



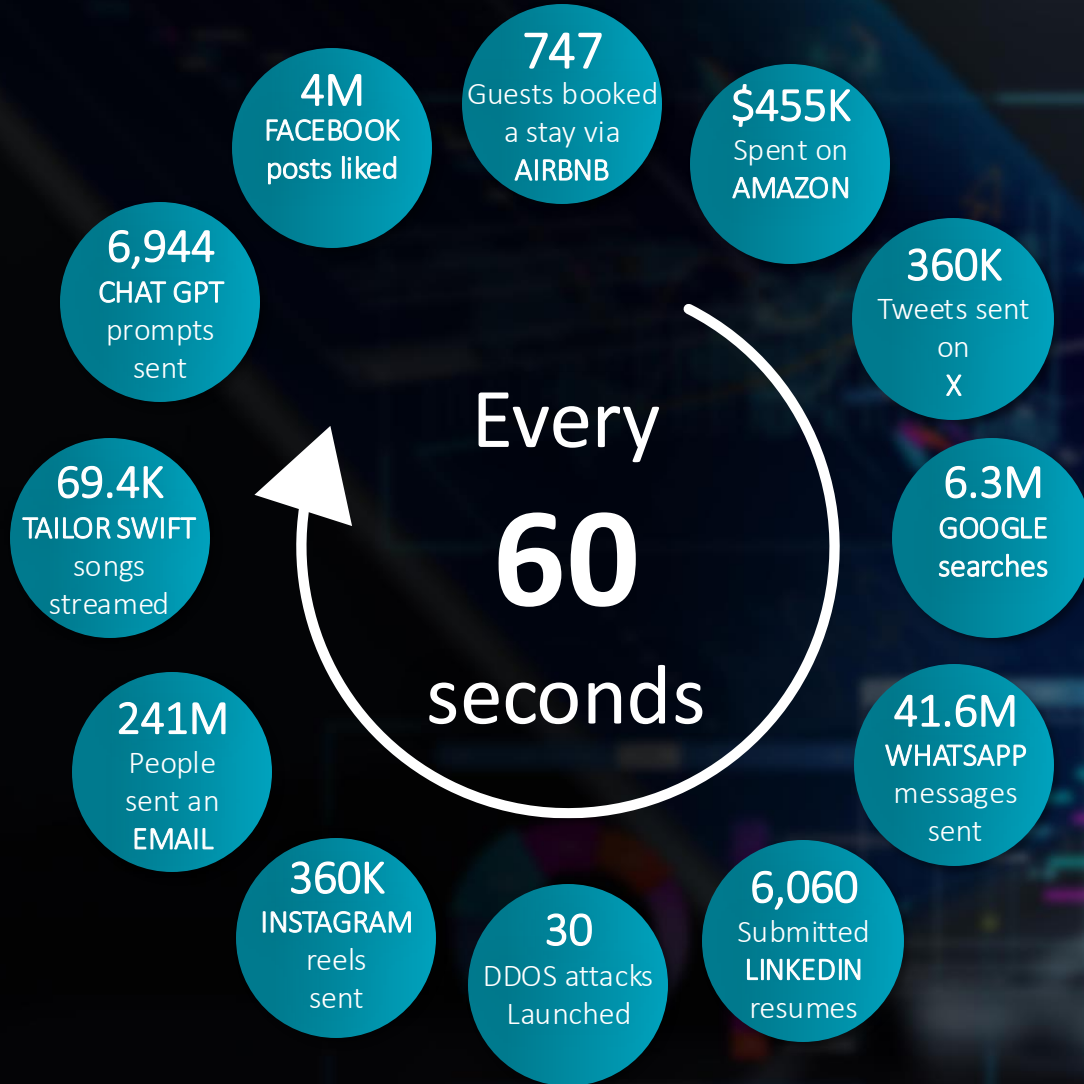
Next-Gen Quant Investing

Mike Chen, PhD
Head of Next Gen Research

3 April 2025

There is an ocean of data

Trend 1



Exponential growth of computing

Trend 2

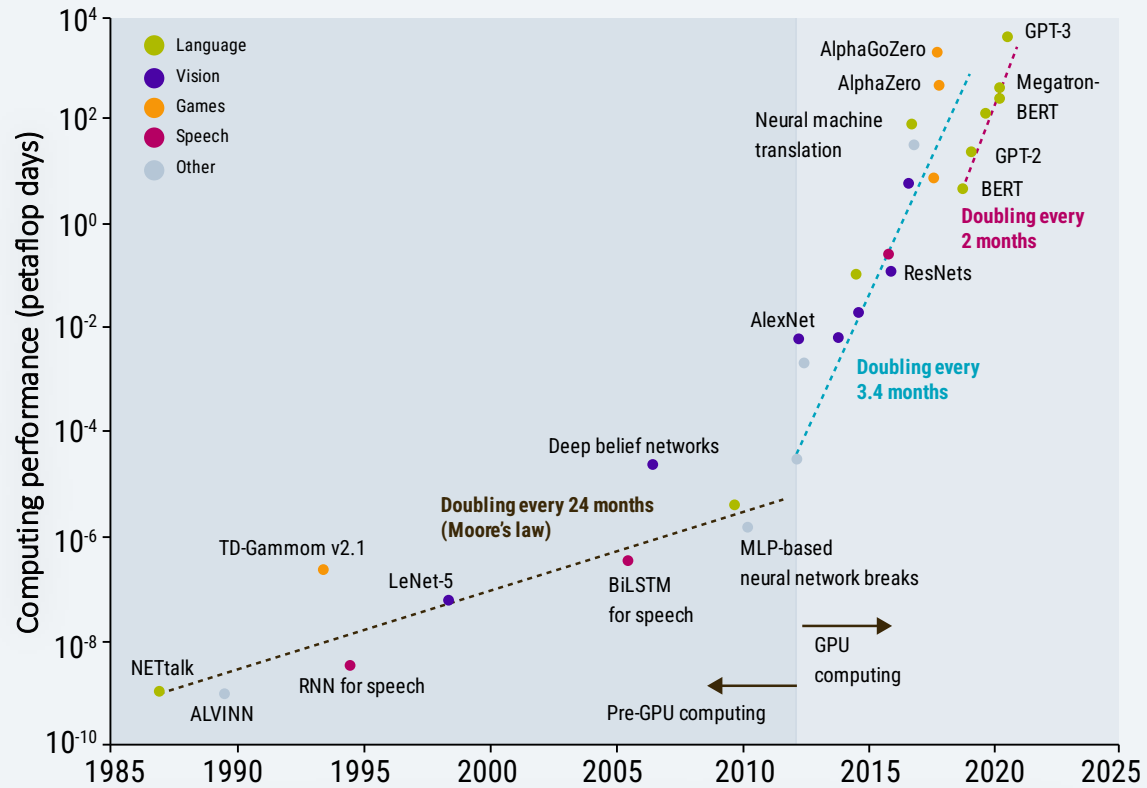
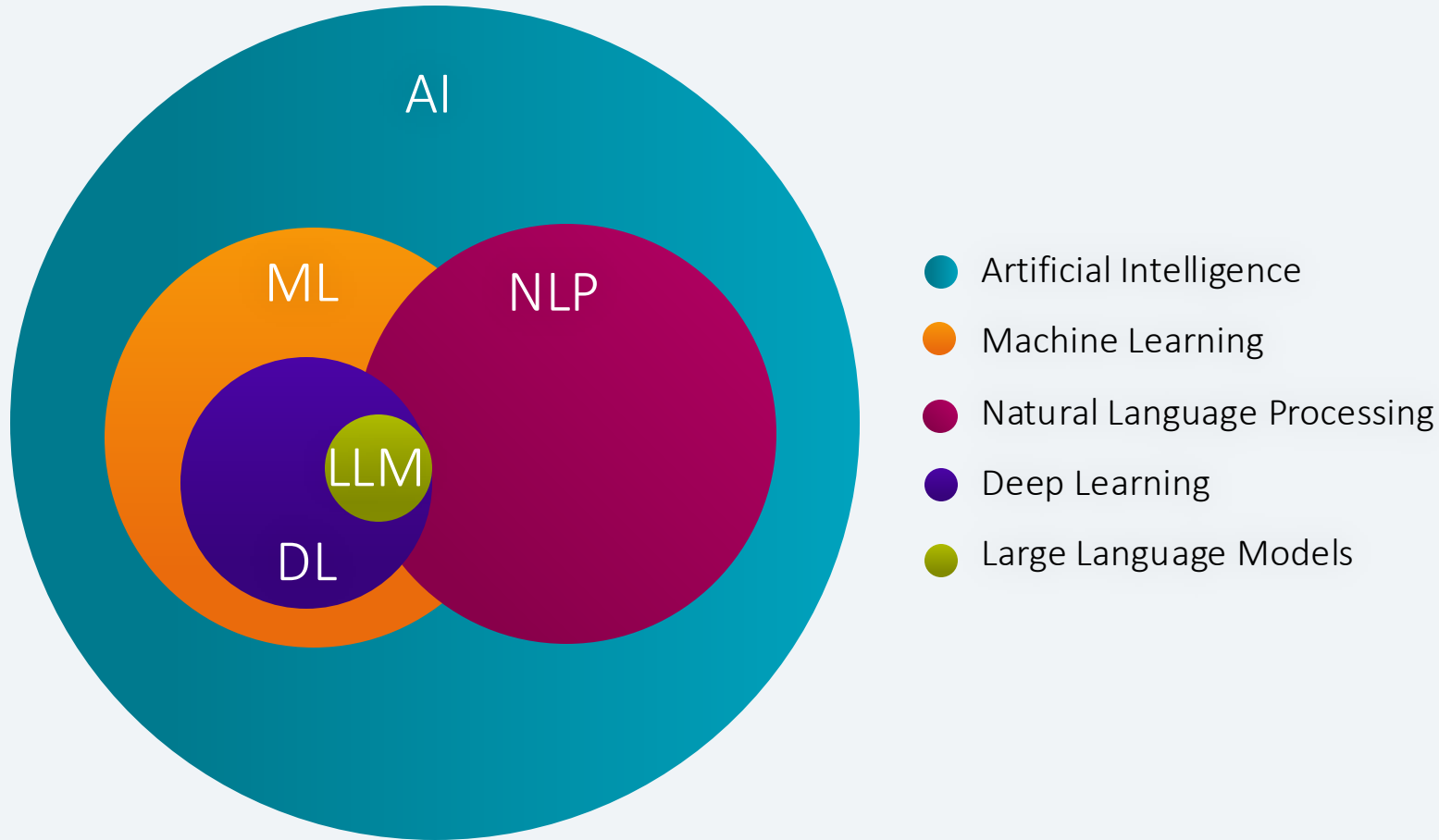


Fig. 10. Growth in computing power demands over the past decade substantially outpaces macro trends [359].



Algorithms are booming

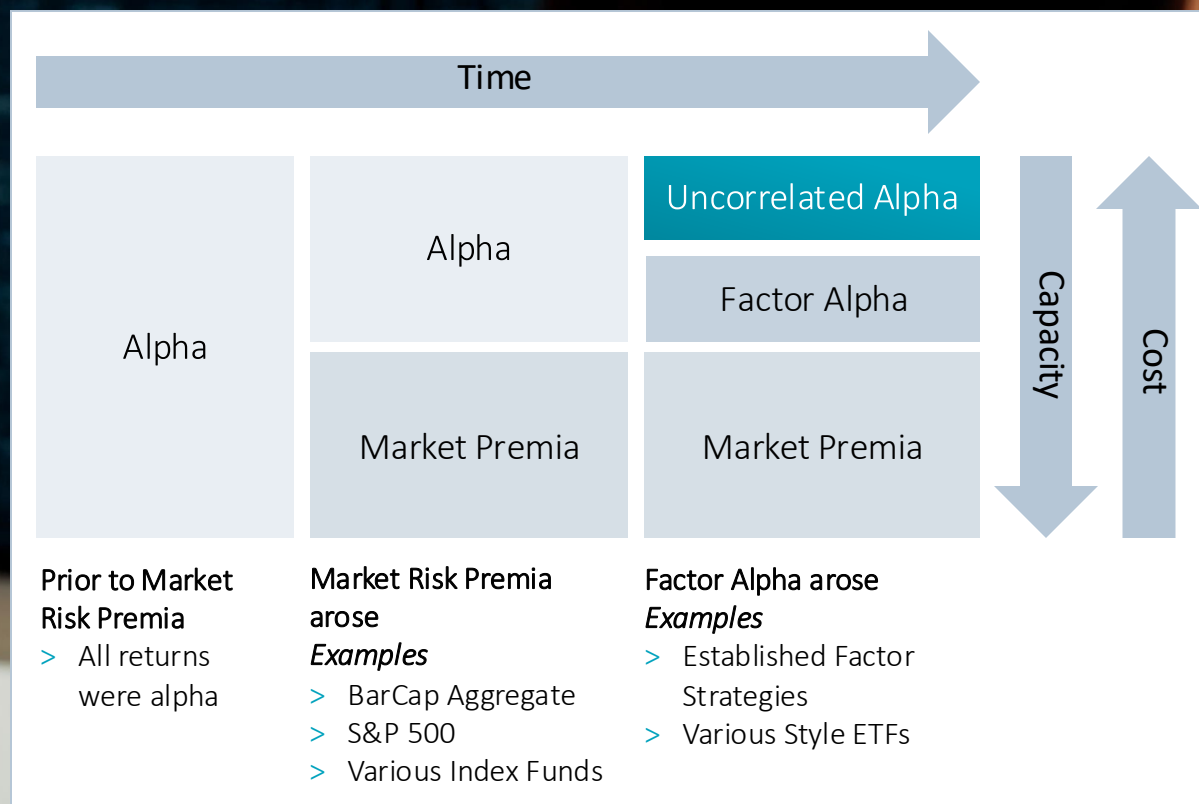
Trend 3



```
DECLARE @invoiceDateTemp  
SET @invoiceDateTemp = CONVERT(DATETIME, '2023-01-01')  
  
INSERT #CTemp  
(line, itemCode, itemBarCode,  
couponSerialNoRef, dayShift)  
SELECT DISTINCT  
T.line, T.itemCode, T.itemBarCode,  
DATEADD(day, I.dayShift, I.invoiceDate)  
IIF(T.couponUpgrade = 'Y', T.couponUpgrade  
FROM  
OrderDetail AS T INNER JOIN  
WHERE  
(T.companyCode = @companyCode)
```

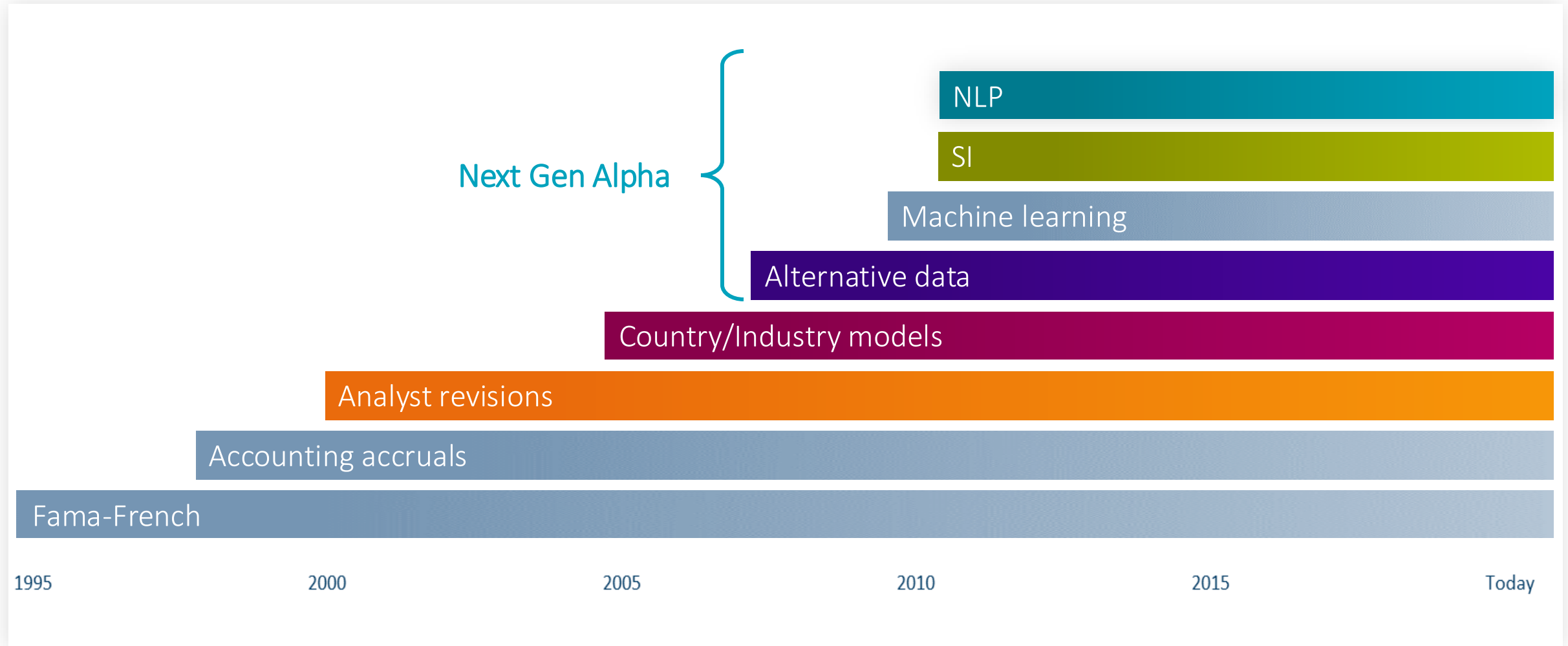
Innovation is not a nice to have, it is an imperative

Focus on uncorrelated alpha



The four pillars of Next Gen Alpha

Evolution of quantitative investment research



Attempting to exploit alternative data

Human insight remains important

PILAR 1

A few decades ago, the quant financial data landscape was much simpler

- > Mainly consists of financial statements and market data
- > Those sources have long been exhaustively examined

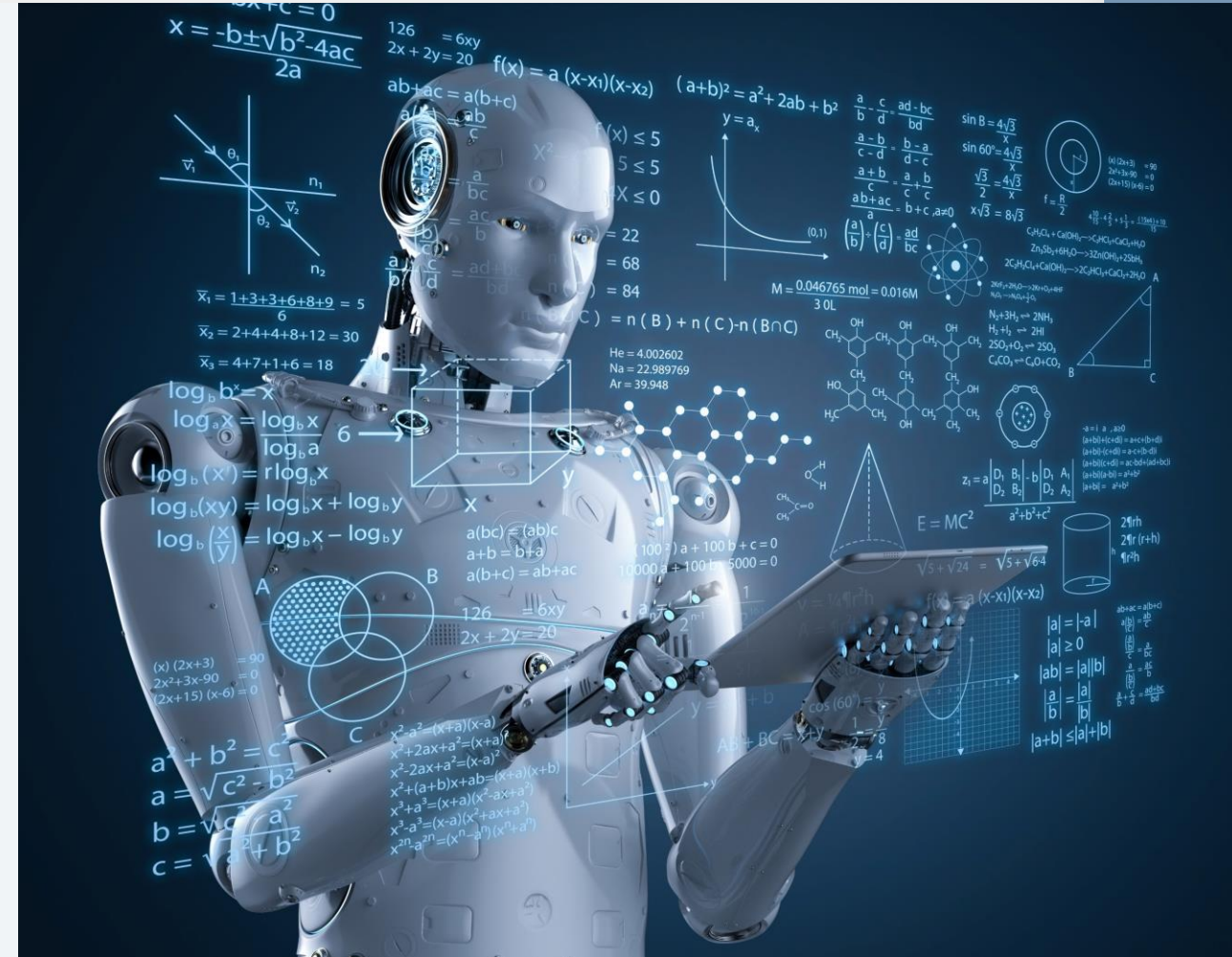
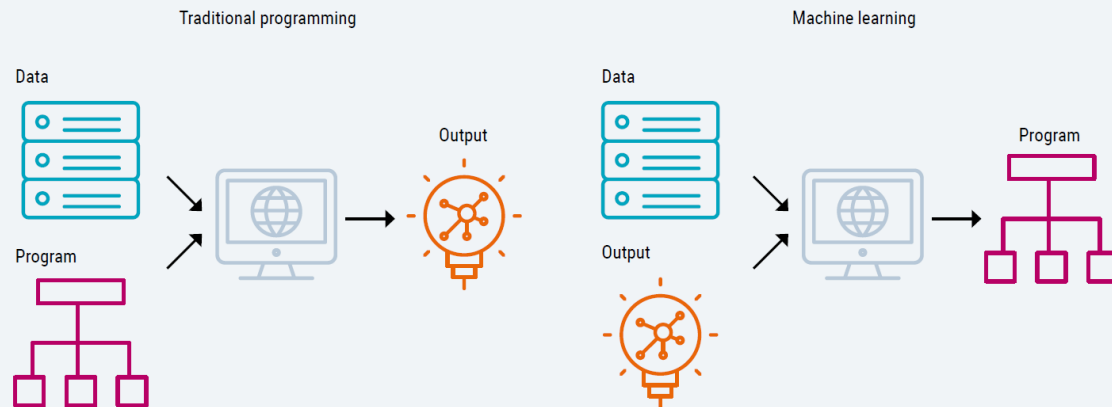
Next-gen quant researchers utilize alternative data

- > Unconventional/non-traditional data
- > Not used historically
- > Characterized by 4 Vs: volume, velocity, variety, veracity
- > Lots of data, but also a lot of noise
- > Only about 0.5% of all data is ever analyzed or used
- > Economic insights and advanced analytics needed to convert data to alpha



PILAR 2

- > Rather than a hindrance, the amount of available data supercharges ML algorithms
- > Able to detect patterns in the ocean of data, revealing relationships that might have been missed
- > When applied correctly, can allow for detection of insights and opportunities not apparent via traditional methods



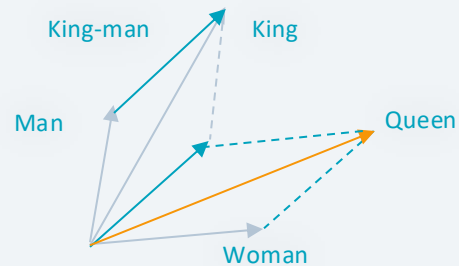
What do we mean by NLP and Gen AI

What is being said and what is not being said

PILAR 3

Like ML, NLP is also a branch of AI that has bloomed recently

- > Financial information is more than just numbers in structured formats
- > NLP allows practitioners to deduce information from what and how things are said
- > Quants can now glean information from earnings calls, interviews, news articles, etc.
- > Goes beyond the written word (tone, sentiment, emotion, etc.)



King-man+woman≈queen



Can alpha and sustainability co-exist?

Assess sustainability and intangible assets simultaneously

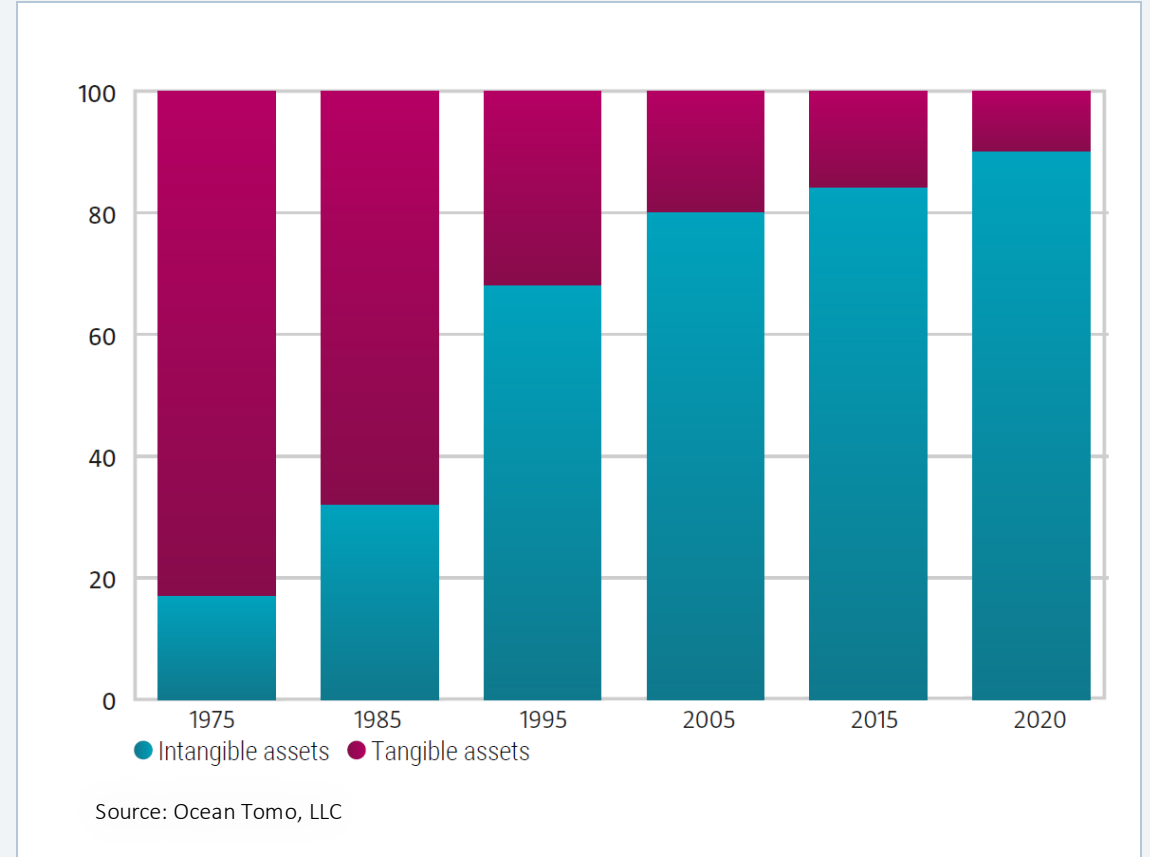
PILAR 4

Can you have both your cake and eat it too?

- > The answer is maybe
- > There is a large overlap between “sustainability” and “intangibles”
- > It all depends on the **financial materiality** of the “sustainability” metric that one care

The key is to assess sustainability and intangible assets simultaneously

- > Sustainability-related data is notoriously poor
- > Alternative data and innovative techniques can be a solution



B. Example Next-Gen Signals

How to build an optimal, customized, sustainable strategy?

3-D investing as a solution

PILAR 4

By definition, sustainable strategies must be custom

- > There is no agreed-upon definition of what is sustainable
- > For sustainable asset managers, the aim is to customize to client's sustainability goals (what?), and any potential tradeoffs between alpha (how much?)
- > I.e., sustainable investing is 3-dimensional

What does it mean to build an “optimal” 3-D portfolio?

- > In Chen and Mussalli (2020, JPM) and Blitz, Chen, Howard, and Lohre (2024, FAJ), we show how to build ex-ante **Pareto-optimal** 3-D strategies



Why do this? This is expensive

We need to do this because the alpha needed

It takes a lot of resources to build-up a next-gen program

- > New skill sets need to be developed/acquired
- > New data sources need to be purchased
- > Infra needs to be built and computing needs to be spent

Why?

Because alpha decays and get arbitrated away over time

Infrastructure & investment

30+ data sources

200TB data utilized

20M+ spending on data,
2x growth versus 3 years ago

60.000 CPU/hours
used on a monthly basis, more
than **5x** the rate back in 2020



Infrastructure is the foundation

Good, fast, or cheap? Pick two

Infrastructure for a quant program is like the foundation of a building

- > Not normally seen, but critical
- > Requires serious investment to make it robust and scalable
- > One can do it in either “dorm-room” or “industrial” styles
- > practical consequences are huge between the two

Consequences of badly build infrastructure

- > Scalability: cannot handle data volume and computing demands
- > Replicability: Hard to verify research done by others
- > Leads to potential p-hacking
- > Maintainability: spend most of the time fixing things that break
- > versus expanding the system/capability
- > Iterate: hard to modify and improve specific functionalities



A great workplace is having the best colleagues as possible

People matter

This is super obvious, and everyone says this. But surprisingly many shops get it wrong!

- > From personal experience, almost all corporate ills start with culture
- > Super hard to get right, and takes constant work to maintain
- > More than just slogans... Even Enron said ethical behavior is one of their “north stars”
- > They mention it on many of their earnings calls.

What makes a great researcher?

- > Curiosity, courage, drive, and scientific mind
- > Aim for impact rather than busyness
- > You and your research
(<https://www.cs.virginia.edu/~robins/YouAndYourResearch.html>)



Next Gen quant research at Robeco

Harnessing AI to fortify our time-tested investment process

Machine learning signals example research

- > ML model features and return attribution: Framework for ML attribution, **2024**.
- > Signal momentum timing: Identifies signal momentum by also incorporating risk, spreads and valuations in assessment, **2023**.
- > ML stock price crash prediction: Forecasts likelihood of stock price crashes based on distress indicators via ML, **2022**.
- > Interactive reversal, **2023**, ML stock price crash prediction, **2022**

Natural language processing signals

- > Conference call audio: Uncovers unspoken information from earnings call audio data, **2024**.
- > China A investor forum Q&A: Assesses sentiment from how companies respond to investor questions on forums, **2024**.
- > Earnings call Q&A: Uncovers sentiment from analysts and company representatives related to earnings calls, **2024**.
- > Bad ethics: Captures the extent to which companies conduct business in immoral or unethical ways, **2023**.
- > NGO sentiment, **2023**, Founder C-suite, **2023**, RICS momentum, **2023**, News sentiment, **2019**

Dismissed signals*

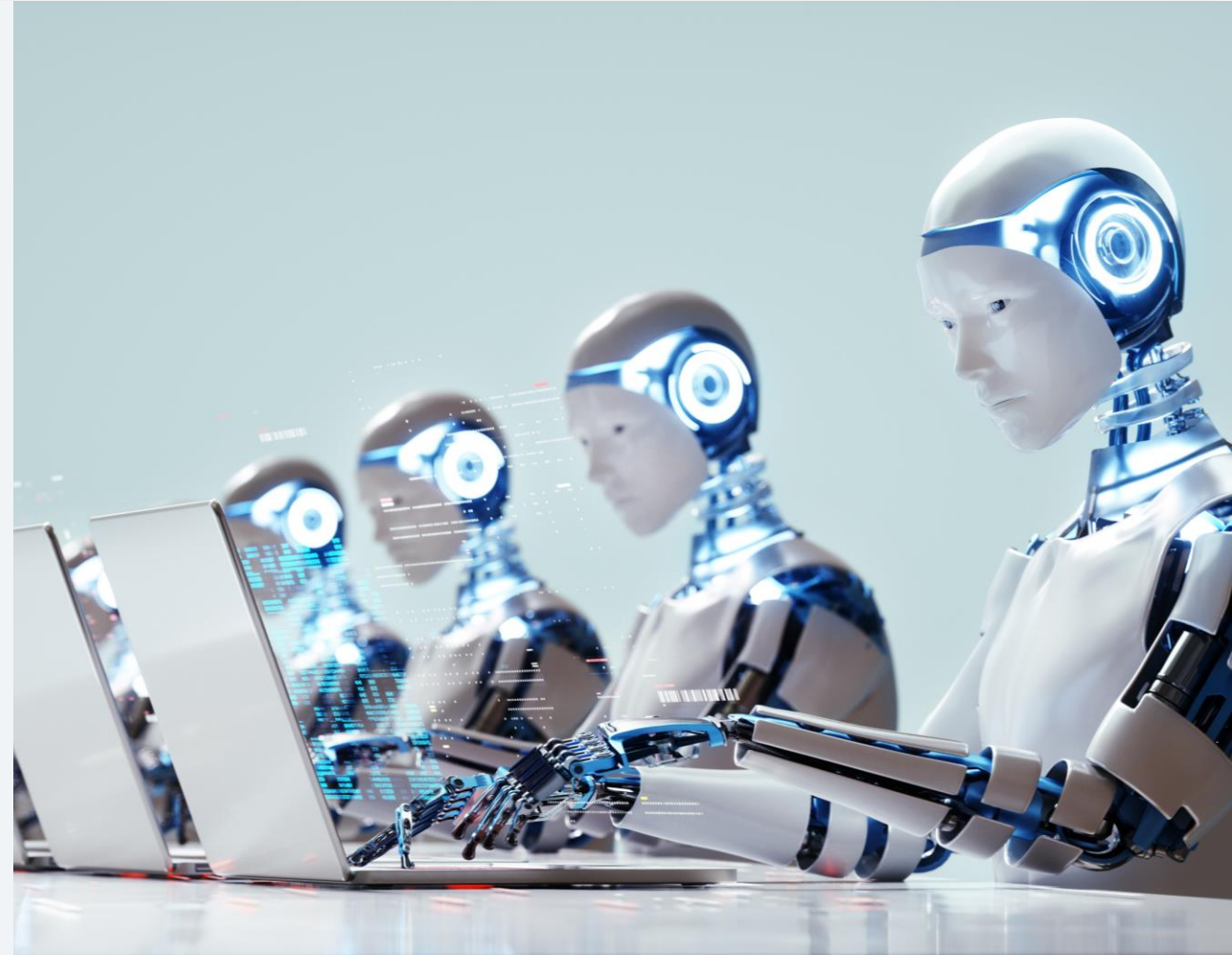
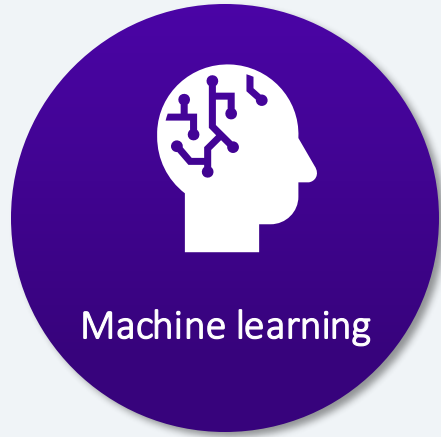
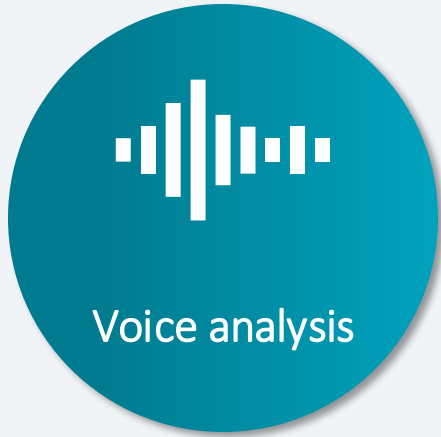
- > ML region/sector specific models, NLP on broker reports



The bots are listening

Leveraging advanced speech analytics

Most of communication isn't words!



The figure shows mean vocal feature characteristics for the top and bottom quantiles as a percentage relative to the third quantile. This is not a buy, sell or hold recommendation for any particular security. The information shown is only available for one-on-one presentations and for illustrative purposes only. No representation is made that these examples are past or current recommendations, that they should be bought or sold, nor whether they were successful or not.

SI alpha signal: why bad practices lead to financial distress

Applying NLP technique to uncover alternative risk sources

The way of doing business matters

1.0 ★★★★★ ✓

Former Employee

RUN! One of the worst companies to work for

Jan 3, 2018 - Anonymous Employee

✗ Recommend

✗ CEO Approval

○ Business Outlook

Pros

There are no pros to this company.

Cons

Where to start?! Poor, inexperienced management. They promote people to trainers who have no training.

5 min bathroom breaks...you can't even combine multiple 5 min breaks to properly go. Only 30 min meal break which really is 15 min once you sign in/out and head to the break room. The "trainers" and team leads have no restrictions and frequently are outside smoking, but god forbid if you take one minute extra.



They change rules, play favorites, deny bonuses and are creative with finances.

This company has NO integrity when it comes to employees and its clients. Anyone with any honour would not work there. They should be ashamed of their practices.

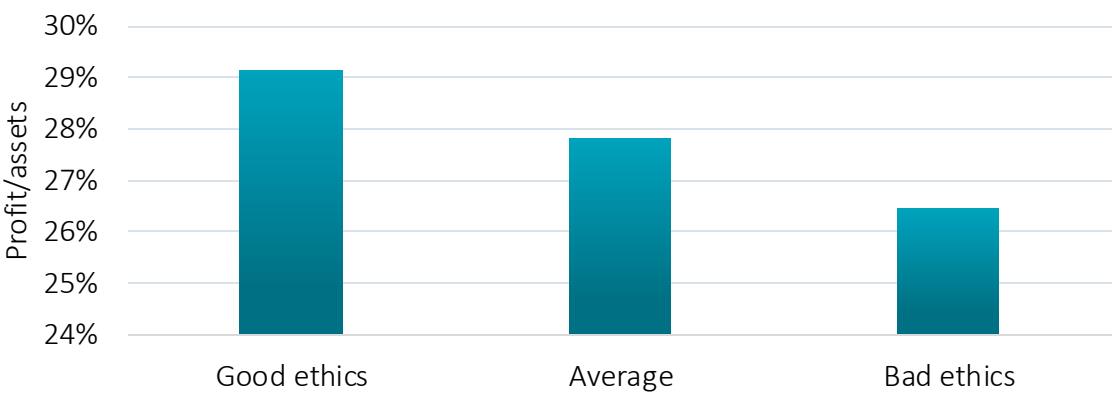
Very low pay.

Advice to Management

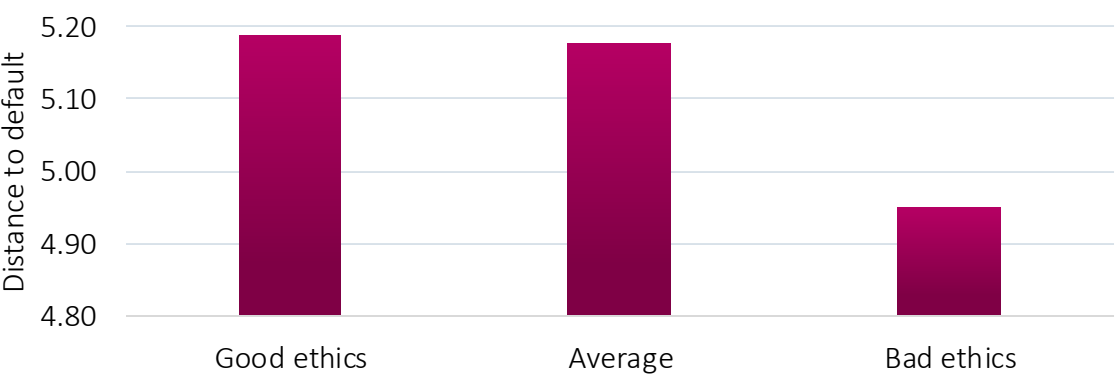
It really needs to do some deep soul searching and clean house from mid-level all the way to the top.



Business conduct affects the bottom line



Bad practices are related to financial distress



Using alternative data to exploit the unique nature of Chinese retail market and regulation

Examples of novel alpha signals

Input from exchange forum questions

Positive sentiment

"Fuxing Tan consistently demonstrates responsibility and strong executive skills. Recently, he has shown commitment by increasing his stake in the company by 5%. "

Negative sentiment

"The company displays a concerning level of arrogance, often exhibiting delays in addressing shareholders' inquiries with a rather indifferent attitude. "

Management earnings disclosure



Loss



Turning profit



Large change in earnings

Info from analyst company visits

Shenzhen exchanges mandate listed corporations disclose company site visits. For companies on Shanghai exchange this is optional.





Alpha decay necessitates innovation

Next-gen quant investing can unlock novel alpha from alternative data, ML, NLP, and sustainability

Reconciling the new with the established brings about challenges and opportunities

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Robeco Institutional Asset Management B.V.

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