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Internet | North America

ChatGPT: What is it? Why it Matters? Is it a Google Threat...and Broader Industry Implications

Investor questions about OpenAI and ChatGPT have picked up after its viral launch. We detail what ChatGPT is, why we believe Google Search is still well positioned (and set to improve with its own AI/ML offerings), broader industry and stock implications, and what to watch for next.

Who is OpenAI? OpenAI is an artificial intelligence research company founded in 2015 by Sam Altman, Elon Musk, and several others. Its mission is to ensure that AI benefits all of humanity by building safe artificial general intelligence. It started as a non-profit and evolved into a "capped profit" company – hybrid of a for-profit (OpenAI LP) and nonprofit (OpenAI Nonprofit entity) – in order to raise additional capital, attract talent, and scale. As a result investors and employees can receive a capped return. Returns in excess of the capped return are owned by the OpenAI Nonprofit. We believe OpenAI LP has several hundred employees, and to-date has raised \$2bn+ (\$1bn investment from MSFT, and \$1bn of grants from AWS, Infosys, Y Combinator, Peter Theil, and Reid Hoffman). It has three primary offerings today: [ChatGPT](#), [DALL-E 2](#), and [Whisper](#).

Meet OpenAI's ChatGPT: OpenAI recently launched ChatGPT, a large-scale natural language model with a prompt for users to submit questions into. ChatGPT then responds with human-like (coherent/natural) answers. In simple terms, it's a **broad-based, highly-sophisticated chat bot that offers answers that read like they are coming from a human** (see examples in [Appendix](#)). GPT was trained over the last ~3 years by ingesting large amounts of text data across the internet. It launched to the public on 11/30/22 and amassed 1mn users within a week. Its interest on Google Trends (See [Exhibit 1](#)) and Twitter speak to the high level of interest in this notable next step in the use of AI.

Is Chat GPT a Structural Threat to Google Search? The viral launch of ChatGPT has caused some investors to question whether this poses a new disruption threat to Google Search. The Google bear case would be that language models could continue to gain users and take share of Search queries and disrupt Google's position as the entry point for people on the Internet. While we believe the near-term risk is limited – we believe the use case of search (and paid search) is different than AI-driven content creation – **we are not dismissive of threats from new, unique consumer offerings**. Think about the potential AI-driven use cases around product reviews or travel research (to name just two), which over

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time could cause a change in consumer behavior. That said, **we now detail two key points that (for now) leave us confident in Google's durable position.**

1. Scale and the 10X Rule Matter: Google has an estimated ~4bn+ daily users, with billions of searches per day. While we are not dismissive of disruptive technologies, we continue to believe that technologies need to offer 10X better solutions than the second best offering to drive significant (aka billions of people) behavioral change. The volume and consistency of consumers' activity speaks to how they derive utility from Google (see even our recent AlphaWise survey on Google as a starting point [here](#))...so driving significant differentiation and change will be challenging. Google Search also continues to improve with thousands of changes made to paid search per year.

2. Google Invests Hard in AI/ML, Already Has Multiple Products and (We Believe) More To Come: Google has spent \$100bn/\$79bn on R&D and capex over the past 3 years alone and has ~187k employees (up from 119k in 2019). We don't see this letting up either, modeling R&D to grow at a 13% '23-'25 CAGR and for infrastructure annual capex to reach ~\$30bn by '25. We estimate roughly 50% of GOOGL's headcount is engineers, with our **industry conversations continuing to indicate GOOGL is the big cap tech leader of AI/ML research and investment.** Google is also building similar natural language models such as **LaMDA**, which it showed powerful examples of in 2021 (see [here](#)). Google hasn't released LaMDA broadly to the public, but we look for further products to come over time. Google has also been investing in **BERT**, a machine learning architecture that helps Google process language and better understand context, for 5+ years. There are likely more products we don't even know about too, as consider that last Friday, GOOGL's Deepmind announced the release of **Dramatron**, a vertical specific language model enabling writers to co-create theatre and film scripts (complete with title, characters, location descriptions, and dialogue).

Broader Industry Implications from ChatGPT? Expect AI and ML Investment to Continue to Ramp: GOOGL has been speaking about investing in AI/ML for nearly 20 years (first mentioned in 2005 10k) and on its 3Q:22 call spoke to AI powered Search (and large language models) at the top of its 4 key investment initiatives (AI, YouTube, Hardware, Cloud). META's step up to \$35.5bn in estimated '23 capex is largely driven by further investment in AI/ML and higher-end GPUs to allow for more analytics and computations of its leading first party data. We also expect PINS/SNAP to spend more with third party cloud services in '23 in order to use more AI/ML models and capabilities. Expect the investment in AI/ML to continue to ramp...and for the engagement and monetization capabilities of these large, leading platforms to expand in '23/'24 and beyond. From our perspective, **this will put the scale leaders (with more ability and willingness to invest) at an advantage.** As a read across, this would also be a tailwind to component vendors such as NVDA, AMD, MRVL, INTC, AVGO, ANET, and PSTG. NVDA/AMD/MRVL/INTC/AVGO are covered by Joe Moore, ANET/PSTG are covered by Meta Marshall.

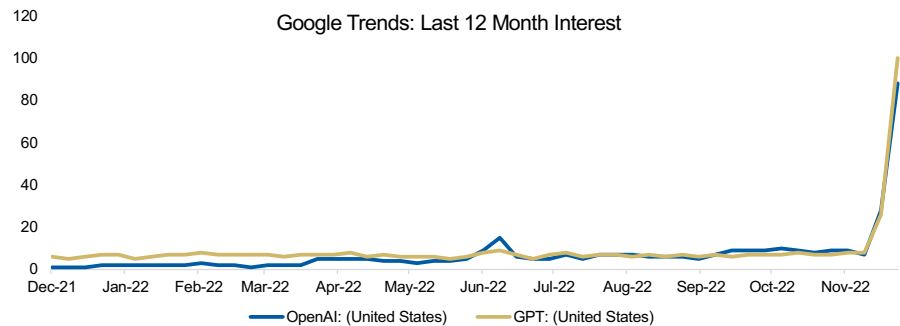
What to Watch for Next From ChatGPT?

1) What Will Improve With GPT-4, the next iteration of OpenAI's GPT algorithm? The launch timing is uncertain (some sources suggest 2023), but what improvements come will matter. We will be very focused on improvements to

the user experience/interface and a clearer path towards monetization.

2) How Will MSFT's Involvement with ChatGPT evolve? ChatGPT and other OpenAI services run on Azure infrastructure. The two companies have a deep partnership. We have seen MSFT integrate OpenAI's text to image generator (DALL-E 2) into its new Designer App and will be watching as to whether it will integrate its unique ChatGPT technology into its Bing search offering. MSFT is covered by Keith Weiss.

Appendix

Exhibit 1: Interest in OpenAI and GPT inflected meaningfully with the launch of ChatGPT in late November

Source: Google Trends, Morgan Stanley Research

Exhibit 2: Background of OpenAI generated by ChatGPT:

K What is the history of OpenAI?



OpenAI is a research institute founded in 2015 by Elon Musk, Sam Altman, and other prominent figures in the technology industry with the goal of promoting and developing friendly artificial intelligence. The organization was founded with the belief that AI has the potential to be a powerful tool for improving our lives, but that it is also important to ensure that it is developed safely and responsibly. OpenAI conducts research in a wide range of areas related to artificial intelligence, including machine learning, robotics, and economics.

K Who has OpenAI partnered with?



OpenAI partners with a number of organizations and companies in the technology industry, including Microsoft and Amazon Web Services. These partnerships allow OpenAI to leverage the resources and expertise of these companies to further its research and development efforts in the field of artificial intelligence. In addition, OpenAI also works with academic institutions and other research organizations to advance the state of the art in AI and to promote the responsible development of the technology.

K What's the ownership structure of OpenAI?

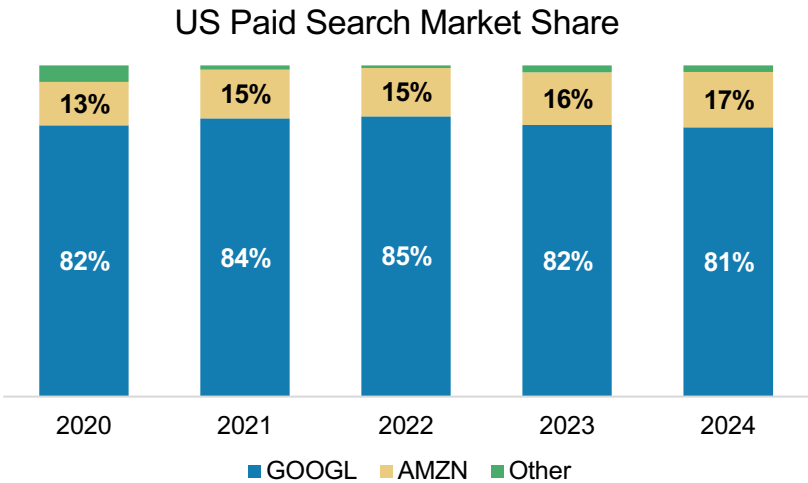


OpenAI is a non-profit organization, and as such it does not have traditional owners or shareholders. Instead, it is funded by a combination of donations, grants, and partnerships with companies in the technology industry. The organization is governed by a board of directors, which includes representatives from its founding organizations as well as other experts in the fields of technology, AI, and ethics.

In addition to its board of directors, OpenAI also has a research team and staff members who work on its various projects and initiatives. The organization has a decentralized structure, with researchers and staff working on a wide range of projects in different areas of AI. This allows OpenAI to be flexible and adaptable in its approach to research and development in the field of artificial intelligence.

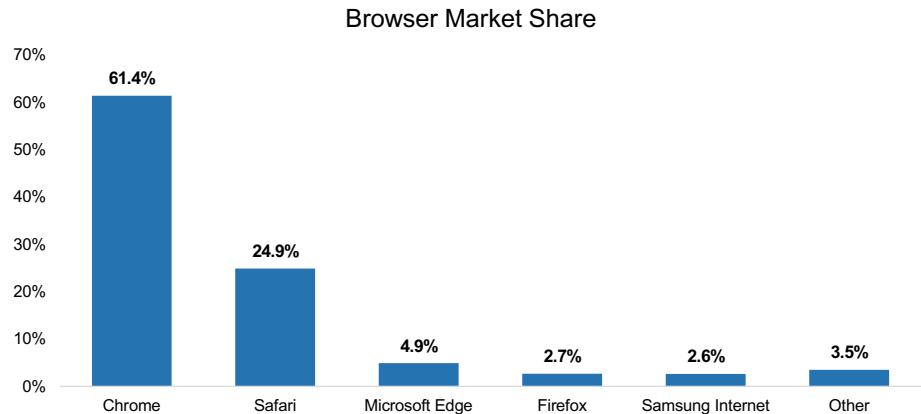
Source: OpenAI, Morgan Stanley Research

Exhibit 3: Google has leading share of Paid Search... we estimate 85% of US paid search in '22



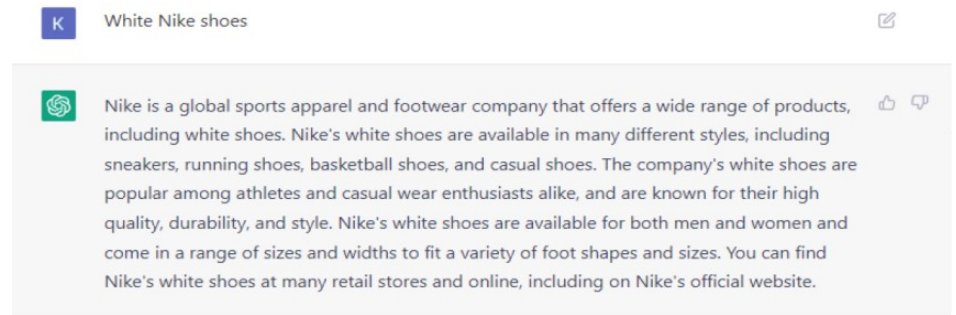
Source: Company data, Morgan Stanley Research

Exhibit 4: Google also has leading share of the Browser market at ~60% share... which combined underscore how difficult it will be to shift user behavior away from Google Search



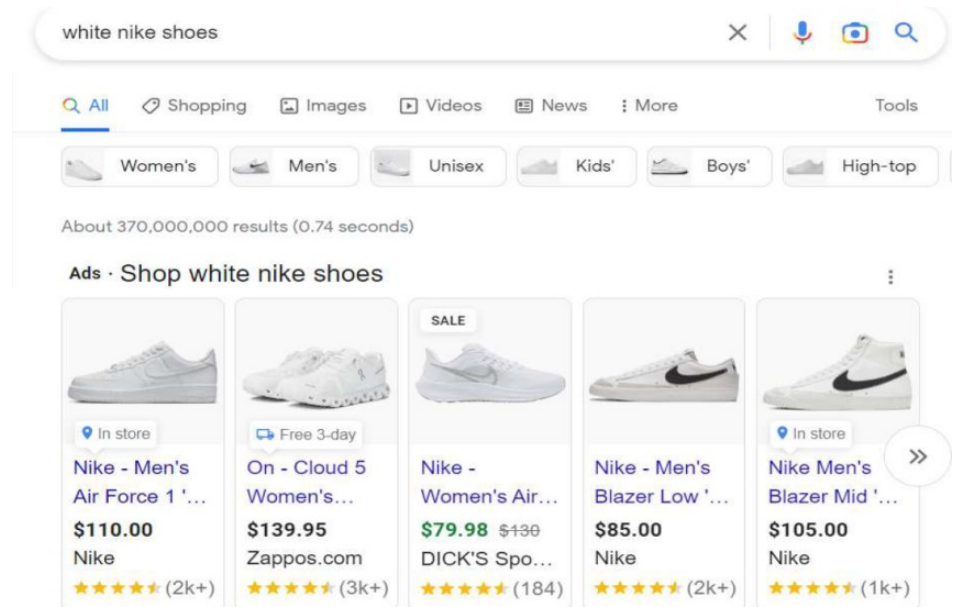
Source: Similarweb, Morgan Stanley Research

Exhibit 5: There are also certain queries that would be difficult create ad formats for using ChatGPT or other large language models... below is the response from ChatGPT when typing in "white nike shoes"



Source: OpenAI, Morgan Stanley Research

Exhibit 6: Here is the same query in Google, which clearly directs the user to products of interest...



Source: Google Search, Morgan Stanley Research

Exhibit 7: ... but it's not unfeasible:

K What airlines have the cheapest flights to Paris?



The cost of flights to Paris can vary depending on a number of factors, including the time of year, the specific departure and arrival airports, and the availability of promotions and discounts. In general, however, there are several airlines that are known for offering relatively cheap flights to Paris, including the following:



- * [Air France](#) ← Insert Affiliate Link
- * KLM
- * Norwegian Air
- * Air Canada
- * Turkish Airlines

It is always a good idea to compare prices from different airlines to find the best deal on a flight to Paris. You can do this easily by using a travel booking website or app, such as Expedia, Kayak, or Orbitz, which will allow you to search for flights from different airlines and compare prices.

In addition, it can be helpful to be flexible with your travel dates and to book your flight in advance in order to take advantage of the best prices and promotions. You can also sign up for fare alerts from airlines and travel websites, which will notify you when prices drop for flights to Paris.

Source: OpenAI, Morgan Stanley Research

Risk Reward – Alphabet Inc. (GOOGL.O)

Alphabet Inc.

PRICE TARGET \$120.00

Our price target is determined using a discounted cash flow/discount to long-term EBITDA multiple. It implies a ~12X 2023e adjusted EBITDA. Our DCF uses a ~10.5% WACC and a ~3% terminal growth rate (in line with other growth-oriented internet companies). Our multiple based valuation uses a ~12.5x EV/EBITDA multiple, ~7% below the 3-year median.

Consensus Price Target Distribution

\$93.00 \$127.80 \$169.50

MS PT

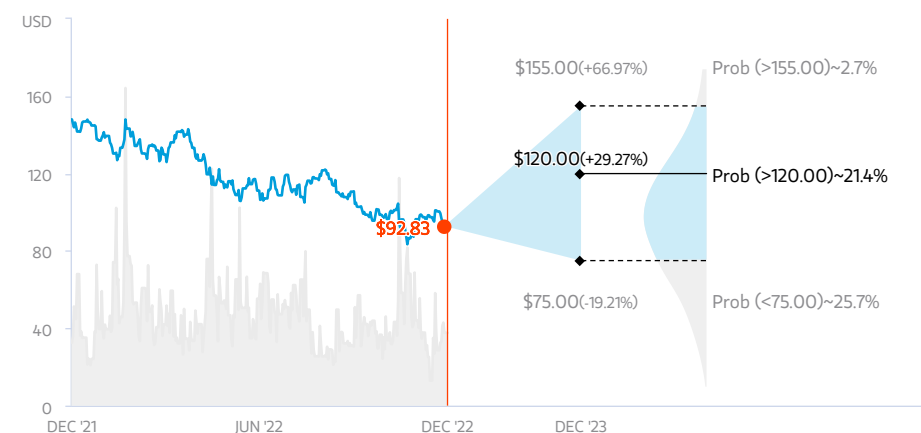
◆ Mean ◆ Morgan Stanley Estimates

Source: Refinitiv, Morgan Stanley Research

OVERWEIGHT THESIS

- Continued platform-level innovation on retail search and YouTube; as well as under appreciated products driven by mobile search and Maps may lead to further Website growth in '23
- Continued expense discipline leads to operating leverage and upward revisions on EPS estimates.

RISK REWARD CHART AND OPTIONS IMPLIED PROBABILITIES (12M)



Key: — Historical Stock Performance ● Current Stock Price ◆ Price Target

Source: Refinitiv, Morgan Stanley Research, Morgan Stanley Institutional Equities Division. The probabilities of our Bull, Base, and Bear case scenarios playing out were estimated with implied volatility data from the options market as of 09 Dec, 2022. All figures are approximate risk-neutral probabilities of the stock reaching beyond the scenario price in either three-months' or one-years' time. View explanation of Options Probabilities methodology [here](#)

Consensus Rating Distribution

- 92% Overweight
- 8% Equal-weight
- 0% Underweight

MS Rating

Source: Refinitiv, Morgan Stanley Research

Risk Reward Themes

Secular Growth: Positive
New Data Era: Positive

View descriptions of Risk Rewards Themes [here](#)

BULL CASE

\$155.00

Implied ~15X 2023e bull case EBITDA.

Better than expected expense discipline and share repurchases lead to multiple expansion and higher earnings power. Mobile monetization proves highly incremental to core search revenue growth and search takes more share of global budgets. YouTube becomes an even bigger contributor to top-line growth, and operates at a higher margin than in our base case.

BASE CASE

\$120.00

Implied ~12X 2023e base case EBITDA.

Assumes pragmatic revenue/EBITDA growth in '22 and continued incremental platform monetization. As GOOGL continues platform-level innovation on retail search (and other categories), we assume pragmatic revenue/EBITDA growth while digital ad budgets continue to grow. We also look for the continuation of mobile search taking share of global ad budgets.

BEAR CASE

\$75.00

Implied ~8X 2023e bear case EBITDA.

Global ad growth slows...investment spend leads to margin compression too. Assumes slower search advertising growth, and that ad budgets slows. Expense discipline fails to materialize leading to lower than expected adj. EBITDA.

Risk Reward – Alphabet Inc. (GOOGL.O)

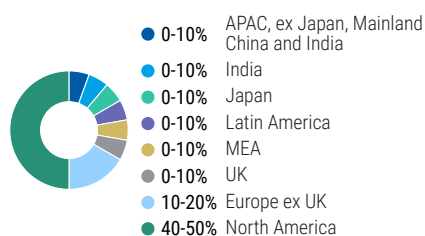
KEY EARNINGS INPUTS

Drivers	2021	2022e	2023e	2024e
Total operating income (GAAP) (\$, mm)	78,714	72,873	75,759	89,704
GAAP Operating Income (Loss) (\$, mm)	84,495	79,060	79,559	93,604

INVESTMENT DRIVERS

- Search advertising spend continues to gain share of global advertising budgets.
- Mobile search advertising continues to take share of online budgets.
- Investments in video driving longer-term monetization at YouTube.
- Moderation of expense growth.

GLOBAL REVENUE EXPOSURE



Source: Morgan Stanley Research Estimate
View explanation of regional hierarchies [here](#)

MS ALPHA MODELS

2/5 BEST	24 Month Horizon	2/5 MOST	3 Month Horizon
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Source: Refinitiv, FactSet, Morgan Stanley Research; 1 is the highest favored Quintile and 5 is the least favored Quintile

RISKS TO PT/RATING

RISKS TO UPSIDE

- New products generate higher than expected top line contribution.
- Capital returns through greater share buybacks.
- Hiring and/or spend per headcount is lower than expected

RISKS TO DOWNSIDE

- High exposure to SMB and travel could pressure ad revenue in a recession
- Improved disclosure around the Google and Other Alphabet segments may not decrease the overall investment activity of the business.

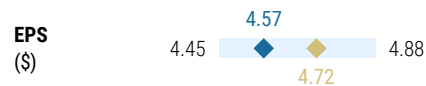
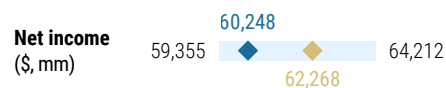
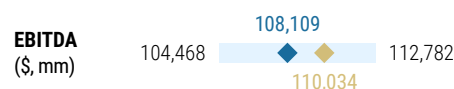
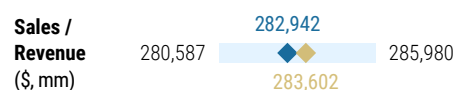
OWNERSHIP POSITIONING

Inst. Owners, % Active	64.5%				
HF Sector Long/Short Ratio	2.3x				
HF Sector Net Exposure	11.1%				

Refinitiv; MSPB Content. Includes certain hedge fund exposures held with MSPB. Information may be inconsistent with or may not reflect broader market trends. Long/Short Ratio = Long Exposure / Short exposure. Sector % of Total Net Exposure = (For a particular sector: Long Exposure - Short Exposure) / (Across all sectors: Long Exposure - Short Exposure).

MS ESTIMATES VS. CONSENSUS

FY Dec 2022e



◆ Mean ◆ Morgan Stanley Estimates

Source: Refinitiv, Morgan Stanley Research

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(as of November 30, 2022)

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STOCK RATING CATEGORY	COVERAGE UNIVERSE		INVESTMENT BANKING CLIENTS (IBC)			OTHER MATERIAL INVESTMENT SERVICES CLIENTS (MISC)	
	COUNT	% OF TOTAL	COUNT	% OF TOTAL IBC	% OF RATING CATEGORY	COUNT	% OF TOTAL OTHER MSC
Overweight/Buy	1360	37%	286	41%	21%	593	38%
Equal-weight/Hold	1646	45%	327	47%	20%	732	48%
Not-Rated/Hold	3	0%	0	0%	0%	0	0%
Underweight/Sell	625	17%	77	11%	12%	216	14%
TOTAL	3,634		690			1541	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

Analyst Stock Ratings

Overweight (O). The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Not-Rated (NR). Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

Analyst Industry Views

Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

Stock Price, Price Target and Rating History (See Rating Definitions)

Alphabet Inc. (GOOGL) - As of 12/11/22 in USD
Industry : Internet



Stock Rating History: 12/1/17 : 0/A; 1/10/18 : 0/I

Price Target History: 10/27/17 : 57.5; 1/12/18 : 60.5; 1/25/18 : 60.75; 2/2/18 : 60; 4/10/18 : 58.75; 4/24/18 : 60; 6/28/18 : 62.5; 7/23/18 : 66.25; 8/29/18 : 75.75; 10/26/18 : 75; 4/29/19 : 71.25; 7/15/19 : 70; 7/26/19 : 72.5; 1/21/20 : 78; 2/24/20 : 82.5; 3/29/20 : 65.5; 4/29/20 : 70; 7/9/20 : 85; 7/31/20 : 88; 9/24/20 : 90; 10/30/20 : 94; 1/4/21 : 102.5; 2/3/21 : 110; 3/25/21 : 117.5; 4/28/21 : 128.75; 7/27/21 : 150; 11/1/21 : 160; 1/19/22 : 171.5; 2/2/22 : 172.5; 4/27/22 : 163.5; 5/31/22 : 150; 7/18/22 : 140; 7/27/22 : 145; 10/9/22 : 135; 10/26/22 : 125; 11/14/22 : 120

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target -- No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) — Stock Price (Covered by Current Analyst) —
Stock and Industry Ratings (abbreviations below) appear as + Stock Rating/Industry View
Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)

Effective January 13, 2014, the stocks covered by Morgan Stanley Asia Pacific will be rated relative to the analyst's industry (or industry team's) coverage.

Effective January 13, 2014, the industry view benchmarks for Morgan Stanley Asia Pacific are as follows: relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

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INDUSTRY COVERAGE: Internet

COMPANY (TICKER)	RATING (AS OF)	PRICE* (12/12/2022)
Brian Nowak, CFA		
Airbnb Inc (ABNB.O)	U (12/06/2022)	\$95.58
Alphabet Inc. (GOOGL.O)	O (08/11/2015)	\$93.31
Amazon.com Inc (AMZN.O)	O (04/24/2015)	\$90.55
Booking Holdings Inc (BKNG.O)	E (01/09/2019)	\$2,080.00
Compass, Inc. (COMP.N)	E (07/20/2022)	\$2.64
Criteo SA (CRTO.O)	E (01/26/2016)	\$26.49
Despegar.com Corp (DESP.N)	E (10/16/2017)	\$4.62
DoorDash Inc (DASH.N)	E (04/24/2022)	\$58.02
Expedia Inc. (EXPE.O)	E (01/09/2019)	\$95.60
Innovid Corp (CTV.N)	U (09/12/2022)	\$2.05
Integral Ad Science Holding Corp. (IAS.O)	O (07/26/2021)	\$9.28
Lyft Inc (LYFT.O)	E (10/24/2019)	\$11.51
Meta Platforms Inc (META.O)	E (10/27/2022)	\$114.71
Nextdoor Holdings Inc (KIND.N)	E (02/24/2022)	\$2.11
Pinterest Inc (PINS.N)	E (03/28/2022)	\$23.61
Quotient Technology Inc. (QUOT.N)	U (12/19/2019)	\$3.12
Snap Inc. (SNAP.N)	U (07/25/2022)	\$9.46
TRIVAGO NV (TRVG.O)	E (09/28/2017)	\$1.34
Uber Technologies Inc (UBER.N)	O (06/04/2019)	\$27.03
Wheels Up Experience Inc. (UP.N)	U (11/08/2021)	\$1.11
Yelp Inc (YELP.N)	U (01/10/2019)	\$27.98
Zillow Group Inc (Z.O)	E (04/18/2018)	\$35.44
Lauren Schenk		
Bumble Inc. (BMBL.O)	E (03/08/2021)	\$23.48
Chewy Inc (CHWY.N)	E (04/16/2020)	\$45.14
eBay Inc (EBAY.O)	U (06/23/2022)	\$43.72
Etsy Inc (ETSY.O)	E (08/04/2021)	\$129.52
Farfetch Ltd. (FTCH.N)	O (11/17/2020)	\$4.45
FIGS, Inc. (FIGS.N)	E (06/21/2021)	\$7.30
Match Group Inc (MTCH.O)	O (06/17/2021)	\$43.55
Mytheresa (MYTE.N)	E (04/12/2022)	\$10.11
Peloton Interactive, Inc. (PTON.O)	E (03/14/2022)	\$11.71
Poshmark Inc (POSH.O)	E (02/08/2021)	\$17.86
RealReal Inc (REAL.O)	E (11/17/2020)	\$1.41
Rent the Runway, Inc. (RENT.O)	E (11/18/2022)	\$3.08
Revolve Group Inc (RVLV.N)	E (02/24/2022)	\$26.15
Rover Group Inc (ROVR.O)	E (08/06/2021)	\$4.58
Shutterstock Inc (SSTK.N)	E (07/28/2022)	\$50.79
Stitch Fix Inc (SFXO)	E (12/03/2021)	\$3.91
ThredUp Inc. (TDUP.O)	E (04/20/2021)	\$1.60
VWV International Inc (VWV.O)	E (04/07/2021)	\$3.85
Matthew Cost		
Activision Blizzard Inc (ATVI.O)	O (11/27/2022)	\$77.36
AppLovin Corp (APP.O)	E (11/27/2022)	\$10.70
Electronic Arts Inc (EA.O)	E (08/04/2021)	\$125.60
Playstudios Inc. (MYP.S)	E (09/23/2021)	\$4.10
Playtika Holding Corp (PLTK.O)	E (11/27/2022)	\$8.48
Roblox Corporation (RBLX.N)	E (02/16/2022)	\$33.32
SciPlay Corporation (SCPL.O)	E (05/28/2019)	\$15.66
Take-Two Interactive Software (TTWO.O)	O (02/01/2018)	\$102.61
Trade Desk Inc (TTD.O)	E (10/18/2022)	\$49.22
Unity Software Inc (U.N)	E (11/27/2022)	\$33.78

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* Historical prices are not split adjusted.