Software

AI Evolution: Enterprise apps will be special(ized)

Industry Overview

It's okay to ask for help (with app development)

We hosted a call with Nazneen Rajani, founder and CEO of Collinear AI, an AI middleware company that helps enterprises develop and deploy specialized AI apps that incorporate proprietary data and align with brand values and compliance requirements.[1] As the newest AI wave unfolds, leading tech companies have emerged as the largest AI beneficiaries across the tech stack (Exhibit 1), but we anticipate AI startups to increasingly capture market share in the middleware and application layers (Exhibit 2). Our view is that enterprises will likely integrate off-the-shelf generalized and industry-specific AI apps in the near term to drive efficiencies and increased productivity (Exhibit 3). However, over the longer term, we also expect enterprises to integrate specialized AI apps for enterprise-specific use cases that drive competitive advantages (Exhibit 4).

Enterprise AI adoption ex-Tech has only just begun

Generalized AI apps like ChatGPT have proliferated since its Nov'22 launch with releases from enterprise software companies like Microsoft, Adobe, Salesforce, ServiceNow, GitLab, HubSpot and Workday, as well as from the developer community. Industry-specific AI apps like those for the utilities and insurance sectors are also emerging, but specialized AI apps remain largely in development.[2] However, we expect enterprise adoption of specialized AI apps to accelerate as performance converges between closed- and open-source models, which provide enterprises with greater control, transparency and privacy, but also reduced reputational and regulatory risks from hallucinating chatbots or non-compliance with data privacy laws.

Specialized AI apps drive LT competitive advantages

Enterprises may initially integrate generalized and industry-specific AI apps as natural extensions of current operational efficiency strategies (Exhibit 5) before adding specialized (and proprietary) apps to generate competitive advantages (Exhibit 6). McDonald's partnered with IBM to replace some drive-thru workers with generalized AI bots and went viral on TikTok. Videos showed customers pleading with unresponsive AI bots to remove bacon from ice cream orders, underscoring why enterprises are likely to favor specialized AI apps that run on auditable open-source models and partnerships with middleware companies that ensure brand values are incorporated.[3] A major broker rolled out a specialized AI app for its FAs that incorporates proprietary data to drive client engagement and identify prospects, but lacks transparency into and control over adjustments that OpenAI may make to the closed-source model on which its app runs.

Beneficiaries – middleware companies & one-stop shops

We view GitLab, which offers tools for enterprises to optimize and customize AI applications, as a likely beneficiary of accelerating open-source model adoption and usage. However, Microsoft has invested across the tech stack – both horizontally and vertically – and offers models, compute, storage and tools, which likely positions the company to capture AI upside regardless of which model type is used. We maintain our Buy rating and $480 price objective for MSFT, covered by Brad Sills, and maintain our Buy rating and $74 price objective for GTLB, covered by Koji Ikeda.

06 February 2024

Equity
Americas
Server & Enterprise Software

Alkesh Shah
Research Analyst
BofAS
+1 646 855 1556
alkesh.shah@bofa.com

Andrew Moss
Research Analyst
BofAS
+1 646 743 2178
andrew.moss@bofa.com

Brad Sills
Research Analyst
BofAS
+1 415 436 1400
brad.sills@bofa.com

Koji Ikeda, CFA
Research Analyst
BofAS
+1 415 913 2106
koji.ikeda@bofa.com

Michael J. Funk
Research Analyst
BofAS
+1 646 855 5664
michael.j.funk@bofa.com

AI = Artificial Intelligence

Apps = Applications

FA = Financial Advisor

LLM = Large Language Model

[1] We use the term "align" synonymously with "fine-tuning," which refers to the process of training a pre-trained model on new structured data to improve performance for specific tasks.

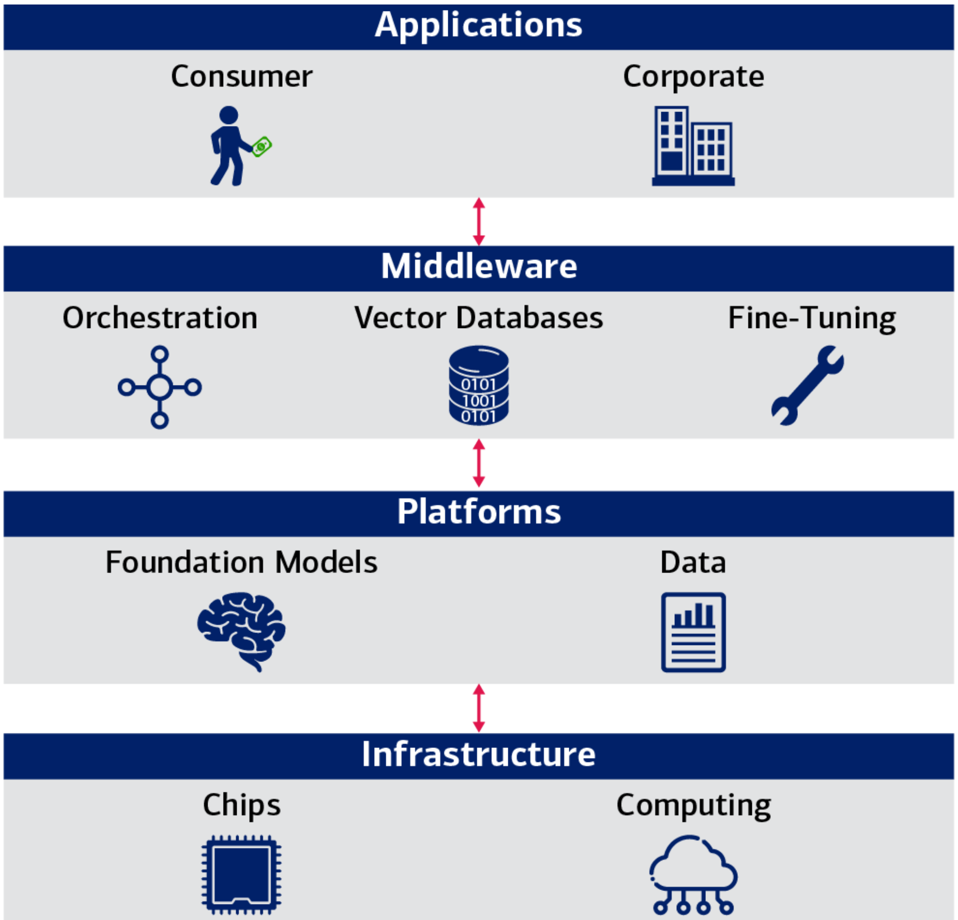
[2] AI foundation models (FMs) are pretrained on broad datasets and generate outputs from human inputs (prompts) by identifying patterns in unlabeled data (self-supervised learning). GPT-4 is a LLM, which is a type of FM, that powers ChatGPT. We use the terms model, foundation model and LLM interchangeably in this report.

[3] McDonald's was also sued for allegedly violating Illinois' Biometric Information Privacy Act (BIPA).

Rising tide lifts all boats but not over the long term

Some investors have expressed concerns that any realized benefit from generalized or industry-specific AI apps will normalize over time as the tools become commoditized. We agree that generalized and industry-specific AI tools may become ubiquitous, but note that cost savings and the ability to reallocate workers to higher-value tasks are beneficial even if realized by competitors. However, specialized AI apps will only be as performative and differentiated as the data on which they are trained. We expect companies with large proprietary datasets to see outsized AI advantages relative to smaller and less diversified peers that use AI tools trained on publicly-available data.

Exhibit 1: Pick & Shovel beneficiaries have already emerged
AI technology stack – from Infrastructure to Applications



Source: BofA Global Research

BofA GLOBAL RESEARCH

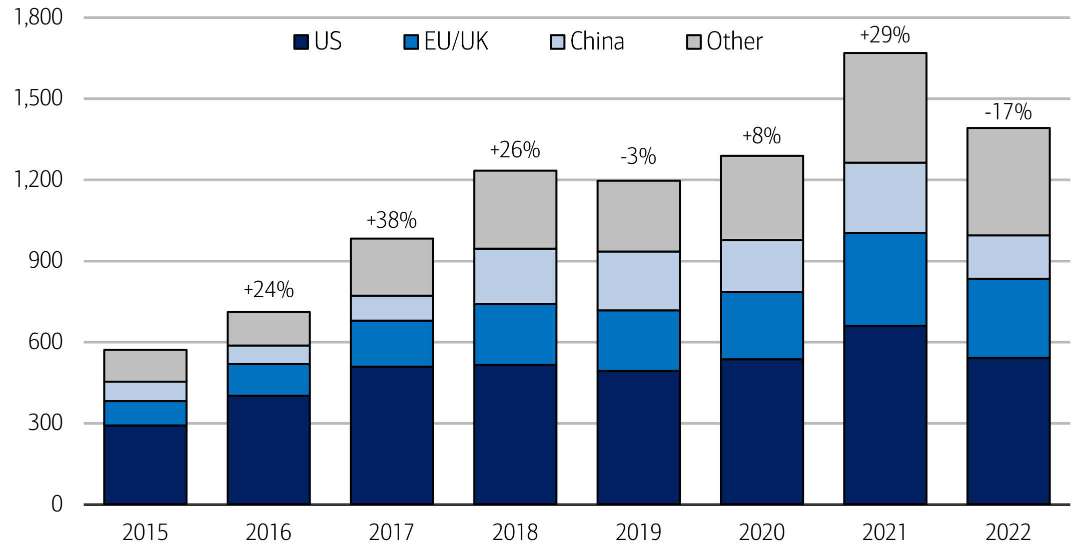
Closed- & open-source models likely to coexist

What's the different between the two model types?

Closed-source models, such as those offered by OpenAI, Microsoft, Alphabet and Anthropic, are not publicly available or customizable and provide limited or no transparency into the model's architecture, dataset, training method, compute costs or hardware. In contrast, open-source models and tools, like those offered by Meta, Alibaba, Hugging Face, Stability AI, PyTorch and TensorFlow, are publicly available, customizable and transparent. Open-source models may also benefit by enabling a global community of developers to collaborate and improve them, whereas closed-source models are improved only by the developers employed at the company that owns it.

We note that many benefits of AI apps built on open-source models are similar to the benefits of Web3 apps built on public blockchains.

Exhibit 2: Newly funded AI startups peaked in 2021 following accelerating funding in Q4'20
There were ~9k newly funded AI companies globally that received a $1.5mn+ investment from 2015-2022



Source: NetBase Quid via AI Index (2023)
Data labels indicate the percentage change y/y in the total number of newly funded AI startups globally that received a $1.5mn investment.
BofA GLOBAL RESEARCH

"On the competitive landscape front – it's competitive out there. GPT-4 is not easy to develop. It took pretty much all of OpenAI working together for a very long time to produce this thing. And there are many many companies who want to do the same thing, so from a competitive side, you can see this as a maturation of the field."

–Ilya Sutskever, OpenAI Co-Founder & Chief Scientist, Mar'23

"Open science and open source prevent black-box systems, make companies more accountable and help [solve] today's challenges like mitigating biases, reducing misinformation, promoting copyrights and rewarding all stakeholders including artists and content creators in the value creation process."

–Clement Delangue, Hugging Face Co-Founder & CEO, Jun'23

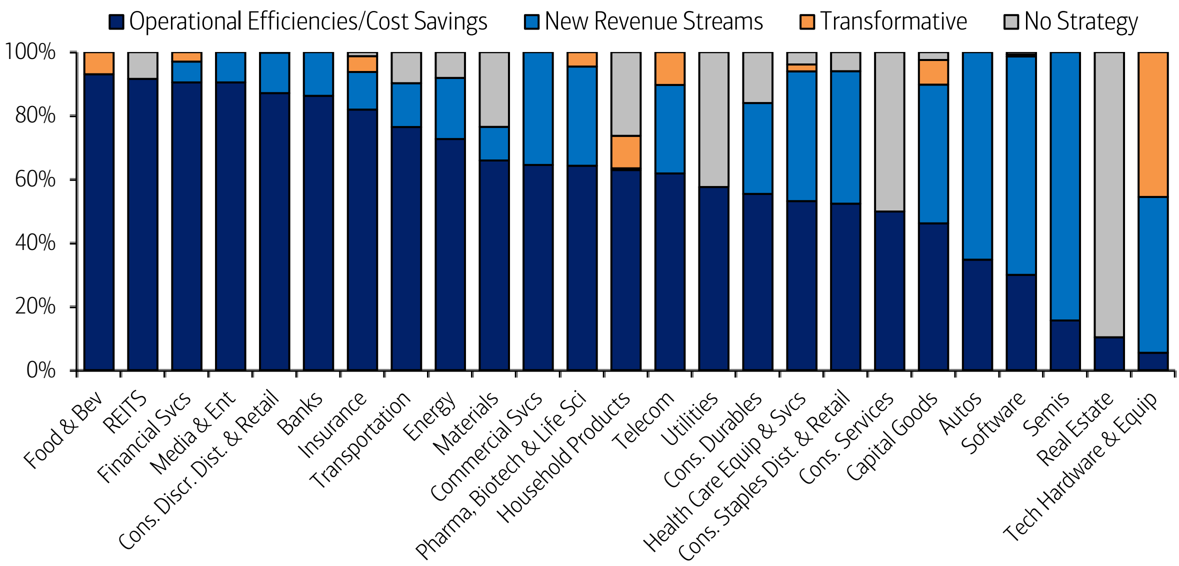
Enterprises will likely leverage both model types over the long term

Enterprises may prefer to build some AI apps, specifically ones that incorporate proprietary data, on open-source models, given the potential for greater control, flexibility, privacy and security, but our view is that the lower performance exhibited by open-source models may hinder adoption in the near term. However, over the longer term, we expect performance to converge between closed- and open-source models and enterprises to leverage both model types depending on the app's use case.

For example, enterprises may leverage open-source small-language models (SLMs) for specialized AI apps that facilitate scalable consumer use cases for which data privacy is critical. But the same enterprise may also leverage closed-source LLMs for generalized AI apps like personal assistants or bots for low/no code development.

Exhibit 3: Semis, SW and, to a lesser extent, Capital Goods most likely to leverage AI to generate new revenue streams

Corporate strategies to leverage AI may target new revenue streams initially but ultimately transform businesses

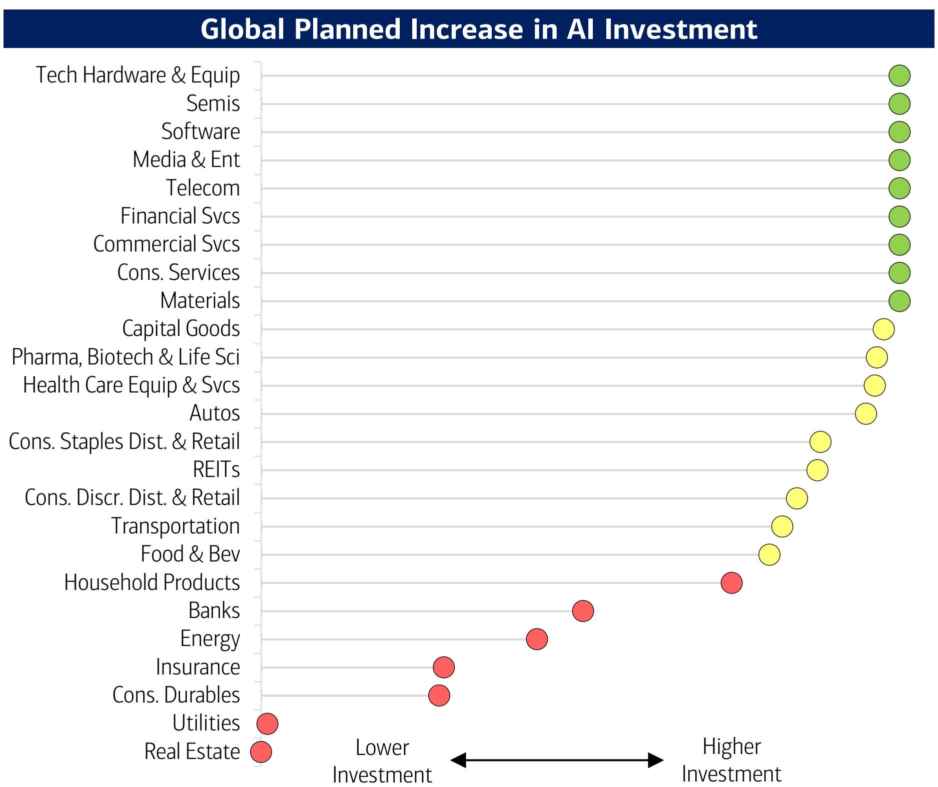


Source: BofA Global Research. Results are based on survey responses.

BofA GLOBAL RESEARCH

Exhibit 4: Tech industry groups lead in future AI investment

Industry group intentions for future AI investment are skewed toward "higher"



Source: BofA Global Research

Green/red shading indicates the top/bottom 25% of industry groups by planned increase in AI investment. Results based on survey responses.

BofA GLOBAL RESEARCH

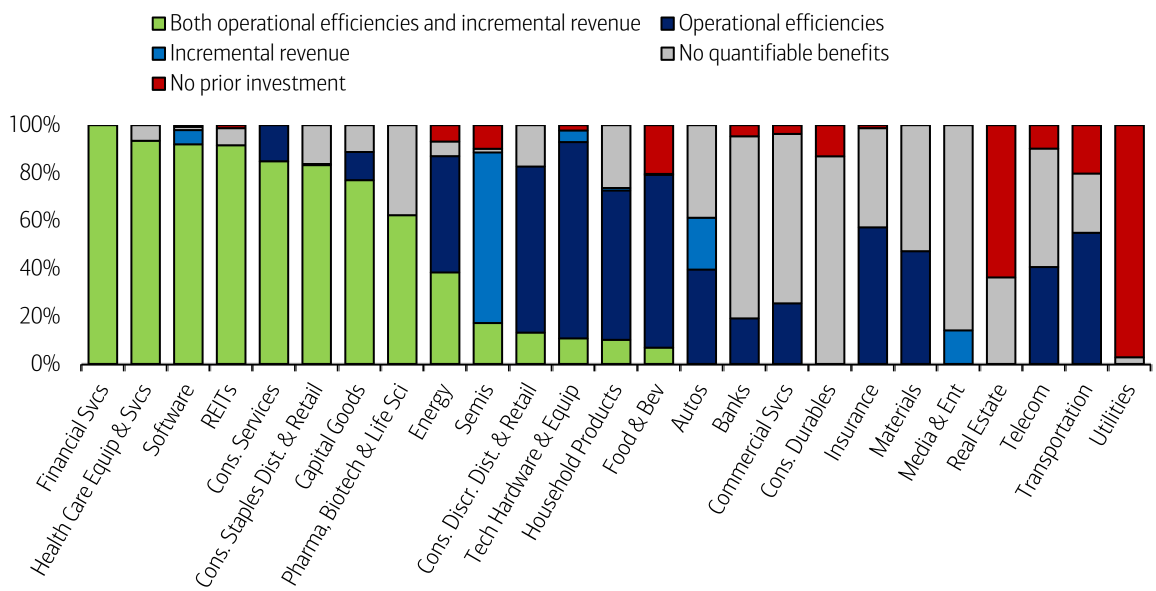
What's advantageous now may not be down the road

Companies have spent millions developing foundation models and likely intend to defend their investment and first-mover advantage by limiting access and, therefore, the ability for competitors to replicate them or attract developers to build AI apps that leverage them. However, there are tradeoffs from a monetization perspective for closed-source models for both model producers and enterprises that build AI apps. We note that Alphabet's Android smartphones run on the open-source Android operating system and have captured a significantly higher share of the global smartphone market relative to Apple's iPhone, which runs on the closed-source iOS operating system.

Closed-source models may be advantageous for model producers in the near term, given the potential to maintain high barriers to entry and generate network effects, but not advantageous for enterprises, given privacy, security and compliance risks, as well as potentially higher costs to scale. However, over the longer term, closed-source models may not be advantageous for model producers if they are unable to drive enterprise adoption or attract AI app developers to generate network effects, given the drawbacks noted above. We expect AI inference to increasingly drive workloads relative to AI training, which may provide tailwinds for open-source model producers that attract developers to build an ecosystem of AI apps, as well as middleware companies that support enterprise application development.

Exhibit 5: Fin. Svcs, HC Equip, SW and REITs most likely to generate both op. efficiencies and incremental revenue

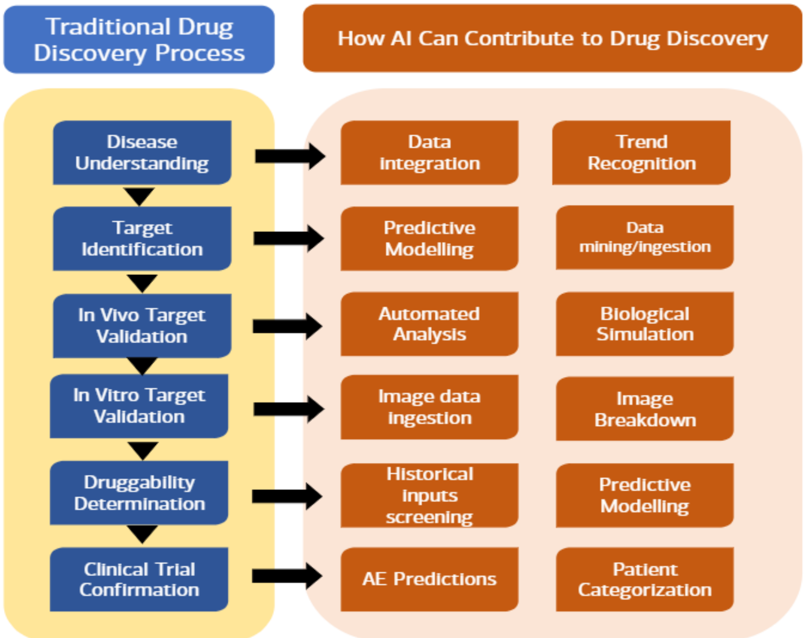
Corporate strategies to leverage AI may generate more than one benefit



Source: BofA Global Research. Results based on survey responses.

BofA GLOBAL RESEARCH

Exhibit 6: AI may drive optimized clinical trials and healthcare systems
How AI applications may transform the drug discovery process



Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 7: Companies mentioned
Companies mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
ADBE	ADBE US	Adobe	US$ 607.14	B-1-9
GTLB	GTLB US	GitLab	US$ 70.95	C-1-9
HUBS	HUBS US	HubSpot	US$ 605.93	C-1-9
MSFT	MSFT US	Microsoft	US$ 405.49	B-1-7
CRM	CRM US	Salesforce.com	US$ 285.83	B-1-9
NOW	NOW US	ServiceNow	US$ 777.45	B-1-9
WDAY	WDAY US	Workday	US$ 288.63	B-1-9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Price objective basis & risk

Adobe (ADBE)

Our PO of $700 is based on an EV/FCF multiple of 31x our C25E free cash flow estimate. This represents 1.5x our 3-year mid-teens FCF CAGR, a premium to the large-cap GARP (growth at reasonable price) software group average of 1.3x. We view the premium as justified given Adobe's AI leadership position and durability of both top- and bottom-line growth.

Risks to our PO are 1) competition from point solutions and platform vendors, 2) application spending cyclicality, and 3) future acquisitions, which could weigh on margin expansion.

GitLab Inc. (GTLB)

Our $74 PO is based on an EV/revenue multiple of 15.5x to our FY25E (C24E) revenue estimate. The multiple implies an EV/revenue/growth multiple of 0.58x, which is above infrastructure peers at 7.4x/0.57x. We believe the premium multiple to peers is warranted given its faster growth, NRR in the high 120s, and upside potential.

Risks to our PO: 1) valuation risk, 2) competition, 3) deteriorating NRR, 4) extended timeline to profitability, 5) execution, and 6) enterprise software spend can be cyclical.

HubSpot (HUBS)

Our PO of $650 is based on an EV/revenue multiple of 10.8x our CY25 revenue estimate. The 10.8x multiple represents an EV/Rev/Growth multiple of 0.5x based on our C25E revenue growth rate of +22% y/y, a slight discount to the large cap group on a growth-adjusted basis, at 0.6x EV/Rev/G (+16% y/y growth).

Risks to our PO are: 1) higher customer attrition rate (low teens) may limit future growth, particularly as the company grows and the dollar attrition amount grows, 2) HubSpot shares trade at a premium to where the software stocks have historically traded, presenting the risk of a pullback, which could occur in the event of changes to market sentiment stemming from the global macro uncertainty, or potentially disappointing quarterly revenue growth, 3) we believe that HubSpot's business has a high degree of exposure to the macro economic cycle, given the company's focus on selling applications into the SMB market segment. Applications projects are discretionary and can be delayed in the event of a shrinking IT budget, unlike projects involving more mission critical infrastructure or security technologies. Also, SMB mortality increases during cyclical downturns, which could affect HubSpot's renewal rate.

Microsoft Corporation (MSFT)

Our PO of $480 is based on an EV/FCF multiple of 43x our C25E free cash flow estimate. The growth-adjusted multiple of 1.8x trades at a premium to the large cap GARP group, which we view as warranted given our view of Microsoft as a leading AI play in software.

Downside risks to our price objective: 1) Microsoft could see some near term gross margin pressure as the Azure business grows as a percentage of overall revenue. While Microsoft's on premise offerings offer a high margin profile, growth in these lines of business is decelerating. 2) Enterprise application spending has proven to be highly cyclical, given the more discretionary nature of applications projects. During an economic slowdown, when firms are faced with shrinking IT budgets, projects involving application upgrades, migrations or new installations are often deferred. This could present a higher degree of risk for a bookings deceleration for Microsoft and other application vendors, in the event of an economic slowdown.

Salesforce.com (CRM)
Our PO of $300 is based on an EV/FCF multiple of 22x our C25 FCF estimate, representing a growth adjusted multiple of 0.7x. This is a discount to the large cap software group at 1.3x, which we believe is justified for margin expansion.

Downside risks are: 1) Competition from point solutions and platform vendors presents the risk of slowing share gains/share losses if the company fails to continue delivering ongoing roadmap of new features/new modules, 2) Salesforce's history of acquisitions could present a higher degree of execution risk given the need to continuously integrate the technologies and the installed bases of offerings of technology that are not organically built, and 3) enterprise application spending has proven to be highly cyclical, given the more discretionary nature of applications projects - during an economic slowdown, projects involving application upgrades, migrations or new installations are often deferred which could present a higher degree of risk for a bookings deceleration.

ServiceNow (NOW)
Our price objective of $900 is based on 42x our C25E FCF estimate, representing an EV/FCF/Growth multiple of 1.6x. The multiple compares to the GARP group trading at 30x EV/C25E FCF (1.4x growth-adjusted).

Downside risks are: 1) ServiceNow shares currently trade at a premium versus its large cap software peer group, and we recognize the risk of a potential pullback in the event of changes to market sentiment or a disappointing bookings quarter, 2) an inability to maintain key product advantages may slow share gains and large established competitors in the space may pose threats to ServiceNow's goal of continuing to capture market share by competing on price, 3) application spending is highly cyclical, which could present a higher degree of risk for a bookings deceleration for ServiceNow and other application vendors in the event of an economic slowdown.

Workday Inc. (WDAY)
Our PO of $300 is based on a C25E EV/FCF multiple of 32x. On a growth-adjusted basis, this is 1.3x our estimated our estimated 3-yr FCF CAGR of 20%. Our 1.3x multiple is in line with the large cap software GARP group at 1.3x (growing +21% y/y).

Downside risks are as as follows: 1) Large deal size could be impacted by a worsening macro environment (deal delays). 2) Workday has been gaining share in the HCM market since the company's founding in 2005. There is risk that overall growth slows faster than expected from slowing sales in the HCM market, absent increased progress selling Financials and add-on products. 3) Enterprise application spending has proven to be highly cyclical, given the more discretionary nature of applications projects. We believe that this profile presents a higher degree of risk for a billings deceleration for Workday and other application vendors, in the event of an economic slowdown.

Analyst Certification

We, Alkesh Shah, Brad Sills and Koji Ikeda, CFA, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	8x8	EGHT	EGHT US	Michael J. Funk
	Adobe	ADBE	ADBE US	Brad Sills
	Alarm.com	ALRM	ALRM US	Michael J. Funk
	Amplitude, Inc.	AMPL	AMPL US	Koji Ikeda, CFA
	BILL	BILL	BILL US	Brad Sills
	CCC Intelligent Solutions	CCCS	CCCS US	Michael J. Funk
	Dropbox	DBX	DBX US	Michael J. Funk
	Dynatrace	DT	DT US	Koji Ikeda, CFA
	Elastic NV	ESTC	ESTC US	Koji Ikeda, CFA
	GitLab Inc.	GTLB	GTLB US	Koji Ikeda, CFA
	Global-e Online Ltd.	GLBE	GLBE US	Koji Ikeda, CFA
	HubSpot	HUBS	HUBS US	Brad Sills
	Informatica Inc.	INFA	INFA US	Koji Ikeda, CFA
	Intapp Inc.	INTA	INTA US	Koji Ikeda, CFA
	Intuit	INTU	INTU US	Brad Sills
	JFrog Ltd	FROG	FROG US	Koji Ikeda, CFA
	Microsoft Corporation	MSFT	MSFT US	Brad Sills
	MongoDB Inc	MDB	MDB US	Brad Sills
	nCino, Inc.	NCNO	NCNO US	Adam Bergere
	NICE Ltd.	NICE	NICE US	Michael J. Funk
	NICE Ltd.	NCSYF	NICE IT	Michael J. Funk
	PagerDuty	PD	PD US	Koji Ikeda, CFA
	PowerSchool Holdings, Inc.	PWSC	PWSC US	Koji Ikeda, CFA
	RingCentral	RNG	RNG US	Michael J. Funk
	Salesforce.com	CRM	CRM US	Brad Sills
	ServiceNow	NOW	NOW US	Brad Sills
	UiPath	PATH	PATH US	Brad Sills
	Unity	U	U US	Michael J. Funk
	Weave	WEAV	WEAV US	Michael J. Funk
	Workday Inc.	WDAY	WDAY US	Brad Sills
	Zeta Global	ZETA	ZETA US	Koji Ikeda, CFA
	ZoomInfo	ZI	ZI US	Koji Ikeda, CFA
NEUTRAL				
	Autodesk	ADSK	ADSK US	Michael J. Funk
	Bentley Systems	BSY	BSY US	Michael J. Funk
	BigCommerce Holdings, Inc.	BIGC	BIGC US	Koji Ikeda, CFA
	Coveo	YCVO	CVO CN	Koji Ikeda, CFA
	Datadog Inc	DDOG	DDOG US	Koji Ikeda, CFA
	DocuSign	DOCU	DOCU US	Brad Sills
	Freshworks, Inc.	FRSH	FRSH US	Adam Bergere
	HashiCorp	HCP	HCP US	Brad Sills
	Jamf	JAMF	JAMF US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	LSPD	LSPD US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	YLSPD	LSPD CN	Koji Ikeda, CFA
	Oracle Corporation	ORCL	ORCL US	Brad Sills
	Paycom	PAYC	PAYC US	Adam Bergere
	Paylocity	PCTY	PCTY US	Adam Bergere
	Shopify, Inc.	SHOP	SHOP US	Brad Sills
	Snowflake	SNOW	SNOW US	Brad Sills
	Veeva Systems, Inc.	VEEV	VEEV US	Brad Sills
	Zoom Video Communications	ZM	ZM US	Michael J. Funk
UNDERPERFORM				
	AvidXchange, Inc.	AVDX	AVDX US	Brad Sills
	Blackbaud, Inc.	BLKB	BLKB US	Koji Ikeda, CFA
	BlackLine, Inc.	BL	BL US	Koji Ikeda, CFA
	C3.ai	AI	AI US	Brad Sills
	Confluent	CFLT	CFLT US	Brad Sills
	CS Disco, Inc.	LAW	LAW US	Koji Ikeda, CFA
	Enfusion, Inc.	ENFN	ENFN US	Koji Ikeda, CFA
	Five9	FIVN	FIVN US	Michael J. Funk
	Guidewire Software, Inc.	GWRE	GWRE US	Michael J. Funk
	Twilio	TWLO	TWLO US	Michael J. Funk
	Vertex, Inc.	VERX	VERX US	Brad Sills

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
RSTR				
	MeridianLink, Inc.	MLNK	MLNK US	Koji Ikeda, CFA
	Splunk	SPLK	SPLK US	Brad Sills

Disclosures

Important Disclosures

Equity Investment Rating Distribution: Technology Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	215	53.09%	Buy	111	51.63%
Hold	97	23.95%	Hold	45	46.39%
Sell	93	22.96%	Sell	24	25.81%

Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

[R1] Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. INVESTMENT RATINGS reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R2]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R2] Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

Price Charts for the securities referenced in this research report are available on the Price Charts website, or call 1-800-MERRILL to have them mailed.
BofAS or one of its affiliates acts as a market maker for the equity securities recommended in the report: Adobe, GitLab, HubSpot, Microsoft, Salesforce.com, ServiceNow, Workday.
The issuer is or was, within the last 12 months, an investment banking client of BofAS and/or one or more of its affiliates: Adobe, GitLab Inc., Microsoft Corp, Salesforce.com, Workday.
BofAS or an affiliate has received compensation from the issuer for non-investment banking services or products within the past 12 months: Adobe, GitLab Inc., IHubSpot, Inc., Microsoft Corp, Salesforce.com, ServiceNow, Inc., Workday.
The issuer is or was, within the last 12 months, a non-securities business client of BofAS and/or one or more of its affiliates: Adobe, GitLab Inc., IHubSpot, Inc., Microsoft Corp, Salesforce.com, ServiceNow, Inc., Workday.
An officer, director or employee of BofAS or one of its affiliates is an officer or director of this issuer: Salesforce.com.
BofAS or an affiliate has received compensation for investment banking services from this issuer within the past 12 months: Adobe, Microsoft Corp, Salesforce.com.
BofAS or an affiliate expects to receive or intends to seek compensation for investment banking services from this issuer or an affiliate of the issuer within the next three months: Adobe, GitLab Inc., Microsoft Corp, Salesforce.com, Workday.
BofAS together with its affiliates beneficially owns one percent or more of the common stock of this issuer. If this report was issued on or after the 9th day of the month, it reflects the ownership position on the last day of the previous month. Reports issued before the 9th day of a month reflect the ownership position at the end of the second month preceding the date of the report: Microsoft Corp, Salesforce.com, ServiceNow, Inc., Workday.
BofAS or one of its affiliates is willing to sell to, or buy from, clients the common equity of the issuer on a principal basis: Adobe, GitLab, HubSpot, Microsoft, Salesforce.com, ServiceNow, Workday.
The issuer is or was, within the last 12 months, a securities business client (non-investment banking) of BofAS and/or one or more of its affiliates: Adobe, GitLab Inc., IHubSpot, Inc., Microsoft Corp, Salesforce.com, ServiceNow, Inc., Workday.
Due to the nature of strategic analysis, the issuers or securities recommended or discussed in this report are not continuously followed. Accordingly, investors must regard this report as providing stand-alone analysis and should not expect continuing analysis or additional reports relating to such issuers and/or securities.
BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.
The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.
This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the Electronic Communications Disclaimers for further information.
This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.
General Investment Related Disclosures:
Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.
This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.
Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

Digital assets, including cryptocurrencies and digital tokens, are a new technological innovation and are extremely speculative assets. Digital assets are volatile, have variable liquidity and may be subject to manipulation or fraud. Digital asset markets are relatively nascent and are not regulated in a manner similar to U.S. securities markets. Digital assets do not have a standardized exchange, like a stock market. Any future regulatory developments could limit or affect the viability of digital assets.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

BofA ESGMeter Methodology:

ESGMeter is a proprietary metric based on quantitative analysis and fundamental analyst inputs that reflects our assessment of a company's Environmental, Social and Governance-related attributes. The ESGMeter is intended to indicate a company's likelihood of experiencing stronger financial stability (higher return on equity and lower earnings and price volatility) over the next three years relative to peer group. There are three ESGMeter levels - Low, Medium, and High - which indicate whether a company has attributes most likely to translate into superior financial stability (in the case of a High level) or weaker financial stability (in the case of a Low level) over the next three years relative to its peer group. A Medium level suggests that a company exhibits ESG characteristics that are likely associated with financial stability results in line with its peer group over the next three years. Full details of our methodology, financial stability definition and disclaimers are available at BofA ESGMeter methodology. ESGMeter is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of the BofA Global Research fundamental equity analyst's investment rating, volatility risk rating, income rating or price objective for that company.

Copyright and General Information:

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Subject to the quiet period applicable under laws of the various jurisdictions in which we distribute research reports and other legal and BofA Securities policy-related restrictions on the publication of research reports, fundamental equity reports are produced on a regular basis as necessary to keep the investment recommendation current.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.