Xtrackers by DWS

Xtrackers US National Critical Technologies ETF

Product Overview

Agenda


Xtrackers
by DWS
Setting The Stage
01

Setting The Stage

U.S. Critical Technologies

Xtrackers by DWS

01

The global political landscape is becoming increasingly complex. Nations are vying for influence and alliances; the stakes are higher than ever.

02

The world is no longer exclusively competing for land or resources; the new field of competition is technology.

03

Technology is central to the future of the United States' national security, economy and democracy.[1] In order to maintain their position as a world leader, the United States must focus on accelerating and developing their technological capabilities.

Sources: October 2022, "National Security Strategy". Quotes [1] Financial Times as of October 20, 2023; [2] ABC news as of October 20, 2023.

The importance of leading critical technologies

Examples

Xtrackers by DWS

CYBER

- The scope of the threat from cyber-crime and digital attacks is growing fast.
- The average **cost per data breach** has **increased by 170%** from 2006-2022.[1]

TRUSTED AI

- AI systems are being used with malicious intent.
- An executive at a UK-based energy firm was duped into sending **$243,000** to a Hungarian Bank account by a **fraudster using AI voice** technology.[2]

BIOTECHNOLOGY

- Biotechnology can be **purposely manipulated to cause harm.**
- North Korea is rumored to have assembled an arsenal containing "anthrax, botulism, hemorrhagic fever, plague, smallpox, typhoid, and yellow fever," ready to use in case of attack.[3]

Sources: [1] September 2022, "Average cost per data breach in the United States 2006-2022." [2] September 2019, "A Voice Deepfake Was Used To Scam A CEO Out Of $243,000." [3] November 2018 "Benefits & Risks of Biotechnology."

Our Partners 02

Our Partners

J.H. Whitney Investment Management

J.H. Whitney Overview

J.H. Whitney Investment Management and its affiliates provide index products, proprietary risk-assessment methodologies, and advanced analytics that are designed to assess geopolitical risks to business operations and technology development. They support a wide variety of industries, governmental agencies, and participants in asset management.

J.H. Whitney has three distinct lines of business:

WHITNEY STRATEGIC SERVICES

Line 1 (Consulting Business): Retained advisor to the U.S. Department of Defense.

J.H. WHITNEY INVESTMENT MANAGEMENT, LLC

Line 2 (Principal Investing): Direct investments in early-stage military and civilian technologies.

J.H. WHITNEY DATA SERVICES

Line 3 (Data & Analytics): Provides custom indices and geostrategic risk mitigation analytics.

J.H. Whitney - Research Network

Government

Academia

Commercial Risk Management

Source: J.H. Whitney as of September 2024.

Our Partners

Solactive AG

Solactive AG Overview

SOLACTIVE
German Index Engineering

Solactive is a Germany-based index provider operating globally and growing at a fast pace.

Since 2007, Solactive has been developing tailor-made and multi-asset class index solutions for ETFs and other index-linked investment products at competitive prices. Solactive's collaborative and client-centric approach is what has led them to become one of the market leaders in the indexing industry.

Currently present in Frankfurt, Dresden, Berlin, Amsterdam, Witham (UK), Toronto, and Hong Kong to provide 24/6 coverage. Solactive's ambition is to continue expanding their footprint in order to better serve their clients around the world.

Solactive in Numbers

Source: Solactive as of June 2024.


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Critical Technologies
03

Critical Technologies

America's 14 Critical Technologies

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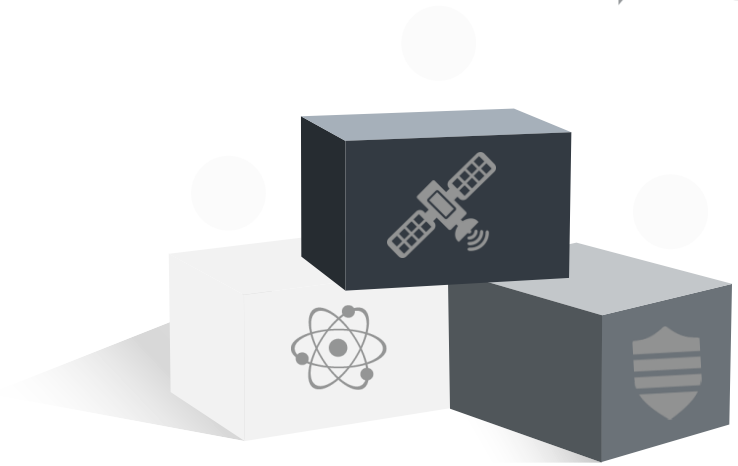
Definition of Critical Technologies

Critical and emerging technologies (CETs) are a subset of advanced technologies that are potentially significant to U.S. national security.[1] The U.S. Department of Defense defines 14 technologies as dual-use, disruptive, emerging, or "critical" to national and economic security. The DoD will seek to accelerate the development and growth of these technologies in order to support and enhance the national security capabilities of the United States.[2]



Emerging Opportunity Areas

- Biotechnology
- Quantum Science
- Advanced Materials
- Future Generation Wireless Technology

Effective Adoption Areas

- Advance Computing & Software
- Space Technology
- Renewable Energy & Storage
- Integrated Networks
- Microelectronics
- Trusted AI
- Human Machine Interfaces

Defense Specific Areas

- Hypersonics
- Directed Energy
- Cyber

Sources: [1] February 2022, "Critical and Emerging Technologies List Update." [2] February 2022, "USD(R&E) Technology Vision for an Era of Competition."

Investment Case 04

Why U.S. Critical Technology?

Shifting Global Dynamics

The world is experiencing a significant shift in global dynamics.

The global economic system, which has long been synonymous with Western technological innovation and Eastern manufacturing is no longer seen as viable model.

Rising geopolitical tensions have led to more protectionism and increasing use of cross-border restrictions on national security grounds. The number of imposed trade restrictions are rapidly increasing.[1]

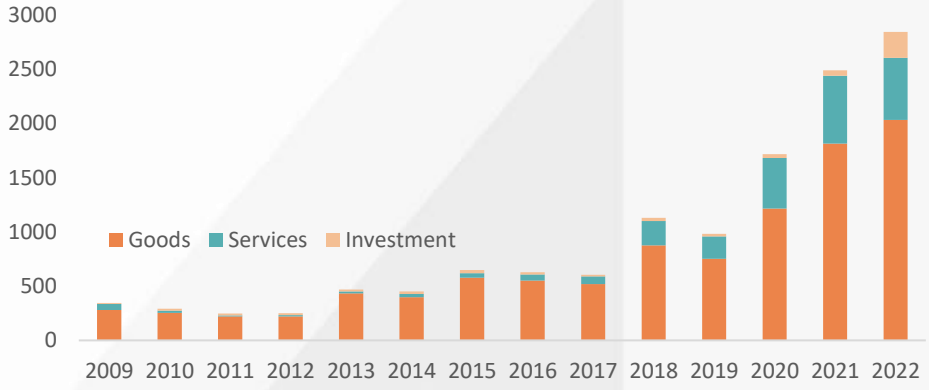


Figure 1: Number of trade restrictions imposed annually worldwide by type, 2009 - 2022

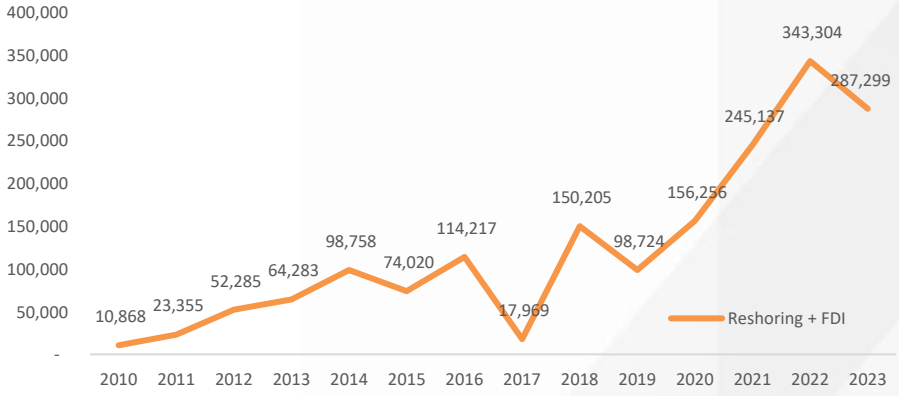


Figure 2: Manufacturing Job Announcements per Year, Reshoring + FDI, 2010 thru 2023

On shoring is becoming the new norm.

In an effort to secure their place as a market leader, the United States is beginning to decouple from adversarial nations and is placing greater emphasis on supply chain security.

Reshoring continues to outpace FDI 62% to 38% - the most extreme rate in recent history - indicating that the country and domestic companies are prioritizing local production.[2]

Sources: [1] June 2023, "THE COSTS OF GEOECONOMIC FRAGMENTATION" [2] July 2024, "Reshoring Initiative 2023 Annual Report".

Why U.S. Critical Technology?

Reasons to consider CRTC

Xtrackers by DWS

Shifting Global Dynamics

Opportunity to Monetize Increased Technology Spending

Bipartisan US Government Priority

Streamlined Approach

Why U.S. Critical Technology?

Bipartisan Government Priority

Xtrackers by DWS

The United States government acknowledges the importance of maintaining their nation's technological advantage and military prowess.

Through both their words and actions, the United States government has signaled to the public that they are dedicated to "continuing to pursue their national security interests in the world."[1]

Particular emphasis has been placed on their technological capabilities which they believe are "central to today's geopolitical competition and to the future of their national security, economy and democracy"[1]

Sources: [1] October 2022, "National Security Strategy." Photo: www.unsplash.com.

Why U.S. Critical Technology?

Opportunity to Monetize Increased Technology Spending

Companies aligned with America's critical technologies are well positioned to capture the upside of increased federal technology spending.

For 2025, the Department of Defense (DoD) has requested a budget of $849.8 billion.[1] Of the requested budget, a significant portion is intended to be allocated to technology-based use cases. Some of which include:

- Microelectronics: $2.5b[1]
- Space Technology: $33.7b[1]
- Cyberspace activities: $14.5b[1]
- Hypersonics: $1.6b[1]

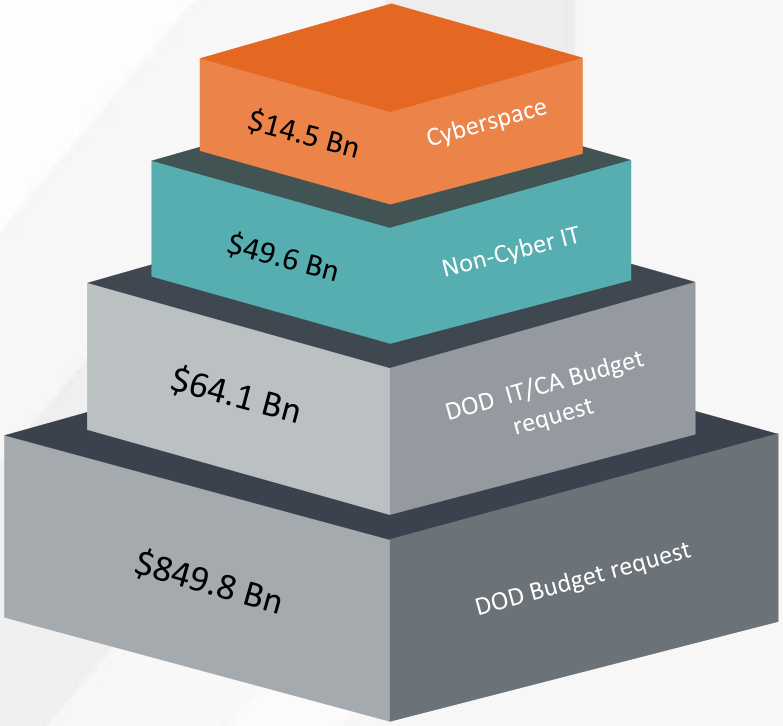


Figure 2: IT/CA Budget as Related to the Overall DoD Budget (US$ Billion)[4]

Sources: [1] March 2024, "FY2025 Budget Request Overview Book [2] March 2024, "Department of Defense Information Technology and Cyberspace Activities Budget Overview."

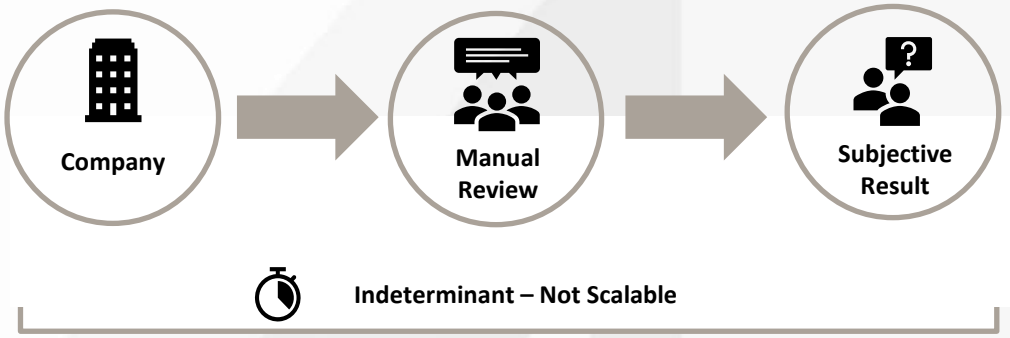
Why U.S. Critical Technology?

Taking A Streamlined Approach

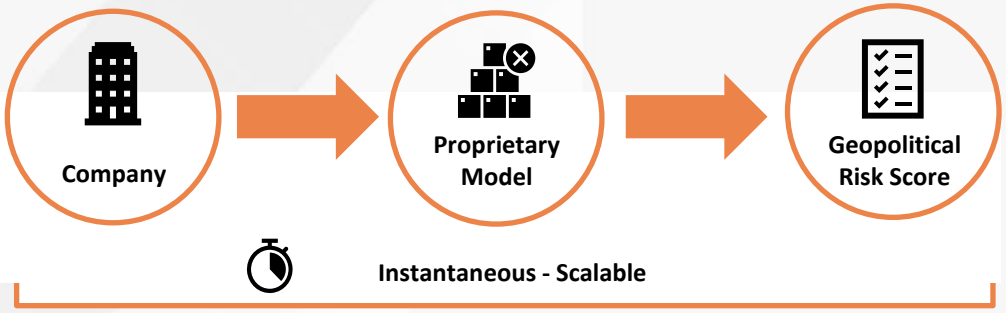
Whitney's geostrategic risk rating (GRR) provides investors with a formalized approach to quantifying geopolitical risk within their portfolio.

Historically speaking, quantifying geopolitical risk, in the context of an investment portfolio, has been incredibly difficult, inconsistent, subjective, and manual. J.H. Whitney takes the ambiguity out of quantifying geopolitical risk by employing a proprietary multifactor model that achieves a high level of data attribution and transparency by utilizing data drawn primarily from company public disclosure documents.[1]

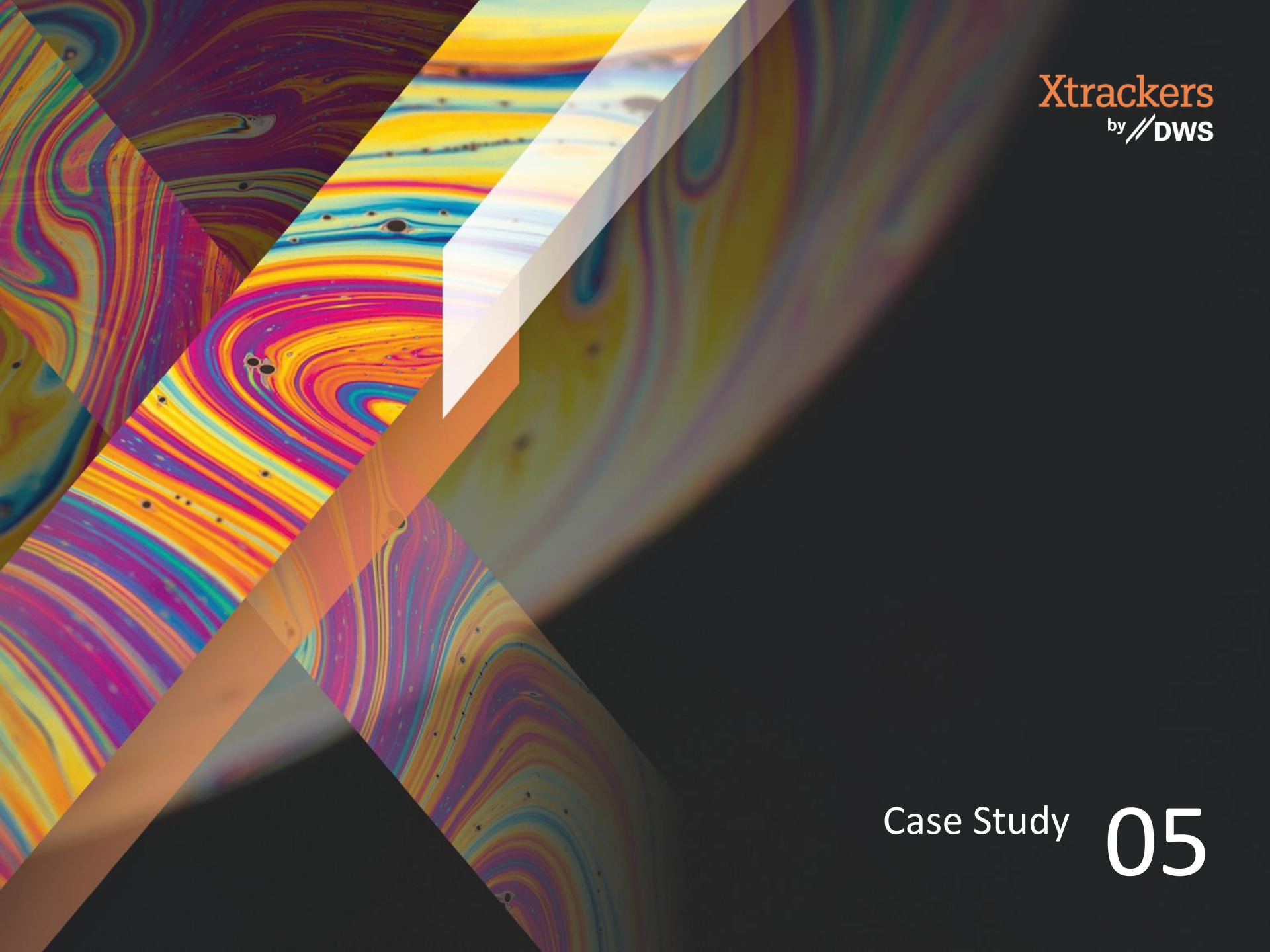
Traditional Process for Quantifying a Company's Geopolitical Risk



J.H. Whitney's Process for Quantifying a Company's Geopolitical Risk – GRR Rating



Sources: [1] September 2024, "Whitney Geostrategic Risk Ratings (GRR) Overview"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Case Study
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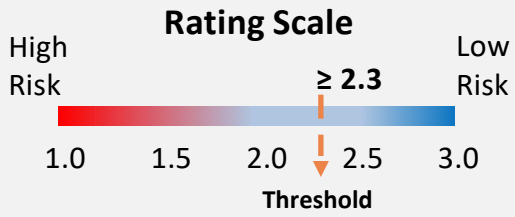
Case study

Overview of J.H. Whitney's geostrategic risk ratings

Summary:

- To assess an entity's vulnerability to geostrategic risk, a proprietary 10-factor model is employed
- This model uses publicly available company-reported and government data to measure thresholds, entanglement, or dependency across geopolitical borders
- The model is scored 1 to 3, with 3 being the least risky



Country Evaluations:

- **3 – Indicates exposure to countries with lower geopolitical risk**
  - *United States*
  - *United Kingdom*
  - *Australia*
  - *Canada*
  - *New Zealand*
- **2 – Indicates exposure to countries with average geopolitical risk**
  - *All else*
- **1 – Indicates exposure to countries with higher geopolitical risk**
  - *China*
  - *Russia*
  - *North Korea*
  - *Iran*

Ratings Components:

Governance (4 factors):

- Country of Incorporation
- Board Composition
- Foreign Ownership
- USG Exemption List

Commercial (3 factors):

- Geographic Revenue
- Joint Ventures
- Strategic Alliances

Operational (3 factors):

- Customers
- Geographic Assets
- Suppliers

Source: J.H. Whitney as of September 30, 2024.

CASE STUDY

Application of critical technology screen & geostrategic risk rating to index construction

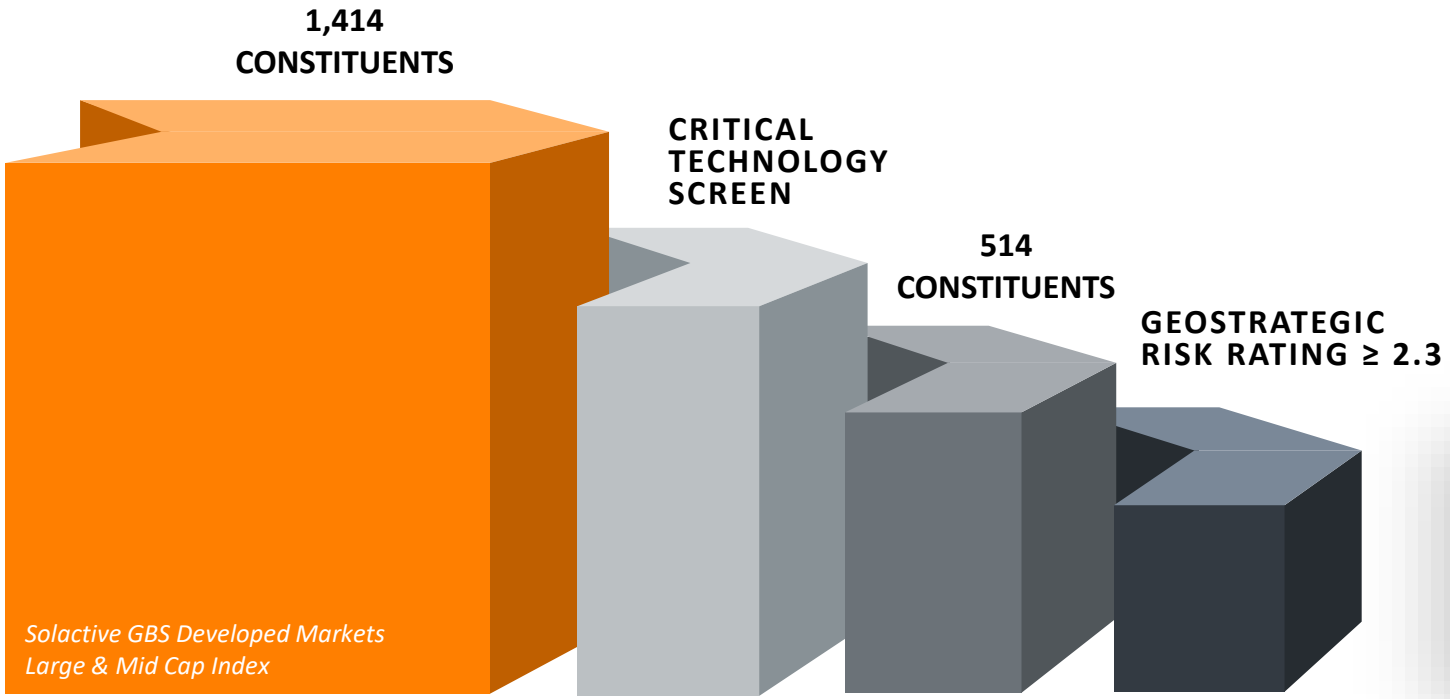
TOP COMPONENTS AS OF 30-SEP-2024 – PRE & POST SCREENS

Company	Ticker	Country	Currency	Pre-Screen(s) Weight	Disqualified	Post-Screen(s) Weight	Difference
APPLE INC	AAPL	US	USD	4.91%	GRR = 2.11	0.00%	-4.91%
NVIDIA CORP	NVDA	US	USD	4.87%		5.12%	0.25%
MICROSOFT CORP	MSFT	US	USD	4.69%		4.87%	0.18%
AMAZON.COM INC	AMZN	US	USD	2.65%		4.91%	2.26%
META PLATFORMS INC	META	US	USD	1.93%	GRR = 2.29	0.00%	-1.93%
ALPHABET INC-CL A	GOOGL	US	USD	1.51%		4.70%	3.55%
ALPHABET INC C-SHARES	GOOG	US	USD	1.36%	Secondary Listing	0.00%	-1.36%
BROADCOM INC	AVGO	US	USD	1.19%	GRR = 2.29	0.00%	-1.19%
ELI LILLY & CO	LLY	US	USD	1.06%	GRR = 2.29	0.00%	-1.06%
TESLA INC	TSLA	US	USD	1.05%	GRR = 2.20	0.00%	-1.05%
JPMORGAN CHASE & CO	JPM	US	USD	0.95%	Not Crit Tech	0.00%	-0.95%
BERKSHIRE HATHAWAY INC-CL B	BRK/B	US	USD	0.87%	Not Crit Tech	0.00%	-0.87%
EXXON MOBIL CORP	XOM	US	USD	0.77%		3.49%	2.72%
UNITEDHEALTH GROUP INC	UNH	US	USD	0.77%	Not Crit Tech	0.00%	-0.77%
VISA INC-CLASS A SHARES	V	US	USD	0.68%	Not Crit Tech	0.00%	-0.68%

Sources: Bloomberg, J.H. Whitney and Solactive as of September 30, 2024.

Case study

Application of critical technology screen & geostrategic risk rating to index construction

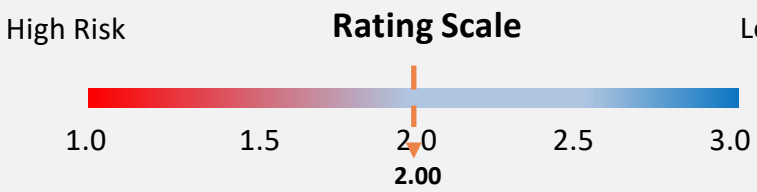


Sources: J.H. Whitney and Solactive as of September 30, 2024.

Case study

Geostrategic risk rating exclusion example

Excluded Company: Apple Inc.



Geographic Revenue
- 19% China

Geographic Assets
- 17% China

Joint Ventures
- Russian Direct Investment Fund (Russia)
- Beijing Tianrun New Energy Investment Co., Ltd. (China)
- Alibaba Group Holding Limited (China)
- Bank Of Communications Co., Ltd. (China)
- China Post Group Corporation Limited (China)
- Didi Chuxing (Beijing) Consulting Co. Ltd. (China)

Suppliers
- 17 Education & Technology Group Inc.. (China)
- 7Road Holdings Limited (China)
- Beijing Founder Electronics Co., Ltd. (China)
- Boyaa Interactive International Limited (China)

Strategic Alliances
- Automated Systems Holdings Limited (Hong Kong)
- CMGE Technology Group Limited (China)
- Foshan Electrical And Lighting Co. ,Ltd . (China)
- HNA Technology Co., Ltd. (China)
- Innuovo Technology Co., Ltd. (China)

Data output reveals significant risks in multiple categories resulting in lowest score of “1” and bringing overall score below industry peers

Ratings Components:

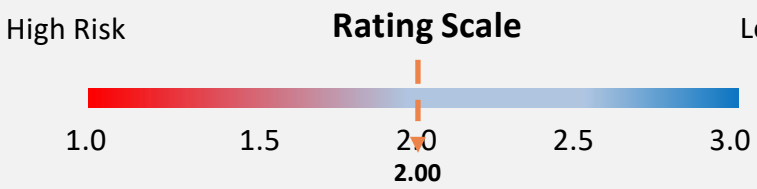
- ❑ Governance (46%)
  - ❑ Country of Incorporation (3/3)
  - ❑ Board Composition (3/3)
  - ❑ Foreign Ownership (3/3)
  - ❑ USG Exemption List (3/3)
- ❑ Commercial (27%)
  - ❑ Geographic Revenue (1/3)
  - ❑ Joint Ventures (1/3)
  - ❑ Strategic Alliances (1/3)
- ❑ Operational (27%)
  - ❑ Customers (2/3)
  - ❑ Geographic Assets (1/3)
  - ❑ Suppliers (1/3)

Source: J.H. Whitney as of September 30, 2024.

Case study

Geostrategic risk rating exclusion example

Excluded Company: Tesla Inc.



Geographic Revenue
- 22% China

Geographic Assets
- 10% China

Suppliers
- Citic Dicastal Co., Ltd. (China)
- Citic Heavy Industries Co., Ltd. (China)
- Contemporary Amperex Technology Co., Limited (China)
- Eva Precision Industrial Holdings Limited (Hong Kong)
- Jinfu Technology Co., Ltd. (China)

Strategic Alliances
- Brilliance-Bea Auto Finance Co., Ltd. (China)
- Jiangsu Azure Corporation (China)
- Navinfo Co., Ltd. (China)
- Nbtm New Materials Group Co., Ltd. (China)

Board
- Murdoch, James Rupert sits on the board of Phoenix Media Investment (Holdings) Limited (Hong Kong)

Data output reveals significant risks in multiple categories resulting in lowest score of “1” and bringing overall score below industry peers

Ratings Components:

- ❑ Governance (46%)
  - ❑ Country of Incorporation (3/3)
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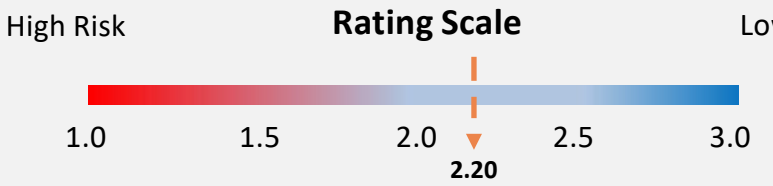
- ❑ Commercial (27%)
  - ❑ Geographic Revenue (1/3)
  - ❑ Joint Ventures (3/3)
  - ❑ Strategic Alliances (1/3)
- ❑ Operational (27%)
  - ❑ Customers (2/3)
  - ❑ Geographic Assets (1/3)
  - ❑ Suppliers (1/3)

Source: J.H. Whitney as of September 30, 2024.

Case study

Geostrategic risk rating exclusion example

Excluded Company: Eli Lilly & Company



Geographic Revenue
- 5% China

Strategic Alliances
- Hutchmed (China) Limited (Hong Kong)
- Innovent Biologics, Inc. (China)
- Triastek Co. Ltd. (China)
- Nbtm New Materials Group Co., Ltd. (China)

Board
- Fyrwald, J. Erik sits on the board of Sinofert Holdings Limited (Hong Kong)

Data output reveals significant risks in multiple categories resulting in lowest score of "1" and bringing overall score below industry peers

Ratings Components:

- ❑ Governance (46%)
  - ❑ Country of Incorporation (3/3)
  - ❑ Board Composition (1/3)
  - ❑ Foreign Ownership (3/3)
  - ❑ USG Exemption List (3/3)
- ❑ Commercial (27%)
  - ❑ Geographic Revenue (1/3)
  - ❑ Joint Ventures (2/3)
  - ❑ Strategic Alliances (1/3)
- ❑ Operational (27%)
  - ❑ Customers (2/3)
  - ❑ Geographic Assets (3/3)
  - ❑ Suppliers (2/3)

Source: J.H. Whitney as of September 30, 2024.

Noteworthy Inclusions

Explanations

Snapchat

- Strong AR/VR association.
- The technology behind its Lens Studio is of interest for DoD for future training and maintenance applications.

Pinterest

- Large image rich data set.
- Significant R&D efforts towards fine grained image recognition, object to object visual search, and massive scale visual search infrastructure which are priorities for U.S. Navy for ship identification/tracking as well as the NGA.

theTradeDesk

- "Koa" artificial intelligence helps to empower decision makers. This is a key capability being discussed in projects like the Joint All Domain Command & Control (JADC2).

Warner Brothers

- Have proprietary video file management capabilities and utilization of multiple CDNs to aggregate and distribute large data files at scale.

Source: J.H. Whitney as of September 30, 2024.

Index Level Information 06

Solactive Whitney U.S. Critical Technologies Index

Index Profile

Solactive Whitney U.S. Critical Technologies Index

The Solactive Whitney U.S. Critical Technologies Index is a market-capitalization weighted index, subject to caps on the weighting of individual companies, that is designed to track companies that support critical emerging technologies across the U.S. and its allies by selecting companies from a defined investment universe that satisfy key criteria related to their association with critical technology sectors and their geopolitical risk rating.

Key Details

ISIN	DE000SL0FSB3
WKN	SL0FSB
Bloomberg Index Ticker	SOLUCTIN
Index Currency	USD
Dividends	Reinvested
Parent Index	Solactive GBS Developed Markets Large & Mid Cap USD Index PR
Number of Constituents	222

Top 10 Constituents

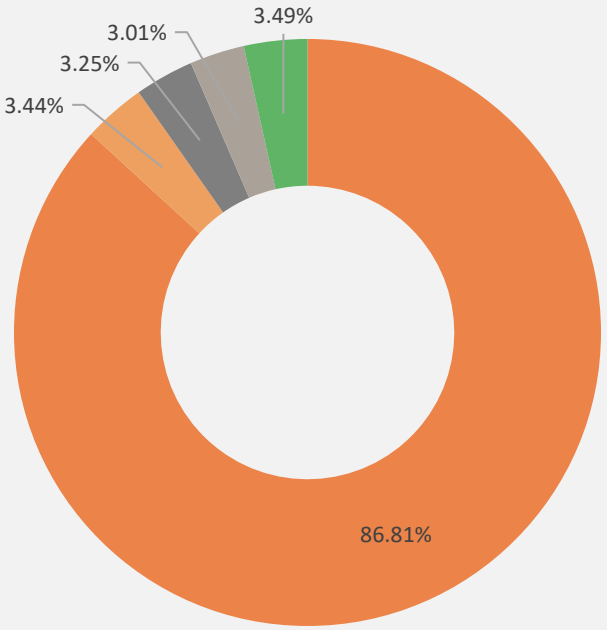
Index constituent	Country	GICS Sector	Weight
NVIDIA Corp	US	Information Technology	5.12%
Amazon.com Inc	US	Consumer Discretionary	4.91%
Microsoft Corp	US	Information Technology	4.87%
Alphabet Inc	US	Communication Services	4.70%
Exxon Mobil Corp	US	Energy	3.45%
AbbVie Inc	US	Health Care	2.29%
Oracle Corp	US	Information Technology	1.79%
Chevron Corp	US	Energy	1.78%
Salesforce Inc	US	Information Technology	1.70%
Thermo Fisher Scientific Inc	US	Health Care	1.55%

Source: Bloomberg as of September 30, 2024.

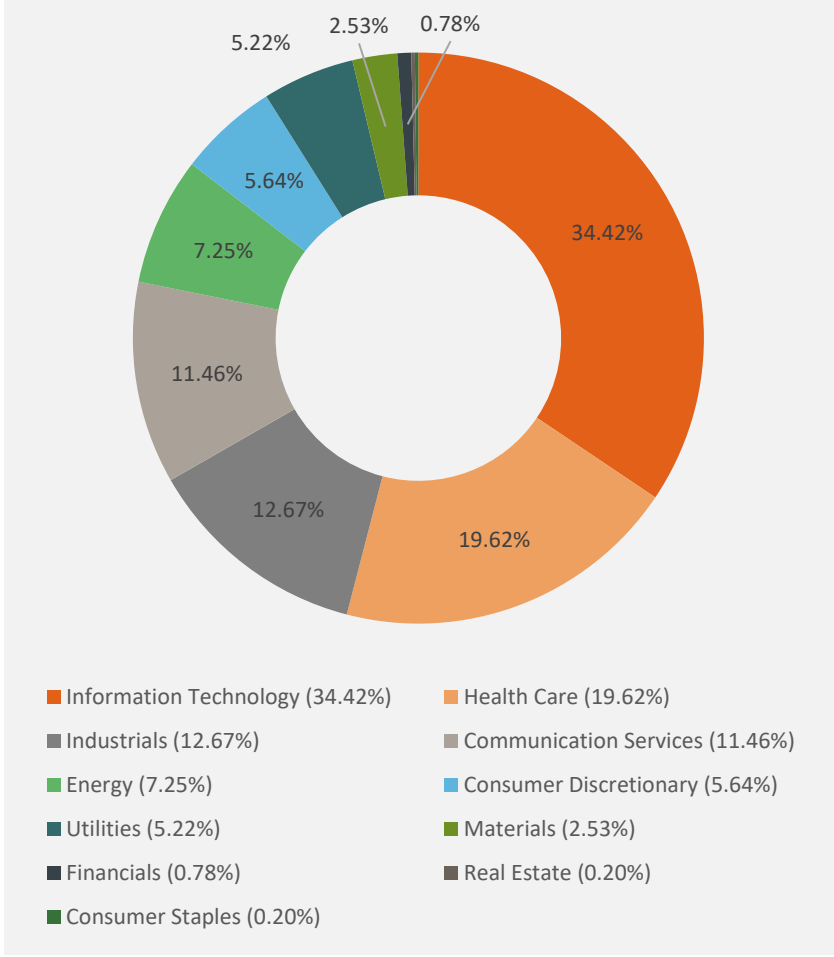
Solactive Whitney U.S. Critical Technologies Index

Index Profile

Country Of Domicile Breakdown



GICS Sector Breakdown



Source: Bloomberg as of September 30, 2024.

Solactive Whitney U.S. Critical Technologies Index

Index Methodology Visualized

Xtrackers by DWS

Starting Universe

Solactive GBS Developed Markets Large & Mid Cap Index

Selection of Index Components

Step 1

Securities from the starting universe are evaluated based on the below risk-related criteria to derive a final evaluation score. Companies' scores are divided into low, neutral, and high, based on their activities in high-risk, neutral or FVEY countries, based on the country classification.

Risk Related Criteria:

(1) Ownership by Country **(2)** Country Incorporation **(3)** Geographic Revenue **(4)** Geographic Assets **(5)** Customers **(6)** Suppliers **(7)** Board Memberships **(8)** Joint Ventures **(9)** Strategic Alliances **(10)** Sam Exemption List

Step 2

Securities from companies that are assigned a sufficiently high combined score based on the above evaluation are selected for the final index, upon confirmation that those companies are also active in Critical Technology sectors.

Weighting

Each index component is assigned a weight according to free float market capitalization with the individual weights being capped at 5% and floored at 0.05%.

Final Universe

Solactive Whitney U.S. Critical Technologies Index

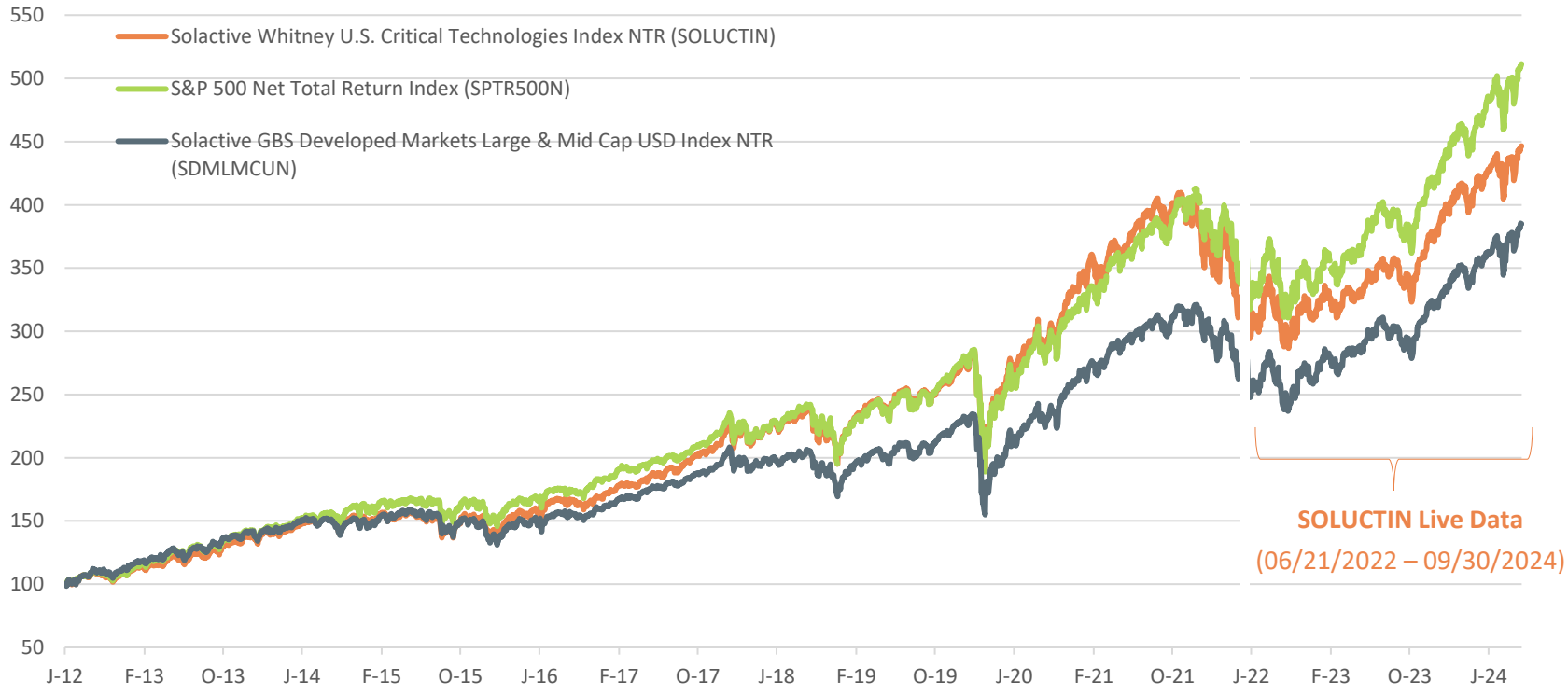
Source: Solactive as of September 2024.

Solactive Whitney U.S. Critical Technologies Index

Index Performance

Xtrackers by DWS

Solactive Whitney U.S. Critical Technologies Index Performance (06/21/2012 – 09/30/2024)



Source: Bloomberg as of 9/30/24. For illustrative purposes only. The Solactive Whitney U.S. Critical Technologies Index went live 6/22/22. Past performance does not guarantee future results. The ETP is a new product and any performance prior to the date of the index inception is hypothetical. Back tested results are based on criteria applied retroactively with the benefit of hindsight and knowledge of factors that may have positively affected its performance, and cannot account for all financial risk that may affect the actual performance of an ETF. The actual performance of an ETF may vary significantly from the back-tested data. In addition, back-tested results do not account for factors such as transaction costs, liquidity and other market factors. The performance data for the Solactive Whitney U.S. Critical Technologies Index is a result of the deduction of fees and charges applicable to the Xtrackers US National Critical Technologies ETF.

Fund Level Information 07

Xtrackers US National Critical Technologies ETF

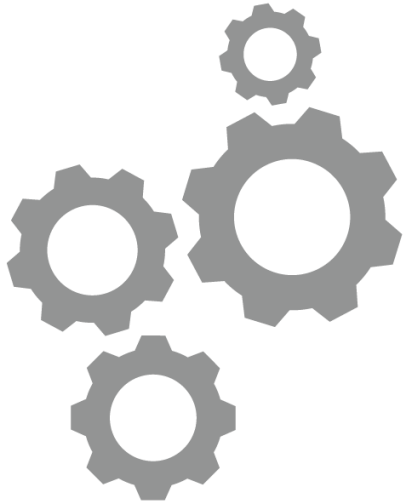
Product Profile

ETF Summary

The Xtrackers US National Critical Technologies ETF (CRTC), using a “passive” or indexing investment approach, a seeks investment results that correspond generally to the performance, before fees and expenses, of the Solactive Whitney U.S. Critical Technologies Index (the “Underlying Index”).

ETF Details

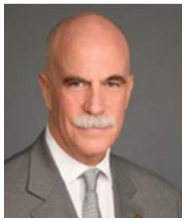
Name	Xtrackers US National Critical Technologies ETF
Fund Ticker	CRTC
ISIN/CUSIP	US23306X8609 / 23306X860
Primary Listing	NYSE
Expense Ratio (Gross/Net)	0.35% / 0.35%
Listing Date	11/16/2023



Source: Bloomberg as September 30, 2023.


Xtrackers
by DWS
Appendix
08

J.H. Whitney Leadership Team



John M B O'Connor

Chairman & CEO

John O'Connor has served as Chairman of J.H. Whitney Investment Management, LLC since January 2005. From January 2009 through March 2011, he served as CEO of Tactronics Holdings, LLC, a Whitney Capital Partners portfolio holding company that provided tactical integrated electronic systems to US and foreign military customers as well as composite armor solutions for military vehicles through its Armostruxx division. Previously, John was Chairman of JP Morgan Alternative Asset Management, Inc. and an Executive Partner of JP Morgan Partners. He was also a member of the Risk Management Committee of JP Morgan Chase, which was responsible for policy formulation and oversight of all market and credit risk-taking activities globally. John has extensive experience in transaction leadership, structuring and portfolio management, and is a member of J.H. Whitney's Investment Committee, contributing significant global renewable and energy investment, regulatory, and operational expertise to the Investment Manager's team. John earned a B.A. in economics from Tulane University and an M.B.A. from Columbia University Graduate School of Business.

C. Allen Parker

President

Allen Parker became a Senior Advisor to J.H. Whitney Investment Management and its affiliates after most recently serving for three years as an executive at Wells Fargo & Company, where he was Interim Chief Executive Officer for seven months and General Counsel for the remainder of his tenure. Throughout his time at Wells Fargo, he was also a member of the Wells Fargo Operating Committee, which is the company's senior-most business committee responsible for considering and deciding on key strategic, business, and operational matters. Prior to his work at Wells Fargo, Allen was a partner for 27 years at the New York law firm Cravath, Swaine & Moore LLP, where he was a member of the firm's corporate governance and board advisory practice and held a variety of leadership roles, including as Cravath's Presiding Partner, the firm's chief executive officer. Allen has extensive experience in matters relating to corporate governance, crisis management, financial institution regulation, financing, mergers and acquisitions, and derivative transactions in the United States and over 20 foreign countries. Allen earned an undergraduate degree from Duke University, an M.A. from the University of Chicago, and a J.D. from the Columbia University School of Law.

Bret Mahoney

COO

Bret Mahoney serves as Chief Operating Officer of Whitney Strategic Services and is responsible for development of strategic and technical analysis for client programs. Prior to joining WSS, he worked in the corporate and investment banking division at Deutsche Bank AG with the industrials coverage team. He completed multiple M&A transactions over $1 billion in enterprise value as both sell-side and buy-side advisory. Before moving to the private sector, Bret served as a Lieutenant in the United States Navy. In his role as an intelligence officer, LT. Mahoney served aboard multiple naval platforms as a staff officer with Commander Amphibious Squadron 4 (COMPHIBRON 4) and as a lead analyst for the Office of Naval Intelligence Special Programs division. He and his teams received multiple individual and unit recognitions including a Meritorious Unit Citation from the Director of National Intelligence. Bret earned an MBA from the University of Chicago Booth School of Business with concentrations in Finance, Accounting, and Strategic Management. He also earned a Bachelor's degree in Political Science from Loyola University New Orleans.

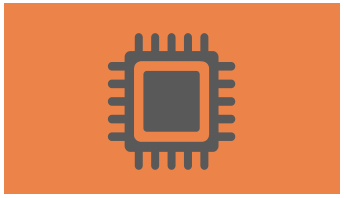
Source: J.H. Whitney as of October 2023.

Critical Technologies

Definitions & DoD Use Cases

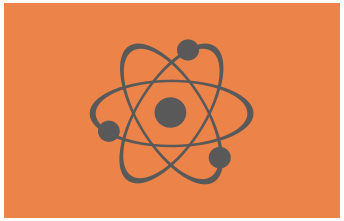
Xtrackers by DWS

Emerging Opportunity Areas



Advanced materials explore innovative new materials and novel manufacturing techniques that can dramatically improve many of the Department's capabilities. Materials that have higher strength, lighter weight, higher efficiency, and can handle more extreme temperatures will have the potential to better protect our service members and enhance their ability to accomplish their missions.[1]

FutureG is a suite of emerging **wireless network technologies** enabled by DoD and commercial industry cooperation to enable military operations and ensure a free and open internet. As Fifth Generation (5G) wireless technology is adopted and provides building blocks for capability, the DoD will also look to FutureG for leap-ahead technologies to lead in creating future standards. The Department will invest in FutureG technology development to lay the groundwork for continued United States leadership in information technology, which is vital for maintaining our economic and national security.[1]



Quantum Science is the study of physical properties at small, even atomic, scales. Defense applications include atomic clocks, quantum sensors, quantum computing, and quantum networks. Quantum science promises to enable leap-ahead capabilities. Quantum computing can provide unprecedented computational speeds and help solve the Department's hardest analytical problems. Quantum sensors promise the ability to provide unprecedented accuracy in position, navigation, and timing. From more accurate information to faster decision making, to significantly stronger encryption capabilities, quantum science has the promise to deliver cutting-edge technology.[1]

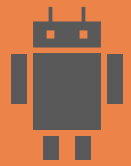
Biotechnology is an emerging engineering discipline that uses living systems to produce a wide range of technologies and capabilities. From fighting global pandemics and avoiding surprises to reducing logistics and sustainment costs and increasing energy efficiency, biotechnology can help change the way the Department conducts missions, performs in contested logistics environments, and adapts to major global changes.[1]

Source: [1] February 2022, "CRITICAL TECHNOLOGY AREAS"

Critical Technologies

Definitions & DoD Use Cases

Xtrackers by DWS

Effective Adoption Areas	
	**Human-Machine Interface** refers to technologies related to human-machine teaming and augmented and virtual reality. Rapid advancements in this technology will have a multitude of benefits for our service members. Highly immersive realistic training environments provide real-time feedback to enhance warfighter performance. Intuitive 5 interactive human-machine interfaces enable rapid mission planning and mission command by providing a common operational picture to geographically distributed operations.[1]
	**Artificial Intelligence (AI)** is the software engineering discipline of expanding capabilities of software applications to perform tasks that currently require human intelligence. Machine learning is an engineering subfield of AI that trains software models using example data, simulations, or real-world experiences rather than by direct programming or coding. Autonomy is the engineering discipline that expands robots' abilities to perform tasks while limiting the need for human interaction. AI holds tremendous promise to improve the ability and function of nearly all systems and operations. Trusted AI with trusted autonomous systems are imperative to dominate future conflicts. As AI, machine learning, and autonomous operations continue to mature, the DoD will focus on evidence-based AI-assurance and enabling operational effectiveness.[1]
	**Microelectronics** are circuits and components that serve as the "brain" to human-made electronic functional systems. Virtually every military and commercial system relies on microelectronics. Diminishing microelectronics manufacturing in the United States and supply chain concerns have highlighted national economic and security risks. Working closely with industry, academia, and across the Government, the Department is addressing the need for secure microelectronics sources and will leverage state-of-the-art commercial development and production for defense microelectronic solutions.[1]
	**Integrated Network Systems-of-Systems** technology encompasses the capability to communicate, provide real-time dissemination of information across the Department, and effective command and control in a contested electromagnetic environment. Integrated Network Systems-of-Systems capability must enable engagements by any sensor and shooter, with the ability to integrate disparate systems. An interoperable network that leverages emerging capabilities across the electromagnetic spectrum such as 5G, software defined networking and radios, and modern information exchange techniques will allow the Department to better integrate many diverse mission systems and provide fully networked command, control, and communication that is capable, resilient, and secure.[1]

Source: [1] February 2022, "CRITICAL TECHNOLOGY AREAS"

Critical Technologies

Definitions & DoD Use Cases

Xtrackers by DWS

Defense Specific Areas

Hypersonic systems fly within the atmosphere for significant portions of their flight at or above 5 times the speed of sound, or approximately 3700 miles per hour. Hypersonics dramatically shorten the timeline to strike a target and increase unpredictability. While strategic competitors are pursuing and rapidly fielding advanced hypersonic missiles, the DoD will develop leap-ahead and cost-effective technologies for our air, land, and sea operational forces.[1]

To provide advantage for the joint force in highly contested environments, the Department must develop wideband sensors to operate at the intersection of cyber space, electronic warfare, radar, and communications. **Sensors** must be able to counter advanced threats and can no longer be stove-piped and single function.[1]

Directed Energy Weapons utilize lasers, high power microwaves, and high energy particle beams to produce precision disruption, damage, or destruction of military targets at range. Directed energy systems will allow the Department to counter a wide variety of current and emerging threats with rapid responses and engagement at the speed of light. High-power lasers and high-power microwave technologies both offer new ways to counter diverse sets of threats.[1]

Source: [1] February 2022, "CRITICAL TECHNOLOGY AREAS"

Critical Technologies

Definitions & DOD Use Cases

Xtrackers by DWS

Effective Adoption Areas (cont.)

Space technologies include space flight, Space communication and other technologies needed to maintain space operations. With rising threats and increasing dependence on space-based systems, the Department's space strategy must shift away from exquisite satellites to a more robust and proliferated architecture. Novel space technologies are necessary to enable resilient cross-domain operations. The space strategy must incorporate technologies that enhance the Department's adaptive and reconfigurable capabilities in space situational awareness, space control, communication path diversity, on-orbit processing, and autonomy.[1]

Advanced computing and software technologies include supercomputing, cloud computing, data storage, computing architectures, and data processing. Software is ubiquitous throughout the Department, but the speed at which software develops outpaces the Department's ability to stay up to date. The Department must rapidly modernize its legacy software systems with resilient, affordable, and assured new software that has been designed, developed, and tested using processes that establish confidence in its performance. The Department must migrate to a Development-Security-Operations (DevSecOps) approach in its software development and evolve to a model of continuous development, continuous test, and continuous delivery. The Department must leverage modular open system architecture approaches to isolate hardware from software and enable rapid upgrades to secure processors.[1]

Renewable energy generation and storage includes solar wind, bio-based and geothermal technologies, advanced energy storage, electronic engines, and power grid integration. Renewable energy generation and storage promises to decrease warfighter vulnerability and deliver new operational capabilities for the Department. From more efficient batteries to diversifying energy sources and reduced fuel transportation risks, renewable energy generation and storage will add resilience and flexibility in a contested logistics environment.[1]

Source: [1] February 2022, "CRITICAL TECHNOLOGY AREAS"

Case Study

Risk Criteria Definitions

Ownership by Country	This risk component focuses on the location of the relevant company's shareholders. Shareholders have significant influence over operations and management of a company, so any hostile actions at the shareholder level could pose a threat to the overall value or ability for the company to deliver innovation.
Country Incorporation	This risk component focuses on where the relevant company is incorporated. Where a company is incorporated may have significance relative to its resilience in the face of geopolitical upheavals. Companies with U.S. or FVEY incorporations are likely to be more resilient to evolving geopolitical risks.
Customers	This risk component focuses on the concentration (geographic and otherwise) of the relevant company's customers. Resilient companies have a diversified customer base. Non-resilient companies are dependent on a small group of customers or have a large concentration of customers in high-risk countries.
Suppliers	This risk component focuses on the concentration (geographic and otherwise) of the relevant company's suppliers. Resilient companies have a diversified group of suppliers. Non-resilient companies are dependent on a small group of suppliers or have a large concentration of suppliers in high-risk countries.
Board Memberships	This risk component focuses on risks posed by the composition of the relevant company's Board of Directors. The Board of Directors is responsible for the long-term direction and outlook of the company. Companies with Board members who are also members of other resilient companies are scored high. Companies with Board members who also serve on Boards of companies in high-risk countries are scored low.

Sources: January 2023, "Index Guideline: Solactive Whitney U.S. Critical Technologies Index"

Case Study

Risk Criteria Definitions

Joint Ventures	This risk component focuses on risks posed by the relevant company's participation in joint ventures. Joint ventures pose a risk of technology transfer that could result in loss by a participant of future market share from a new competitor. Because this risk causes a company to be deemed not resilient for the long-term purposes of government spending, companies that participate in joint ventures in high-risk countries, or with companies that are located in high-risk countries, are scored low.
Strategic Alliances	This risk component focuses on risks posed by the relevant company's participation in strategic alliances. Strategic alliances pose a risk of technology transfer that could result in loss by a participant of future market share from a new competitor. Because this risk causes a company to be deemed not resilient for the long-term purposes of government spending, companies that participate in such alliances in high-risk countries, or with companies that are located in high-risk countries, are scored low.
SAM Exemption List	This risk component focuses on whether the relevant company appears on the System for Award Management (SAM) exemption list. The SAM exemption list is created to deny government contracts to entities that have engaged in negative activities such as contract non-fulfillment, being agents of a foreign government, or participating in other illicit and/or negligent activities. If a company appears on the SAM exemption list, it is assigned a low score.
Geographic Revenue	This risk component focuses on whether the relevant company is dependent on revenue streams from high-risk countries.
Geographic Assets	This risk component focuses on whether the relevant company owns assets, or makes capital expenditures, that are concentrated in high-risk countries.

Sources: January 2023, "Index Guideline: Solactive Whitney U.S. Critical Technologies Index"

Solactive Whitney U.S. Critical Technologies Index

GICS Industry Group Breakdown

GICS Industry Group

GICS Industry Group	Weight (%)
Software & Services	22.42%
Pharmaceuticals, Biotechnology & Life Sciences	15.29%
Capital Goods	10.85%
Semiconductors & Semiconductor Equipment	8.58%
Media & Entertainment	7.35%
Energy	7.25%
Utilities	5.22%
Consumer Discretionary Distribution & Retail	4.91%
Health Care Equipment & Services	4.32%
Telecommunication Services	4.11%
Technology Hardware & Equipment	3.42%
Materials	2.53%
Commercial & Professional Services	1.31%
Financial Services	0.78%
Transportation	0.51%
Consumer Services	0.41%
Automobiles & Components	0.33%
Real Estate Management & Development	0.20%
Household & Personal Products	0.20%

Source: Bloomberg as of September 30, 2024.

Solactive Whitney U.S. Critical Technologies Index

GICS Sub-Industry Group Breakdown

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GICS Sub-Industry Group

GICS Sub-Industry Group	Weight (%)	GICS Sub-Industry Group	Weight (%)
Systems Software	9.79%	Human Resource & Employment Services	0.74%
Application Software	8.99%	Interactive Home Entertainment	0.53%
Biotechnology	7.25%	Electronic Equipment & Instruments	0.49%
Integrated Oil & Gas	6.16%	Technology Hardware, Storage & Peripherals	0.39%
Semiconductors	5.87%	Specialty Chemicals	0.39%
Aerospace & Defense	5.39%	Construction Machinery & Heavy Transportation Equipment	0.33%
Interactive Media & Services	5.12%	Automobile Manufacturers	0.33%
Broadline Retail	4.91%	Commodity Chemicals	0.33%
Electric Utilities	4.28%	Advertising	0.32%
Life Sciences Tools & Services	4.06%	Research & Consulting Services	0.30%
Pharmaceuticals	3.98%	Health Care Technology	0.29%
Health Care Equipment	3.79%	Restaurants	0.28%
Integrated Telecommunication Services	3.14%	Data Processing & Outsourced Services	0.27%
Semiconductor Materials & Equipment	2.71%	Highways & Railtracks	0.25%
Communications Equipment	2.54%	Health Care Services	0.24%
IT Consulting & Other Services	2.12%	Real Estate Services	0.20%
Electrical Components & Equipment	1.74%	Personal Care Products	0.20%
Industrial Machinery & Supplies & Components	1.65%	Air Freight & Logistics	0.19%
Internet Services & Infrastructure	1.52%	Steel	0.15%
Diversified Metals & Mining	1.38%	Copper	0.14%
Cable & Satellite	1.26%	Renewable Electricity	0.13%
Oil & Gas Refining & Marketing	1.09%	Hotels, Resorts & Cruise Lines	0.12%
Industrial Conglomerates	0.95%	Movies & Entertainment	0.12%
Wireless Telecommunication Services	0.90%	Gold	0.08%
Multi-Utilities	0.81%	Alternative Carriers	0.07%
Building Products	0.79%	Precious Metals & Minerals	0.07%
Transaction & Payment Processing Services	0.78%	Airport Services	0.07%

Source: Bloomberg as of September 30, 2024..

Xtrackers

Important Information

War, terrorism, sanctions, economic uncertainty, trade disputes, public health crises and related geopolitical events have led, and, in the future, may lead to significant disruptions in U.S. and world economies and markets, which may lead to increased market volatility and may have significant adverse effects on the fund and its investments.

Fund Risks: Critical technologies are technologies that are deemed to be vital to maintaining the national security of the U.S. now and in the future. Companies involved in critical technologies may be subject to a significant amount of governmental regulation, and changes in governmental policies and the need for regulatory approvals may have a material adverse effect on the critical technologies and the companies involved with them. Critical technologies companies are heavily dependent on patent and intellectual property rights which may be difficult to protect. Investing involves risk, including the possible loss of principal. Stocks may decline in value. This fund is non-diversified and can take larger positions in fewer issues, increasing its potential risk. An investment in the fund should be considered only as a supplement to a complete investment program for those investors willing to accept the risks associated with the fund. Please read the prospectus for more information.

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