The Right Way to Think About "Generative" AI
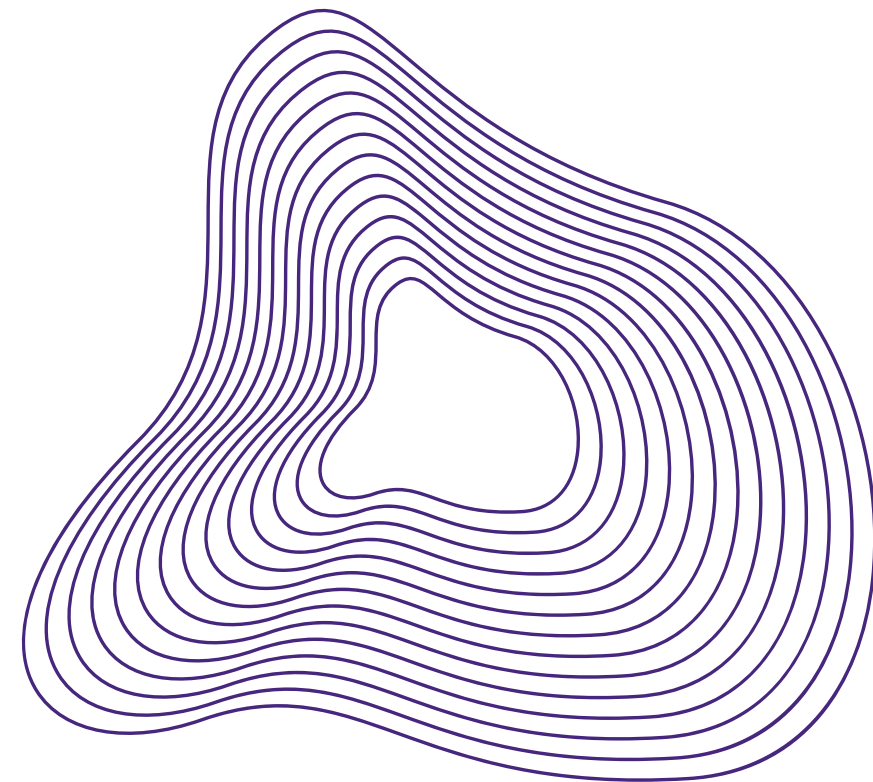
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Table of Contents
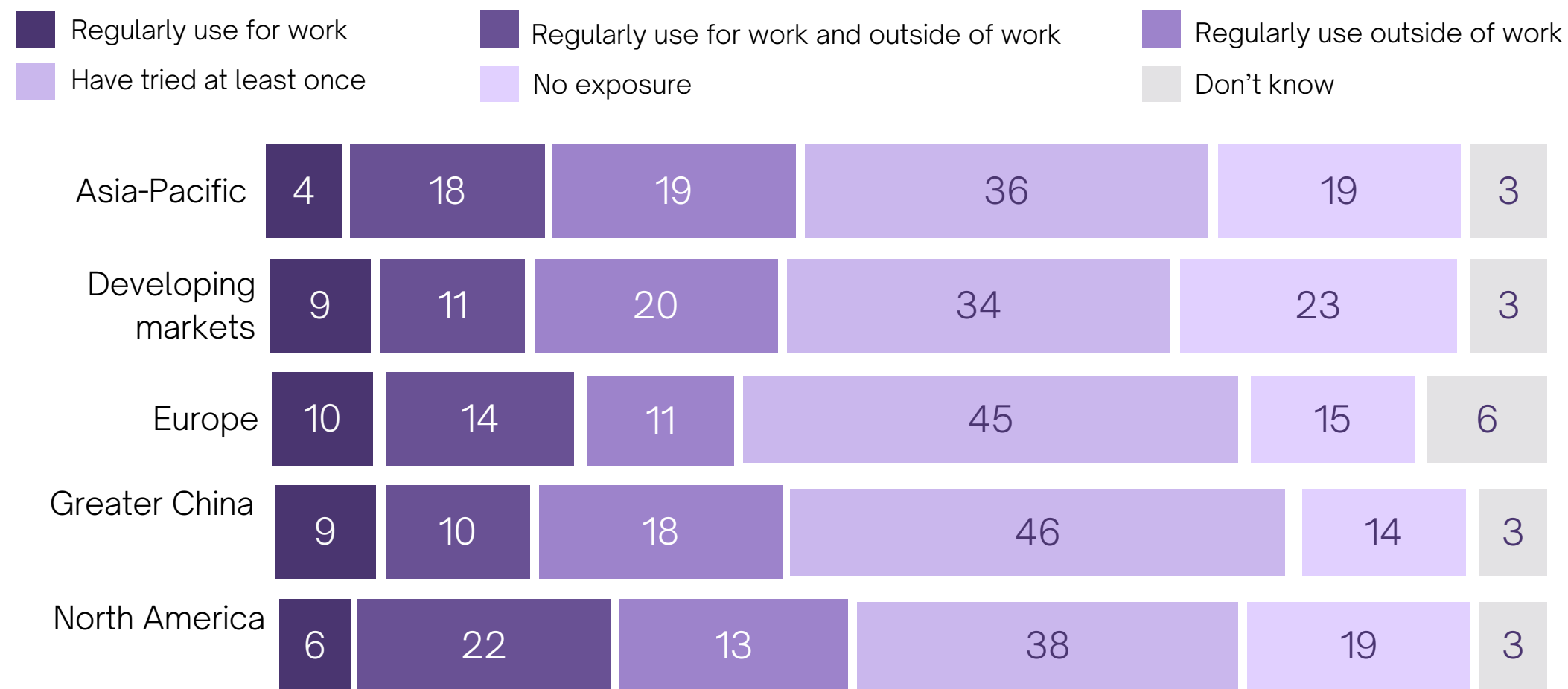
Overview of Generative AI

Generative AI has quickly emerged as a critical focus for investors, who see it as a significant source of value creation. **In our view, the "hype" around generative AI is well-justified.** These models have significantly advanced AI and are being **deployed across various industries**, driving revenue growth and cost savings.

Figure 1 Generative AI Usage by Geography
Source: *McKinsey & Company Insights*

Over 5% of workers across geographies now use generative AI regularly (Figure 1), and Statista Market Insights projects a market exceeding $200B by 2030. The projection, In our view, is overly conservative. Instead, we think that investors should expect **a generative AI market of several trillion dollars by 2030.**

Generative AI in the Public Markets

If the premium the market is willing to pay for Microsoft over Alphabet is mainly due to the **former's increased likelihood of dominating in generative AI**, then the market consensus on the total revenues from generative AI in 2030 must be in the trillions to justify the current magnitude of the premium that investors are willing to pay for Microsoft over Alphabet.

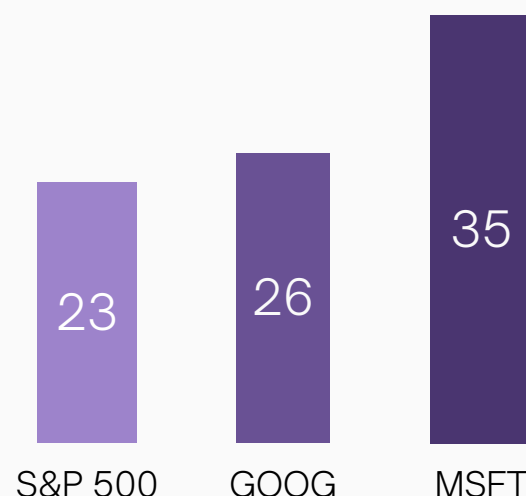Figure 2 Stock Price: MSFT & GOOG (April 2021 to April 2024)
Source: *Pitchbook*

Figure 3 PE Ratios as of 4/28/24
Source: *Pitchbook*

Alphabet's PE ratio stands at **26**, slightly above the S&P 500's average of 23, while Microsoft enjoys a **35% premium with a PE ratio of 35**, reflecting long-term investor optimism about its prospects in generative AI markets through **its partnership with OpenAI**. In contrast, concerns that LLMs might undercut its core search business **depress Alphabet's market valuation.** The expected total revenues from generative AI by 2030 **must be in the trillions to justify the significant premium** investors are currently placing on Microsoft.

Sam Altman's efforts to **raise $5-7 trillion** to boost chip production for generative AI make sense, considering the broader benefits **beyond just AI**. However, if the generative AI market only reaches $200 billion by 2030, as Statista predicts, such a massive investment would be clearly excessive.

How We Are Misunderstanding "Generative" AI

Over-indexing on the "generative" angle implied by the generative AI moniker **may mislead investors** as to the nature of the technology and where its largest economic opportunities lie.

"Generative" AI, often associated with creative applications like writing media content or creating synthetic art, actually derives its name from the **"generative model,"** used to distinguish it from the **"discriminative model."** This term emphasizes training deep neural networks to represent a target domain accurately. **The term "generative AI" should *not* suggest to investors that content generation is uniquely poised for disruption over other applications.**

Indeed, given that most economically valuable activity does not straightforwardly involve generating novel content, **investors should explicitly assume that such areas will not be the main applications of generative AI.**

Discriminative Model

Discriminative approaches directly **attempt** to compute the **input-output mappings** for classification and regression.
Goal: Directly estimate $P(y|x)$
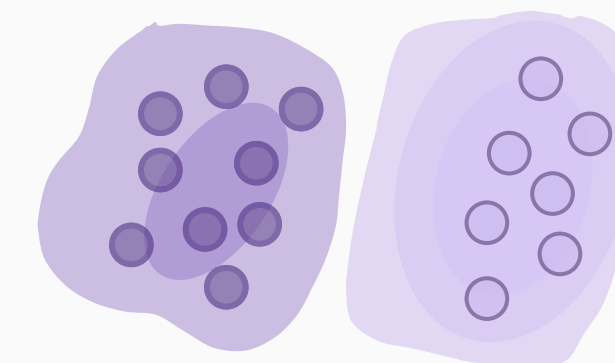**What's learned:** Decision Boundary
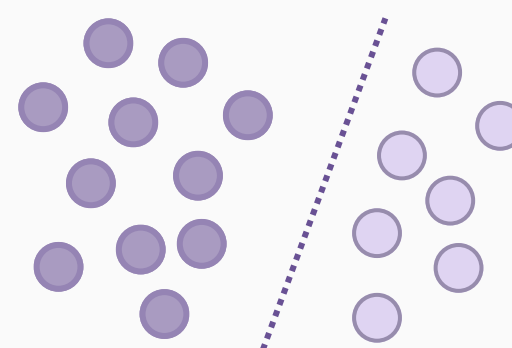
Generative Model

Generative approaches produce a probability density model over all variables in a system and manipulate it to compute classification and regression functions.
Goal: Estimate $P(x|y)$ to then deduce $P(y|x)$
What's learned: Probability distributed of the data

Source: *Stanford CS 229 Machine Learning, Machine Learning by Gebara*

Generative AI Doesn't Mean "Generative" Applications

Each some highlights below, each represents an example of using a generatively trained model in an application domain that is not "generative" in the colloquial sense. Investors should recognize that while tasks often involve content generation, classification planning, and control, generative models **may not focus solely on content creation** in practice.

Trading Algorithms

Perhaps closest to home for investors is a **trading algorithm** produced by pretraining a generative network on historical price data and public Tweets before using the network as the **basis for a stock-buying agent.**

Classification

In the problem domain of classification, generatively pre-trained models are well-represented in the leaderboard for ImageNet classification, supporting applications such as the use of a generative vision-language model to flag harmful memes online.

Robotic Control

Generatively trained models have also been utilized in the domain of planning, in which an agent must decide the best course of action given available information, and in the related domain of robotic control.

The Right Way to Think About Opportunities in Gen AI

Unlike earlier approaches, honew models can better repurpose pretraining on a large amount of related data before fine-tuning more specific data from the task at hand. **In particular, we are watching players such as:**

Figure, which raised **$675 million** at a $2.6 billion valuation, has partnered with OpenAI and aims to enable intelligent humanoid robots using an end-to-end deep learning approach.

Waabi has raised over **$83 million** and aims to take generative AI into the real world with its foundation model for self-driving cars. However, deploying generative models in non-generative applications isn't limited to physical-world applications.

Oscilar, self-funded with **$20 million**, aims to bring generative models to credit risk assessment and fraud detection. In short, the application areas are relatively unconstrained because generative models are a technique formodeling the underlying distribution of any domain in which sufficient data exist.

Generative AI succeeds in domains with enormous amounts of data and fails when data is scarce. A more helpful approach for identifying opportunities might focus on "foundation models," which are extensively trained on broad datasets and then fine-tuned for specific applications. The greatest economic potential for generative AI lies in areas where these large-scale pre-trained models can be adapted to particular use cases.

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