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Date: February 8, 2023
Topic: Thematic

GLOBAL X ETFs – INFLECTION POINTS

Mind-Bending Breakthroughs

Editor's Note: Inflection Points is a monthly series intended to explore the underlying trends, dynamics and opportunities shaping the thematic investing landscape. Click here to receive future updates via email.

The end of 2022 and start of 2023 may be an innovation bonanza with major breakthroughs in artificial intelligence and clean energy. ChatGPT, while technically opened for public use on November 30, 2022, is an advanced AI algorithm that offers a glimpse of computing's fascinating and possibly frightening future.[1] News of a successful nuclear fusion experiment, where energy produced exceeded that needed to cause the reaction, is a major milestone.[2] To top it all off, the ozone layer is repairing itself.[3] Each of these breakthroughs required decades of work, but they serve as reminders that the innovation economy is alive and well.

Key Takeaways

- Recent advances in ChatGPT, nuclear fusion, and the ozone layer illustrate why innovation should be viewed through short- and long-term lenses as their applications materialize.
- Research shows the pace revolutionary breakthroughs may be slowing, but adoption of many evolutionary innovations is still early and backed by corporate spending.
- Investment themes tied to AI like Robotics & Automation and to clean energy like Lithium & Battery Tech may resonate in the months ahead.

Breakthrough Bonanza

ChatGPT has the world's attention, and we seem to be getting a glimpse of AI's future. Since January 1, Google searches for the chatbot outnumber those for Taylor Swift, and just accessing the software is more difficult given user traffic.[4] ChatGPT is considered a generative AI that uses machine learning. Generative AI is built to create new content, usually in specific mediums such as prose, images, or music.[5] Machine learning is a form of AI that allows an algorithm to learn from existing data patterns rather than receive explicit instructions.

ChatGPT may turn out to be the most impressive chatbot to date. Beyond the program's ability to answer questions, rewrite paragraphs, and write code, perhaps most importantly, ChatGPT is the first AI many people will engage.[6] This engagement can inform ChatGPT'S learning curve and set a tone for AI integration. Recently, researchers subjected ChatGPT to the bar and CPA exams just weeks apart.[7] The software failed both but still performed quite well. What is clearer than ever is that practical and industrial uses for the technology are wide-ranging, from legal to accounting and much more.[8]

The breakthrough in nuclear fusion may prove to be the most important of our time, setting the stage for cheap, renewable, accessible, and safe energy.[9] Fusion works by combining atoms without producing nuclear waste or risk of meltdown, as opposed to fission which separates them.[10] Widespread adoption would reduce the reliance on fossil fuels and lower energy costs at a time when the world increasingly relies on electrification to power the digital revolution.[11]

The improved ozone layer is evidence that the combination of science and policy can overcome major obstacles. Back in the 1980s, it seemed as though the hole in the ozone layer would be catastrophic and prompted discussions of a man-made shield like that from the cult classic *Highlander* film series.[12]

Fast forward 38 years since the ozone's rapid decline over the Antarctica was first identified, and the ozone is likely to heal itself to 1980 levels between 2040 and 2066.[13] The clock did not magically turn back. World leaders signed the Montreal Protocol in 1987 that banned CFC, chemicals largely responsible for breaking down ozone.[14]

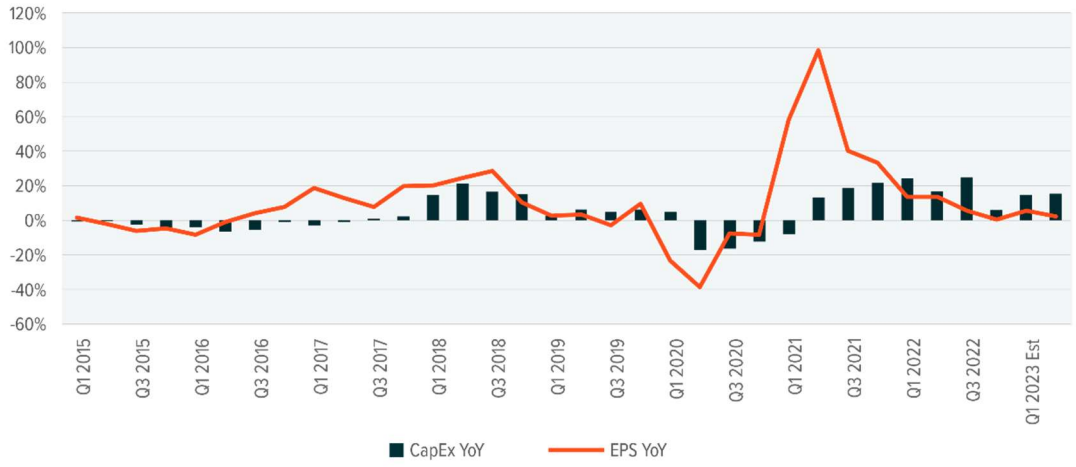
The Differences Between Revolutionary and Evolutionary Advances

Events of early 2023 offer reasons for excitement in future innovations, but research published in January strikes a different chord. The prevalence of disruptive scientific and technological research, defined as rendering prior knowledge obsolete, seems to be declining since the 1950s.[15] More research is produced that seems to incrementally build on prior research than offer radical paradigm shifts.

Of course, not all advances need be disruptive. In the short term, investors may be better off with exposure to evolutionary than revolutionary innovation, especially in an environment of higher interest rates and more disciplined capital allocation. Revolutionary innovation offers the chance of history-changing moonshots but also comes with high costs or rates of failure.[16] Electric vehicles and the electrification of the drive train may well change transportation and energy forever, but the costs to realization are high, including retooling auto plants and installing charging stations.[17] Cost is one reason the transition has taken this long.

Evolutionary innovation tends to be more predictable and is often associated with experimenting on existing processes.[18] With only 1 in 3 factories wholly automating a single process, adoption of existing productivity enhancing technologies remains early.[19] Companies seem to understand the importance of evolutionary improvement and have not cut back on capital expenditure despite the 2022 economic slowdown and 2023 recession forecasts (see chart). Policy moves to onshore technology manufacturing may increase the rate of evolutionary innovation by offering more opportunity to experiment with development and manufacturing processes.

S&P 500 CAPEX OUTPACING EARNINGS GROWTH
Source: Bloomberg as of 1/25/2023.



This discussion raises an important question. Are ChatGPT and nuclear fusion revolutionary or evolutionary advances? The implication is that they are likely revolutionary, though their trajectory is perhaps more evolutionary. Scientists and inventors developed the ideas for AI and clean nuclear energy decades ago. The steps to realization required incremental improvements over time and tremendous persistence.

Investing in a Time of Breakthroughs

There is irony that a series of potentially revolutionary breakthroughs would come on the heels of 2022, widely touted as the end of growth, the dawn of a new value investing age, and a time for risk aversion.[20] Recent breakthroughs could revitalize interest in particular growth themes.

Focus on ChatGPT may spur interest in companies tied to themes such as Artificial Intelligence, Robotics & Automation, and Cloud Computing. AI software providers are an important piece, but hardware providers will prove critical in building capacity to support increased computational demand.[21]

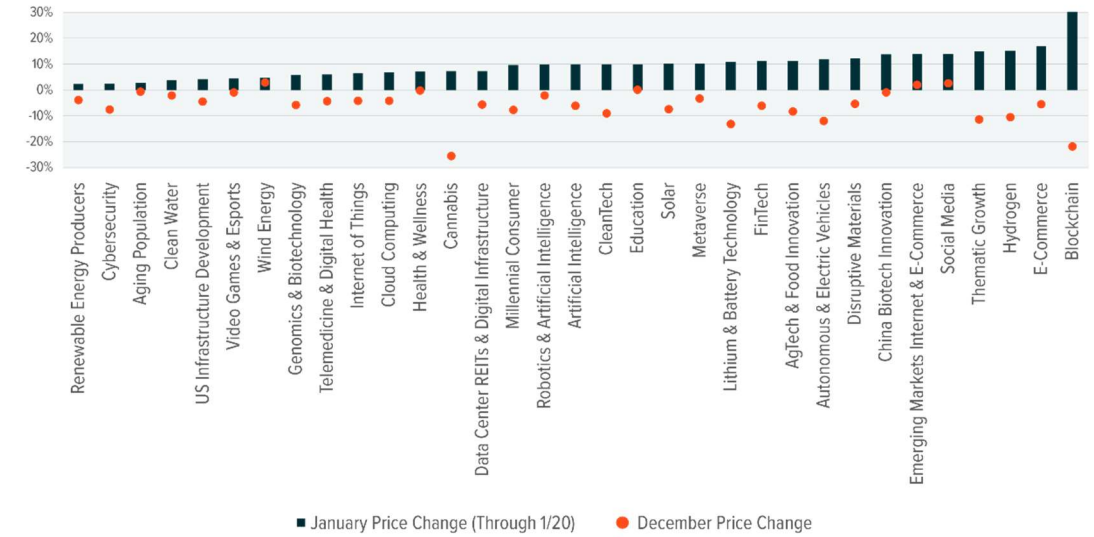
Nuclear fusion likely has an extended development and scaling path ahead, but this breakthrough does reinforce the importance of clean energy.[22] Companies associated with themes such as CleanTech, Lithium & Battery Tech, and a range of alternative generation approaches could be critical in meeting growing energy needs as fusion matures.

And the ozone layer? Get outside for some fresh air, but perhaps keep using sunscreen until 2066. A short on moving to Mars could be another approach.

Inflection Point Theme Dashboard

MONTHLY PRICE CHANGE

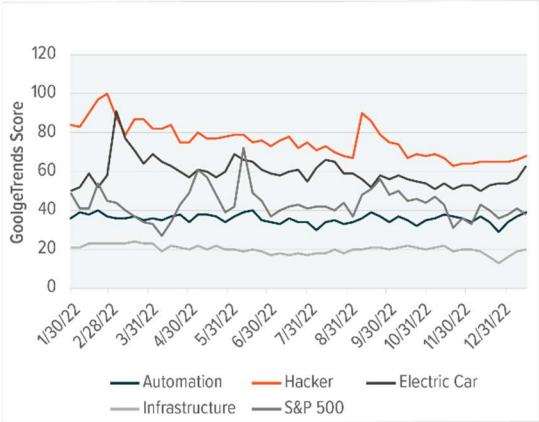
Source: Bloomberg as of 1/20/2023.



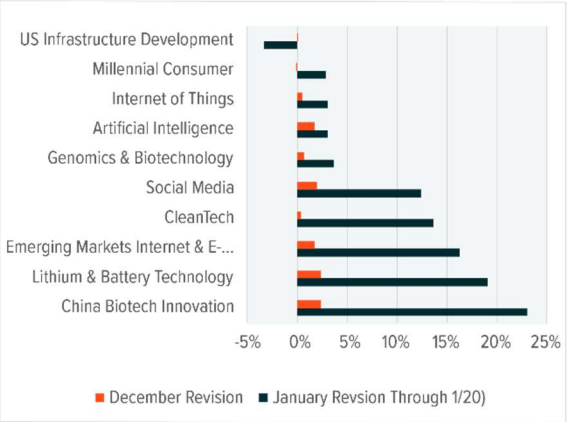
Note: Please refer to endnotes for additional information about indexes used for each theme.

Source: Google as of 1/15/2023 and Bloomberg as of 1/20/2023.

Google Trends Search Data

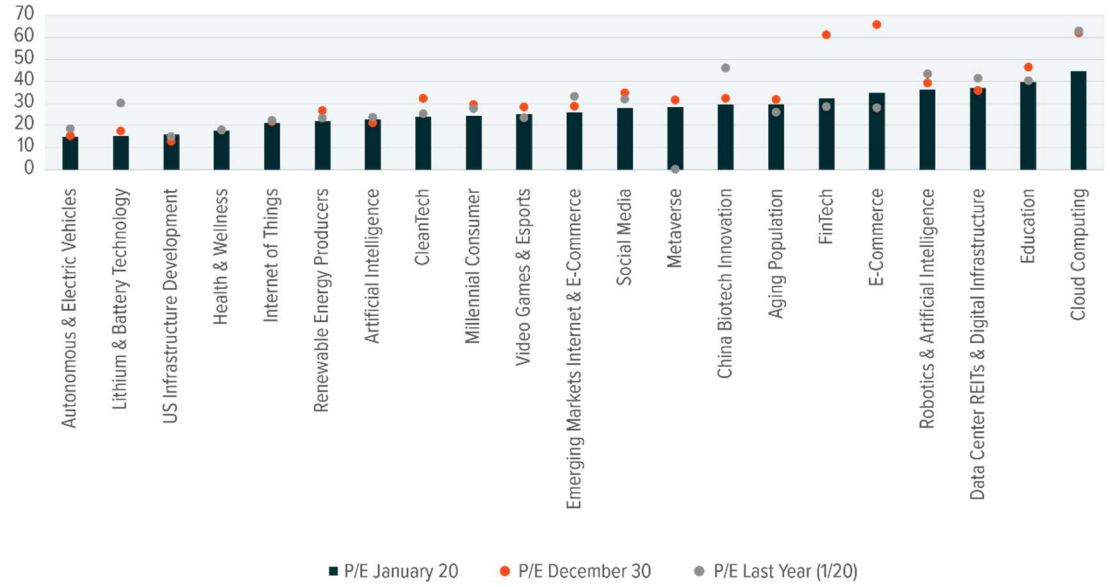


Revenue Revisions – Top and Bottom Five



CHANGES IN FORWARD PRICE-TO-EARNINGS MULTIPLES

Source: Bloomberg as of 1/20/23.



Footnotes

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Theme Dashboard – Reference index for each theme:

Blockchain – Solactive Blockchain Index
Disruptive Materials – Solactive Disruptive Materials Index
Lithium & Battery Technology – Solactive Global Lithium Index.
FinTech – Indxx Global FinTech Thematic Index
Cloud Computing – Indxx Global Cloud Computing Index
Robotics & AI – Indxx Global Robotics & Artificial Intelligence Thematic Index
China Biotech Innovation – Solactive China Biotech Innovation Index
Artificial Intelligence – Indxx Artificial Intelligence & Big Data Index
Cybersecurity – Indxx Cybersecurity Index
Millennial Consumer – Indxx Millennials Thematic Index
E-commerce – Solactive E-commerce Index
Genomics & Biotechnology – Solactive Genomics Index

Data Center REITs & Digital Infrastructure – Solactive Data Center REITs & Digital Infrastructure Index
Social Media – Solactive Social Media Total Return Index
Solar – Solactive Solar Index
Autonomous & Electric Vehicles – Solactive Autonomous & Electric Vehicles Index
Education – Indxx Global Education Thematic Index
Telemedicine & Digital Health – Solactive Telemedicine & Digital Health Index
Hydrogen – Solactive Global Hydrogen Index
Internet of Things – Indxx Global Internet of Things Thematic Index
Emerging Markets Internet – Nasdaq CTA Emerging Markets Internet & E-commerce Net Total Return Index
U.S. Infrastructure Development – Indxx U.S. Infrastructure Development Index
Cannabis – Cannabis Index
CleanTech – Indxx Global CleanTech Index
AgTech & Food Innovation – Solactive AgTech & Food Innovation Index
Health & Wellness – Indxx Global Health & Wellness Thematic Index
Renewable Energy Producers – Indxx Renewable Energy Producers Index
Aging Population – Indxx Aging Population Thematic Index
Metaverse – Global X Metaverse Index
Clean Water – Solactive Global Clean Water Industry Index
Wind Energy – Solactive Wind Energy Index
Video Games & Esports – Solactive Video Games & Esports Index
Green Building - Solactive Green Building Index