

S&P Kensho New Economies Quarterly Commentary

The S&P Kensho New Economy Indices seek to track the industries and innovation of the Fourth Industrial Revolution

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TOP THREE FROM ACROSS THE NEW ECONOMIES

[Drones \(11.5%\)](#): 2022 kicked off with a challenging start for technology and innovation stocks under pressure from inflation, rising rates and concerns over a potential recession. The outbreak of the Russia-Ukraine conflict on Feb. 24, 2022, significantly affected the global economy. Drones, one of the underperforming subsectors in the previous quarter, took off with accelerated demand for U.S. unmanned aircrafts from the battlefield. Within the first three days of the conflict, this subsector gained 14.1%. In mid-March, the U.S. government announced USD 800 million in military support to Ukraine, including 100 Switchblade drones, further fueling the subsector's performance. AeroVironment, the manufacturer of Switchblade Drones, and airborne electronic systems providers such as Elbit Systems and Rada Electronic Industries were the other leading contributors to this outperformance.

[Clean Energy \(7.9%\)](#): The Russia-Ukraine war magnified the risk of the world's dependence on fossil fuels, potentially speeding up the transition to alternative energy sources such as solar and wind. On March 8, 2022, U.S. President Biden signed an executive order to ban the import of Russian oil and gas, promptly followed by similar orders from European allies. Clean energy stocks benefited from the rising prices of traditional energy sources—the price of WTI crude oil increased by USD 30.40 per barrel (or 40.2%) during the first quarter. Companhia Paranaense de Energia (Copel), Centrais Elétricas Brasileiras and Enbridge also saw notable gains during this period.

[Space \(3.6%\)](#): Mixed news from various constituent stocks sent the Space subsector Q1 performance on a turbulent ride. On one hand, company-specific events such as the failure of Astra's rocket launch and doubt regarding Virgin Galactic's profitability over its new ticket sale of space tours dragged the space subsector down. On the other hand, the Russia-Ukraine war helped to proliferate the role of satellites and airbornes in modern national defense. Maxar Technologies, which provides high-resolution satellite images over a battlefield, was the largest contributor and the top performer within the Space subsector.

BOTTOM THREE FROM ACROSS THE NEW ECONOMIES

Distributed Ledger (-22.7%): The Distributed Ledger subsector, which primarily covers blockchain technologies, experienced a tough quarter. The biggest underperformer, The9 Ltd, lost more than half of its market value, on the back of their large stock offering announcement. The price of Stronghold Digital Mining dropped 55%, as its Q4 2021 earnings disappointed. BIT Mining also fell about 55%, stemming from operating challenges as Kazakhstan experienced widespread internet blackouts due to social unrest.

Genetic Engineering (-23.7%): Rising volatility and weakening consumer sentiment were headwinds to small-cap performance within the Genetic Engineering subsector. ProQR Therapeutics, a clinical-stage biopharmaceutical company, fell 89% in Q1 after the release of disappointing news around its drug Sepofarsen. The clinical-stage immunotherapy company Gritstone bio dropped by 68% in the quarter, as its mRNA product made no significant progress. Berkeley Lights dropped 61%, affected by its CEO's departure and sales falling below earlier guidance levels.

Autonomous Vehicles (-24.1%): Rising raw material costs threatened automakers' bottom lines, especially those in the electric and autonomous vehicle industries. Only 2 out of 30 constituents within this subsector posted positive returns in Q1. Additionally, rising geopolitical tensions added to the industry woes. TuSimple Holdings Inc. accepted the U.S. government's request to limit access to certain data and adopt a technology control plan under harsh data security scrutiny. Its price dropped by 66% in the quarter. Concerns about potential sanctions and being delisted from U.S. exchanges prompted the tumble of XPeng Inc., whose price decreased 45%. Another underperformer was Ambarella Inc., whose 48% price drop reflected its geopolitical risk and persistent supply chain challenges that undercut revenue and gross profit margins.

COMPOSITE INDEX	QTD	12-MONTH
New Economies Composite (KNEX)	-11.7%	-22.4%
New Economies Select (KNESLX)	-11.7%	-22.9%
S&P Composite 1500®	-4.6%	14.6%
SECTOR INDEX	QTD	12-MONTH
Final Frontiers (KEXPLORE)	3.5%	3.4%
Sustainable Staples (KSTAPLE)	2.9%	-9.4%
Future Security (KSECURE)	0.5%	10.5%
Clean Power (KPOWER)	-0.3%	-20.1%
Intelligent Infrastructure (KINFRA)	-10.1%	-9.0%
Advanced Manufacturing (KMAKE)	-12.3%	-6.7%
Democratized Banking (KFIN)	-14.3%	-25.3%
Smart Transportation (KMOVE)	-15.1%	-22.5%
Future Communication (KCONNECT)	-18.6%	-28.9%
Human Evolution (KEVOLVE)	-21.6%	-33.1%
SUBSECTOR INDEX	QTD	12-MONTH
Drones (KDRONE)	11.5%	3.7%
Clean Energy (KENERGY)	7.9%	0.9%
Space (KMARS)	3.6%	1.4%
Sustainable Farming (KFARM)	2.5%	-12.6%
Cyber Security (KCYBER)	0.4%	21.8%
3D Printing (KDDDP)	0.2%	-27.0%
Smart Grids (KGRIDS)	-6.2%	-7.6%
Cleantech (KCLEAN)	-7.4%	-32.1%
Wearables (KBORG)	-9.3%	-19.6%
Smart Borders (KDMZ)	-9.5%	2.5%
Smart Factories (KFACT)	-11.3%	5.0%
Future Payments (KPAY)	-11.4%	-22.3%
Robotics (KBOTS)	-12.5%	4.8%
Alternative Finance (KALTFIN)	-13.0%	-22.8%
Electric Vehicles (KEV)	-13.2%	-21.4%
Advanced Transport Systems (KATS)	-16.0%	-15.1%
Enterprise Collaboration (KTEAM)	-16.2%	1.3%
Digital Health (KDOC)	-16.7%	-24.2%
Smart Buildings (KHOME)	-17.2%	-19.0%
Digital Communities (KSOCIAL)	-18.1%	-39.7%
Virtual Reality (KVR)	-19.4%	-22.5%
Nanotechnology (KNANO)	-20.3%	-36.1%
Distributed Ledger (KLEDGER)	-22.7%	-55.4%
Genetic Engineering (KDNA)	-23.7%	-36.8%
Autonomous Vehicles (KCARS)	-24.1%	-17.6%

Source: S&P Dow Jones Indices LLC. Data as of March 31, 2022.

Index performance based on total return in USD. Index tickers shown in parentheses. Table is provided for illustrative purposes.

COMMENTARY FROM ACROSS THE NEW ECONOMIES

Drones

While originally designed for military operations, drones have been rapidly adopted to carry out a wide range of non-military tasks such as package delivery, emergency rescue, agricultural management and even future space exploration. The global drones market is expected to grow from the current USD 22.7 billion to USD 102.4 billion by 2030 [\[Link\]](#).

Drones are playing a vital role in the recent Russia-Ukraine conflict:

- The U.S. government has committed 100 Switchblade drones as a part of the recently approved weapons aid package [\[Link\]](#).
- Draganfly's temperature-controlled drones will be used to deliver medical supplies in Ukraine [\[Link\]](#).

In other drone-related news:

- Alphabet's drone service, Wing, celebrated its 200,000 commercial deliveries milestone [\[Link\]](#).
- North Carolina Department of Transportation is conducting trials using drones for incident monitoring and traffic management [\[Link\]](#).
- Phoenix Fire Department has started to utilize drones for mountain rescues and commercial fires [\[Link\]](#).
- The Indian government set aside funds in its national budget to promote drones for agricultural use [\[Link\]](#).

Drones technology update:

- Integrated swarm control technology allows a single operator to control 130 drones [\[Link\]](#).
- NASA is funding concept studies with a focus on drone technology for exploration and space missions [\[Link\]](#).

Clean Energy

- Amid the Russia-Ukraine conflict, the EU is accelerating its adoption of clean energy to alleviate its reliance on the Russian energy supply [\[Link\]](#). In particular, Germany aims to derive 100% of its energy needs from clean sources by 2035 [\[Link\]](#), and become independent from Russian oil by the end of 2022 and natural gas by mid-2024 [\[Link\]](#).
- The U.S. government's 2023 fiscal year budget proposal allocated USD 48.2 billion for the Department of Energy to aid clean energy research and transition [\[Link\]](#). It also revived the "clean energy loan program," issuing a new loan of up to USD 1 billion to help Monolith Nebraska, LLC expand its commercial production of hydrogen and carbon black from gas using methane pyrolysis technology [\[Link\]](#).

Electric Vehicle and Autonomous Vehicle

More than two years since the start of the COVID-19 pandemic, the electric vehicle and autonomous vehicle industries continue to face production issues and global chip shortages. The conflict between Russia and Ukraine has exacerbated these issues further.

- Nickel is a critical raw material for electric vehicle batteries, and Russia supplies around 10% of the current global demand. Concerns about the financial sanctions on Russia have pushed up nickel prices by nearly 250% to around USD 100,000 per ton [\[Link\]](#). Prices of other metals, like aluminum and lithium, have also soared due to supply cuts and rising demand [\[Link\]](#).
- Tesla raised prices for all its vehicle models due to the cost pressures on key raw materials [\[Link\]](#). Another electric automotive maker, Rivian, also increased the price of its quad-motor electric R1T pickups and R1S SUVs by about USD 12,000. Rivian's CEO acknowledged that “sharp increases in the costs of key components were behind the price increases” [\[Link\]](#).

Satellites and Space

- Elon Musk offered SpaceX’s Starlink Satellites to supplement internet services in Ukraine [\[Link\]](#). However, the impact of these satellites is still debated [\[Link\]](#).
- Maxar’s satellites monitor the battlefield in the Russia-Ukraine conflict, releasing high-resolution eye-in-the-sky images in real time [\[Link\]](#).
- NASA successfully launched new weather satellites for the National Oceanic and Atmospheric Administration, which will support weather coverage in the Western Hemisphere and help predict space weather near Earth [\[Link\]](#).

Sustainable Farming

Climate change, poverty and disruptions in the global food supply chain all point to the importance of sustainable farming. As the second of the UN Sustainable Development Goals, it requires a coordinated worldwide effort from various government policies along with farmers’ practices.

- The U.S. Department of Agriculture will invest USD 250 million to encourage innovative fertilizer production methods [\[Link\]](#).
- The Canadian government announced CAD 185 million in funding to help farmers reduce carbon emissions [\[Link\]](#).
- Walmart invested in the vertical farming company Plenty Unlimited Inc., in alignment with their resilient supply and sustainable goals [\[Link\]](#).
- Kenya’s government will collaborate with the WHO to launch tobacco-free farms [\[Link\]](#).

Nanotechnology

Nanotechnology continues to play a pivotal role to considerably improve and even revolutionize many aspects of people’s lives.

- Modern Medicine: According to the recently published article in the journal of Nano-Micro Letters, scientists analyzed the nanotechnology-enabled mRNA vaccines and other medical-related applications of nanotech. There are about 26 nanotechnology-related vaccine candidates in the clinical testing stage, with 60 more in pre-clinical stages of development [\[Link\]](#).
- Devices: Nano batteries can increase charging efficiency and energy density by employing nanomaterials in the electrodes or in the membrane. Carbon nanotubes, lithium titanate oxide nanoparticles and germanium nanowires are some of applications that use this technology currently [\[Link\]](#).

Alternative Finance and Future Payments

- Feasibility studies of a central bank digital currency (CBDC) were conducted in Europe, highlighting the increased interest and activity within this area. CBDCs are digital tokens issued by a central bank. Wholesale CBDCs are similar to holding reserves and are primarily used by financial institutions, while retail CBDCs are used by consumers and businesses [\[Link\]](#). In the three-day trial, Switzerland's central bank integrated wholesale CBDC into the payment system and settled transactions involving five commercial banks [\[Link\]](#).
- Visa rolled out an NFT creator project to encourage small businesses to participate in the digital market [\[Link\]](#). Mark Zuckerberg mentioned at a South by Southwest conference that “Instagram users might be able to mint NFTs” in the near term [\[Link\]](#).
- After Apple Card and Apple Pay, the company is working on an integrated in-house payment processing technology. With the new financial technology and infrastructure, Apple can cut the need for financial partners. This will enable the company to accomplish multiple tasks in house, like “lending risk assessment, fraud analysis, credit checks, and dispute handling, calculating interest, rewards, approving transactions, reporting data to credit bureaus, etc” [\[Link\]](#).

Smart Buildings and Smart Transportation

- A recently released report from Juniper Research expects “Smart building deployments will grow by over 150% in the next four years reaching 115 million in 2026 from 45 million in 2022.” Moreover, these smart building would likely have broader capabilities when partnered with AI and automation. A key element, the sensors used in smart buildings, is expected to grow to USD 1 billion in 2026, with a growth rate of 206% [\[Link\]](#).
- Meticulous Research predicted that the smart transportation market will reach USD 33.62 billion by 2028, a CAGR of 17.5% [\[Link\]](#).

3D Printing

- Desktop Health announced the commercial launch of its high-precision 3D printers for dental use [\[Link\]](#).
- Ford Maverick truck users can now customize and 3D print their accessories through Ford’s open CAD files [\[Link\]](#).

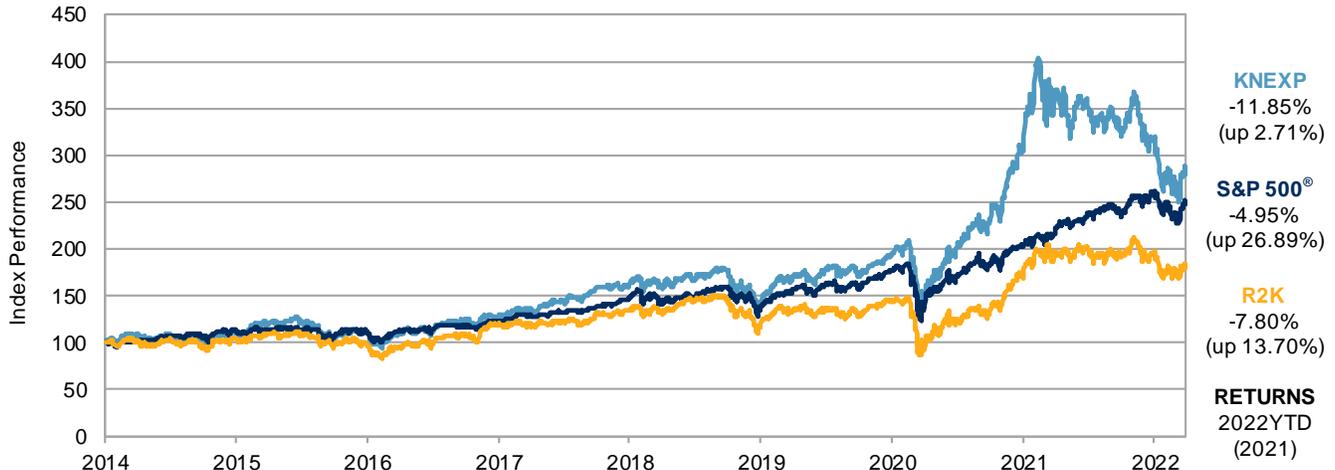
Virtual Reality

- Meta recently added a feature called “personal boundary” to set up a comfort zone in virtual space. The feature is triggered when users come within about four feet of each other to avoid possible harassment [\[Link\]](#).

RELATIVE PERFORMANCE OF THE NEW ECONOMIES COMPOSITE INDEX

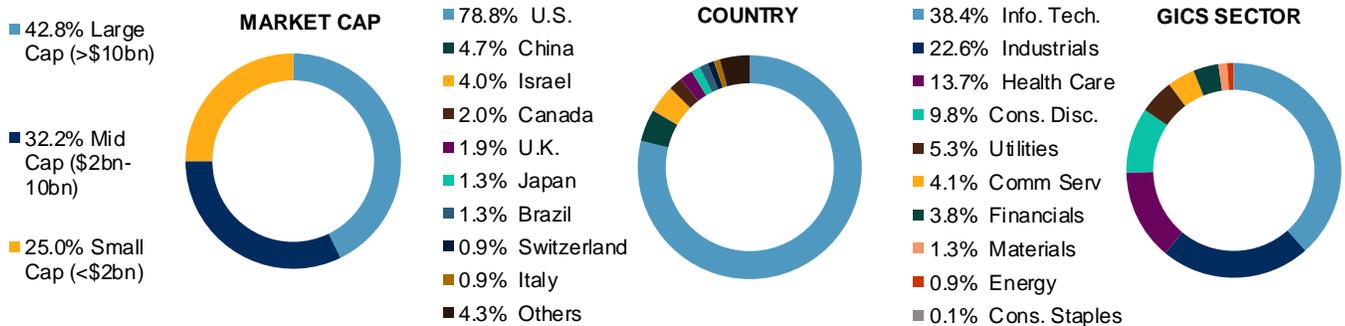
The S&P Kensho New Economies Composite Index (KNEX) is made up of all qualifying New Economy subsectors, the industries driving the Fourth Industrial Revolution, with each weighted according to an algorithmic proxy for industry maturity.

Exhibit 2: Relative Performance of the S&P Kensho New Economies Composite Index



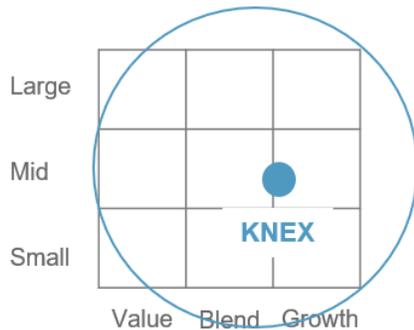
Source: S&P Dow Jones Indices LLC. Data from Jan. 2, 2014, to March 31, 2022. Index performance based on price return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 3: Breakdown of the S&P Kensho New Economies Composite Index



Source: S&P Dow Jones Indices LLC. Data as of March 31, 2022. Charts are provided for illustrative purposes.

Exhibit 4: Style, Fundamentals and Differentiation



FUNDAMENTALS	KNEX	S&P 500	KNEX VS	ACTIVE SHARE (%)
Trailing 12-Month Price to Earnings	17.26	22.09	S&P 500	84.67
Forward 12-Month Price to Earnings	17.60	20.14	Russell 2000	88.26
Price-to-Book Ratio	2.56	4.27	Nasdaq 100	89.52
Price / Cash Flow	11.45	15.96	Morningstar Exp. Tech.	85.32
Estimated 3-5 Year Earnings Per Share Growth (%)	15.60	13.92	S&P 1500	84.31
Historical 3-Year Sales Growth (%)	20.81	20.10	S&P 500 Growth	89.35

Source: S&P Dow Jones Indices LLC. Data as of March 31, 2022. Charts and tables are provided for illustrative purposes.

PERFORMANCE DISCLOSURE/BACK-TESTED DATA

The S&P Kensho New Economies Composite Index was launched February 6, 2017. The S&P Kensho Digital Health Index was launched June 21, 2021. The S&P Kensho Smart Factories Index and S&P Kensho Advanced Manufacturing Index were launched September 16, 2021. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Complete index methodology details are available at www.spglobal.com/spdji. Past performance of the Index is not an indication of future results. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results. Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations. Back-tested performance is for use with institutions only; not for use with retail investors.

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