaining attention in the late 1990s, with it soon being declared the world's largest online sales platform in 1999. As Amazon's prominence grew, it initiated a shift in consumer habits toward digital shopping. Since then, the shift towards the digital marketplace has been irreversible. The introduction of Amazon Prime in 2005 steeply raised the

expectations for convenience and speed by customers. A new, streamlined experience like this was the key in making consumers prefer online shopping to traditional retail.

More recently, many developing countries have also seen significant shifts towards online shopping. Examples of this are seen in countries like China, where Alibaba, an e-commerce platform, has over 900 million active customers. This trend is driven by technological advancements - ranging from increased access to mobile devices, and increased usage of digital payment methods like Alipay and WeChat Pay. Enhanced internet infrastructure, supported by government initiatives, has enabled easier access to a wider variety of products to those who are part of rural communities. Together, these developments have meant that consumers are much more willing and able to make more use of online markets, which highlights the benefits they hold: speed, flexibility and wider choice.

Over the past couple of years, there has been a surge in social media platforms integrating their e-commerce platforms into their applications. A renowned example of this is TikTok Shop, which offers heavily discounted products on the app. The app generated \$11.09 billion in GMV (Gross Merchandise Value), highlighting the potential it has to serve as a replacement for traditional shops. There have been other examples of this idea being implemented - with Instagram also having its shop section. Combined with the use of influencers to market their e-commerce platforms, social media giants like Instagram and TikTok have an outstanding opportunity to promote their platforms and establish themselves as leaders in the e-commerce market.

Digital marketing efforts have been pivotal in increasing the reach of emerging e-commerce platforms internationally. The use of social media has been vital for platforms such as Shein to gain traction with potential customers. By leveraging celebrity endorsements and placing ads on a range of social media channels, companies like Shein have successfully built a large customer base and are flourishing amongst them. The use of targeted content and data-driven ad strategies have helped tailor the online shopping experience to individual user preferences, driving conversion rates higher. Furthermore, the adoption of interactive features, such as live shopping events and user-generated content, has boosted customer engagement, allowing these platforms to create more personalized and immersive shopping experiences.

Another crucial but often overlooked factor is the effect of COVID-19. With countries all around the world being repeatedly locked down for multiple months in a row, it was inevitable that there would be a substantial shift towards online shopping and an increase in the use of online services. Since then, it may be argued that the world has struggled to see a return to the pre-pandemic norm of most shopping being done offline, as many people continue to order

groceries, essential household items and food online. Going back to Amazon, they have recorded their highest sales during and after the pandemic, which may indicate a permanent shift in consumer habits toward e-commerce platforms. This growth is likely not just a temporary surge but a long-lasting change in shopping behaviors, suggesting that even as in-person shopping rebounds, online retail will remain a dominant force, reshaping the global retail landscape as we know it.

In summary, the digitalisation of consumer markets has transformed the global shopping landscape, bridging geographic and economic gaps, and making products more accessible than ever before. From giants like Amazon to Alibaba, online shopping has reshaped consumer expectations, driven by advances in technology. This shift has not only redefined convenience but has also allowed consumers in even the most remote areas to access a diverse range of goods. The future of retail is undeniably digital, and with ongoing innovations, the possibilities for both consumers and businesses are limitless.



BY ARUN PILLAI

25.5% versus 3.7%. The difference in year-to-date (YTD) growth rates for the S&P 500 and the Euro Stoxx 600 respectively only begin to tell the story of how the US stock market is continuing to push on and leave Europe in the dust. The S&P 500 holds an impressive weighting of technology stocks, with just over 26% of its total market capitalisation belonging to technology companies. The Euro Stoxx 600, on the other hand, only holds a 7% weighting toward technology stocks. Whether it is the American emphasis on technological growth stocks over traditional value stocks, the concentration of large-cap tech stocks in the US, or even a deregulated business friendly environment, the underlying theme of technology remains constant among the reasons for this transatlantic divergence.

The Magnificent Seven stocks (Alphabet, Amazon, Apple, Meta, Microsoft, Nvidia & Tesla) are seen as the biggest seven technology companies in the world. They are known for their AI innovation, strong financials, and impressive growth over the last few

years with advancement in machine learning.

However, there is another common denominator between these companies – all seven are American. The US evidently has a technology-friendly environment which is not only home to the big players, but also boasts the most tech-related startups in the world. Top universities concentrated in tech-friendly ecosystems such as San Francisco, New York and Boston provide a talent pool of international workers, all of whom are highly educated. But the United Kingdom and Ireland are both ranked as better-educated than the US according to OECD, as well as Sweden and Luxembourg in mainland Europe – the education hypothesis does not hold. So, what gives the US an economic environment which is conducive to growth through technology?

Historically, the US has maintained the pre-conditions necessary for technology companies to grow, particularly in their venture capitalist phases. The US has always held a relatively low rate of corporation tax in comparison to their transatlantic

counterparts in mainland Europe.

With a current rate of 21%, which may well drop further to 15% under the Trump administration in 2025, the environment for tech startups to grow in America is strong. Whereas Europe's rates are significantly higher, 29.9% in Germany, 25.8% in France, and 25% in the UK (recently increased from a previously competitive 19%). The Tax Cuts and Jobs Act of 2017 exemplifies Trump's business-friendly stance. The steep slashing of the corporation tax from 35% to 21% has incentivised both domestic growth, but has also effectively attracted international startups to invest, develop, and grow in the US. With Trump securing a second presidential term, this influx of tech startups to the US may very well continue after he is sworn in at his presidential inauguration on the 25th of January. A potential reduction in corporation tax, paired with his heavy bias towards a deregulated business environment will catalyse this "brain drain" of technology companies out of other countries. With the Dow Industrials, S&P 500, and most topically the NASDAQ all climbing to record highs after Trump secured the presidency on November 6th, it seems promising in regards to technology related growth to continue to surge in the USA.

The notable 2023 initial public offering (IPO) of ARM is a significant example of this. The Cambridge-based semiconductor firm opted for an IPO directly in the US, as opposed to staying home in the UK. The biggest US listing of the year, jumping \$6/share to \$57 proved the decision to list in the US was sensible. Despite the best efforts of British ministers to lobby an IPO on the London Stock Exchange, the tech-friendly environment in the US was too good to turn down for ARM. A more bullish investor sentiment, particularly in the technology sector, also provided fair rationale for ARM to go public on the other side of the pond. This is not a standalone example either. Companies including Wise plc and Argo blockchain similarly chose a US-based IPO. To make matters

worse for Europe, a number of firms delisted from European exchanges in favour of pastures new in the USA – namely Flutter Entertainment, CRH and Smurfit Kappa. Flows of technology-related capital are flooding into the states, and simultaneously leaving Europe.

Even the scarce few European based tech companies are struggling in comparison to their American rivals. The US tech index surged 55% this past year, its best results since the infamous dot-com boom of 1999. In comparison, the EURO STOXX technology index experienced a more modest increase of 33%. Whilst 33% may seem impressive, the relatively lower weighting of tech stocks in Europe, and lagging performance of value stocks in the energy, healthcare and industrials sectors have dragged European performance down. This is where the great divergence has truly opened up over the last 5 years. If the current trend continues, it will be more bad news for Europeans.

Can Europe do anything to turn the tide? Lower corporation tax rates would be ideal, but unfunded tax cuts will not sit well with investors, especially against a strengthening dollar. Policies need to be more focused, as evidenced by the ARM IPO in the US. Whether it is greater export credit to tech startups in Europe, or a more favourable environment for technological innovation generally, there is work for Europe to do. Especially with the threat of Trump promoting further corporate tax cuts and deregulation, Europe needs to make its business environment more attractive. The EU single market has potential to achieve this. Whilst consumer markets are unified, regulatory framework makes it tough for companies to expand, which is even more significant in the start-up phase of tech companies. EU reforms across data privacy, tax policy and intellectual property rights would alleviate the issues it has experienced, and subsequently create a previously unachievable tech-friendly business environment. Europe has a long way to go if it wants

to catch the US in the technology space, but it can certainly take small steps in the right direction. counterparts in mainland Europe.



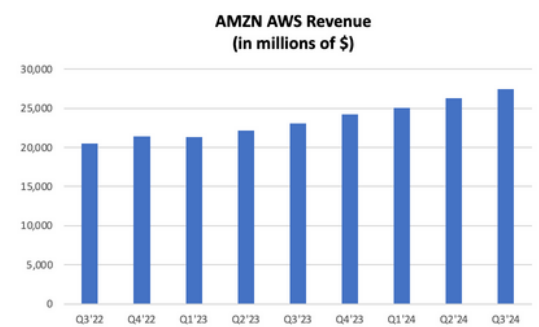
BY PRARTHAK SHARMA

Amazon's transformation from an online bookstore to a global tech giant has redefined e-commerce and digital innovation, becoming a powerhouse across multiple industries. Its remarkable success stems from visionary strategy, relentless innovation, and an unwavering focus on customer satisfaction. By leveraging cutting-edge technologies, particularly AI, Amazon has solidified its competitive edge, positioning itself ahead of industry rivals. Today, Amazon is more than an online retailer—it's a diversified business with thriving segments in cloud computing, advertising, and subscription services. This analysis explores Amazon's fundamental strengths and technical performance, revealing how its strong financials, continuous innovation, and robust stock trajectory enable it to deliver unparalleled results and shape the future of technology and retail.

Amazon's AWS Cloud

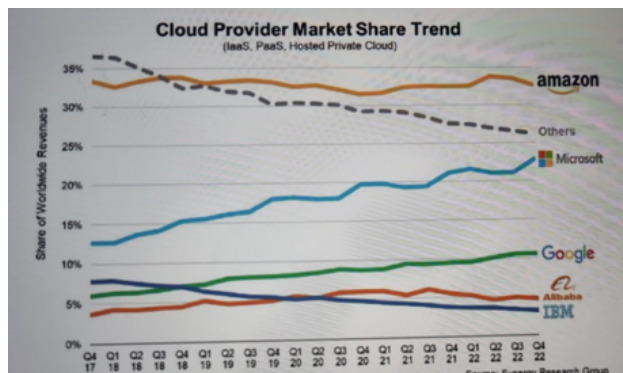
The majority of Amazon's success stems from its highly instrumental Amazon Web Service (AWS). AWS being the most significant cloud service globally, helps expand Amazon's revenue thus,

reasserting its dominance.



The sales generated from AWS have surged to \$27.5B, increasing 19% YoY. With a potential to generate revenue of around \$125B, with substantial growth ahead. Amazon's AWS provides users with a platform to scale the next wave of innovation by leveraging more than 25 years of pioneering AI experience. Through its instrumental AWS cloud Amazon has been able to provide users with comprehensive generative AI, AI services, machine learning, AI infrastructure, a data foundation for AI, and more. Over 100,000 customers have chosen AWS for AI to improve customer service, optimize business growth, and create better consumer experience. With consistent growth in Amazon's AI advantage, there is

potential to enable more market share, sales, and profitability gains.



Based on the market dynamic presented here, Amazon's market-leading cloud service has remained around 32-33% market share for years. Amazon has the top global cloud service, with roughly 33% global share, putting it ahead of major market giants like Google and Microsoft. With a potential for more advancements in AI AWS's market share has an opportunity to surge beyond its current value, cementing its spot as the top cloud service globally.

However, despite the strong figures, I do believe the market still continues to underestimate the scope of potential growth in this segment. The cloud market is expected to expand to about \$1.27T by 2028, illustrating a healthy CAGR of approximately 15%. This essentially implies that AWS can continue to expand even if it maintains its current market share of 30-35%. If Amazon manages to increase its market shares, its revenue can expand substantially allowing it to generate record profits

However, with everything that revolves around the world of technology and economics, there will be certain challenges that Amazon will need to navigate. The AWS could experience slower-than-expected growth and worse-than-anticipated profitability due to advancing competition and general growth issues. Furthermore, if rates remain high, Amazon's profitability growth could be slower than expected. Regardless, if Amazon does manage

to overcome any potential hurdles down the road, we will be seeing a boom period for Amazon as a company and a stock.

Fundamental Analysis of Amazon

From a financial perspective, Amazon is essentially considered a haven for investors investing in the stock market. This is mainly due to the strong growth in finances with no signs of stopping any time soon. **Net sales increased by 11%** in the third quarter, to \$158.9B. Subsequently, **operating revenue increased to \$17.4B** in the third quarter, which is growth of approximately 55.4% YoY. Amazon has also seen substantial growth in net income (**up by 54.5% YoY**) operating cash flow (**up by 57.7% YoY**), and free cash flow (**up by 119.6% YoY**). Amazon expects these strong performances to continue heading into the 4th quarter due to the holiday season being a historically boosted period for e-commerce sales.

Amazon continues to show substantial growth, with CAPEX doubling year-over-year, a trend common among mega-tech companies investing in AI, technology, and cloud computing. While AWS remains Amazon's primary revenue driver, other segments like advertising (19% YoY growth) and subscription services (11% YoY growth) are also expanding significantly, reflecting Amazon's diverse revenue streams. Notably, third-party seller services now generate 50% more revenue than AWS, highlighting Amazon's evolution beyond e-commerce and cloud. Investors view Amazon as a multi-faceted growth engine, with the potential for profit growth outpacing revenue due to rising margins, especially through AWS. Despite AWS facing competition from Google and Microsoft, its scale still solidifies Amazon's long-term growth outlook.

Technical Analysis of Amazon

Based on the strong financial performances, dominance of AWS, and future growth outlook investors do consider Amazon to be undervalued

essentially making it the most attractive of the Magnificent Seven stocks.



Due to the strong earnings report the Amazon stock managed to break its previous resistance of approximately \$200 indicating that investors are indeed bullish about Amazon as a stock. The breakout volume was high as well which strengthens the confidence that investors have on Amazon.



Since January 2023, Amazon's weekly chart has shown a strong uptrend, consistently trading above the 50-week (yellow), 100-week (orange), and 200-week (red) moving averages in a bullish alignment. This configuration, supported by higher volumes, reflects sustained buying momentum and a stable bullish outlook for Amazon's growth trajectory. Subsequently, Amazon has managed to outperform the earnings predicted by Wall Street analysts seven

times in a row thus, highlighting how it's exceeding expectations on a regular basis.

Conclusion

Amazon's third-quarter earnings are a clear indication of the strong sentiment that the markets have toward Amazon. The trajectory in operating profit growth is extremely compelling for anyone looking to invest or double their stake in Amazon. While arguments could be made regarding the fact the stock is over-extended mainly due to the market's currently over-valued nature, many investors do believe Amazon still has legs to continue to grow further primarily due to its diverse range of services and dominance in the AI and cloud computing industry through the AWS platform.



THANK YOU NOTE

We hope you had an enriching experience reading this edition of the Assumptions magazine. We are grateful to all our writers who helped us explore the innovative and ever-evolving world of technology.

From sustainability-driven tech innovations to technology's impact on global markets, the insights here offer a glimpse into the forces shaping global economies. We hope these articles inspire discussion and a deeper understanding of the instrumental potential of the tech landscape. We look forward to providing our readers with more fascinating content in the future!

***Arun Pillai &
Prarthak Sharma***
EDITORS IN CHIEF

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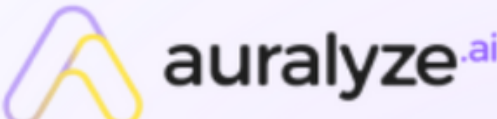


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