The Year so far... Thematics

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As we are in the middle of summer 2024, we take a look back at the first half of the year and take stock of the performance of various investment themes in the first six months of the year.

This part of the series takes a look at Solactive's thematic index offering and the respective performance in the first half of 2024.

The year so far... Thematics

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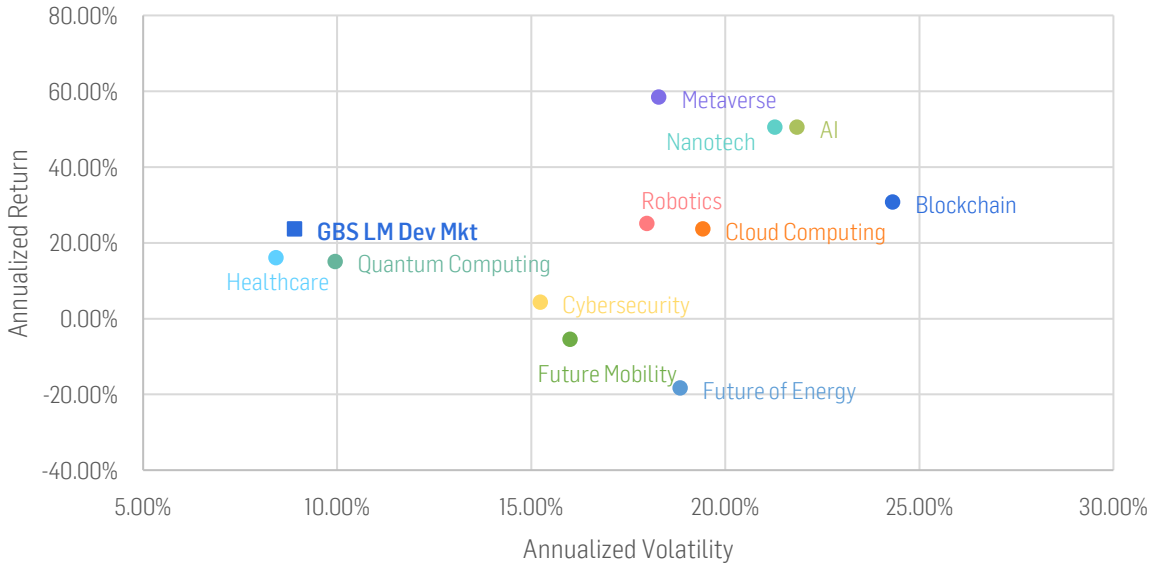
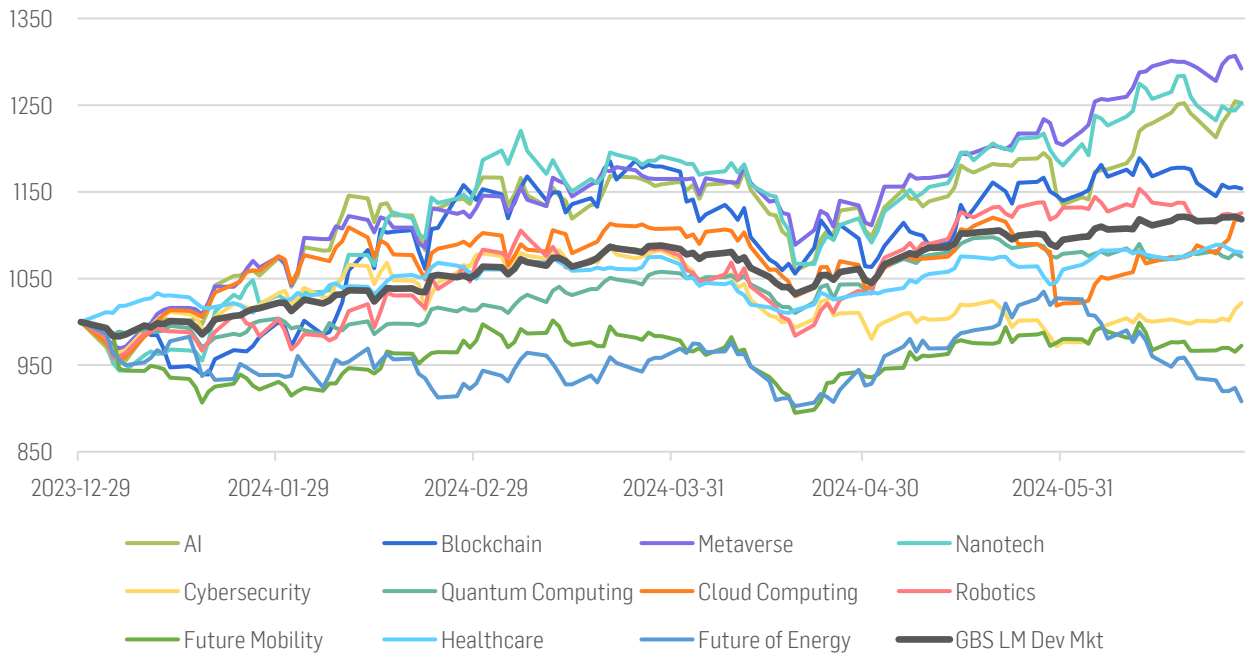
This report provides an in-depth analysis of the most relevant and promising investment themes observed during the first half of 2024..

In the first half of the year, the Metaverse theme has established itself as the best performer not only in absolute terms but also on a risk-adjusted basis with a Sharpe Ratio just slightly below 3. Themes incorporating NVIDIA such as Metaverse, AI, and Nanotech have significantly outperformed those without.

We will explore the intricacies of each theme, offering insights into their current market standing and potential trajectory. Through this thematic review, we aim to equip investors with valuable information, helping them understand the potential and risks associated with each theme. The themes under our review include **AI**, **Blockchain**, **Metaverse**, **Robotics**, **Nanotech**, **Cybersecurity**, **Cloud Computing**, **Future of Energy**, **Future Mobility**, and **Quantum Computing**. Each theme is analyzed with a focus on its unique market dynamics, recent developments, and future growth prospects.





	AI	Blockchain	Metaverse	Nanotech	Cybersecurity	Quantum Computing	Cloud Computing	Robotics	Future Mobility	Healthcare	Future of Energy
Return (YTD)	25.26%	15.37%	29.23%	25.26%	2.17%	7.50%	11.84%	12.54%	-2.76%	8.03%	-9.16%
Volatility (annualized)	21.85%	24.31%	18.29%	21.28%	15.23%	9.95%	19.43%	17.99%	16.00%	8.43%	18.84%
Max Drawdown	-9.88%	-11.02%	-7.75%	-12.61%	-10.50%	-4.51%	-9.06%	-11.00%	-10.65%	-6.00%	-12.22%
Sharpe Ratio	2.07	1.05	2.91	2.13	-	0.98	0.95	1.10	-	1.28	-

(Data from 29/12/2023 to 28/06/2024)

Artificial Intelligence (AI)

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Look Back: AI in 2024

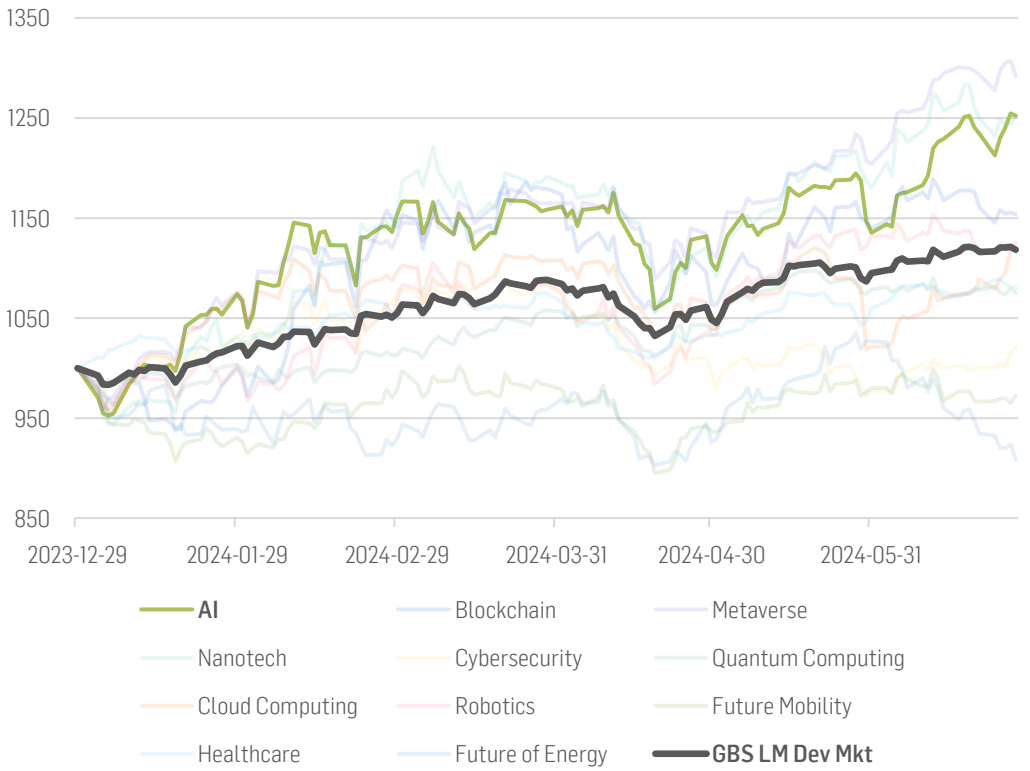
The first half of 2024 has seen significant advancements in AI, transforming various sectors with innovations in natural language processing, machine learning, and AI hardware. NVIDIA's AI-specific chips have set new performance standards, enhancing computational efficiency and reducing energy consumption. FAANG companies, particularly Google and Amazon, have utilized AI to improve search algorithms and optimize logistics, driving substantial gains in their operations. These advancements have solidified AI's role as a critical technology in the modern economy. One of the main contributors to the sector's strong performance has been the widely recognized GPU processor producer, NVIDIA, with an astonishing 149.5% increase in stock price YTD that sets the company as the leader in the innovative AI world. The Californian company has more than a 90% share of the market for AI GPU chips for data centers.

Future Outlook

The AI sector's future is incredibly promising, driven by key trends. Generative AI will enhance content creation in entertainment, marketing, and customer experiences: 97% of business owners believe ChatGPT will help their business[1]. Innovations in AI hardware, such as neuromorphic computing, will produce more efficient chips, making AI more accessible[2][3]. AI in consumer products and autonomous systems will boost engagement and create new revenue streams. Advances in natural language understanding will transform customer service with sophisticated voice assistants, with over 60% of business owners believing AI will improve customer relationships[4]. AI-driven automation will optimize supply chains, enhance manufacturing, and enable predictive maintenance, increasing efficiency and cost savings. AI ethics and governance frameworks will ensure responsible use, addressing privacy, bias, and transparency. AI is projected to create around 97 million new jobs[5] and it is expected to contribute a significant 21% net increase to the United States GDP by 2030, showcasing its impact on economic growth. The sector potential is also highlighted by the forecasts about its market size, projected to reach $184 billion this year from $86.9 billion in 2022 and expected to attain $407 billion in 2027 and $826 billion in 2030[6][7].

Concerns

The main doubts regard a possible over-hype around the sector and look back at the Dotcom crisis seeing similar dynamics and potential similar risks. In particular, the AI sector is the most correlated with the Solactive US L&M Cap Technology index (93%) and concerns arise from overconcentration and overexposure of the whole tech sector to the AI rally. Furthermore, as AI evolves, it could displace 400 million workers worldwide and affect around 15% of the global workforce, according to a McKinsey report[8].



Top 5 Holdings	Weight	YTD Return
MICROSOFT CORP	8.33%	18.86%
NVIDIA CORP	8.29%	149.47%
APPLE INC	5.44%	9.40%
AMAZON.COM INC	4.54%	27.19%
META PLATFORMS INC	4.19%	42.45%

(Data from 29/12/2023 to 28/06/2024; Solactive Etna Artificial General Intelligence Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Blockchain

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Look Back: Blockchain in 2024

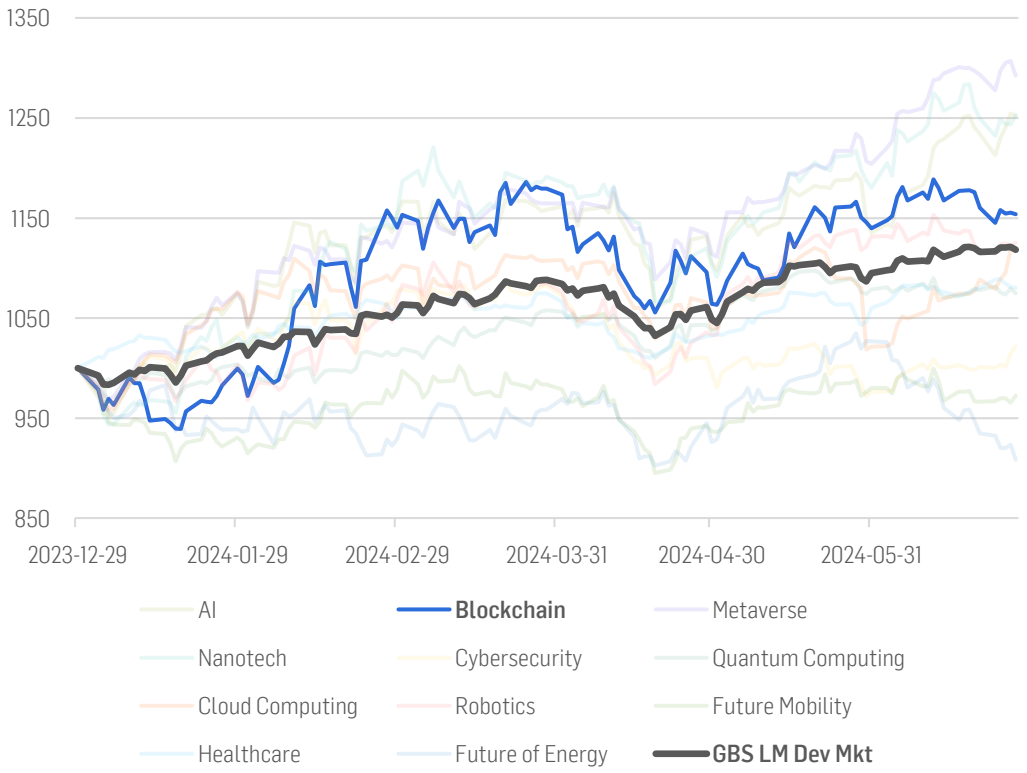
2024 is set to be a pivotal year for blockchain, marked by its maturation and widespread adoption across industries. At the end of February, Bitcoin reached the value of $60,000 for the first time since 2021, driving an increase in the entire blockchain sector. Beyond its strong association with cryptocurrencies, blockchain has evolved into a versatile tool gaining mainstream acceptance. Governments, financial institutions, and businesses are increasingly acknowledging its capability to improve efficiency and transparency. Smart contracts are pivotal in automating transactions and bypassing intermediaries, thereby cutting costs and ensuring smooth transactions without interruptions. Major companies like Walmart, IBM, Microsoft, Amazon, and JPMorgan Chase are integrating blockchain solutions into their operations, enhancing their service offerings and operational efficiency. Furthermore, Polkadot's use of parachain architecture ensures interoperability between specialized blockchains while maintaining robust security and performance standards.

Future Outlook

The blockchain sector is poised for robust growth, driven by the technology's transformative potential across key industries. Financial services will remain a cornerstone of blockchain adoption. Major financial institutions are leveraging blockchain to minimize fraud and improve the efficiency of transactions[9]. The rise of decentralized finance (DeFi) platforms is particularly noteworthy, offering innovative financial products and services that operate without traditional intermediaries[10]. In supply chain management, blockchain's capacity to provide an immutable and transparent ledger is pivotal and companies are already integrating it into their supply chains to optimize operational costs, thus enhancing overall efficiency and trust in the whole process[11] [12]. Moreover, the integration of blockchain with emerging technologies such as the Internet of Things (IoT) and artificial intelligence (AI) will drive further innovation, enhancing the security and reliability of IoT applications by providing a secure platform for data sharing[11]. As industries continue to adopt it, the demand for innovative blockchain solutions will rise, driving significant advancements and investments in the sector.

Concerns

The sector faces volatility, as the past behavior of the theme shows, and regulatory uncertainty. The decentralized nature of blockchain and past collapses of DeFi platforms such as Terra protocol highlight the need for robust security measures and regulatory frameworks to ensure stability and trust[13]. Additionally, the energy consumption of blockchain networks, particularly those using proof-of-work consensus mechanisms, poses environmental concerns that need to be addressed[14][15].



Top 5 Holdings	Weight	YTD Return
NVIDIA CORP	8.38%	149.47%
ROBINHOOD MARKETS INC – A	6.45%	78.26%
INTERACTIVE BROKERS GROUP INC	5.11%	47.89%
META PLATFORMS INC	5.00%	42.45%
COINBASE GLOBAL INC -CLASS A	4.99%	27.78%

(Data from 29/12/2023 to 28/06/2024; Solactive Blockchain & Crypto Technology Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Metaverse

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Look Back: Metaverse in 2024

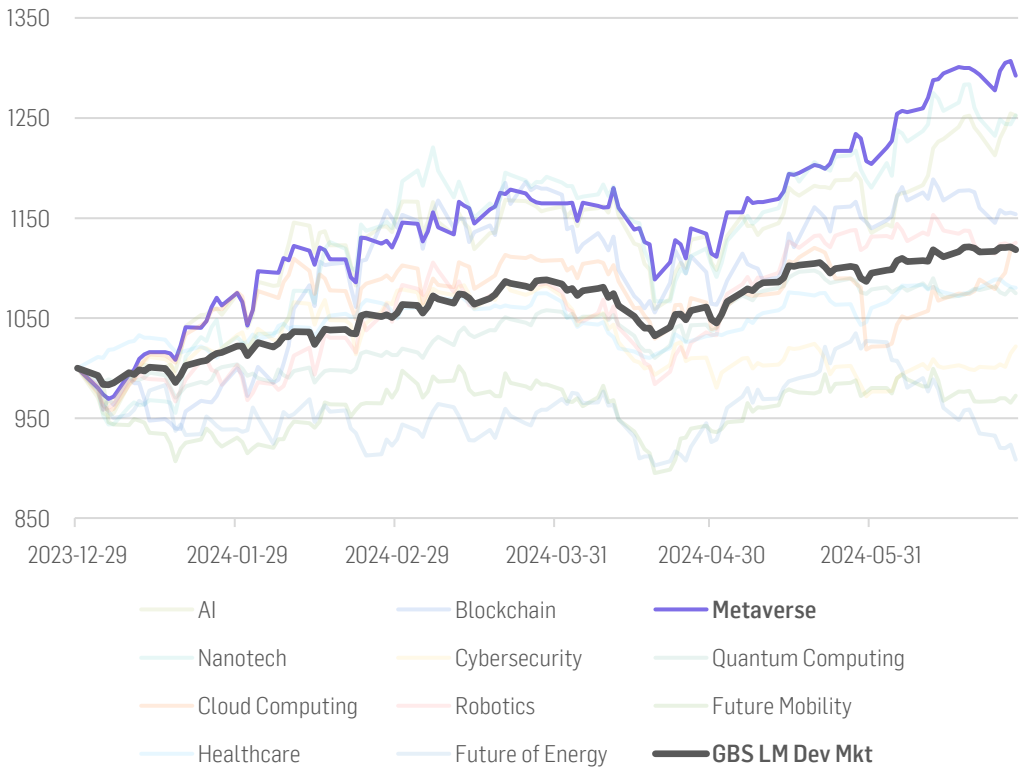
In the first half of 2024, progress has been made in creating immersive digital environments and integrating virtual reality (VR) and augmented reality (AR) technologies. Companies like Alphabet, Cirrus Logic, Himax Technologies, Microsoft, and NVIDIA have played key roles with their innovative solutions and strategic investments, contributing to a more developed and accessible metaverse. The integration of advanced VR and AR technologies has improved user experiences and broadened applications into areas like remote work, education, and social interaction. For example, Microsoft has advanced its mixed reality platform Mesh, while NVIDIA's developments in graphics processing units (GPUs), such as the NVIDIA RTX series, have enabled more realistic and responsive virtual environments.

Future Outlook

The Metaverse and the sector surrounding it is expected to grow, driven by advancements in VR, AR, and AI technologies. The global metaverse market is projected to reach $1.3 trillion by 2030, growing at a CAGR of about 38% from 2024 to 2030[16]. VR and AR will enhance user experiences in gaming, remote work, education, and social interaction. For example, the VR gaming market is expected to reach $109.59 billion by 2030[17]. Education will benefit from immersive learning environments, making content more interactive and engaging. Platforms like ClassVR provide virtual classrooms and simulations that allow students to explore complex concepts in new ways. The metaverse will also impact remote work and social interaction by creating immersive virtual environments. Companies such as Reality Labs (formerly Oculus) and Gather are investing in virtual offices and collaboration tools that enable seamless teamwork regardless of location, enhancing productivity and connection among remote teams. AI will drive the development of advanced virtual assistants and personalized interactions, making the metaverse more engaging and dynamic. Technologies like NVIDIA's Omniverse and AI-driven virtual assistants from companies like Soul Machines are examples of how AI is transforming the metaverse.

Concerns

Privacy and security concerns are significant challenges[18]. The possible exploitation of biometric information is also a threat[19]. Ensuring robust measures to protect personal data and prevent malicious activities will be crucial for the sector's sustained growth[20]. Moreover, the ethical implications of immersive environments and their impact on mental health and social behaviour are areas that require careful consideration and regulation[21].



Top 5 Holdings	Weight	YTD Return
NVIDIA CORP	12.29%	149.47%
APPLE INC	10.42%	9.40%
AMAZON.COM INC	9.96%	27.19%
META PLATFORMS INC	9.89%	42.45%
MICROSOFT CORP	9.80%	18.86%

(Data from 29/12/2023 to 28/06/2024; Solactive Developed Markets Metaverse Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Nanotechnology

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Look Back: Nanotech in 2024

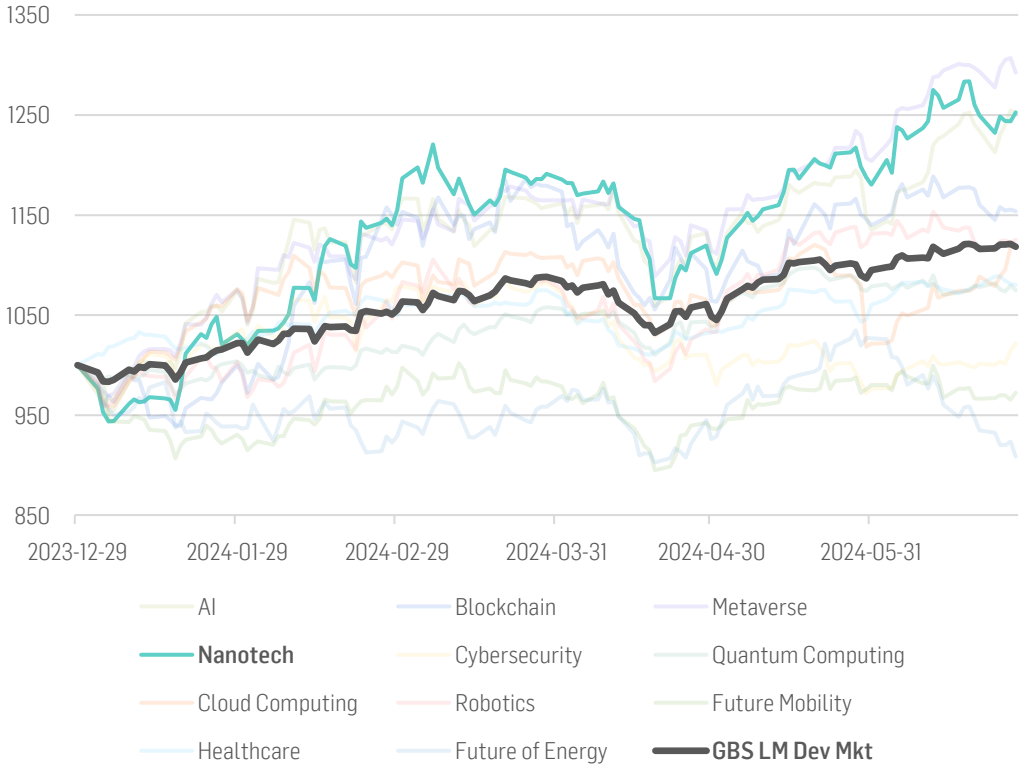
The first half of 2024 has been a significant period for the nanotechnology sector, marked by notable advancements. The sector experienced growth driven by innovations and strategic investments. Companies in the fields of semiconductors, biotech, and materials science have been pivotal in advancing the sector. In the semiconductor industry, companies like Taiwan Semiconductor Manufacturing Company and NVIDIA have developed smaller, more efficient chips, enhancing computing power and driving innovation in AI, IoT, and consumer electronics. Materials science has also seen benefits from nanotech innovations. In the first half of 2024, Applied Materials Inc. introduced a new nanocomposite material used in semiconductor manufacturing, significantly improving efficiency and performance.

Future Outlook

There is no consensus among researchers about the projected compound annual growth rate (CAGR) for the nanotechnology sector, with estimates ranging from 8.4% to 36.4%, averaging around 20%[22][23][24][25][26]. Advances in nanomaterials are expected to have significant impacts on various industries by providing enhanced properties and capabilities. These materials are essential for improving the performance and durability of products across the aerospace, automotive, and construction sectors[25] . In the semiconductor industry, nanotechnology is anticipated to continue driving the miniaturization of components, enabling the production of smaller, more powerful chips. This development supports advancements in emerging technologies such as quantum computing and advanced AI systems, fostering further innovation and expanding technological possibilities[27] . In the medical field, nanoparticles are poised to enable more precise disease treatments, potentially improving patient outcomes and reducing side effects[22] . Additionally, nanotechnology applications in diagnostics are expected to lead to earlier and more accurate disease detection, enhancing preventative healthcare[23] . Energy storage and renewable energy technologies are also set to benefit from nanotechnology, with improvements in the efficiency and capacity of batteries and supercapacitors supporting the growth of electric vehicles and renewable energy systems. This progress is likely to contribute to a more sustainable and energy-efficient future[23] .

Concerns

The nanotech sector faces significant concerns, particularly the geopolitical tensions between China and Taiwan, which could disrupt the supply chain for critical nanotechnology components. Additionally, the industry's heavy dependency on microchips makes it vulnerable to supply shortages and market fluctuations[23].



Top 5 Holdings	Weight	YTD Return
NVIDIA CORP	5.87%	149.47%
AXCELIS TECHNOLOGIES INC	5.75%	9.64%
COHERENT CORP	5.48%	66.46%
TAIWAN SEMICONDUCTOR MANUFAC	5.18%	54.14%
TOWER SEMICONDUCTOR LTD	5.06%	28.80%

(Data from 29/12/2023 to 28/06/2024; Solactive Nanotechnology Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Cybersecurity

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Look Back: Cybersecurity in 2024

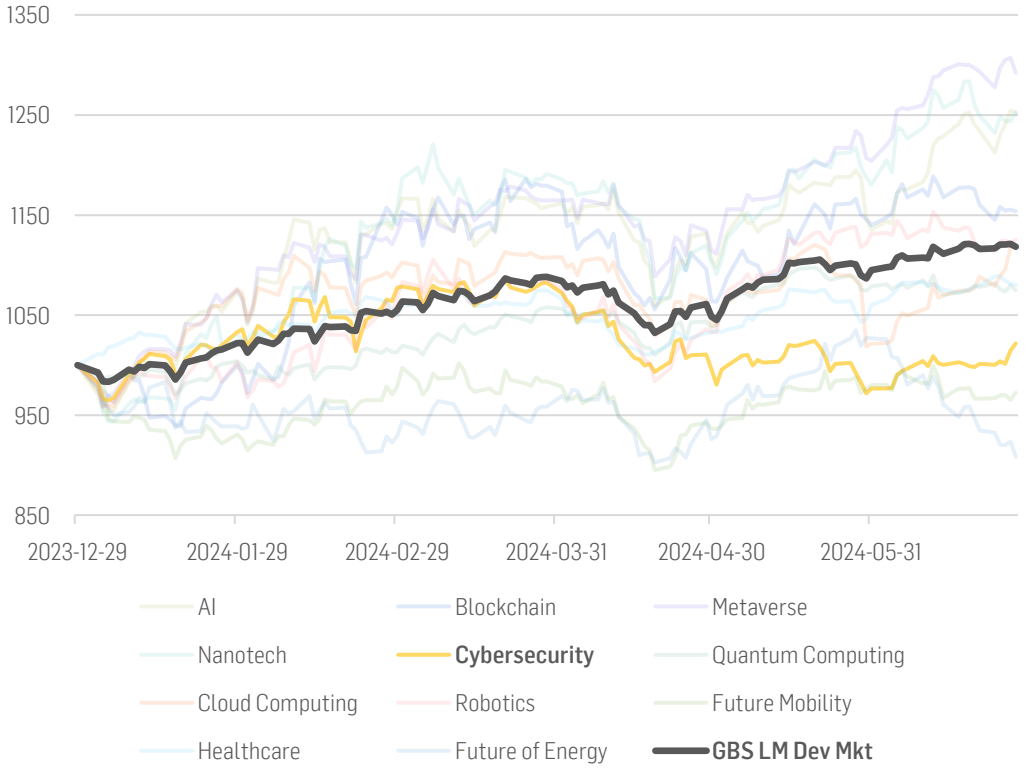
The cybersecurity sector has been both dynamic and challenging in 2024, with the increasing sophistication of cyber threats driving demand for more advanced security solutions. High-profile breaches and ransomware attacks, such as the massive ransomware attack on Change Healthcare in February, which disrupted payment processes for healthcare providers and resulted in significant financial losses, have highlighted the vulnerabilities in existing systems and underscored the need for robust cybersecurity measures. Similarly, the UK Ministry of Defence payroll hack in May exposed sensitive data of nearly 270,000 staff, emphasizing the critical need for enhanced security protocols. Companies across various sectors have been ramping up their cybersecurity investments to protect sensitive data and maintain operational integrity. Cloud security, endpoint protection, and threat intelligence have been key areas of focus. Major players like Palo Alto Networks, CrowdStrike, and Fortinet have led the way with innovative solutions that address the evolving threat landscape. However, the sector has also faced challenges, including regulatory pressures, unreliable software updates and the need for continuous innovation to stay ahead of cybercriminals.

Future Outlook

The cybersecurity market is set to experience significant growth, with an anticipated CAGR of 9.5% to 16%, potentially reaching $450 to $650 billion by 2030[28][29][30]. An important driver for this expansion will be the increasing adoption of cloud services and IoT devices, necessitating more advanced security solutions. AI and machine learning will play crucial roles in enhancing threat detection and response capabilities, enabling more proactive and adaptive security measures, as seen in CrowdStrike's AI-driven platforms[30]. The implementation of zero-trust architectures, exemplified by Google's BeyondCorp framework, will become a standard practice, ensuring robust security by continuously verifying all access requests. Sectors like finance, energy, utilities, and healthcare will see substantial investments in cybersecurity to protect against sophisticated cyber threats[29]. This forward-looking approach underscores the importance of continuous innovation and investment to combat the growing sophistication of cyber threats and the projected global cost of cybercrime, which is expected to reach $10.5 trillion annually by 2030[31].

Concerns

Challenges in the cybersecurity sector include the fast-evolving nature of threats, high costs, regulatory compliance, and a skills gap. Ensuring effective solutions is crucial for data protection and trust. The integration of AI raises ethical and privacy concerns needing clear guidelines. The CrowdStrike outage in July, caused by a faulty update leading to global disruptions, highlights the importance of reliable cybersecurity practices and the potential risks of poor code.



Top 5 Holdings	Weight	YTD Return
PALO ALTO NETWORKS INC	4.36%	14.97%
CROWDSTRIKE HOLDINGS INC	4.23%	50.08%
ARISTA NETWORKS INC	4.14%	48.82%
SYNCHRONY FINANCIAL	3.91%	23.57%
DIGITAL REALTY TRUST INC	3.71%	12.98%

(Data from 29/12/2023 to 28/06/2024; Solactive Developed Markets Cybersecurity USD Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Quantum Computing

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Look Back: Quantum Computing in 2024

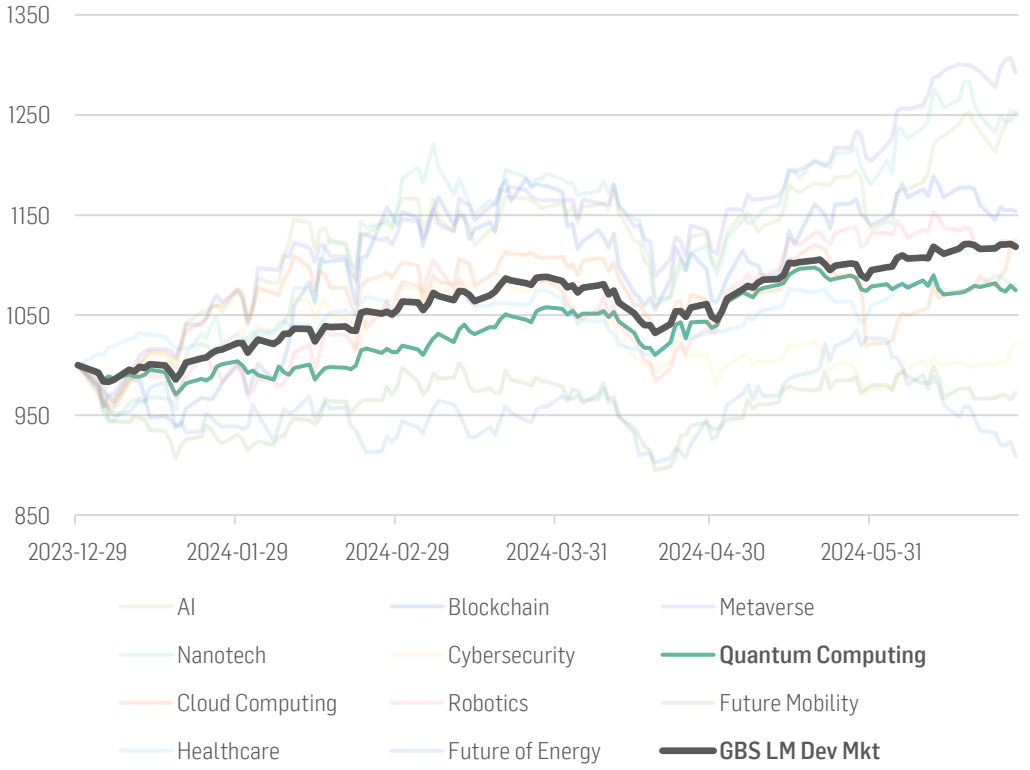
The first half of 2024 has been a period of modest but solid growth for the quantum computing sector, showing some of the lowest volatility among the analyzed themes. While the sector exhibited positive changes, several companies faced significant challenges. Companies like IONQ, Airbus, and Alphabet encountered operational and market pressures, leading to declines. Furthermore, this area is experiencing a decrease in the total amount of private investment compared to past years, highlighting the importance of government sources for raising capital. Despite these hurdles, the sector experienced substantial advancements, particularly driven by leading tech giants and research-focused enterprises. Notably, several technologies show promise for scaling quantum control, a technology needed to minimize quantum noise and optimize quantum error correction.

Future Outlook

The quantum computing market is expected to reach $12.6 billion by 2032, growing at a CAGR of 34.8% during that period[32]. Continuous advancements in quantum algorithms and hardware will drive this growth. Quantum computing will revolutionize industries by solving complex problems that are currently intractable for classical computers. Key developments in quantum hardware, including more stable qubits and error correction techniques, will enhance the reliability and scalability of quantum systems[33]. This will pave the way for broader adoption and integration of quantum solutions in industries such as pharmaceuticals, finance, and logistics. In the pharmaceutical industry, quantum computing is expected to accelerate drug discovery and development by enabling the simulation of molecular interactions on an unprecedented scale. The financial sector will benefit from quantum computing through improved risk modeling, optimization of investment portfolios, and enhanced security measures[34]. In logistics, quantum algorithms will optimize supply chain management and route planning, leading to increased efficiency and cost savings[35]. Additionally, advancements in quantum cryptography will enhance data security, providing protection against cyber threats[36].

Concerns

Despite the optimistic outlook, the quantum computing sector faces several challenges. High research and development costs and the need for specialized expertise can be barriers to rapid advancement and adoption. Regulatory uncertainties and the potential for technological misuse pose significant risks. Additionally, the sector must address issues related to the scalability and stability of quantum systems to ensure their practical applicability. From a wider perspective, the strong link between AI and quantum computing could lead to the latter receiving less attention. The long-term success of quantum computing will depend on overcoming these challenges and demonstrating clear, tangible benefits over classical computing solutions.



Top 5 Holdings	Weight	YTD Return
HITACHI LTD	6.31%	78.31%
TENCENT HOLDINGS LTD	6.06%	26.06%
ALPHABET INC-CL A	5.95%	30.40%
EQUINOR ASA	5.37%	-9.73%
AMAZON.COM INC	5.33%	27.19%

(Data from 29/12/2023 to 28/06/2024; Solactive Quantum Computing Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Cloud Computing

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Look Back: Cloud Computing in 2024

The cloud computing sector has continued to thrive in 2024, driven by increasing adoption across various industries. Major providers like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud have expanded their offerings to include advanced analytics, AI, and machine learning capabilities. The rise of hybrid and multi-cloud strategies has enabled organizations to optimize their cloud investments and enhance resilience. Additionally, edge computing has become more prominent, supporting real-time data processing for applications in autonomous vehicles, smart cities, and industrial automation. However, the sector faces ongoing challenges related to data privacy, security concerns, and regulatory compliance.

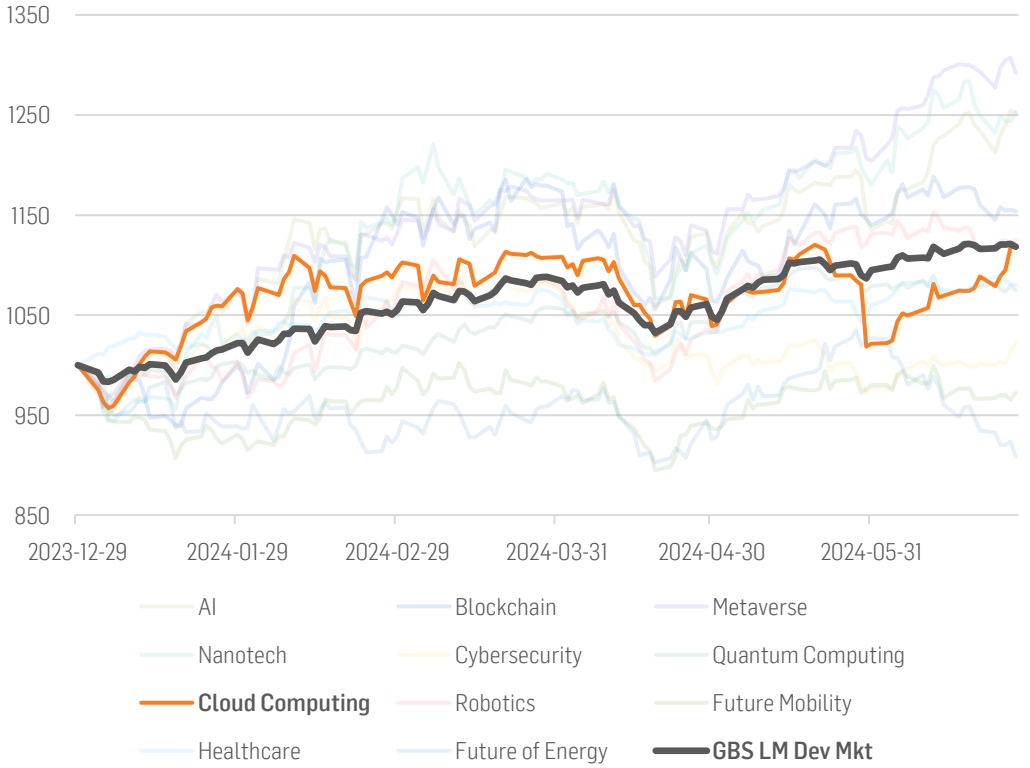
Future Outlook

The cloud computing market is poised for substantial growth, expected to reach $1.44 trillion by 2029, with a CAGR of 16.4% from 2024 to 2029[37]. AI, IoT, and big data analytics will be key drivers of this expansion[38]. Cloud computing will continue to enable digital transformation across industries, providing scalable and cost-effective solutions. Hybrid and multi-cloud strategies will gain prominence, offering flexibility and resilience. Edge computing integration with cloud services will further enhance performance, enabling real-time data processing in sectors like autonomous vehicles and smart cities[39].

Significant investments in cloud infrastructure highlight the sector's robust future. For example, AWS's European Sovereign Cloud initiative, with a projected investment of $8.5 billion by 2040, aims to enhance data residency across Europe[40]. Similarly, Oracle's commitment to invest over $8 billion in Japan's cloud and AI infrastructure underscores the sector's global expansion[41]. The cloud computing market in Asia-Pacific is expected to grow at the fastest rate, driven by rapid digital transformation and increasing investments in cloud technologies. Moreover, cloud-based solutions are set to drive significant advancements in AI, with cloud platforms providing the necessary computational power and scalability for complex AI models[42].

Concerns

Despite the promising outlook, the cloud computing sector faces significant challenges. Data privacy and security concerns remain paramount, necessitating robust data protection measures and clear regulatory frameworks. The environmental impact of large-scale data centers and associated energy consumption requires attention, with sustainable practices and innovations in energy efficiency being crucial for long-term sustainability and growth. Additionally, the sector must address the risks of data breaches and cyber-attacks, particularly in the context of increasing cloud dependency across industries.



Top 5 Holdings	Weight	YTD Return
ORACLE CORP	8.50%	33.93%
ALPHABET INC-CL A	8.42%	30.40%
SAP SE	8.21%	31.83%
MICROSOFT CORP	7.73%	18.86%
INTUIT COM	7.71%	5.15%

(Data from 29/12/2023 to 28/06/2024; Solactive Global Cloud Computing Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Robotics

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Look Back: Robotics in 2024

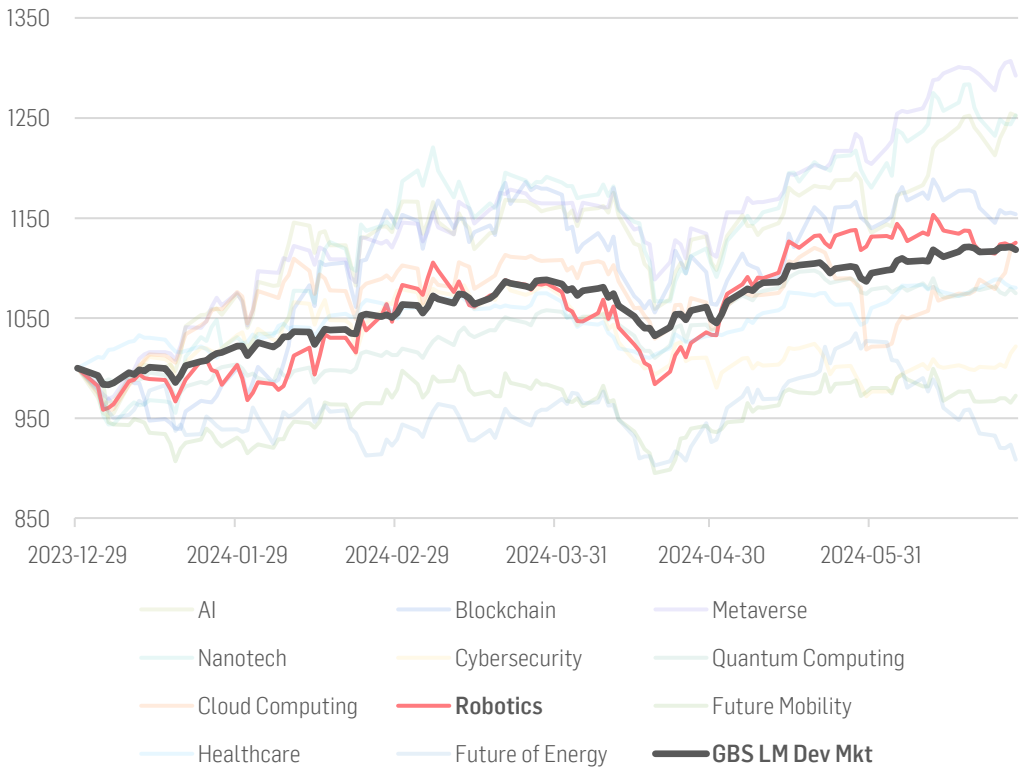
Innovations in automation, AI integration, and machine learning are driving the sector boosting its future potential. Despite operational inefficiencies and market pressures, the sector grew, particularly among companies leveraging advanced AI. Key players like NVIDIA, Intel Corp, AMD, and Keyence provided essential technologies for developing autonomous robots and improving industrial automation. NVIDIA's Isaac platform supports companies like Teradyne in integrating AI into automation solutions. Intel's processors enhance computational power, AMD offers high-performance computing, and Keyence provides precision tools like digital microscopes and laser trackers. These contributions are advancing manufacturing, healthcare, and logistics

Future Outlook

The robotics sector is anticipated to grow significantly, driven by advancements in AI and machine learning, with the global robotics market expected to grow at a compound annual growth rate (CAGR) of 12% to 19%[43][44][45]. In healthcare, surgical robots are projected to become more precise and less invasive, improving patient outcomes and reducing recovery times. This market alone is expected to see significant investment, with surgical robotics anticipated to grow at a CAGR of around 16%, reaching $30 billion by 2030[46]. In manufacturing, collaborative robots (cobots) are expected to drive efficiency, with cobots projected to account for 34% of the industrial robotics market by 2030[47]. The logistics sector is also set to benefit, with the deployment of robotics enhancing inventory management and order fulfillment. The logistics robotics market is projected to grow at a CAGR of 16.7%, reaching up to $21 billion by 2029[48]. A significant emerging use case for robotics is in public safety and security. Advanced robotics equipped with AI for surveillance, monitoring, and disaster response are expected to see increased adoption, with the market for security robots projected to grow at a CAGR of 13.6%, surpassing $30 billion by 2030[49].

Concerns

Challenges include high development costs, job displacement due to automation, regulatory uncertainty, and potential cybersecurity vulnerabilities. Ensuring ethical development and deployment of robotics technologies is essential for public trust and sector growth. Furthermore, there are concerns about the safety and reliability of robots, particularly in healthcare and critical infrastructure, which necessitates stringent regulatory oversight and continuous technological improvements.



Top 5 Holdings	Weight	YTD Return
NVIDIA CORP	4.44%	149.47%
TERADYNE INC	3.93%	36.65%
C3AI INC	3.84%	0.87%
KAWASAKI HEAVY INDUSTRIES ORD	3.82%	69.67%
INTUITIVE SURGICAL INC	3.72%	31.86%

(Data from 29/12/2023 to 28/06/2024; Solactive Robotics & AI EUR Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Future Mobility Leaders

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Look Back: Future Mobility Leaders in 2024

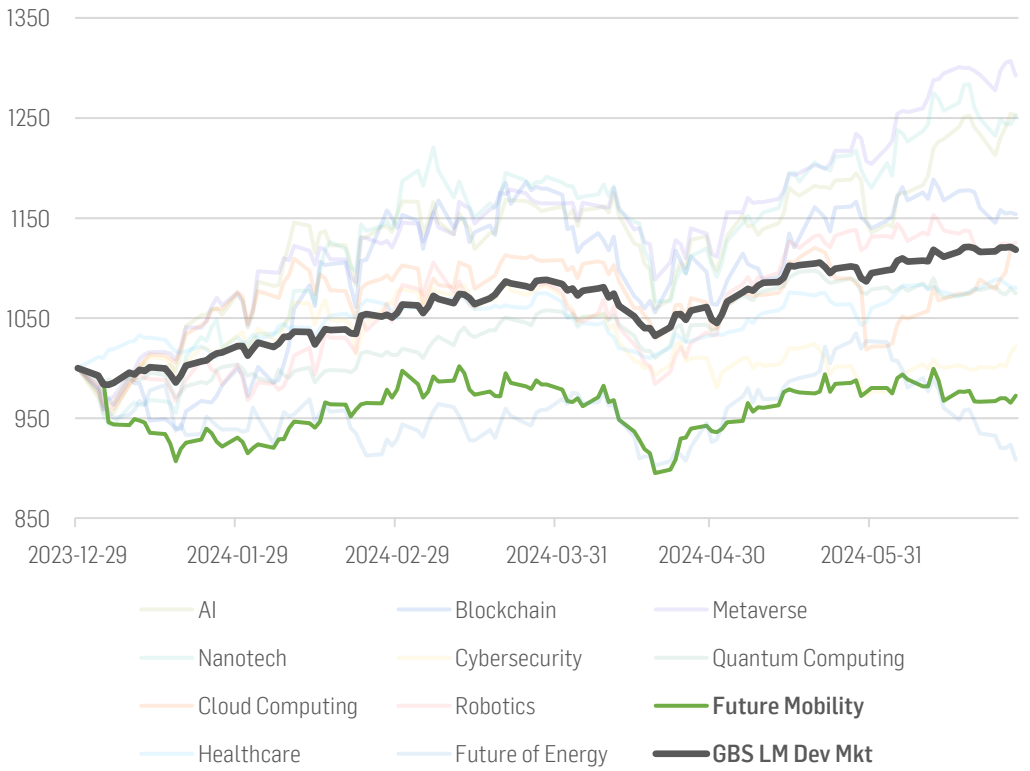
Companies involved in the innovation of the mobility sector have experienced opposite trends from business and technological perspectives: while advancements in electric vehicles (EVs) and autonomous driving technologies have gathered attention to the sector, several companies faced substantial challenges. UBER Technologies, Infineon Technologies, and Li Auto struggled with market pressures and operational issues. The sector faced competition from traditional automotive manufacturers and the market skepticism towards autonomous driving vehicles. Despite these setbacks, the sector continued to innovate, with notable contributions from companies like Tesla, Texas Instruments, and Analog Devices, which have been pivotal in driving technological advancements and market growth.

Future Outlook

The electric vehicle (EV) market is expected to reach $3.2 trillion by 2030, growing at a CAGR of 17.3% from 2024 to 2030[50]. Advances in battery technology and charging infrastructure will drive this growth. Solid-state batteries, which offer higher energy density and faster charging times, are expected to become commercially viable, further boosting EV adoption. Autonomous driving technology will also play a significant role in shaping the future of mobility. The market for autonomous vehicles is projected to reach $114.5 billion by 2030, growing at a CAGR of 22.8%[51]. Companies are making strides in developing self-driving cars, which promise to revolutionize transportation by enhancing safety, reducing traffic congestion, and lowering emissions. Furthermore, advancements in smart city infrastructure will support the growth of the mobility sector. Improved urban planning and the development of intelligent transportation systems will facilitate better traffic management and public transportation solutions, enhancing overall mobility and reducing environmental impact[52]. Shared mobility services, such as ride-hailing and car-sharing, are also expected to grow, with the market projected to reach $675.4 billion by 2030, growing at a CAGR of 14.8%[53].

Concerns

Despite the optimistic outlook, the evolution of mobility faces several challenges. High development and manufacturing costs for EVs and autonomous vehicles hinder widespread adoption. Regulatory uncertainties, particularly around autonomous driving, impact innovation and market acceptance. Additionally, the sector must address cybersecurity issues, as connected vehicles are vulnerable to cyber-attacks. Ensuring ethical development and deployment while maintaining public trust and safety is crucial for sustained growth. The environmental impact of battery production and disposal needs addressing through advancements in recycling technologies and sustainable raw material sourcing.



Top 5 Holdings	Weight	YTD Return
TESLA INC	11.61%	-20.36%
ANALOG DEVICES INC	11.55%	14.96%
TEXAS INSTRUMENTS INC	11.28%	14.12%
UBER TECHNOLOGIES INC	9.35%	18.04%
NXP SEMICONDUCTOR NV	7.30%	17.16%

(Data from 29/12/2023 to 28/06/2024; Solactive Future Mobility Leaders EUR Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Healthcare

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Look Back: Healthcare in 2024

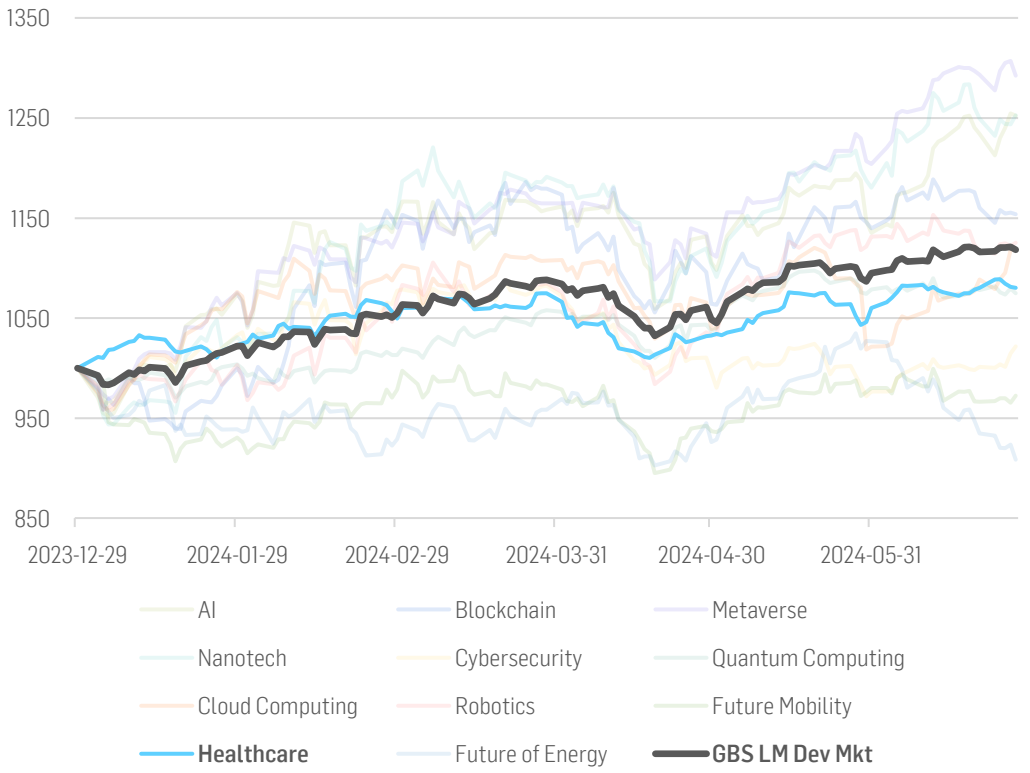
The sector has generated a steady return stream during the first half of 2024. The healthcare sector is one of the most affected by automation and digitalization. In 2024 the pharmaceutical and biomedical sector has seen significant progress in mRNA vaccine technology, expanding its application beyond COVID-19 to other infectious diseases and cancers. Additionally, advancements in gene editing, particularly CRISPR, have led to promising developments in treating genetic disorders and rare diseases. The sector also witnessed breakthroughs in personalized medicine, with AI-driven drug discovery and early disease detection and development enhancing the efficiency and accuracy of new treatments. Furthermore, innovations in telemedicine and digital health technologies have improved patient access to care and remote monitoring capabilities.

Future Outlook

The integration of AI will stay the main driver of healthcare advancements. This process will keep transforming the sector by enhancing diagnostics, treatment personalization, and operational efficiency. AI-driven tools will be increasingly used for early disease detection through advanced imaging and predictive analytics, while personalized medicine benefits from AI's ability to analyze large datasets and identify optimal treatment plans for individual patients. The vaccine sector is also evolving, with AI optimizing vaccine development processes and expanding mRNA vaccine applications[54]. Future drivers of growth in healthcare include continued advancements in AI and machine learning, increased adoption of telemedicine, and the expansion of digital health technologies[55]. By 2030, the global healthcare AI market is projected to reach $187.7 billion, driven by these technological innovations and the growing demand for efficient, cost-effective healthcare solutions[54]. As data interoperability and regulatory frameworks improve, the healthcare sector is poised for significant advancements, ultimately enhancing patient outcomes and accessibility[54].

Concerns

Issues of affordability, access, and privacy will be the main challenges. The rapid advancement of expensive technologies may exacerbate healthcare disparities, making cutting-edge treatments inaccessible to lower-income populations. Additionally, the ethical implications of genetic editing and data privacy are significant, as the potential for misuse of genetic information and AI algorithms raises questions about consent, discrimination, and security[56][57][58]. Ensuring that economic and technological progress in healthcare is equitably distributed and ethically managed will be crucial for the sector's sustainable development.



Top 5 Holdings	Weight	YTD Return
ELI LILLY & CO	9.67%	55,32%
UNITEDHEALTH GROUP INC	5.97%	-3.27%
NOVO NORDISK A/S	5.79%	44.05%
JOHNSON & JOHNSON	4.45%	-6.75%
MERCK & CO. INC.	3.97%	13.56%

(Data from 29/12/2023 to 28/06/2024; Solactive Developed Markets Healthcare 150 Index, Solactive GBS Developed Markets Large & Mid Cap Index)

Future of Energy

SOLACTIVE
German Index Engineering

Look Back: Energy in 2024

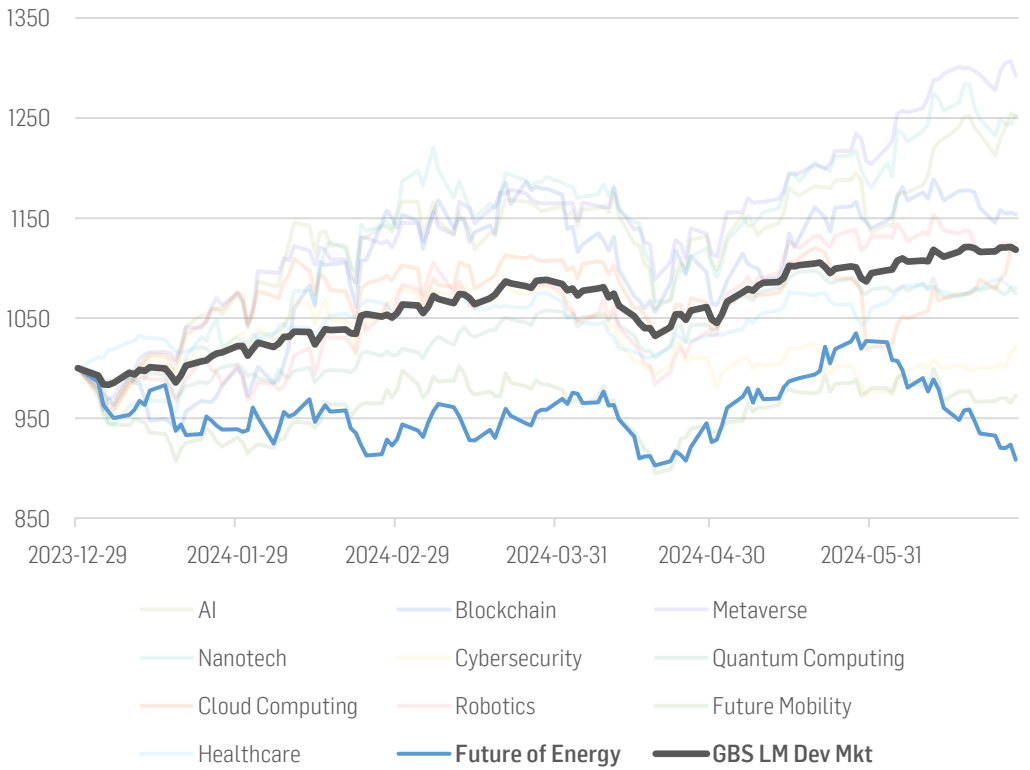
Higher interest rates have increased financing costs, particularly burdening the development of capital-intensive renewable energy projects. These financial pressures have slowed down some renewable initiatives, making it harder for especially wind and solar projects to scale up. Solar energy has experienced policy fluctuations, supply chain disruptions, and raw material shortages due to ongoing geopolitical tensions, although technological advancements in photovoltaic and energy storage solutions have continued. Despite the potential for substantial decarbonization, hydrogen energy development has been hindered by high production costs and slow infrastructure expansion. Nuclear energy has witnessed renewed interest, driven by innovations in small modular reactors (SMRs) and fusion technology, despite ongoing challenges related to safety, waste management and public perception.

Future Outlook: Energy

Despite market and economic difficulties, the increasing need for energy supply and COP28 goals will lead to significant growth in the renewable energy market. The hydrogen market size is expected to grow significantly, projected to reach $410.6 billion by 2030 from $242.7 billion in 2023[59]. Technological advancements in hydrogen production, such as electrolysis and fuel cells, will lower costs and improve efficiency. Governments and the private sector are recognizing hydrogen's potential in decarbonizing industries, transportation, and power generation[60]. Regarding the solar energy sector, government policies and incentives aimed at reducing carbon footprints will drive solar energy adoption, with declining installation costs making it a competitive option for residential and commercial consumers[61]. The nuclear energy sector is also expected to experience significant growth: SMR technology will offer a safer, more flexible, and cost-effective alternative to large-scale reactors. Continued investments in R&D will enhance reactor efficiency and safety, with the evolution of public perception playing a crucial role in the acceptance of this energy source.

Concerns

The hydrogen, solar, and nuclear energy sectors face high initial investment costs, infrastructure development needs, and regulatory uncertainties. Technological challenges related to efficiency, storage, and distribution must be addressed. For hydrogen, the high energy consumption of production processes remains a concern. Solar energy must navigate policy fluctuations and geopolitical tensions affecting supply chains. Nuclear energy continues to grapple with safety, waste management, and public perception issues. Ensuring the sustainable and ethical development of these energy solutions will be crucial for long-term success.



Top 5 Holdings	Weight	YTD Return
FIRST SOLAR INC	4.42%	30.87%
CAMECO CORP	4.03%	13.52%
ENPHASE ENERGY INC	3.10%	-24.54%
ORSTED A/S	2.45%	-0.99%
NEXGEN ENERGY LTD	2.08%	-0.29%

(Data from 29/12/2023 to 28/06/2024; Average between Solactive Global Uranium & Nuclear Components Total Return v2 Index & Solactive Future Energy ESG Index & Solactive Hydrogen Economy Index & Solactive Solar Index, Solactive GBS Developed Markets Large & Mid Cap Index)

References

[1]: M. Webb, "30+ Key ChatGPT Statistics 2024 – Trends, Usage, Predictions". Techopedia, 2023. [Online]. Available: https://www.techopedia.com/chatgpt-statistics

[2]: Intel, [Online]. "Neuromorphic Computing and Engineering with AI". Available: https://www.intel.com/content/www/us/en/research/neuromorphic-computing.htm.html

[3]: A. Patazi, S. Wozniak, "What Is Neuromorphic Computing?". IBM, 2022. [Online]. Available: https://research.ibm.com/projects/neuromorphic-computing

[4]: K. Haan, "How Businesses Are Using Artificial Intelligence In 2024". Forbes Advisor, 2023. [Online]. Available: https://www.forbes.com/advisor/business/software/ai-in-business/

[5]: I. Gregg, "The Future Of Work: Embracing AI's Job Creation Potential". Forbes, 2024. [Online]. Available: https://www.forbes.com/sites/forbestechcouncil/2024/03/12/the-future-of-work-embracing-ais-job-creation-potential/

[6]: B. Stratton, "AI Industry Growth Statistics: Exploring Key Metrics Driving Growth of AI". Blue Tree Digital, 2024. [Online]. Available: https://bluetree.digital/ai-industry-growth-metrics/

[7]: Grand View Research, "Artificial Intelligence Market Size, Share, Growth Report 2030". 2023.

[8]: J. Manyika, S. Lund, M. Chui, J. Bughin, L. Woetzel, R. Ko, S. Sanghvi, "What the future of work will mean for jobs, skills, and wages". McKinsey & Company, 2024. [Online]. Available: https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages

[9]: S. Gandel, "How is blockchain changing financial services?". Financial Times, 2023. [Online]. Available: https://www.ft.com/content/d0447dcd-9aa5-4f71-9919-5061e77772d5

[10]: S. Wu, "Bridging The Gap Between Traditional And Decentralized Finance". Forbes, 2020. [Online]. Available: https://www.forbes.com/sites/forbestechcouncil/2020/08/31/bridging-the-gap-between-traditional-and-decentralized-finance/

[11]: H. Wendy, R. Kathawate, E. Chen, J. Choulter, "Using Blockchain to Drive Supply Chain Transparency and Innovation". Deloitte, 2023. [Online]. Available: https://www2.deloitte.com/us/en/pages/operations/articles/blockchain-supply-chain-innovation.html

[12]:. K. Alicke, A. Davies, M. Leopoldseder, A. Niemeyer, "Blockchain technology for supply chains—A must or a maybe?". McKinsey & Company, 2017. [Online]. Available: https://www.mckinsey.com/capabilities/operations/our-insights/blockchain-technology-for-supply-chainsa-must-or-a-maybe#/

[13]: Terra, "Ecosystem". 2024. [Online]. Available: https://www.terra.money/ecosystem

[14]: M.Wendl, M.H. Doan, R. Sassen, "The environmental impact of cryptocurrencies using proof of work and proof of stake consensus algorithms: A systematic review".2023.

[15]: SHIVANGI, "Proof-of-Stake Vs Proof-of-Work for Sustainable DeFi Environment". Root Quotient, 2023. [Online]. Available: https://www.rootquotient.com/blog/comparing-pos-and-pow-for-sustainable-defi-environment/

[16]: Precedence Research, "Metaverse Market Size to Hit USD 2,369.70 Billion by 2033". 2023.

[17]: Grand View Research, "Virtual Reality In Gaming Market To Reach $109.59 Billion By 2030". 2023.

References

[18]: T. Parler, "Data Privacy and Security in the Metaverse". 2023.

[19]: M. Ghafourian, B. Sumer, R. Vera-Rodriguez, J. Fierrez, R. Tolosana, A. Moralez, E. Kindt "Combining Blockchain and Biometrics: A Survey on Technical Aspects and a First Legal Analysis". 2023.

[20]: V. Bentotahewa, S. Khattak, C. Hewage, S.S. Sengar, P. Jenkins, "Privacy and Security Landscape of Metaverse". 2024.

[21]: C. Li, F. Lalani, "How to address digital safety in the metaverse". World Economic Forum, 2024. [Online]. Available: https://www.weforum.org/agenda/2022/01/metaverse-risks-challenges-digital-safety/

[22]: Grand View Research, "Nanotechnology Market Size, Share & Trends Analysis Report". 2022.

[23]: Fortune Business Insights, "Nanotechnology Market Size, Share & Industry Analysis". 2024.

[24]: Allied Market Research, "Nanotechnology Market Size, Share, Competitive Landscape and Trend Analysis Report". 2021.

[25]: Spherical Insights, "Global Nanotechnology Market Insights Forecasts to 2032". 2023.

[26]: BCC Research, "Global Nanotechnology Market". 2022.

[27]: Growth Market Reports, "Nanotechnology Market Size, Share & Growth | Forecast [2031]". 2022.

[28]: Grand View Research, "Cyber Security Market Size, Share & Trends Report, 2030". 2023.

[29]: Fortune Business Insights, "Cybersecurity Market Size, Share, Analysis | Global Report 2032". 2024.

[30]: Strategic Market Research, "Cyber Security Market Size 2030 | Technology & Service Industry". 2021.

[31]: S. Morgan, "Cybercrime To Cost The World $10.5 Trillion Annually By 2025". Cybersecurity Ventures, 2023. [Online]. Available: https://cybersecurityventures.com/cybercrime-damage-costs-10-trillion-by-2025/

[32]: Fortune Business Insights, "Quantum Computing Market Size, Value | Growth Analysis [2032]". 2023.

[33]: M. Jarvis, “Clearing the way toward robust quantum computing”. Massachusetts Institute of Technology, 2021 [Online]. Available: https://news.mit.edu/2021/clearing-way-toward-robust-quantum-computing-0616

[34]: D. Herman, C. Googin, X. Liu, Y. Sun, A. Galda, I. Safro, M. Pistoia, Y. Alexeev, "Quantum Computing for Finance". 2023.

[35]: IBM, [Online], "Exploring quantum computing use cases for logistics". Available: https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/quantum-logistics

[36]: IBM, [Online], "What Is Quantum Cryptography?". Available: https://www.ibm.com/topics/quantum-cryptography#:~:text=Quantum%20cryptography%20is%20cybersecurity%20methods%20for%20encrypting%20and,naturally%20occurring%20and%20immutable%20laws%20of%20quantum%20mechanics.

References

[37]: Mordor Intelligence, "Cloud Computing Market Size & Share Analysis - Growth Trends". 2023.

[38]: R. Morkos, "Powering The Growth Of Cloud Computing: Infrastructure Challenges And Solutions". Forbes, 2023. [Online]. Available: https://www.forbes.com/sites/forbestechcouncil/2023/07/24/powering-the-growth-of-cloud-computing-infrastructure-challenges-and-solutions/

[39]: D. Newman, "Using Hybrid Cloud To Meet The Challenges Of Modernizing Data Architectures". Forbes, 2023. [Online]. Available: https://www.forbes.com/sites/danielnewman/2023/01/27/using-hybrid-cloud-to-meet-the-challenges-of-modernizing-data-architectures/

[40]: A. Jackson, "AWS Announces €7.8bn European Sovereign Cloud Investment". Technology Magazine, 2024. [Online]. Available: https://technologymagazine.com/cloud-computing/aws-announces-7-8bn-european-sovereign-cloud-investment

[41]: Oracle, [Online] "Oracle to Invest More Than $8 Billion in Cloud Computing and AI in Japan". Available: https://www.oracle.com/news/announcement/oracle-to-invest-more-than-eight-billion-in-cloud-computing-and-ai-in-japan-2024-04-17/?source=:so:tw:or:awr:ocorp:::&SC=:so:tw:or:awr:ocorp:::&pcode=#:~:text=Oracle%20Corporation%20Japan%20today%20announced%20that%20it%20plans,grow%20Oracle%20Cloud%20Infrastructure%E2%80%99s%20%28OCI%29%20footprint%20across%20Japan.

[42]: S. Schlesinger, "Unlocking Business Success in 2023 and Beyond: The Power of Cloud and Generative AI". Cloud Data Insights, 2023. [Online]. Available: https://www.clouddatainsights.com/unlocking-business-success-in-2023-and-beyond-the-power-of-cloud-and-generative-ai/

[43]: Mordor Intelligence, "Robotics Market Size & Growth Forecast, 2024-2029". 2024.

[44]: Grand View Research, "Industrial Robotics Market Size, Share & Trends Analysis Report By Type (Articulated, Cartesian, SCARA, Cylindrical), By Application (Handling, Assembling & Disassembling), By End-use, By Region, And Segment Forecasts, 2023 - 2030". 2023.

[45]: Future Market Insights, "Robotics Market Outlook". 2023.

[46]: Mordor Intelligence, "Healthcare Robotics Market - Growth, Trends, COVID-19 Impact, and Forecasts (2023 - 2030)". 2023.

[47]: Market.us, "Global Collaborative Robots Market By Payload Capacity (Up to 5kg, Up to 10kg, Above 10kg), By Application (Assembly, Handling, Pick & Place, Quality Testing, Packaging, Gluing & Welding, Other Applications), By End-Use Industry (Food & Beverage, Automotive, Plastic & Polymers, Furniture & Equipment, Electronics, Metal & Machinery, Pharmaceutical, Other End-Use Industries), By Region and Companies - Industry Segment Outlook, Market Assessment, Competition Scenario, Trends and Forecast 2024-2033". 2024.

[48]: Fortune Business Insights, " Logistics Robots Market Size, Share & Industry Analysis, By Type (Automated Guided Vehicles, Autonomous Mobile Robots, Robot Arms, Others), By Application (Palletizing & De-palletizing, Pick & Place, Transportation, Others (Shipment & Delivery)), By Industry (E-commerce, Healthcare, Retail, Food & Beverages, Automotive, Others (Consumer Electronics)), and Regional Forecast, 2022-2029Source: https://www.fortunebusinessinsights.com/logistics-robots-market-102923)". 2024.

[49]: Mordor Intelligence, "Security Robots Market Size & Share Analysis - Growth Trends & Forecasts (2024 - 2029)". 2024.

References

[50]: Mordor Intelligence, “Electric Vehicles Market SIZE & SHARE ANALYSIS - GROWTH TRENDS & FORECASTS UP TO 2030”. 2024.

[51]: Mordor Intelligence. “Autonomous Vehicle Market Size & Share Analysis”. 2024.

[52]: R. Boin, T. Möllner, V. Pokotilo, A. Ricotti, N. Sandri, “Infrastructure technologies: Challenges and solutions for smart mobility in urban areas”. McKinsey & Company, 2023. [Online]. Available: https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/infrastructure-technologies-challenges-and-solutions-for-smart-mobility-in-urban-areas

[53]: Grand View Research, “Shared Mobility Market Growth & Trends”. 2022.

[54]: Grand View Research, “AI In Healthcare Market Size To Reach $187.7Bn By 2030”. 2024.

[55]: GMI Research, “AI Healthcare Market Size, Share & Industry Forecast Report 2030”. 2024.

[56]: B. Murdoch, "Privacy and artificial intelligence: challenges for protecting health information in a new era". BMC Medical Ethics, 2021.

[57]: G. Karimian, E. Petelos, S. M. A. A. Evers, "The ethical issues flexibility the application of artificial intelligence in healthcare: a systematic scoping review". 2022.

[58]: I. Bartoletti, "AI in Healthcare: Ethical and Privacy Challenges". 2019.

[59]: Research and Markets. "Global Hydrogen Market Poised for Remarkable Growth, Predicted to Reach $410.6 Billion by 2030". 2023.

[60]: B.S. Zainal, P.J. Ker, H. Mohamed, H. C. Ong, I. M. R. Fattah, S. M. A. Rahman, L. D. Nghiem, T. M. I. Mahlia, "Recent advancement and assessment of green hydrogen production technologies". 2024.

[61]: EPA, 2023. [Online] . "EPA Launches $7 Billion Competition to Bring Low-Cost Solar Energy to More Hard-Working American Families". Available: https://www.whitehouse.gov/cleanenergy/clean-energy-updates/2023/06/28/epa-launches-7-billion-competition-to-bring-low-cost-solar-energy-to-more-hard-working-american-families/

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