Cybersecurity Investment Case: Unique, Defensive Play within Thematic Tech

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What is Cybersecurity?

Cybersecurity involves both measures and technologies that protect digital systems, networks, and data from unauthorized and/or unintended access. It has become a top priority for businesses and governments alike as cyber attacks have risen in recent years due to several factors including the rise of connected devices, shift to the cloud, remote work, and increased network complexity.

The most common types of cybersecurity attacks include malware, ransomware, phishing, insider threats, DDoS (distributed denial of service) and social engineering-based attacks[1.] As a defense against these attacks, companies have developed comprehensive defense tools that span network security, endpoint security, cloud security, application security, IAM (identity & access management) and data security[2].

Why is Cybersecurity Important?

Cybersecurity has become critical to ensuring that organizations are safe from attacks both from internal and external bad actors as the world continues to become more open, connected, and digital. It has been flagged as a top 5 global risk by the World Economic Forum in their most recent survey, among other pressing global issues such as extreme weather from climate change, the cost-of-living crisis, and societal/political polarization.

Statistics validate what is now indisputable in the cybersecurity community, that both the cost and number of cyberattacks continue to increase at an alarming rate. As per a study by Statista, the cost of cybercrime amounted to a whopping $8.2 trillion in 2023 and is expected to rise to $13.8 trillion by 2028. Cyber attacks continue at the rate of one every 39 seconds, as per another study by University of Maryland[3]. If measured as a country, cybercrime would be the third-largest economy after U.S. and China.

Additionally, ongoing pressures from geopolitical tensions and the rise of generative AI have added a layer of complexity to the threat landscape. Given the scale of impact of cyber attacks, it comes as no surprise that 96% of CEOs surveyed by Accenture said that cybersecurity is critical to organization stability.

What is the State of the Cybersecurity Industry?

The landscape of the cybersecurity industry is changing rapidly with the emergence of new growth drivers by way of generative AI. Companies in the cybersecurity industry face a demand and operating environment quite different from that of the previous decade with the rise of insider threats and demand for AI-driven

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[1] https://www.ibm.com/topics/cybersecurity
[2] https://www.accenture.com/us-en/insights/cyber-security-index
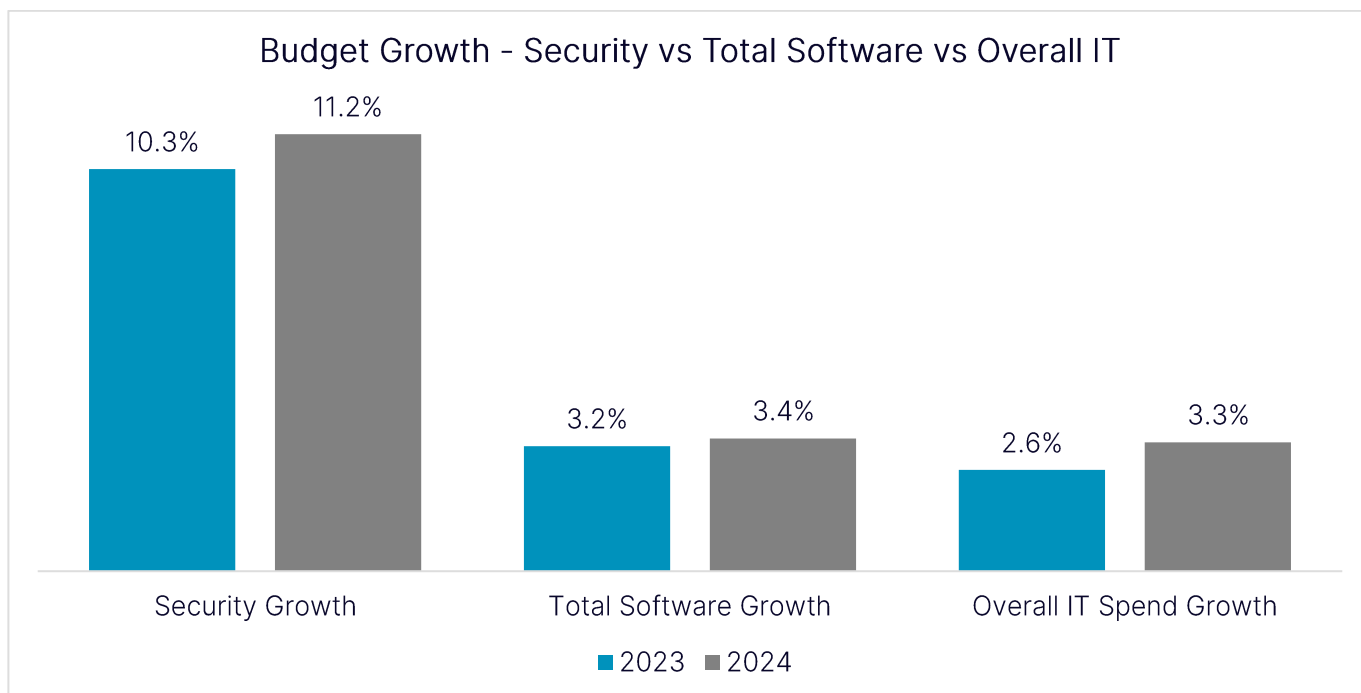[3] https://ung.edu/continuing-education/news-and-media/cybersecurity.php

security solutions. Following recent attacks on U.S. critical infrastructure, cybersecurity became a national policy issue, leading to the issuance of an 'Executive Order on Improving the Nation's Cybersecurity" in May 2021 by President Biden. Since the issuance of the Executive Order, the government has upped the regulatory ante by releasing the U.S. National Cybersecurity Strategy in 2023, following which several federal agencies have published new cybersecurity requirements and guidelines. At the same time, several Big Tech companies have pledged to ramp up investments in cybersecurity, adding another stabilizing force to the revenue growth trajectory of the overall market.
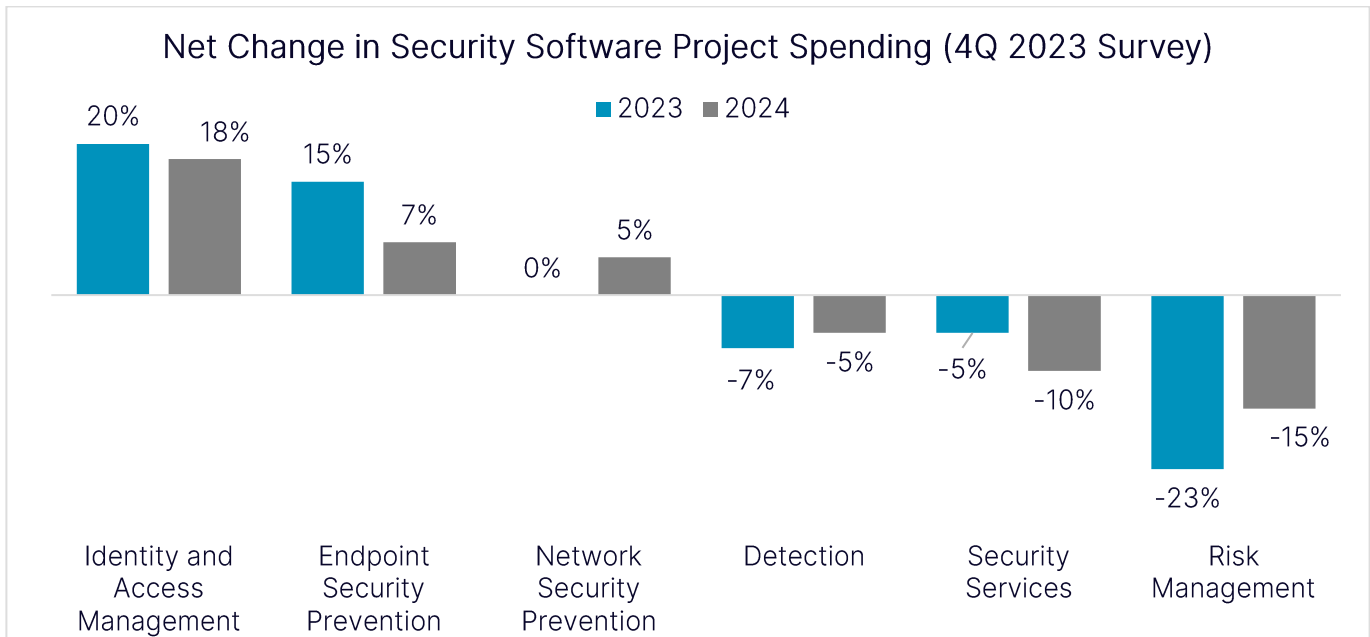
The new narrative of cybersecurity is likely to be dominated by the zero-trust model of security and AI-based security solutions. The zero-trust security model assumes that no user or device can be trusted without continuous verification. An estimate of the total addressable market by McKinsey suggests that the cybersecurity market is $1.5-$2.0 trillion globally, and at best only 10% penetrated with a very long runway for growth. As per Statista, during the period 2024-2028, cybersecurity revenue is expected to grow at an annual rate of 10.6%, resulting in a total market size of $273.6 billion by 2028. These projections suggest that the growth outlook is optimistic for the overall market and not limited to a few key players.

While the threat environment continues to drive strong demand for cybersecurity, there are lingering risks from the heightened scrutiny of IT budgets and resulting longer sales cycles that emerged during the Tech bear market of 2022. Management teams appear to have factored in these risks, as evinced by the conservative stance they have adopted on earnings calls. Additionally, companies are prioritizing certain areas of cybersecurity such as privileged access management (PAM) and Identity over others, as a response to recent high-profile attacks, including UnitedHealth, MGM Resorts International, and Caesars Entertainment.

For the rest of 2024, there is expected to be higher demand for endpoint security, privileged access management and SASE (Secure Access Server Edge) versus other areas of cyber security, as per management commentary on recent earnings calls. Similarly, the Morgan Stanley/AlphaWise survey picked up on Identity & Access Management experiencing the fastest rate of growth among security software project spending areas. This is likely to offset the slowdown in growth in areas such as firewall.

Budget Growth - Security vs Total Software vs Overall IT

Category	2023	2024
Security Growth	10.3%	11.2%
Total Software Growth	3.2%	3.4%
Overall IT Spend Growth	2.6%	3.3%

Source: AlphaWise, Morgan Stanley Research, 4Q2023 Domain Survey (n=60), 4Q2023 CIO Survey (N=100)

Net Change in Security Software Project Spending (4Q 2023 Survey)

Legend: ■ 2023 ■ 2024

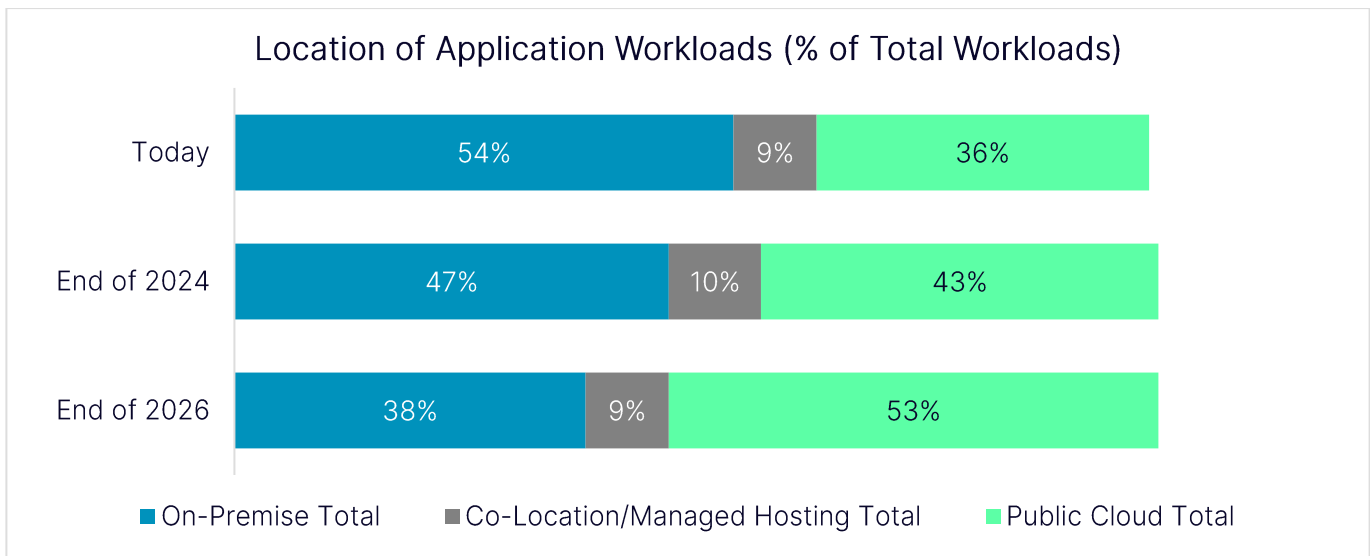|	Identity and Access Management	Endpoint Security Prevention	Network Security Prevention	Detection	Security Services	Risk Management
2023	20%	15%	0%	-7%	-5%	-23%
2024	18%	7%	5%	-5%	-10%	-15%

Source: 4Q 2023 Domain Survey, AlphaWise, Morgan Stanley Research, n=60 (US and EU data)

Cybersecurity Ecosystem Expansion

The cybersecurity ecosystem has expanded rapidly over the past decade or so, especially with the recent emergence of generative AI as a new growth driver. Given the vastness of the attack surface, it comes as no surprise that there are solutions tailored to protect different parts of the attack surface, including firewalls, emails, networks, and the cloud. While there is increasing demand from customers for a single unified solution to prevent tool sprawl, the current landscape is still dominated by companies specializing in one or two areas of cybersecurity versus companies becoming a one-stop shop.

As it currently stands, cybersecurity companies offer more than a dozen offerings with a heightened focus on providing solutions to customers moving workloads to the cloud. The range of offerings by companies in the space include API security, email security, endpoint security, vulnerability management, identity and access management (IAM), user entity and behavior analysis (UEBA), intrusion detection/prevention systems (IDS/IPS), DDoS Mitigation, IoT Security, and security orchestration, automation, and response (SOAR).

Location of Application Workloads (% of Total Workloads)

	On-Premise Total	Co-Location/Managed Hosting Total	Public Cloud Total
Today	54%	9%	36%
End of 2024	47%	10%	43%
End of 2026	38%	9%	53%

Source: 4Q2023 CIO Survey, AlphaWise, Morgan Stanley Research, N=100 (US and EU data)

Security Technologies Expected to See Increased Spend Due to Cloud
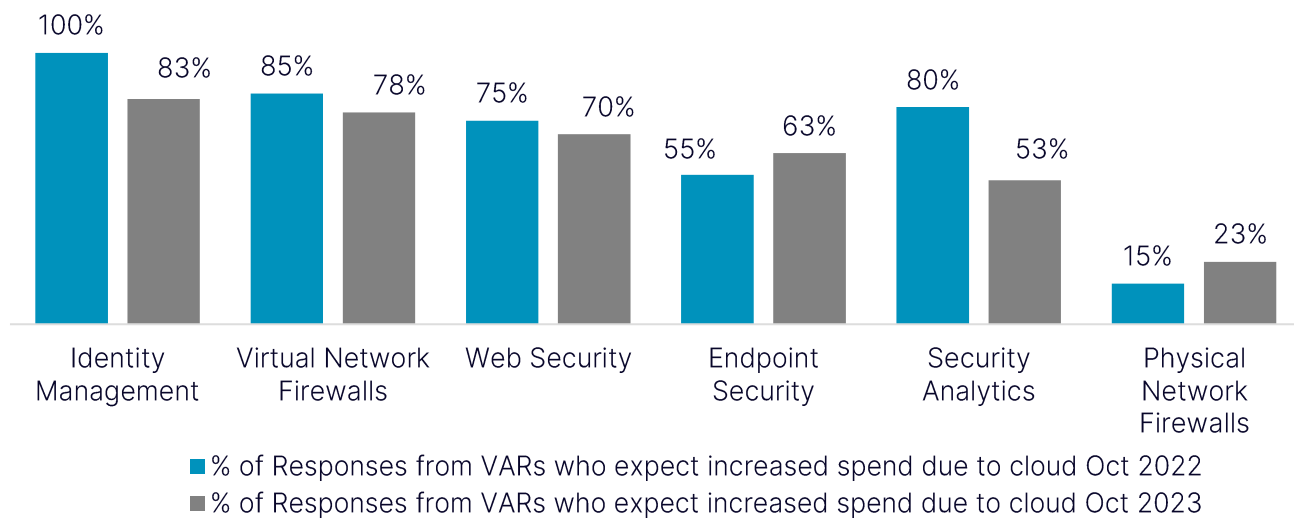
Source: AlphaWise, 3Q 2023 VAR Survey (N=40), 3Q 2022 Security VAR Survey (N=20), Morgan Stanley Research (US and EU data)

As seen in the charts above, there is expected to be a shift towards hosting applications in the cloud, with 56% of total workloads expected to be in the public cloud by the end of 2026 compared to 36% of total workloads as of today. With increased spend on cloud, identity access management is expected to maintain its position as a leading beneficiary of cloud migration.

While there is a potential for increasing revenue streams by specializing in multiple offerings, cybersecurity companies continue to focus on a few areas. Zscaler, for example, which went public in 2018, specializes in cloud-based security for protection against malware. Qualys and Rapid 7, which went public in 2012 and 2015 respectively, offer vulnerability management as well as identity and access management services. Okta, which went public in 2017, offers identity and access management solutions. Palo Alto Networks, which went public in 2012, offers enterprise-wide network and cloud security solutions. Darktrace, which went public more recently in 2021, is a leader in the global-AI cybersecurity domain. It has a self-learning AI tool that is the industry's only solution to learn from data without reference to historical events. Darktrace was removed from the index on June 24th 2024. In April 2024, it had reached an agreement with Thoma Bravo to be acquired, rendering it ineligible for index inclusion[4]. These examples illustrate the diversity of offerings by cybersecurity companies.

Cybersecurity Industry Tailwinds

Federal government agencies are expected to provide a fillip to cybersecurity sales as they work towards implementing zero trust architecture to comply with Executive Order 14028, "Improving the Nation's Cybersecurity"[5]. They are likely to upgrade their legacy IAM infrastructure, implement cloud security controls and upgrade risk controls as they ramp up their cybersecurity infrastructure[6].

In keeping with the changing requirements, the Biden administration is seeking $13 billion in cybersecurity funding across all agencies, with a fiscal 2025 proposal to include $3 billion for the Cybersecurity and Infrastructure Agency, a $103 million increase over the current budget[7]. The budget is likely to secure

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[4] https://ir.darktrace.com/regulatory-news/2024/4/26/1813465
[5] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/12/executive-order-on-improving-the-nations-cybersecurity/
[6] https://www.ey.com/en_us/government-public-sector/top-seven-government-and-public-sector-cyber-trends
[7] https://federalnewsnetwork.com/budget/2024/03/biden-budget-request-includes-13b-for-cybersecurity-continuing-upward-trend/

funding for improving basic and advanced cybersecurity in low-resourced hospitals and the treasury department's IT systems[8].

The ongoing shift to the cloud has spurred higher demand for cloud-based security products. Cloud-based environments are more complex to secure than on-premise environments, necessitating new solutions. Some players - including Crowdstrike, Zscaler, Palo Alto, Cloudflare, and Fortinet - are likely best positioned to capitalize on increased demand for cloud-based solutions. While security software continues to be a smaller market than infrastructure software and application software, the migration to the cloud is likely to propel the security market forward to an impressive $290 billion by 2026, as per Bloomberg and IDC[9]. The pace of growth in security spending is even more encouraging when we note that overall security spend is likely to outpace IT spend by 200 bps through 2027[10].

Interest rate cuts in the second half of 2024 could be another potential tailwind for companies in the cybersecurity universe, lifting valuations and boosting investor sentiment. As many of these stocks belong to the high-growth universe, they came under pressure when the Federal Reserve embarked on its most aggressive rate hiking cycle in decades in 2022.

Regulatory Environment

Cybersecurity has become a national policy issue as evinced by the steps taken by the Biden-Harris administration in recent years to strengthen the cybersecurity framework for federal agencies, public and private enterprises.

Regulations worth noting include the National Security Strategy, Executive Order 14028 (Improving the Nation's Cybersecurity), National Security Memorandum 5 (Improving Cybersecurity for Critical Infrastructure Control Systems), M-22-09 (Moving the U.S. Government Toward Zero-Trust Cybersecurity Principles), and National Security Memorandum 10 (Promoting United States Leadership in Quantum Computing While Mitigating Risks to Vulnerable Cryptographic Systems)[11]. These strategies are likely to incentivize participants to make investments in cybersecurity for the long-term.

More recently, the SEC's 4-day breach disclosure rule went into effect for large public enterprises in December 2023, and is likely to be a near-term tailwind for growth. State-issued data privacy laws are expected to go into effect in July 2024 in Oregon, Texas, Montana, and Florida following California's CCPA laws that went into effect in January 2020[12]. Further, zero trust mandates by the White House are likely to be implemented by federal agencies in 2024, with a focus on the categorization and securing of sensitive data, device inventory and visibility, and DNS/HTTP traffic encryption[13].

How to Invest in the Cybersecurity Theme?

Investors can gain access to the cybersecurity space through the Nasdaq CTA Cybersecurity™ Index (NQCYBR™). The index is designed to track the performance of companies engaged in the cybersecurity segment of the technology and industrial sectors. Companies included in the index are classified by the Consumer Technology Association (CTA) and are primarily involved in the building, implementation, and management of security protocols, applied to private and public networks, computers, and mobile devices, to protect the integrity of data and network operations. All index constituents must have a minimum free-float

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[8] https://www.bankinfosecurity.com/us-federal-budget-proposes-275b-for-cybersecurity-a-24575
[9] https://www.bloomberg.com/professional/insights/trading/cloud-security-remains-in-secular-growth-mode-with-a-long-runway/
[10] https://www.bloomberg.com/professional/insights/trading/cloud-security-remains-in-secular-growth-mode-with-a-long-runway/
[11] https://www.whitehouse.gov/briefing-room/statements-releases/2023/03/02/fact-sheet-biden-harris-administration-announces-national-cybersecurity-strategy/
[12] https://www.pillsburylaw.com/en/news-and-insights/consumer-privacy-laws-united-states-2024
[13] https://www.pwc.com/us/en/tech-effect/cybersecurity/zero-trust-security-cisas.html

market capitalization of $500 million, three-month average daily dollar trading volume of $1 million, and a minimum free float of at least 20%. The index is a modified free-float market capitalization index[14].

Index Methodology Update

On June 24th 2024, changes to the methodology of NQCYBR went effective. Under the new methodology, the three-stage weighting process now begins with Stage 1 initial weights set at a maximum of 8% of the index (versus 6% previously), with proportional redistribution using free float market capitalizations. In Stage 2, the five largest weights are maintained (as previously). For all other securities, weights are now capped at 4% of the index (versus 3% previously). In Stage 3, a minimum weight of 0.25% is applied, with a final round of proportional redistribution (as previously).[15]

How are Cybersecurity Companies Leveraging AI?

AI has emerged as a double-edged sword for cybersecurity companies. Bad actors have developed new attack strategies with generative AI. They are automating attacks, scanning wider attack surfaces, and targeting a broader range of victims. As these attacks are distinct by nature, they require more sophisticated solutions. On the flip side, cybersecurity companies are leveraging AI to automate threat response including prevention, detection, and response capabilities.

Several companies that make up the Nasdaq CTA Cybersecurity Index (NQCYBR) have brought to the market AI-based cybersecurity products and services, with a few companies ahead of the curve. Blackberry released CylancePROTECT, which delivers threat prevention powered by AI to identify threats before they cause harm. CrowdStrike announced a new AI-powered generative assistant called Charlotte AI in May 2023 to help everyday users operate as if they are seasoned security professionals. It announced a new AI-powered indicator of attack (IoA) model, which uses machine learning intelligence to stop breaches in real-time. Okta hasn't released an AI-based security product yet, but has announced that it will allocate $40 million of its annual R&D budget to new AI projects.

Generative AI-based solutions have also been leveraged quite rapidly. Zscaler has released AI-powered controls which use generative AI to improve threat detection and response. SentinelOne uses generative AI to stop attacks, combining a real-time neural network with a large language-model (LLM)-based natural language interface. Cloudflare released a tool called Cloudflare One, which uses generative AI tools without putting data at risk. The integration of AI into security offerings is expected to potentially act as a fillip to growth for companies in the near-term.

M&A Activity

M&A activity in the cybersecurity industry remained robust in 2022 and 2023, quite in contrast to overall M&A activity which was relatively subdued due to macroeconomic and geopolitical challenges[16,17]. The table below illustrates the range of acquisitions in the cybersecurity space, with two big-ticket deals of note including Broadcom's $61 billion acquisition of VMware and Cisco's $28 billion acquisition of Splunk. Cisco's $28 billion acquisition of Splunk, which was announced in September 2023, was the largest deal in the technology sector in 2023. This acquisition signaled to other participants Cisco's commitment to transition from a hardware-based business model to a more stable software-focused, recurring revenue model. It will allow Cisco to compete more effectively in a hybrid, multi-cloud and AIOps-driven world, and

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[14] https://indexes.nasdaqomx.com/docs/Methodology_NQCYBR.pdf
[15] https://indexes.nasdaqomx.com/docs/Methodology_NQCYBR.pdf
[16] https://www.pwc.com/us/en/industries/tmt/library/technology-deals-outlook.html
[17] https://www.skadden.com/insights/publications/2023/12/2024-insights/corporate-trends/global-ma-activity

will position it as one of the dominant players in the Security and Information Event Management (SIEM) sub-segment.

Google's $5.4 billion acquisition of Mandiant in 2022 sent a signal to market participants that cybersecurity, in particular cloud security, is a top priority for Big Tech companies. Mandiant, which was under the FireEye umbrella before it was rebranded, is credited for unearthing the high-profile SolarWinds hack[18]. This acquisition is also likely to help Google compete more closely with Amazon in the cloud cybersecurity space with a cyber defense toolkit that is more proactive than reactive in its operation[19]. The fragmented nature of the cybersecurity industry has lent itself to acquisition activity by private equity funds as well, including Thomas Bravo, Vista Equity, Crosspoint Capital Partners, and Carlyle.

With the Federal Reserve signaling initial rate cuts in 2024, the outlook for M&A activity in the U.S. is expected to improve, with M&A activity in the cybersecurity industry likely to receive a boost as well.

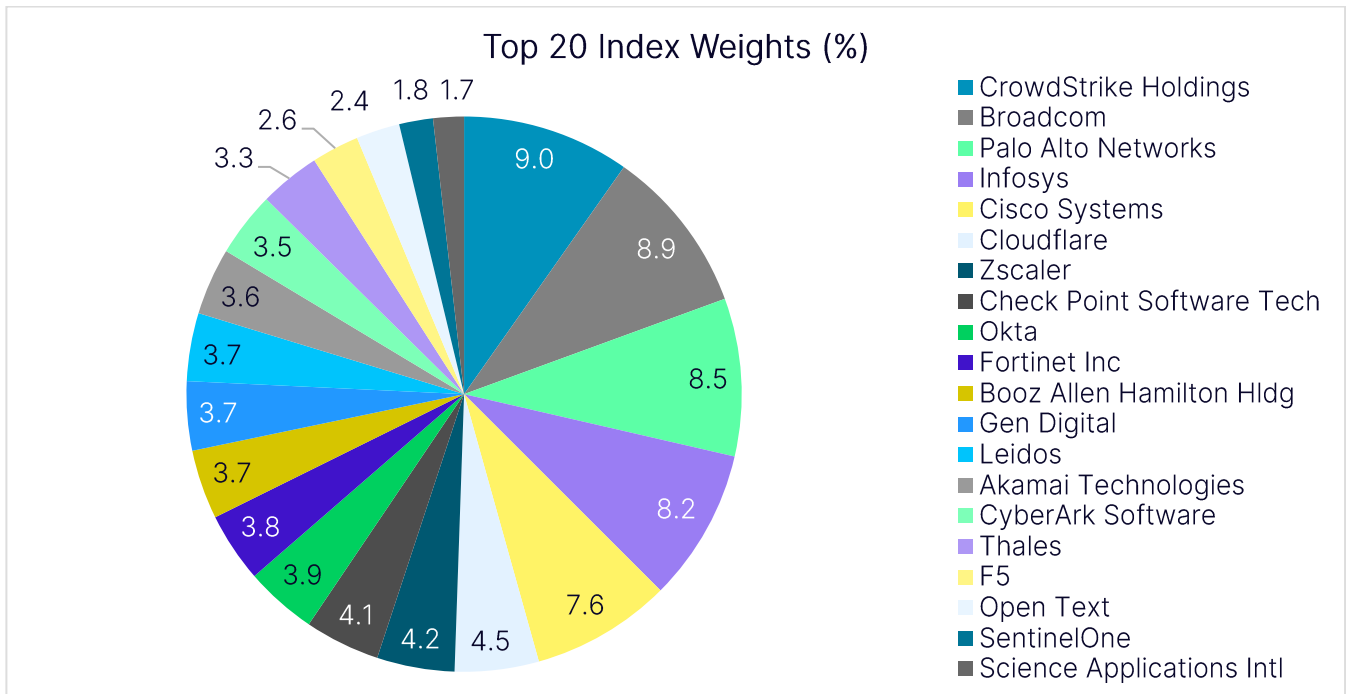| Target	Acquirer	Deal Value	Announcement Date	Premium
Darktrace	Thoma Bravo	$5.3 billion	4/26/2024	20%
Juniper	HPE	$ 14 billion	1/9/2024	32%
Splunk	Cisco	$28 billion	9/21/2023	31%
KnowBe4	Vista Equity	$4.6 billion	10/12/2022	44%
Ping Identity	Thoma Bravo	$2.4 billion	8/3/2022	63%
VMware	Broadcom	$61 billion	5/26/2022	44%
ManTech International	Carlyle	$4.2 billion	5/16/2022	17%
SailPoint Technologies	Thoma Bravo	$6.9 billion	4/11/2022	48%
Tufin	Turn/River	$570 million	4/6/2022	44%
Mandiant	Google	$5.4 billion	3/8/2022	57%
Mimecast	Permira	$5.8 billion	12/7/2021	16%
Talon Cybersecurity	Palo Alto	$625 million	11/6/2023	
Ermetic	Tenable Holdings	$265 million	10/8/2023	
Perimeter 81	Check Point Software	$490 million	9/7/2023	

Top 20 Index Weights

As of June 28th 2024, there were 29 constituents in the Nasdaq CTA Cybersecurity Index (NQCYBR). The top 20 companies represent 92.5% of the total index weight, while the top 10 companies represent 62.6% of the total index weight.

The top 20 names include the likes of Cisco, a legacy telecom hardware provider with a sizable and growing security offering, Broadcom, one of the world's largest semiconductor companies that also has a sizable security offering, a few classic Defense sector names that have expanded into cybersecurity (Thales/Leidos/Booz Allen Hamilton), and otherwise mostly an assortment of pure-play cybersecurity companies such as CrowdStrike, Gen Digital, Fortinet, Cloudflare, and Palo Alto Networks. These companies mostly span a variety of sub-sectors of the Technology and Telecommunications industries, including software, semiconductors, telecommunications equipment, computer services and consumer digital services. Software, with an index weight of 40.9%, has the highest total index weight of all sub-sectors. These companies are at the forefront of innovation in cybersecurity and have launched security tools that protect endpoints, networks, and cloud environments. Recently, they have been integrating AI into their security tools to simplify operations and increase efficiency.
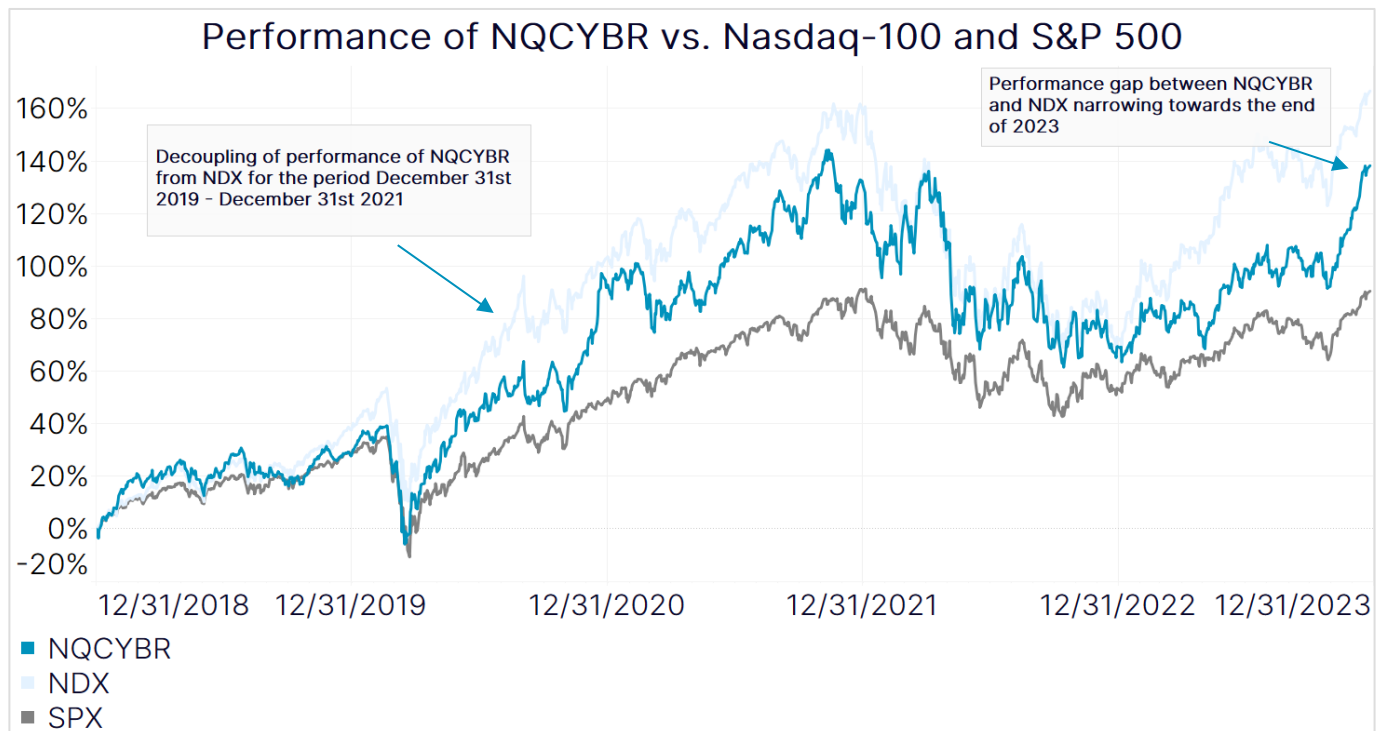
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[18] https://www.cnbc.com/2022/03/08/google-plans-to-acquire-mandiant-for-5point4-billion.html
[19] https://www.theregister.com/2022/10/11/google_mandiant_brain/

Top 20 Index Weights (%)

■ CrowdStrike Holdings	
■ Broadcom	
■ Palo Alto Networks	
■ Infosys	
■ Cisco Systems	
■ Cloudflare	
■ Zscaler	
■ Check Point Software Tech	
■ Okta	
■ Fortinet Inc	
■ Booz Allen Hamilton Hldg	
■ Gen Digital	
■ Leidos	
■ Akamai Technologies	
■ CyberArk Software	
■ Thales	
■ F5	
■ Open Text	
■ SentinelOne	
■ Science Applications Intl	

Performance vs. Competitor Indexes

For the five-year period ending December 29th 2023, the NQCYBR index generated positive price returns of 135.5%, outperforming the S&P 500 by 45 percentage points, while underperforming the Nasdaq-100® by 30 percentage points. For the full year 2023, the NQCYBR index generated returns of 39.1%, outperforming the S&P 500 by approximately 15 percentage points while underperforming the Nasdaq-100 by approximately 15 percentage points. As of March 28th, 2024, the NQCYBR index generated year-to-date returns of 4.9%, underperforming the Nasdaq-100 and the S&P 500, which generated returns of 8.5% and 10.2% respectively.

Performance of NQCYBR vs. Nasdaq-100 and S&P 500

Decoupling of performance of NQCYBR from NDX for the period December 31st 2019 - December 31st 2021

Performance gap between NQCYBR and NDX narrowing towards the end of 2023
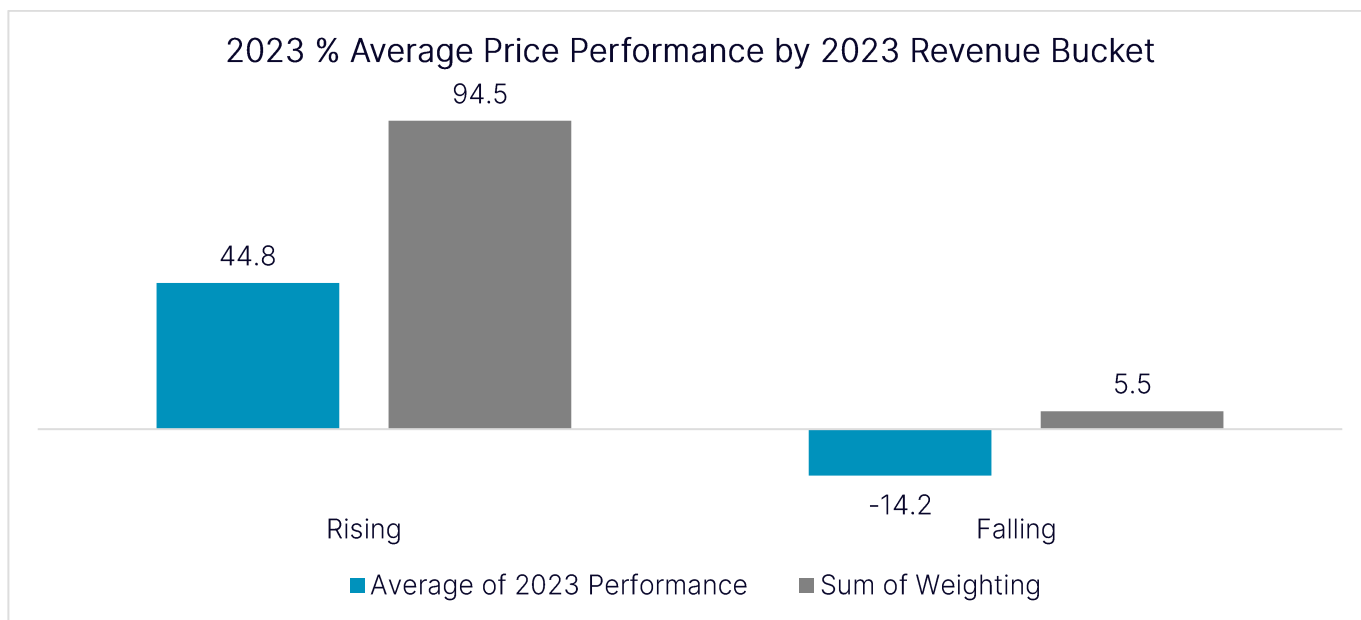
■ NQCYBR
■ NDX
■ SPX

Revenue and Correlation to Performance

For the full year 2023, 28 of 32 companies (94.5% of index weight) tracked by the index grew their revenues by 18% on average, due to strong demand for cybersecurity products, with AI and cloud transformation boosting revenue growth. Several companies that make up the NQCYBR index were able to post strong revenue growth despite headwinds from greater scrutiny on IT budgets. For example, CrowdStrike reported one of its best quarters in history in 4Q 2023, beating expectations on all metrics. Its total revenues grew by 33% y-o-y, with its ARR (annualized recurring revenues) growing by 34% y-o-y, largely due to the rapid growth in cloud and identity segments[20]. Other companies in the index including Cisco Systems were weighed down by weaker demand from service providers, while Qualys was pressured by exposure to legacy virtual environments.

For the rest of 2024, the outlook for revenue growth for the index constituents remains cautiously optimistic. It is expected to be driven by robust demand for cybersecurity solutions, particularly from zero trust, as well as AI and cloud-related tailwinds, but somewhat offset by risks from longer sales cycles.

In terms of fundamentals leading performance, companies with revenues that grew in 2023 outperformed companies with revenues that declined, by an average of 60 percentage points.

2023 % Average Price Performance by 2023 Revenue Bucket

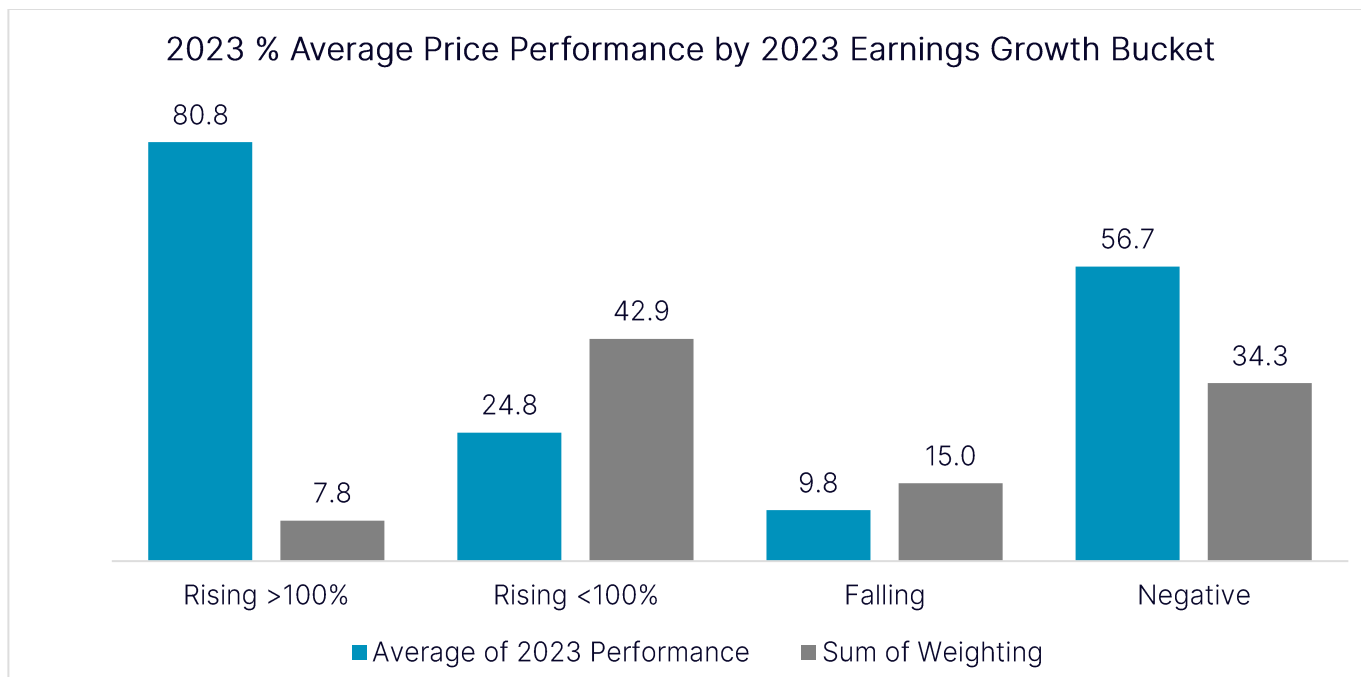|	Rising	Falling
Average of 2023 Performance	44.8	-14.2
Sum of Weighting	94.5	5.5

Earnings and Correlation to Performance

For the full year 2023, 14 out of 32 companies (50.7% of index weight) tracked by the index saw their earnings increase y-o-y. Of this subset, companies that grew earnings the fastest (>100%), with a total index weight of 7.8%, were up 80.8% on average, outperforming the rest of the index. Companies that saw their earnings decline, while remaining profitable overall, were up 9.8%, underperforming the rest of the index. Companies that saw earnings grow at a slower rate (<100%) were up 24.8%.

While these subsets behaved as expected, there was a disconnect with the other subset of the index. Companies that posted losses, with an index weight of 34.3%, registered positive returns of 56.7% on average. As a subgroup, they outperformed all but one subset, suggesting some disconnect with fundamentals.
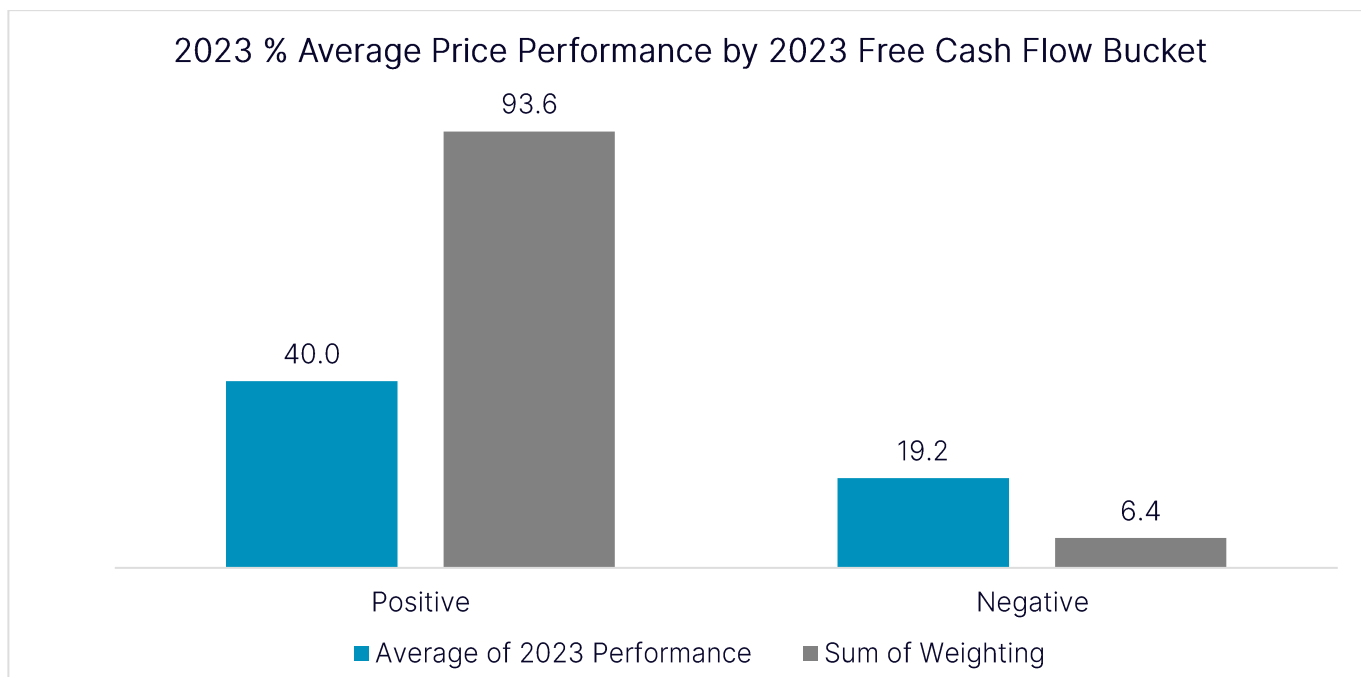
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[20] https://ir.crowdstrike.com/news-releases/news-release-details/crowdstrike-reports-fourth-quarter-and-fiscal-year-2024

Earnings of several companies that make up the index received a boost from strong traction for certain sub-segments of cybersecurity including cloud, AI, and identity, along with strong execution and expense discipline. For the rest of the index constituents, macro/FX headwinds, longer sales cycles, and loss of share to competitors weighed more heavily on earnings.

2023 % Average Price Performance by 2023 Earnings Growth Bucket

Legend: ■ Average of 2023 Performance ■ Sum of Weighting

Categories: Rising >100% (80.8, 7.8), Rising <100% (24.8, 42.9), Falling (9.8, 15.0), Negative (56.7, 34.3)
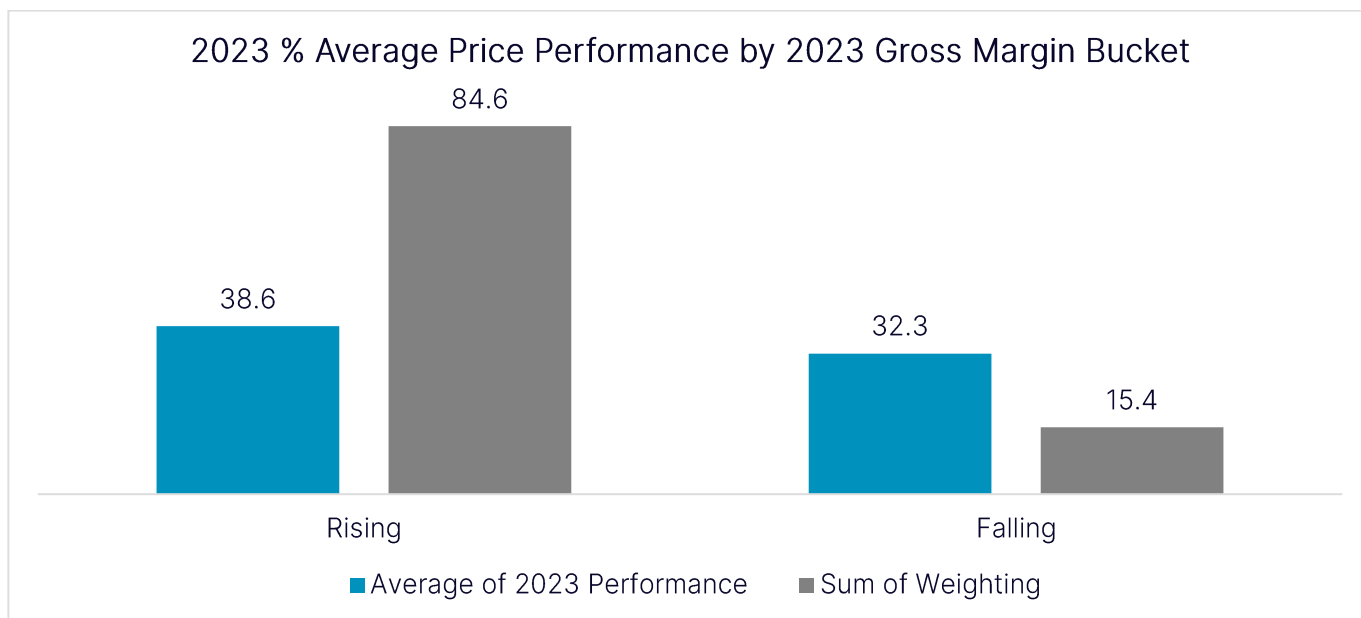
Free Cash Flow and Correlation to Performance

For the full year 2023, companies that were free cash flow positive made up 94% of index weight. As a group, they were up 40.0% on average, outperforming companies that were free cash flow negative by 21 percentage points. It is encouraging that there was an improvement by approximately 4 percentage points in terms of index weight that was free cash positive in 2023 versus 2022.

2023 % Average Price Performance by 2023 Free Cash Flow Bucket

Legend: ■ Average of 2023 Performance ■ Sum of Weighting

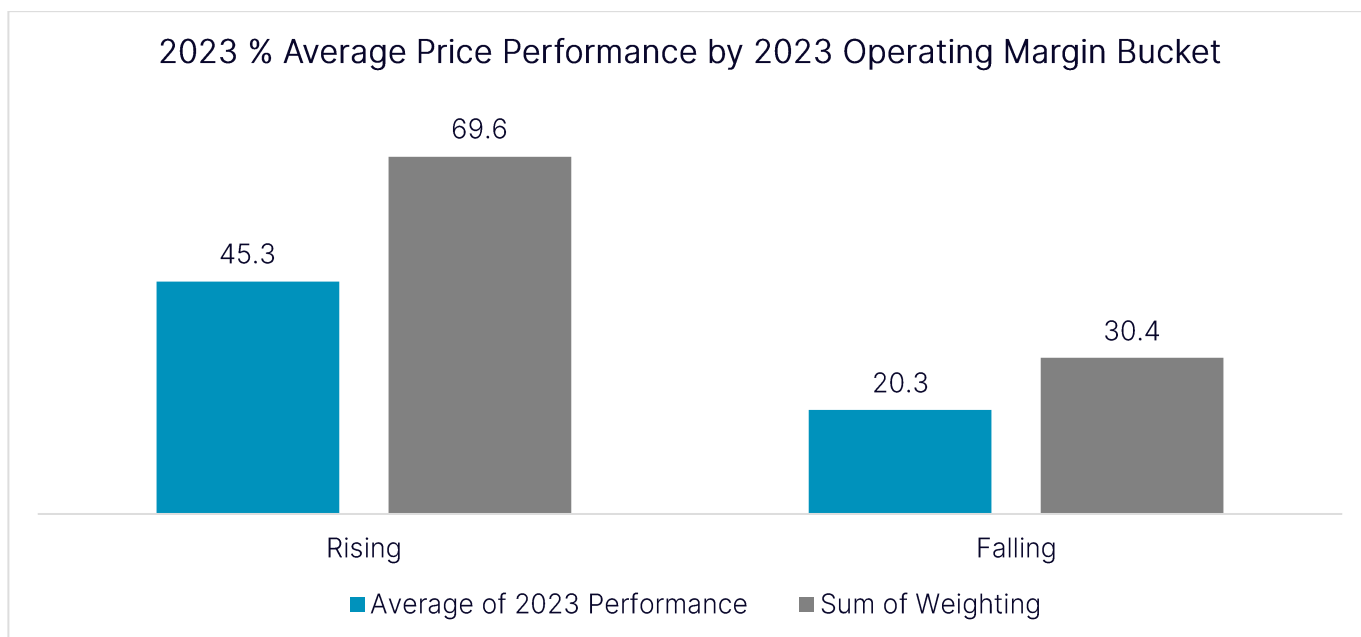Categories: Positive (40.0, 93.6), Negative (19.2, 6.4)

Gross Margin and Correlation to Performance

For the full year 2023, 26 out of 32 companies (84.6% of index weight) tracked by the index saw their gross margins increase y-o-y. As a group, they outperformed the subset that saw gross margins decline by 6 percentage points, of which there were 6 companies representing 15.4% of index weight. What is particularly encouraging is that several companies reported healthy gross margins in 2023 and are also optimistic about gross margin expansion in 2024, despite operating in a challenging macroeconomic backdrop.

2023 % Average Price Performance by 2023 Gross Margin Bucket

Rising: Average of 2023 Performance 38.6, Sum of Weighting 84.6
Falling: Average of 2023 Performance 32.3, Sum of Weighting 15.4

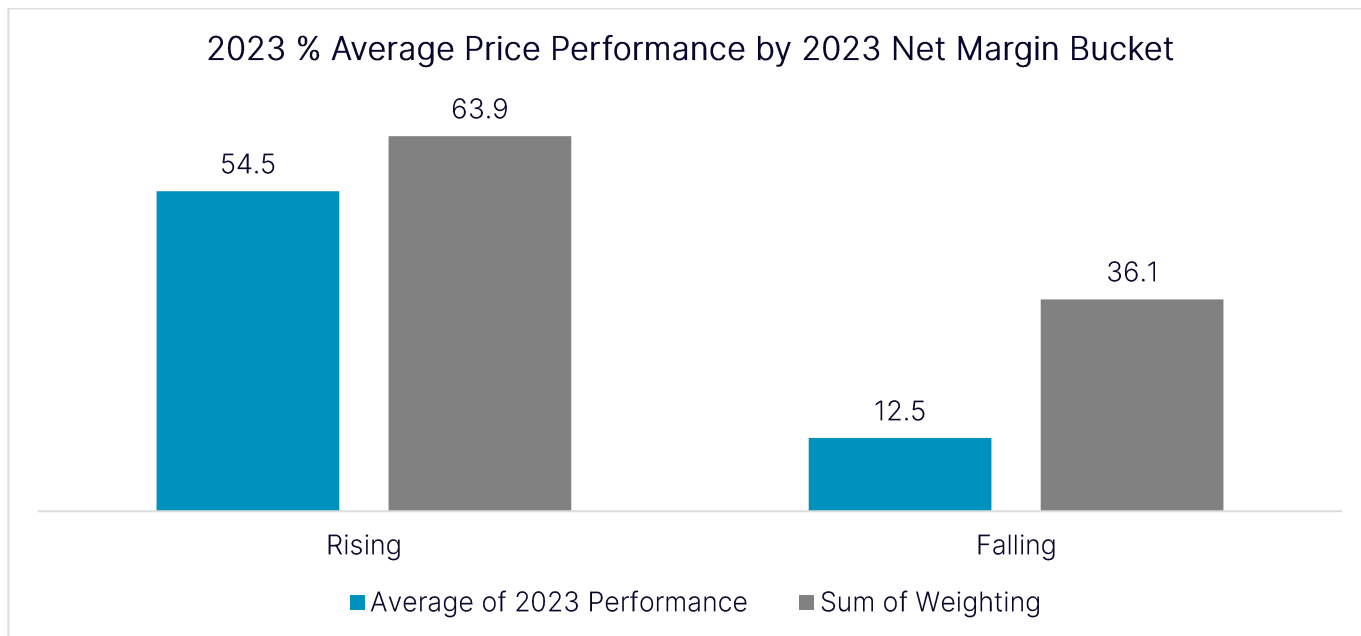Legend: ■ Average of 2023 Performance ■ Sum of Weighting

Operating Margin and Correlation to Performance

For the full year 2023, 22 out of 32 constituents (69.6% of index weight) tracked by the index saw their operating margins increase y-o-y. As a group, they outperformed the subset of companies that saw operating margins decline by approximately 25 percentage points, on average. 10 out of 32 constituents (30.4% of index weight) tracked by the index saw their operating margins decrease y-o-y.

2023 % Average Price Performance by 2023 Operating Margin Bucket

Rising: Average of 2023 Performance 45.3, Sum of Weighting 69.6
Falling: Average of 2023 Performance 20.3, Sum of Weighting 30.4

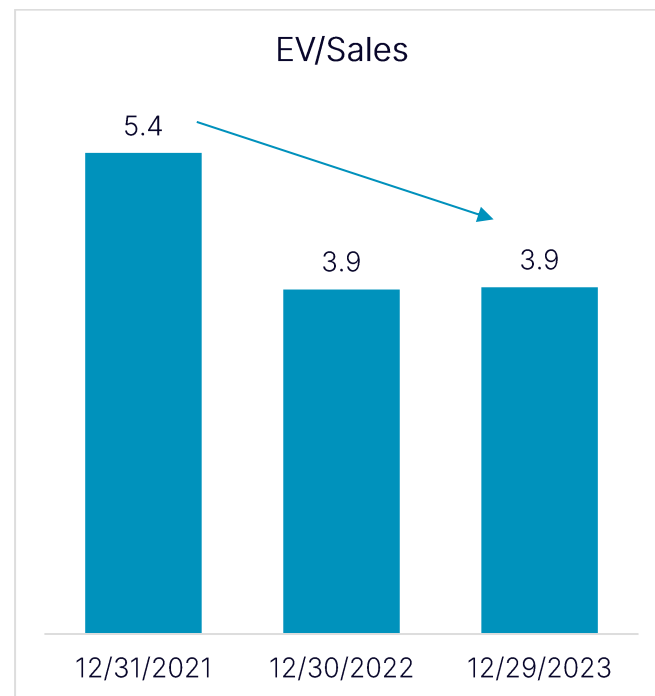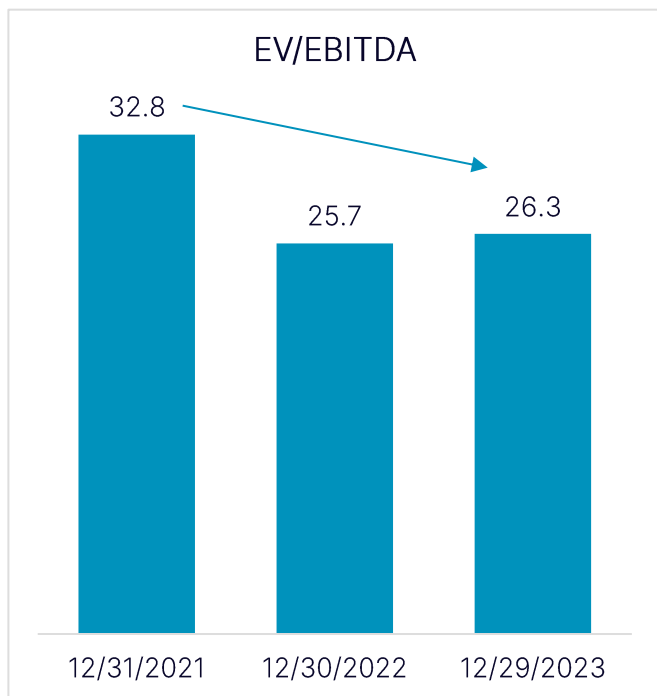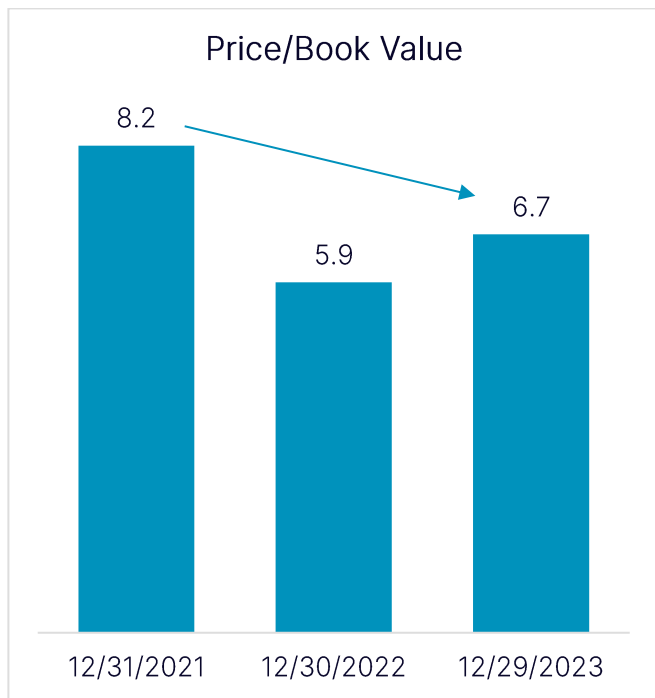Legend: ■ Average of 2023 Performance ■ Sum of Weighting

Net Margin and Correlation to Performance

For the full year 2023, 19 out of 32 constituents (63.9% of the index weight) tracked by the index saw their net margins increase y-o-y. As a group, they outperformed the subset of companies that saw net margins decline by a whopping 42 percentage points, on average. 13 out of 32 constituents (36.1% of index weight) tracked by the index saw their net margins decrease y-o-y.

2023 % Average Price Performance by 2023 Net Margin Bucket

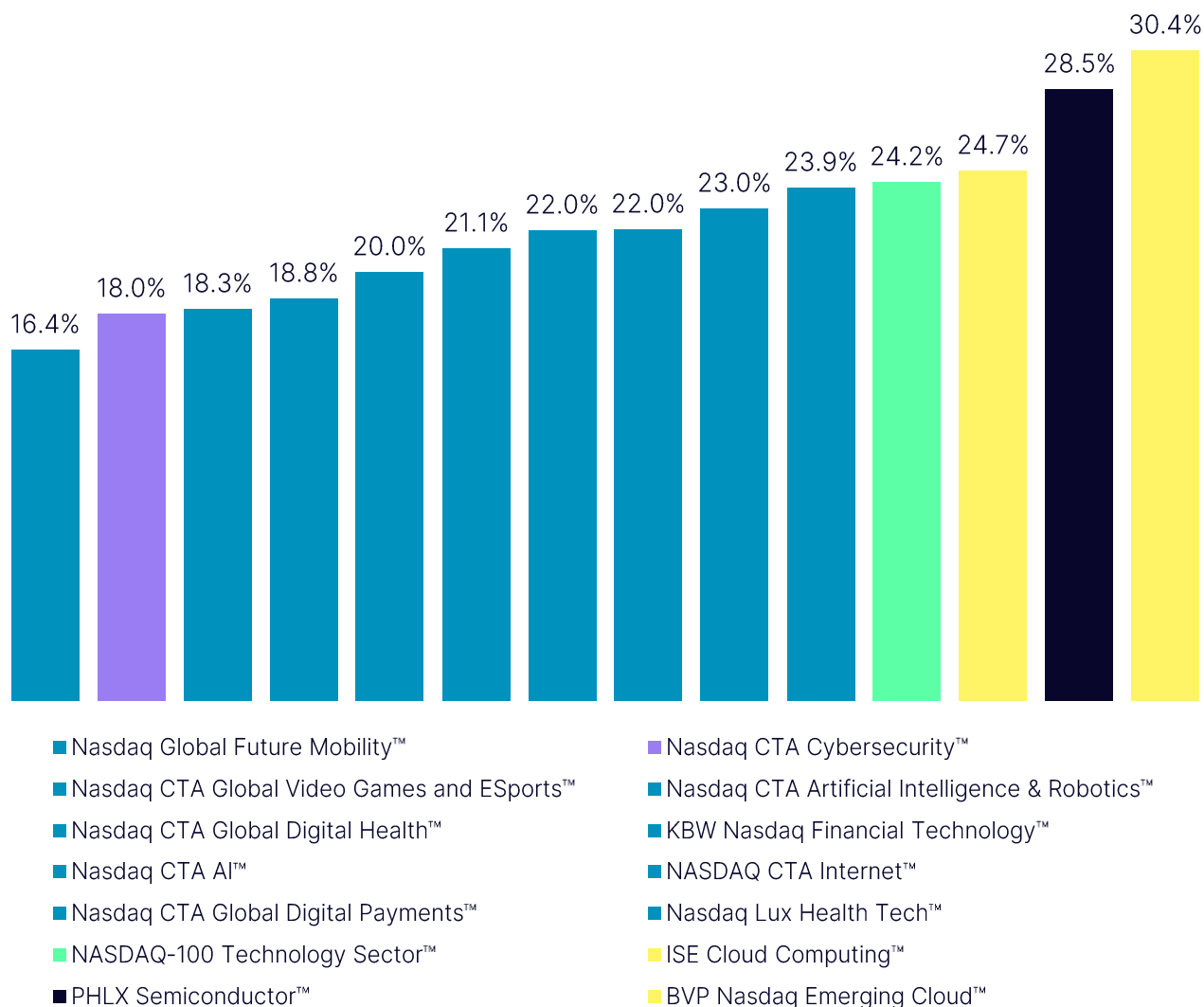| Net Margin Bucket	Average of 2023 Performance	Sum of Weighting
Rising	54.5	63.9
Falling	12.5	36.1

Index Valuations

Since year-end 2021, the Nasdaq CTA Cybersecurity Index (NQCYBR) has gotten cheaper on all four index-weighted valuation metrics: price-to-earnings, price-to-book, EV/EBITDA, and EV/Sales. Multiples contracted dramatically throughout 2022 as investors factored in the impact of rate hikes and a potential recession on valuations. In 2023, investors elevated AI as a theme over other areas of technology, with sentiment towards cybersecurity somewhat subdued relative to AI. Regardless, NQCYBR generated a total return of 40.7% in 2023; despite this impressive performance, valuations did not increase materially as fundamentals like revenue, earnings, and cash flow continued to grow at healthy rates. Looking ahead into the rest of 2024, the latest consensus estimates anticipate the entire index to normalize to a P/E of approximately 22.8 by year-end.

Price/Earnings

40.0

26.5

28.3

12/31/2021   12/30/2022   12/29/2023

Price/Book Value

8.2

5.9

6.7

12/31/2021   12/30/2022   12/29/2023

EV/EBITDA

32.8

25.7

26.3

12/31/2021   12/30/2022   12/29/2023

EV/Sales

5.4

3.9

3.9

12/31/2021   12/30/2022   12/29/2023

Defensive and Differentiated within Broader Tech and Thematics

The Nasdaq CTA Cybersecurity Index (NQCYBR) registered lower volatility than all but one index in a broad sampling of Nasdaq Thematic Tech Indexes, reinforcing the idea that it is a more defensive play within its peer group. For FY 2023, it registered annualized volatility of 18.0%, lower than twelve other Thematic Tech indexes, including Semiconductors (SOX™), Cloud Computing (CPQ™, EMCLOUD™) benchmarks, and the broader Nasdaq-100 Technology Sector™ Index (NDXT™).
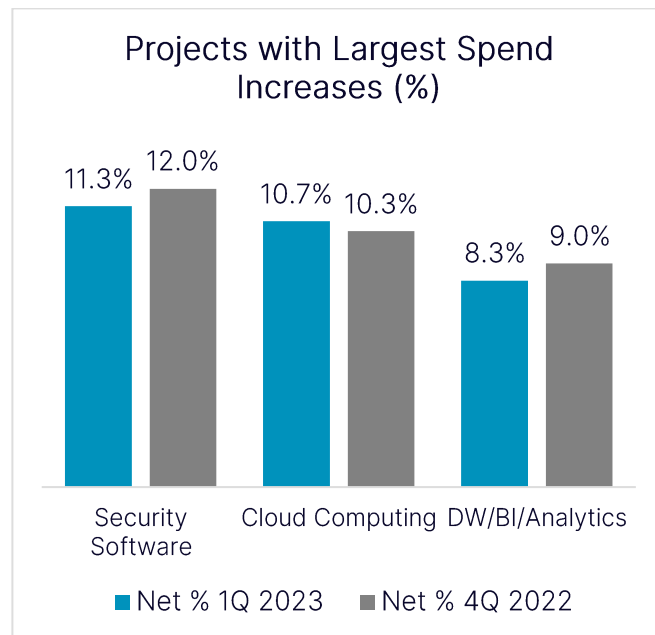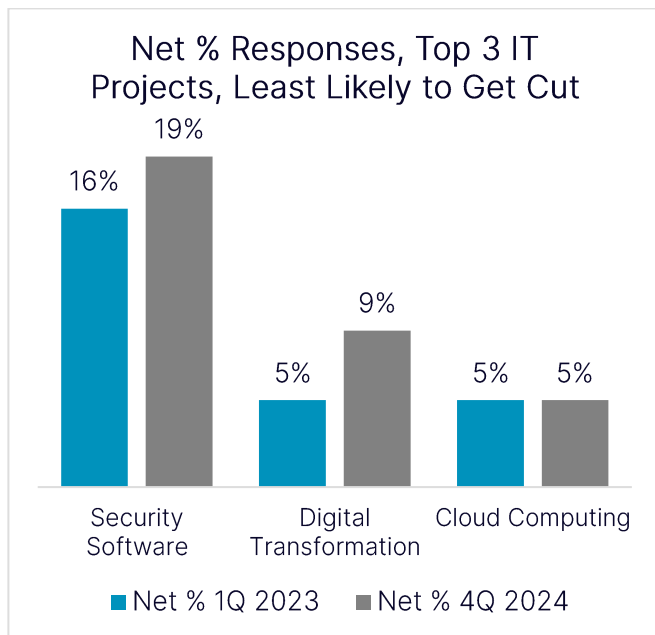
NQCYBR vs. Nasdaq Thematic Indexes, FY 2023 Volatility

Bar chart values (left to right):
- 16.4% — Nasdaq Global Future Mobility™
- 18.0% — Nasdaq CTA Cybersecurity™
- 18.3% — Nasdaq CTA Global Video Games and ESports™
- 18.8% — Nasdaq CTA Artificial Intelligence & Robotics™
- 20.0% — Nasdaq CTA Global Digital Health™
- 21.1% — KBW Nasdaq Financial Technology™
- 22.0% — Nasdaq CTA AI™
- 22.0% — NASDAQ CTA Internet™
- 23.0% — Nasdaq CTA Global Digital Payments™
- 23.9% — Nasdaq Lux Health Tech™
- 24.2% — NASDAQ-100 Technology Sector™
- 24.7% — ISE Cloud Computing™
- 28.5% — PHLX Semiconductor™
- 30.4% — BVP Nasdaq Emerging Cloud™

Legend:
- ■ Nasdaq Global Future Mobility™
- ■ Nasdaq CTA Cybersecurity™
- ■ Nasdaq CTA Global Video Games and ESports™
- ■ Nasdaq CTA Artificial Intelligence & Robotics™
- ■ Nasdaq CTA Global Digital Health™
- ■ KBW Nasdaq Financial Technology™
- ■ Nasdaq CTA AI™
- ■ NASDAQ CTA Internet™
- ■ Nasdaq CTA Global Digital Payments™
- ■ Nasdaq Lux Health Tech™
- ■ NASDAQ-100 Technology Sector™
- ■ ISE Cloud Computing™
- ■ PHLX Semiconductor™
- ■ BVP Nasdaq Emerging Cloud™

Cybersecurity Spending Surveys Reinforce Defensive Nature

As has been the case for several years running, CIOs again expect cybersecurity to be a top area of IT investment in 2024, followed by business intelligence/data analytics and cloud platforms[21]. As per the most recent survey by Gartner, 80% of respondents expect to increase investment in cybersecurity in 2024. The study's results reinforce findings from a survey done by Morgan Stanley in 2023, which records responses to more than 40 areas of IT spending in terms of those that are least likely and most likely to get cut. Ranked by net responses, security software scores by far the highest not only because it has the greatest number of "least likely" responses, but also has zero responses labeling it "most likely to get cut". Security software is unlikely to be cut even in a recessionary environment, as the survey indicated in the depths of the Tech bear market in 2022. These findings continue to underscore the underlying defensive nature of cybersecurity versus other areas of technology.

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[21] https://www.gartner.com/en/newsroom/press-releases/2023-10-17-gartner-survey-of-over-2400-cios-reveals-that-45-percent-of-cios-are-driving-a-shift-to-co-ownership-of-digital-leadership

Net % Responses, Top 3 IT Projects, Least Likely to Get Cut

Security Software: 16% (Net % 1Q 2023), 19% (Net % 4Q 2024)
Digital Transformation: 5% (Net % 1Q 2023), 9% (Net % 4Q 2024)
Cloud Computing: 5% (Net % 1Q 2023), 5% (Net % 4Q 2024)

■ Net % 1Q 2023 ■ Net % 4Q 2024

Projects with Largest Spend Increases (%)

Security Software: 11.3% (Net % 1Q 2023), 12.0% (Net % 4Q 2022)
Cloud Computing: 10.7% (Net % 1Q 2023), 10.3% (Net % 4Q 2022)
DW/BI/Analytics: 8.3% (Net % 1Q 2023), 9.0% (Net % 4Q 2022)

■ Net % 1Q 2023 ■ Net % 4Q 2022

Source: AlphaWise, Morgan Stanley Research, n=100 (US and EU data)

Conclusion

Companies that make up the Nasdaq CTA Cybersecurity Index continue to be well-positioned to capture value in an environment that is seeing increased "platformization" and a shift towards the cloud. Fundamentals of the sector continue to be strong, with artificial intelligence driving renewed investor interest. While there are some near-term risks by way of weaker billings, longer sales cycles, and increased budget scrutiny, they are likely to be outweighed by a strong demand environment. Gartner's most recent spending projections on cybersecurity were revised upward to a growth rate of 14% in 2024, lending further support to the theme's underlying story of consistent, above-average growth. Lastly, as hacks continue to proliferate and regulatory pressures increase, end-users are ever more likely to shore up their cybersecurity defenses in the years ahead.

Investors looking to gain exposure to companies that provide cybersecurity solutions can invest in multiple products tracking the Nasdaq CTA Cybersecurity Index, including the First Trust Nasdaq Cybersecurity ETF (Nasdaq: CIBR), the First Trust Nasdaq Cybersecurity UCITS ETF (London: CIBR), the ProShares Ultra Nasdaq Cybersecurity ETF (Nasdaq: UCYB), and the Betashares Global Cybersecurity ETF (Australia: HACK).

Sources: Nasdaq Global Indexes, FactSet, Bloomberg