

# Harnessing the Power of Artificial Intelligence (AI) in Equity Investing

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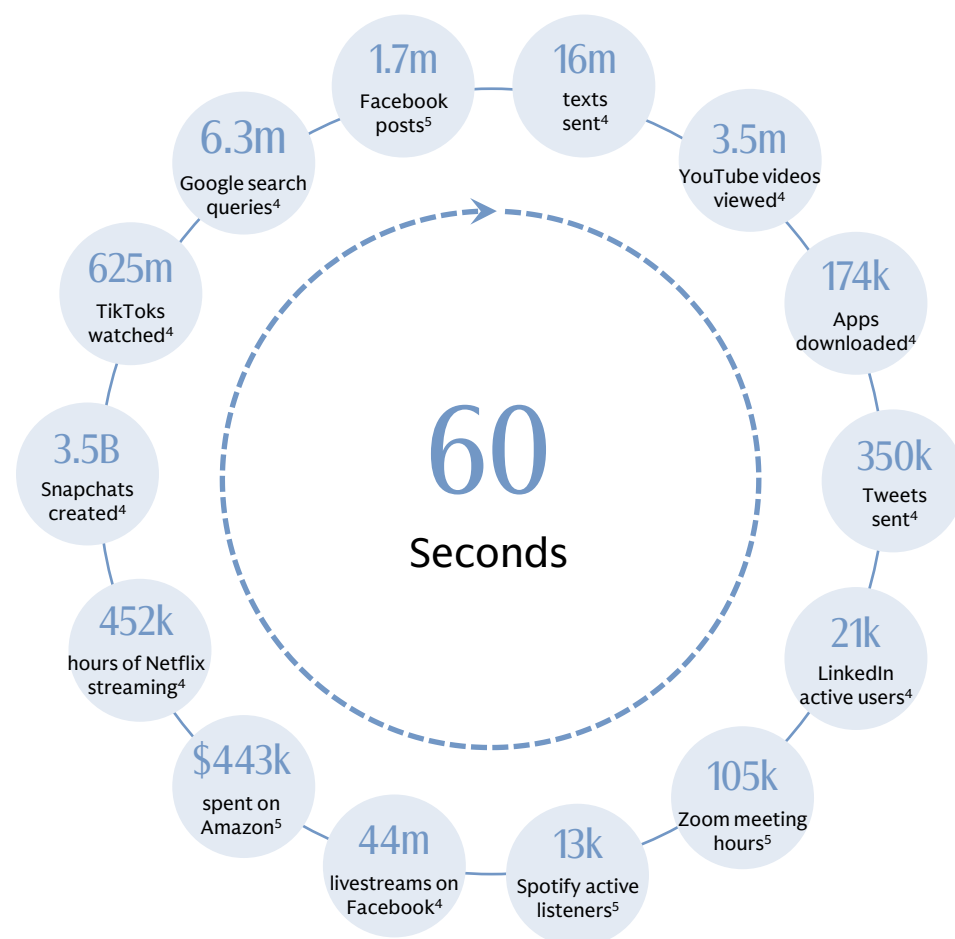
**Quantitative Investment Strategies**

2025

# We Are Living in the Era of Accelerated Computing

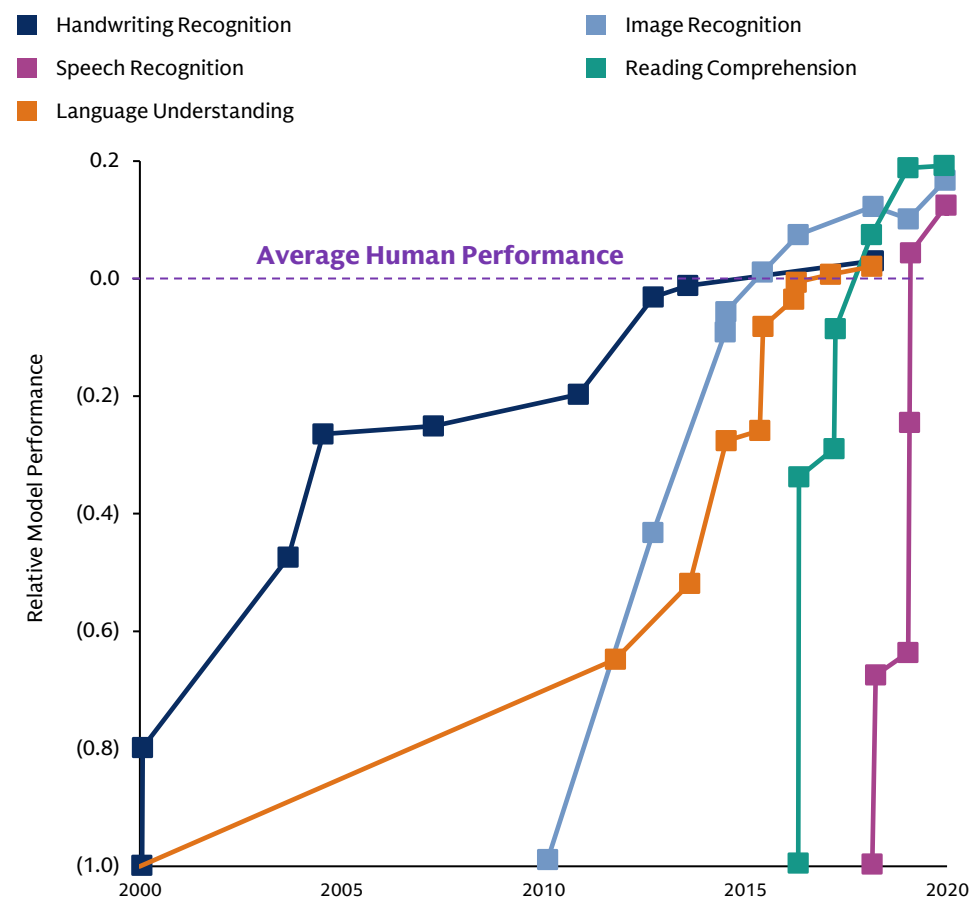
Data Is Growing Exponentially, and AI Is a Powerful Tool that May Help Us Extract Valuable Insights From It

## Data Is Exploding, and the Vast Majority Remains Untapped<sup>1,2</sup>



## Going From Big Data to Smart Data

Artificial Intelligence (AI) is a Powerful Tool That May Help Extract Insights From Data<sup>3</sup>



<sup>1</sup> Data generation is projected to double every 2-3 years, and <sup>2</sup> <1% of global data is currently used. <sup>3</sup> In the past six years, transformer models have seen an exponential surge in parameters – the “memories” enabling them to uncover patterns in data. For illustrative purposes only. Source: Goldman Sachs Asset Management, left chart: <sup>4</sup> LocalIQ (As of 2023), <sup>5</sup> DOMO (As of 2022), right chart: Dynabench Research (As of 2020). There is no guarantee that these objectives will be met. Any reference to a specific company or security does not constitute a recommendation to buy, sell, hold or directly invest in the company or its securities. There is no guarantee that objectives will be met.

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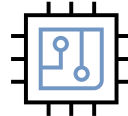
# In Our View, There Are Three Key Ingredients to Harness the Power of AI

When Leveraging AI to Extract Insights From Alternative Data as Part of the Investment Process, We Believe Experience, Infrastructure, and Knowledge Are Crucial



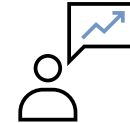
## Experience

- Can you thoroughly **due diligence** your data providers?
- Do you know when to use which AI techniques, to **maximize return on investment**?



## Infrastructure

- Do you have the **computing power**?
- Can you **analyze complex, high-quality datasets**?
- Is this **economically** feasible?



## Knowledge

- Do you have the **human capital**?
- Are they able to **experiment** with advanced technology **safely and knowledgeably**?

Source: Goldman Sachs Asset Management. The QIS Equity Alpha team leverages Natural Language Processing (NLP) techniques and advanced transformer technology within deep learning models to analyze text and audio. Natural language processing (NLP) is an interdisciplinary subfield of computer science and linguistics, primarily concerned with giving computers the ability to support and manipulate human language. For illustrative purposes only. There is no guarantee that objectives will be met.

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# How Do We Uncover Alpha in Public Equity Markets?

Our 150+ Investment Signals (Ideas) Guide Our Understanding of What Makes a Company 1) Fundamentally Strong and 2) A Sound Investment Given Market Dynamics

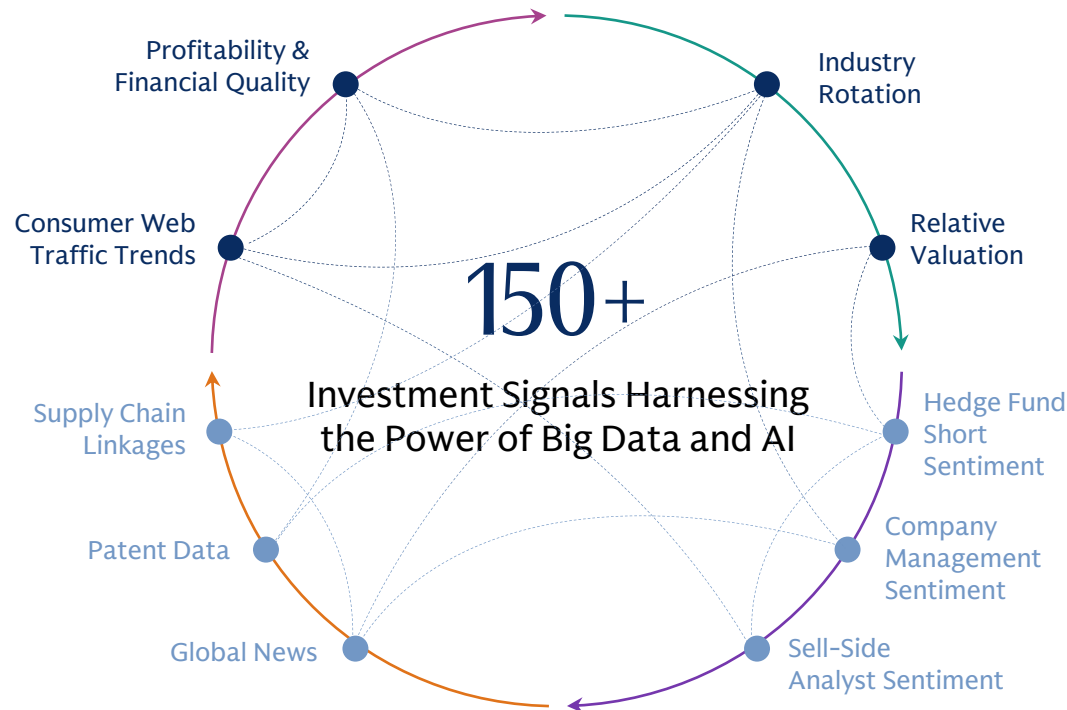
## High-Quality Business Models

Is the company growing and does it have strong management?

## Themes & Trends

Is the company exposed to themes that are trending positively in the market?

Is this a **fundamentally strong** company?



## Fundamental Mispricings

Is the company attractively priced?

## Sentiment Analysis

Does the company have positive sentiment surrounding it?

Is now **the right time** to invest in this company?

Source: Goldman Sachs Asset Management. Investment philosophy diagram for illustrative purposes only. There is no guarantee that objectives will be met. The QIS Equity Alpha team leverages Natural Language Processing (NLP) techniques and advanced transformer technology within deep learning models to analyze text and audio. Natural language processing (NLP) is an interdisciplinary subfield of computer science and linguistics, primarily concerned with giving computers the ability to support and manipulate human language.

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# Mapping Out Hidden Linkages Between Companies

Themes & Trends

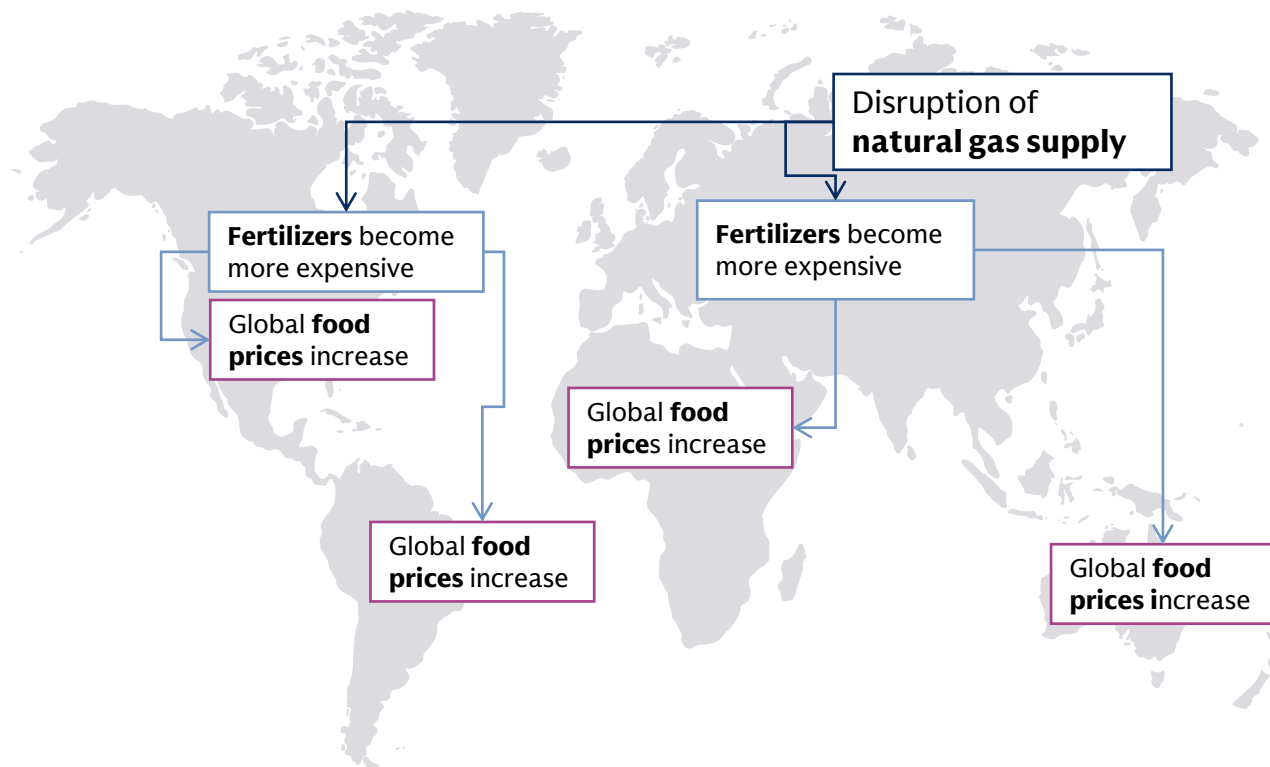
We Seek to Leverage the Power of Machine Learning to Uncover Difficult-to-Detect Company Relationships That We Believe Drive Equity Returns

## Investment Thesis

Understanding the **economic linkages** between companies and the **secular growth themes** driving industries can help us **better anticipate how their performance will be impacted by macroeconomic events**, and **potentially faster than others** in the market.

We seek to anticipate how **global events** will trigger **first** and **second** order effects

AI enables us to **see patterns in data**



Source: Goldman Sachs Asset Management. For illustrative purposes only. The QIS Equity Alpha team leverages Natural Language Processing (NLP) techniques and advanced transformer technology within deep learning models to analyze text and audio. Natural language processing (NLP) is an interdisciplinary subfield of computer science and linguistics, primarily concerned with giving computers the ability to support and manipulate human language. As a part of the team's investment selection process, the team utilizes proprietary models that assess a wide range of indicators. No one indicator, risk or consideration is determinative in the investment selection process. There is no guarantee that objectives will be met.

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# Gauging Company Management Sentiment

Sentiment Analysis

Artificial Intelligence Turbocharges Our Understanding of Company Management: Every Year We Absorb 20,000+ Earnings Transcripts, 2M+ Articles, ~300,000 Analyst Reports & 500,000+ Audio Files

## Investment Thesis

**Company management teams know best** about companies' prospects relative to other market participants – and **subtle shifts in sentiment can reveal nuances of their feelings** that may not yet be priced in. Understanding their sentiment can help us **more accurately forecast company performance**.

### What Do They Say?

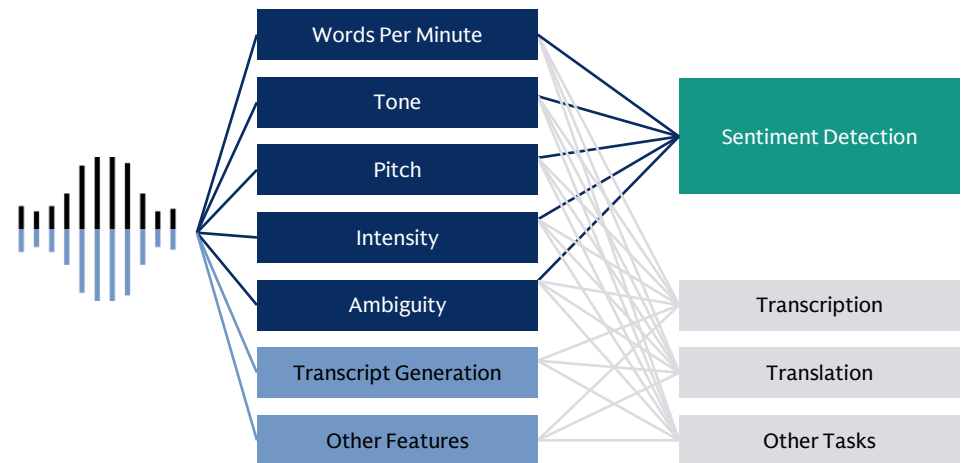
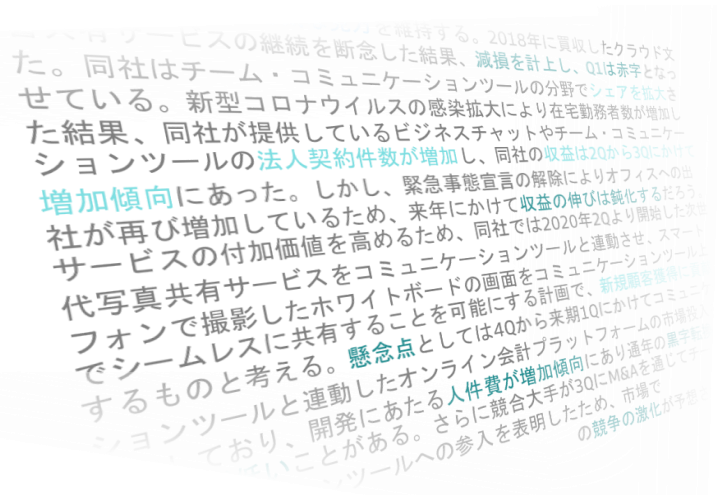
**Natural Language Processing (NLP)** helps us understand sentiment from earnings transcripts. We analyze:

- **Presentations from management**
- **Questions from analysts**
- **Answers from management**

### How Do They Say It?

**Deep learning** helps us understand sentiment from **earnings call audio**. We can gauge:

- **Ambiguity**
- **Tonal emotion**
- **Evasiveness**



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# Closing Remarks

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# Disclosures

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Equity investments are subject to market risk, which means that the value of the securities in which it invests may go up or down in response to the prospects of individual companies, particular sectors and/or general economic conditions. Different investment styles (e.g., “growth” and “value”) tend to shift in and out of favor, and, at times, the strategy may underperform other strategies that invest in similar asset classes. The market capitalization of a company may also involve greater risks (e.g. “small” or “mid” cap companies) than those associated with larger, more established companies and may be subject to more abrupt or erratic price movements, in addition to lower liquidity.

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# Goldman Sachs Business Principles

1. Our clients' interests always come first. Our experience shows that if we serve our clients well, our own success will follow.
2. Our assets are our people, capital and reputation. If any of these is ever diminished, the last is the most difficult to restore. We are dedicated to complying fully with the letter and spirit of the laws, rules and ethical principles that govern us. Our continued success depends upon unswerving adherence to this standard.
3. Our goal is to provide superior returns to our shareholders. Profitability is critical to achieving superior returns, building our capital, and attracting and keeping our best people. Significant employee stock ownership aligns the interests of our employees and our shareholders.
4. We take great pride in the professional quality of our work. We have an uncompromising determination to achieve excellence in everything we undertake. Though we may be involved in a wide variety and heavy volume of activity, we would, if it came to a choice, rather be best than biggest.
5. We stress creativity and imagination in everything we do. While recognizing that the old way may still be the best way, we constantly strive to find a better solution to a client's problems. We pride ourselves on having pioneered many of the practices and techniques that have become standard in the industry.
6. We make an unusual effort to identify and recruit the very best person for every job. Although our activities are measured in billions of dollars, we select our people one by one. In a service business, we know that without the best people, we cannot be the best firm.
7. We offer our people the opportunity to move ahead more rapidly than is possible at most other places. Advancement depends on merit and we have yet to find the limits to the responsibility our best people are able to assume. For us to be successful, our men and women must reflect the diversity of the communities and cultures in which we operate. That means we must attract, retain and motivate people from many backgrounds and perspectives. Being diverse is not optional; it is what we must be.
8. We stress teamwork in everything we do. While individual creativity is always encouraged, we have found that team effort often produces the best results. We have no room for those who put their personal interests ahead of the interests of the Firm and its clients.
9. The dedication of our people to the Firm and the intense effort they give their jobs are greater than one finds in most other organizations. We think that this is an important part of our success.
10. We consider our size an asset that we try hard to preserve. We want to be big enough to undertake the largest project that any of our clients could contemplate, yet small enough to maintain the loyalty, the intimacy and the esprit de corps that we all treasure and that contribute greatly to our success.
11. We constantly strive to anticipate the rapidly changing needs of our clients and to develop new services to meet those needs. We know that the world of finance will not stand still and that complacency can lead to extinction.
12. We regularly receive confidential information as part of our normal client relationships. To breach a confidence or to use confidential information improperly or carelessly would be unthinkable.
13. Our business is highly competitive, and we aggressively seek to expand our client relationships. However, we must always be fair competitors and must never denigrate other firms.
14. Integrity and honesty are at the heart of our business. We expect our people to maintain high ethical standards in everything they do, both in their work for the firm and in their personal lives.