HKUST BUSINESS SCHOOL 香港科大商學院 | WORLD CLASS IN ASIA

INVESTMENT ANALYSIS

Introduction to the Tech of Investments

The Agenda

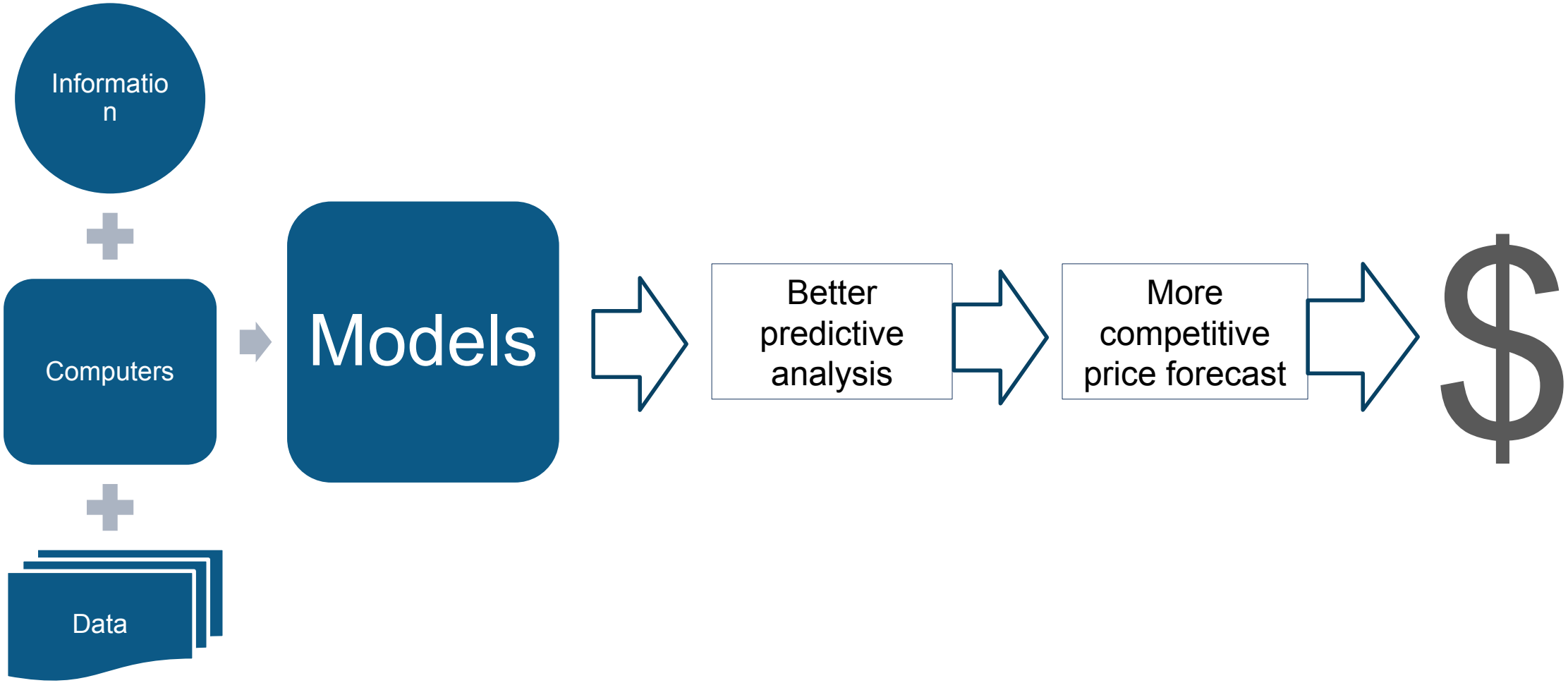
- How tech is transforming the Investment World: Pros and Cons
- AI in Investment World

THE INVESTMENT PROCESS

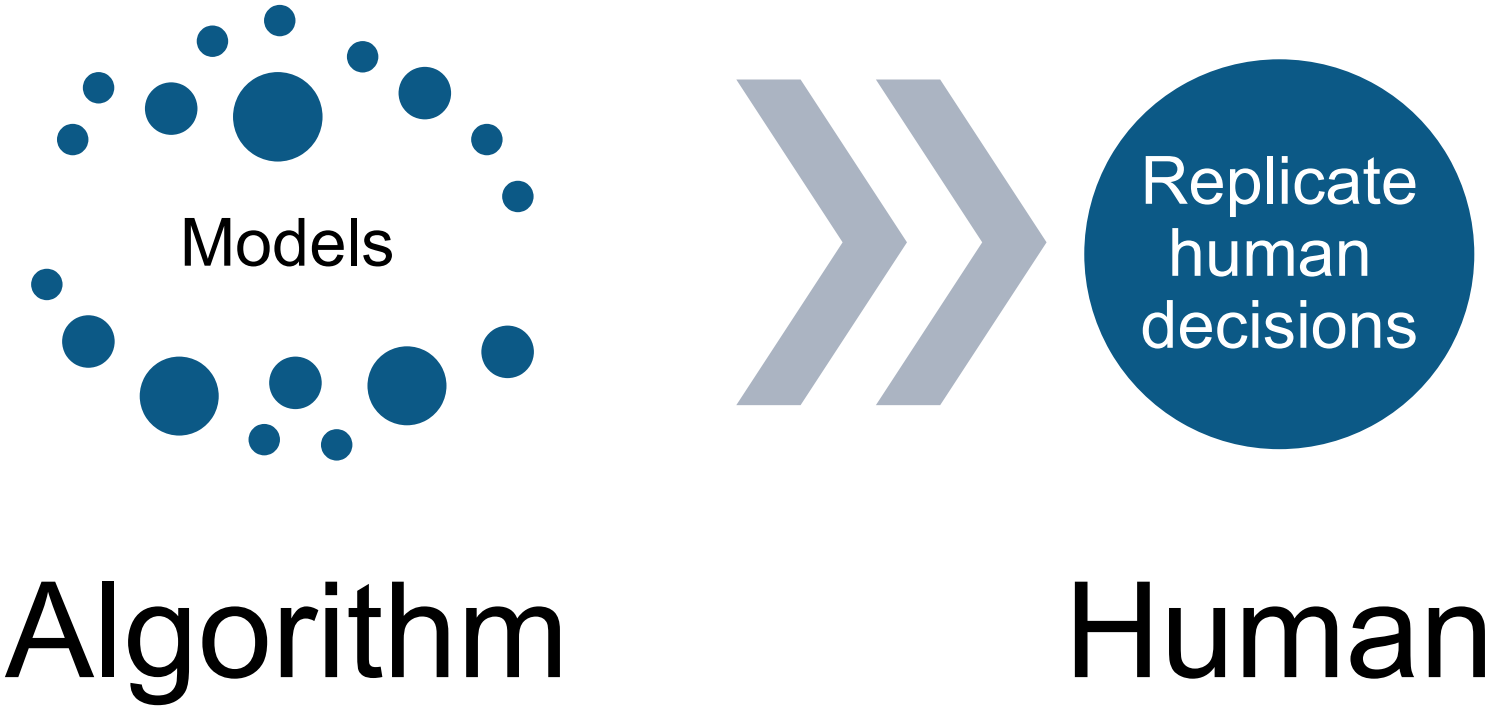
How Tech Has Transformed The Investment Decision Taking

Initial Automation i.e. Traditional Investing

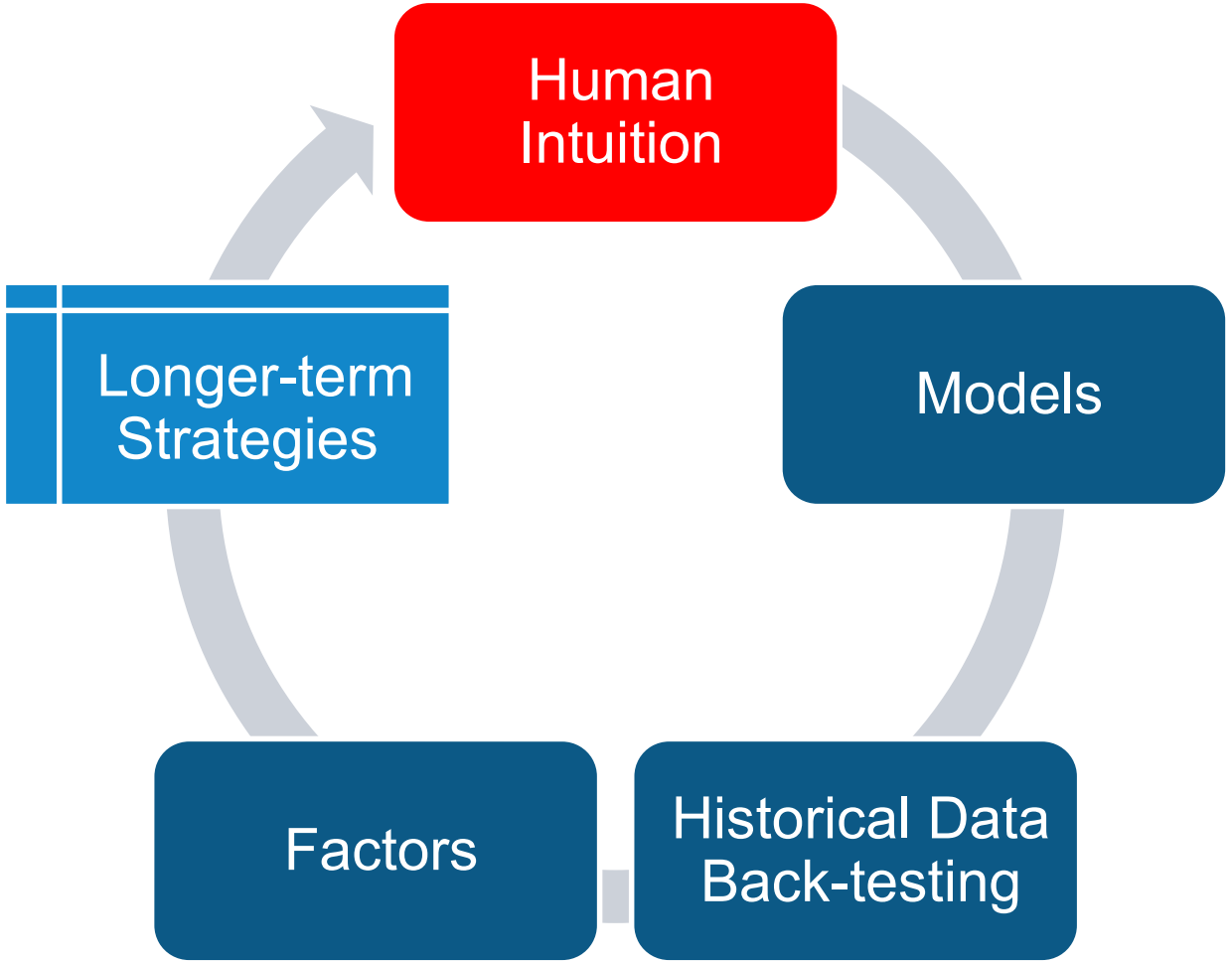
Second Stage Automation…still Traditional Investing



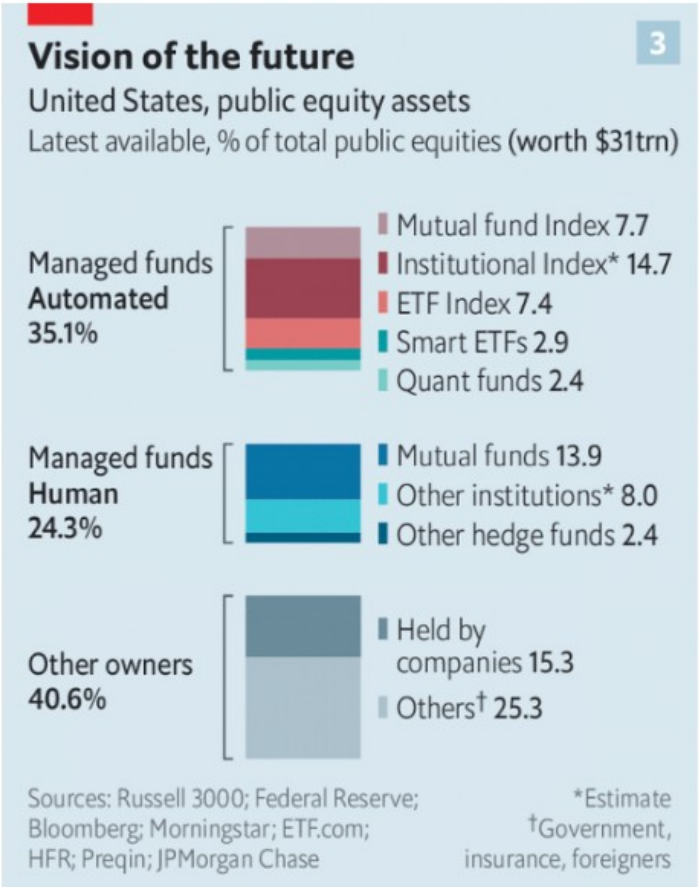
Facts about automation



Traditional Investment Process

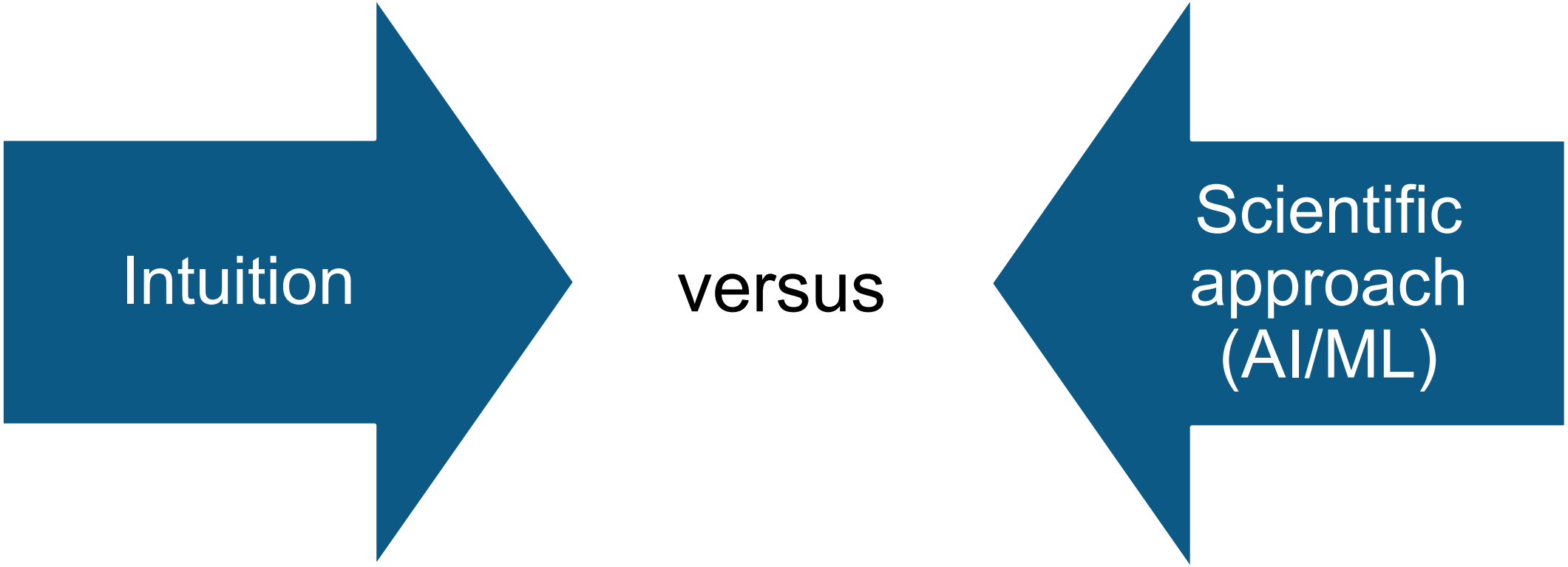


Facts: 36% of the trading is run by algorithms



Source: The Economist, October 5th, 2019: The stockmarket is now run by computers, algorithms and passive managers.

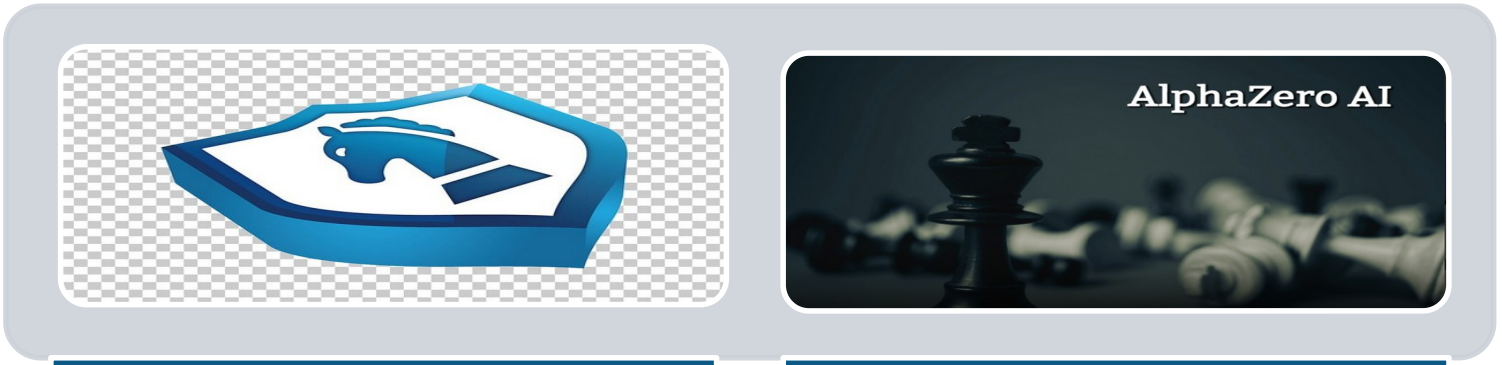
Where next?



Old school

NEW school

What is the Difference?

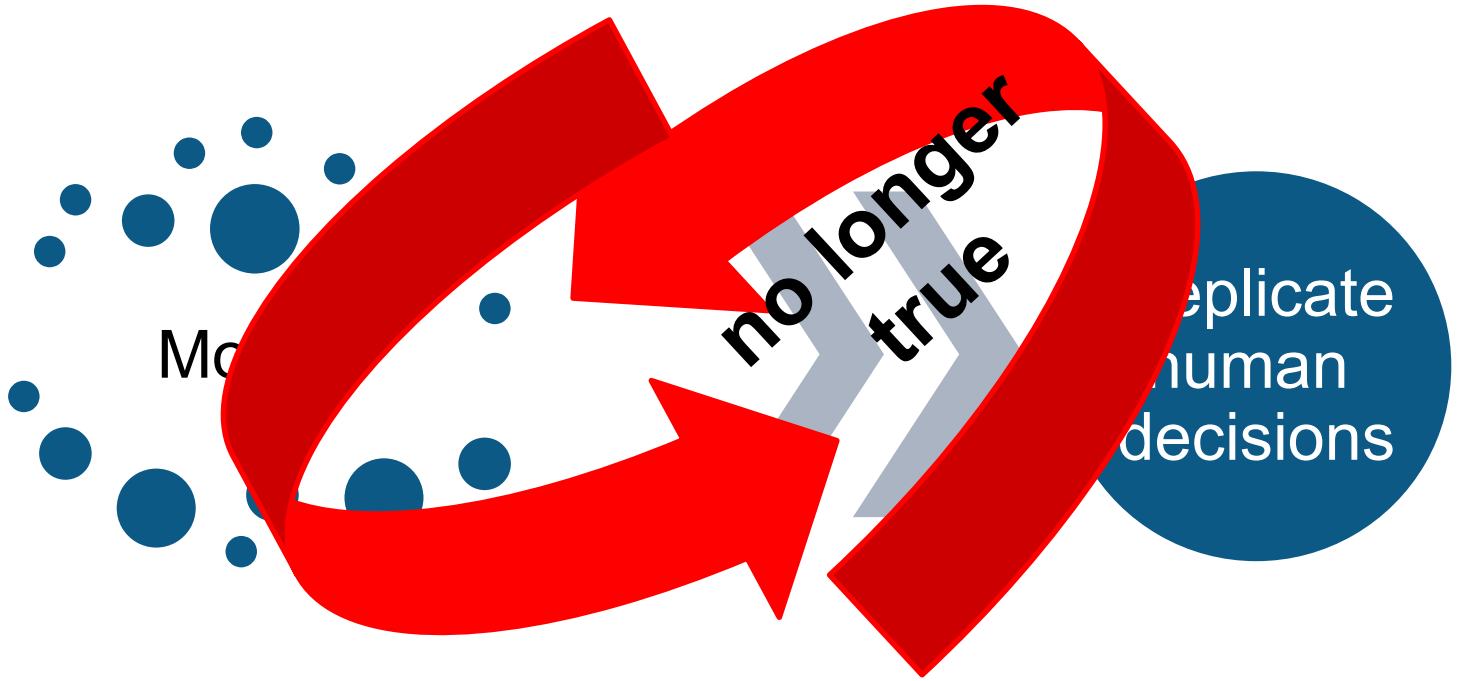


STOCKFISH	ALPHAZERO
Mimic Strategies	**Create Strategies**

With just 4 hours of training, DeepMind's AlphaZero AI developed superhuman performance in chess. ….

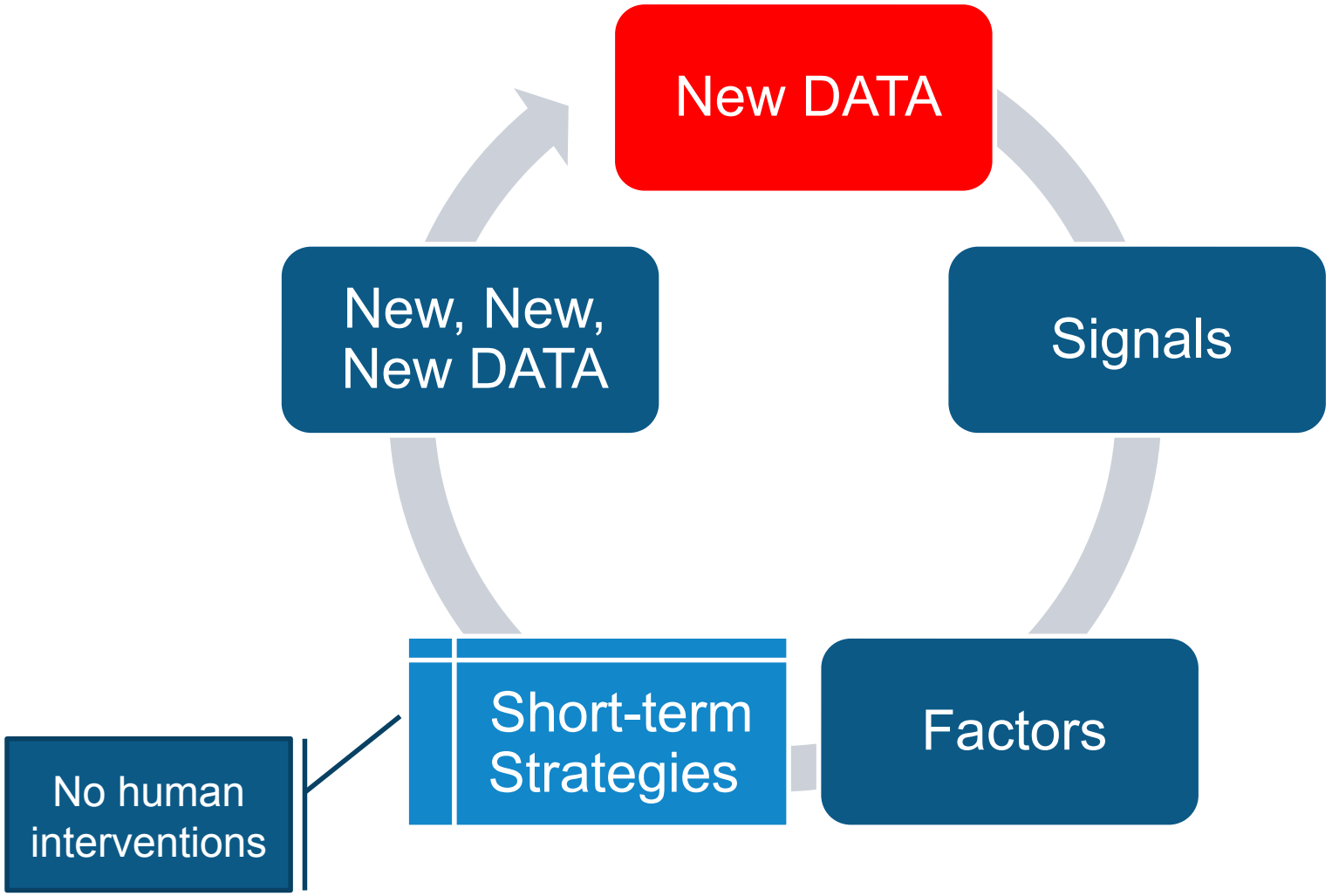
It's worth noting that the AI **was programmed with only rules of chess and no game strategies were fed**.

Facts about automation (recall)



Algorithm Human

Automated Investment Process….no human intervention



Better or Worse?

Why?

Problems with the data

True/False	• Noisy
Observations	• Short-term history
Meaning	• No economic meaning
Crowding	• Increasing market volatility due to similar trades
Role	• The machine will decide where the cash goes in a most efficient allocation, independent of human interventions

The data type, meaning, and processing between

Traditional methods

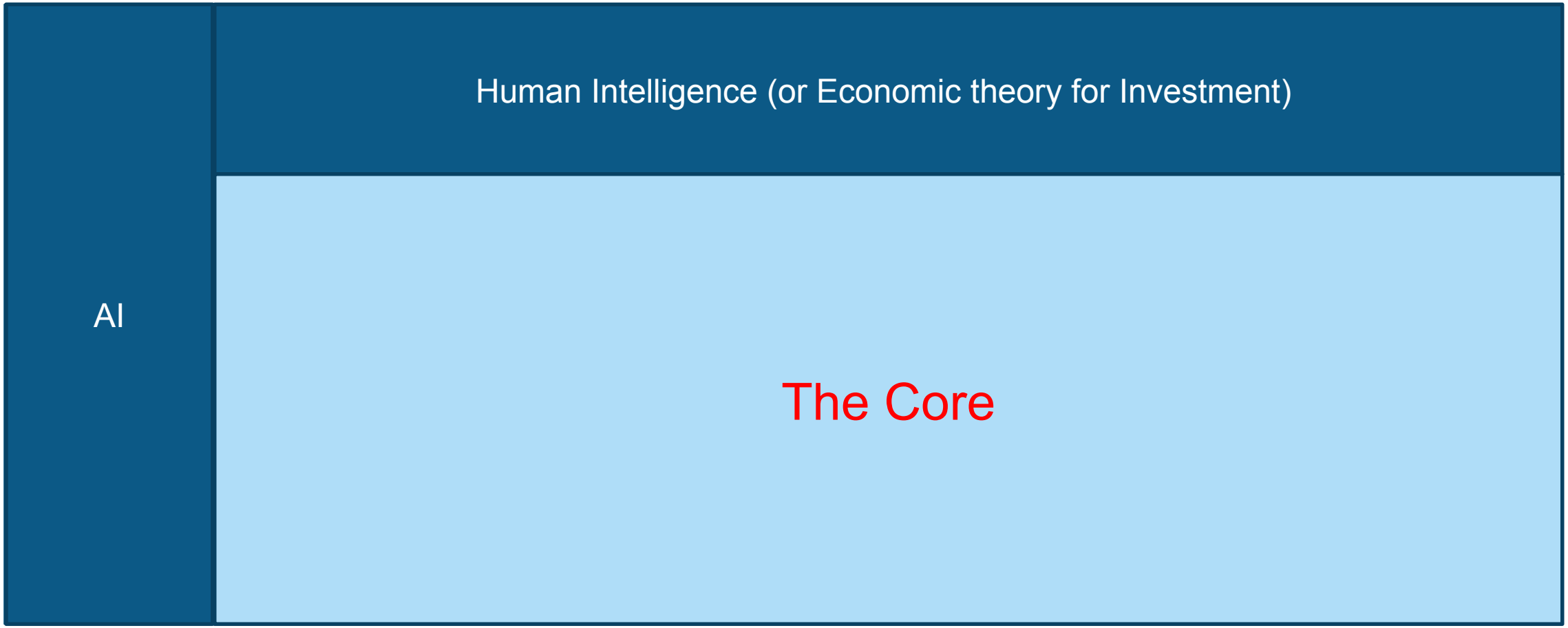
- 10-100 factors
- Computationally limited
- Predefined data sources with certain economic meaning

AI driven methods

- +10,000 factors
- Unlimited numbers of computations in a sec
- Various data type: public data, news, photos

- Spurious results
- Short-lived factors
- Difficult to understand and implement

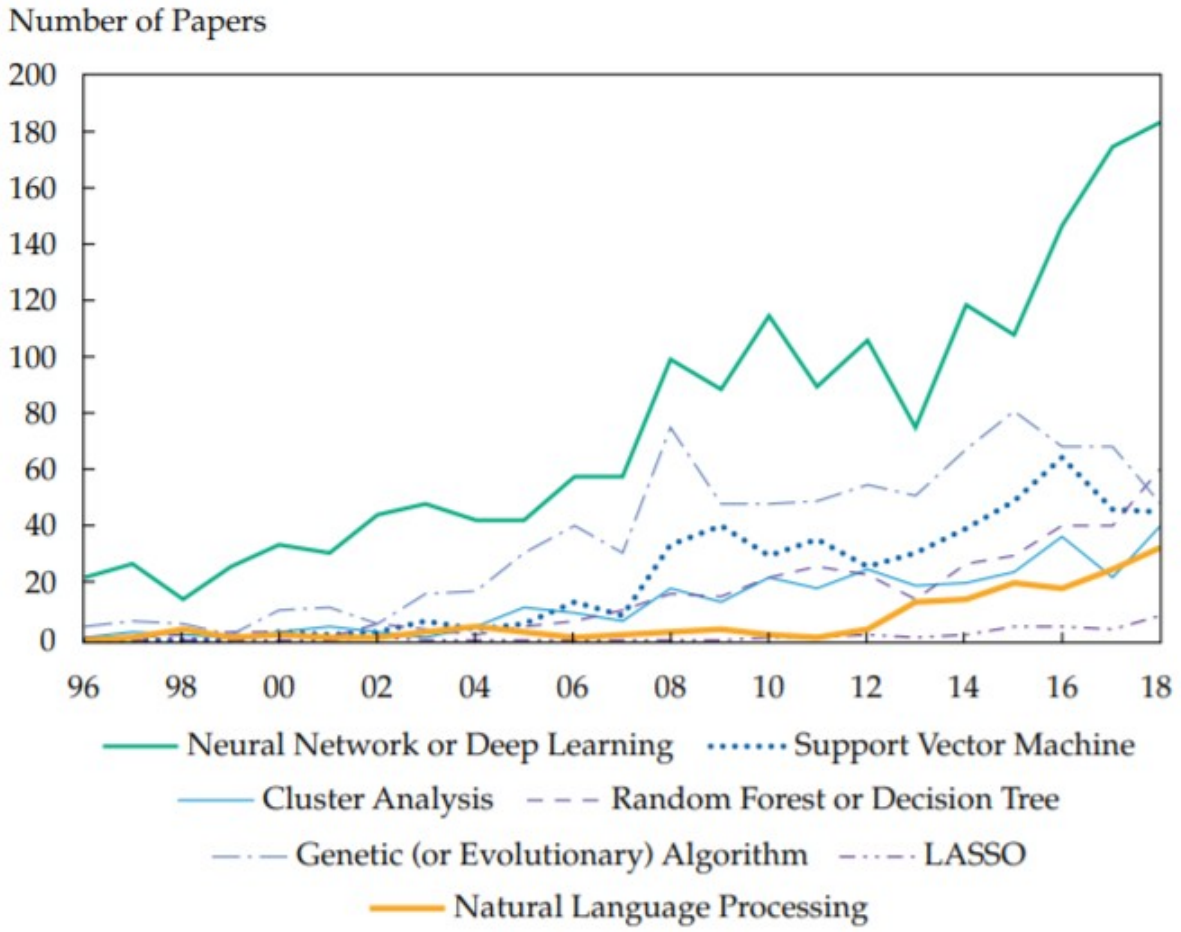
Beneficial only when you combine: AI+HUMAN



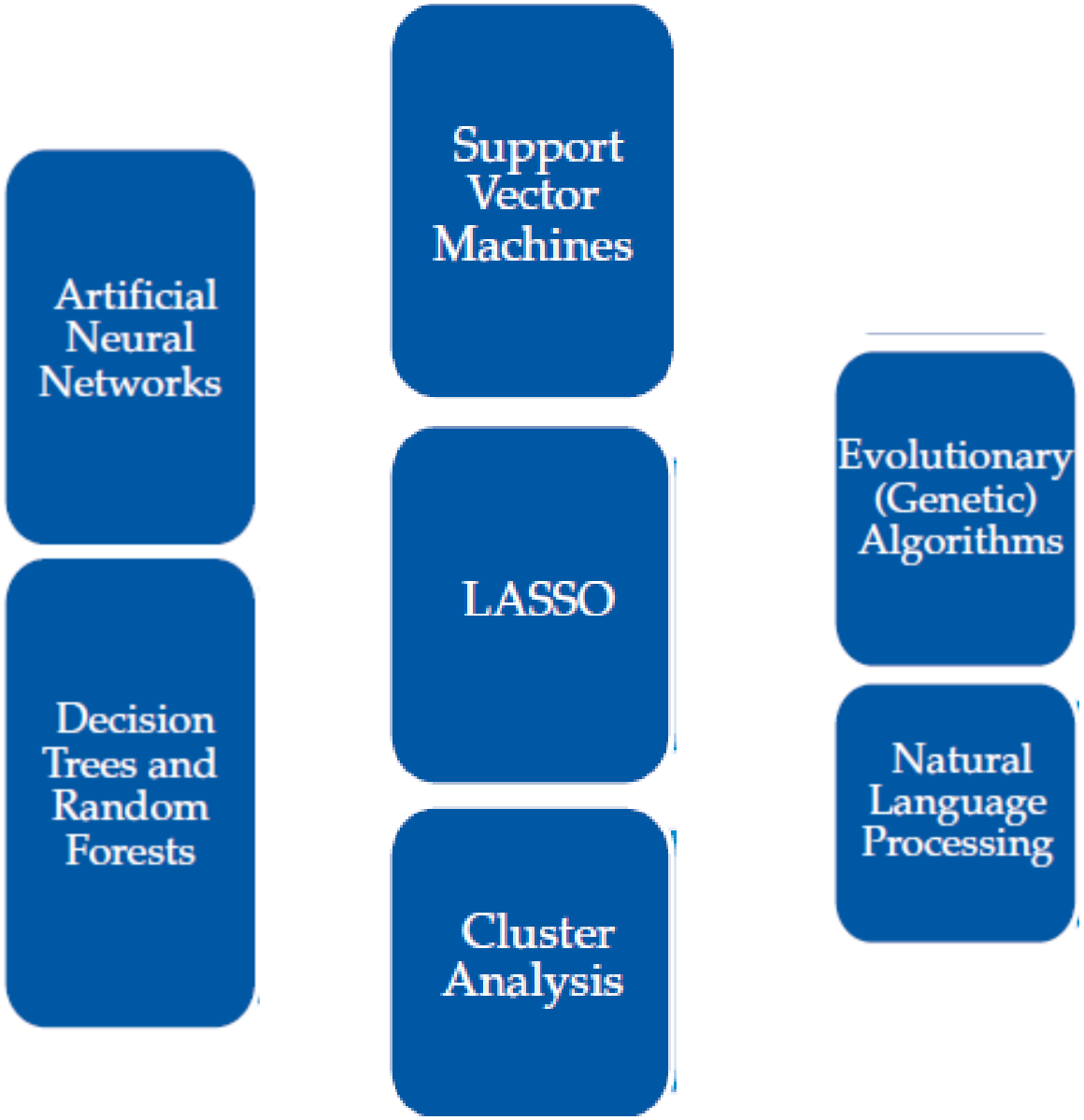
Source: F. Fischer of Blue Ltd

AI IN INVESTMENT

AI in Finance Litterature



AI Techniques



AI for Investment Purposes

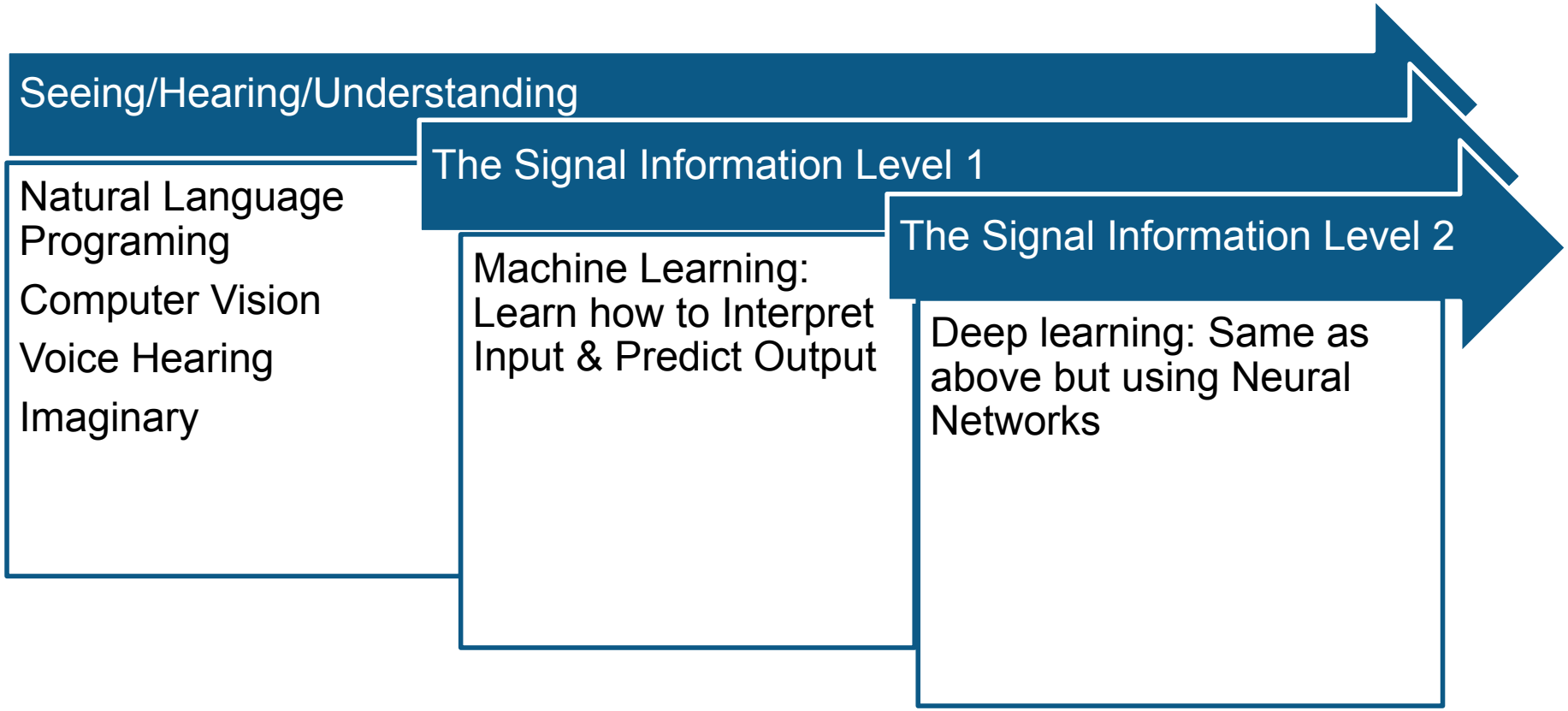
Complementary

- Peer-To-Peer Lending
- Robo-advisory
- Mobile Payment

Disruptive/Transformative

- Artificial Intelligence
- Blockchain
- Cloud-computing
- Big Data

AI for Investment Purposes: Trading algorithms



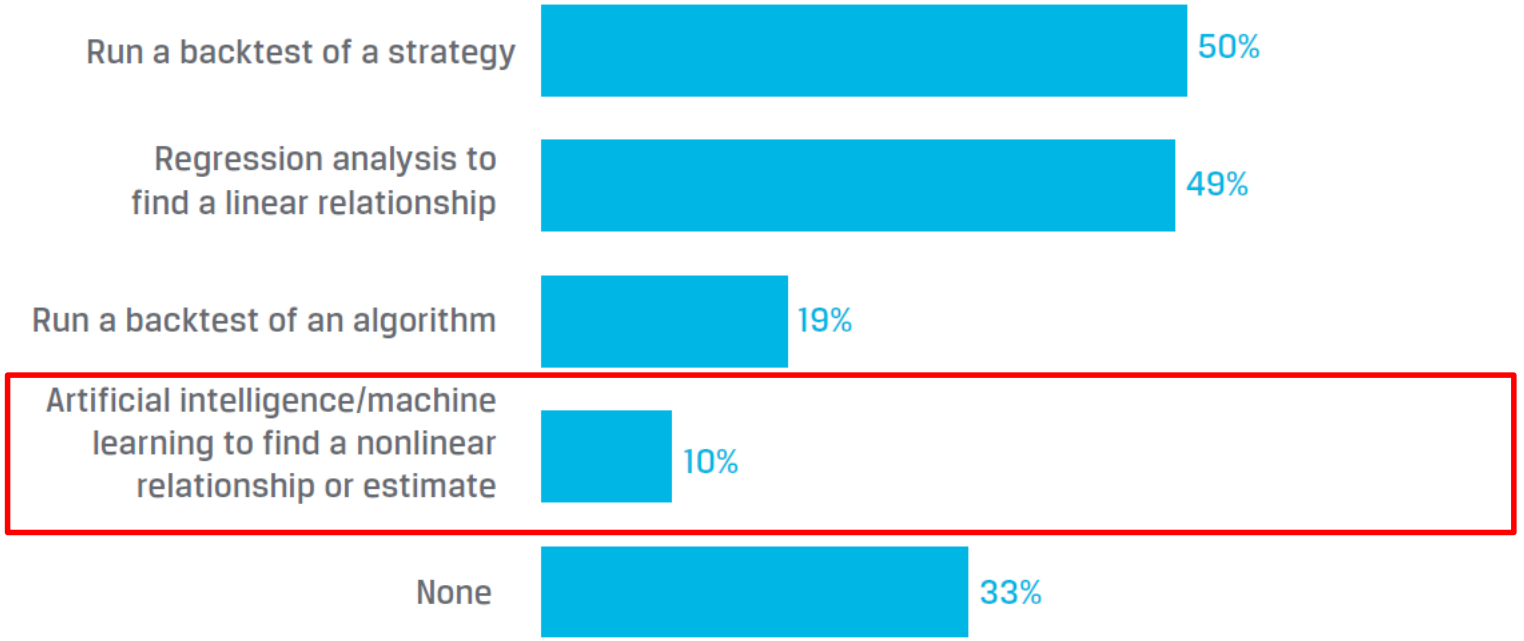
Market Usage

Only 10% of Investment Manager use AI

95% of portfolio managers rely on Excel (not shown)

FIGURE 2. STATISTICAL TECHNIQUES USED IN INVESTMENT STRATEGY AND PROCESS

Portfolio Manager: Which of these have you used in the past 12 months for investment strategy and process?



Note: Survey participation (N = 230).

Source: CFA Institute, AI Pioneers in Investment Management

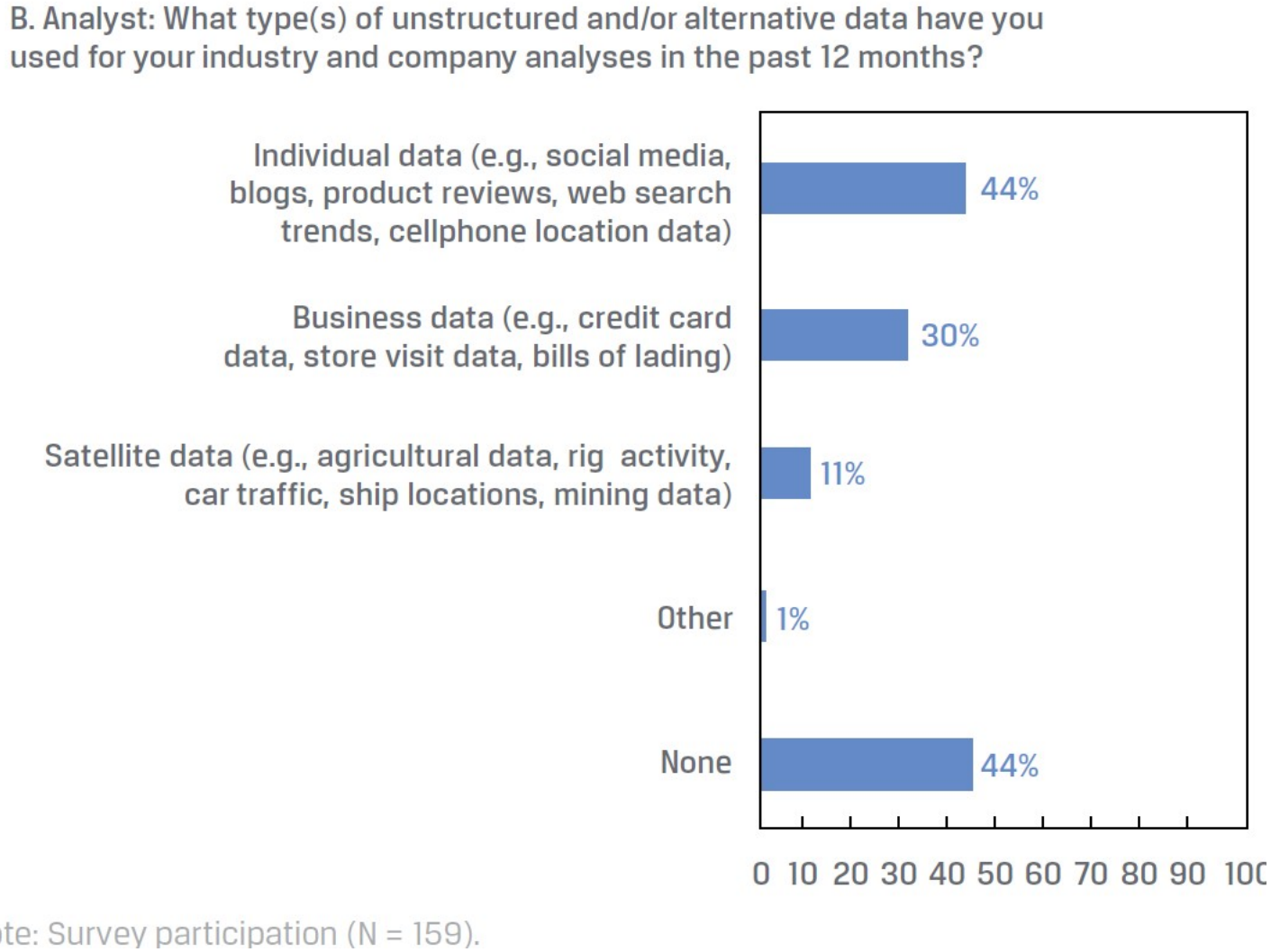
AI/ML techniques used for creating trading algorithms

Buy/sell	15%
Building signals	14%
Unsupervised learning to discover relationships	12%
Sentiment/ NLP	10%
Determine market trends (Hidden Markov Model)	9%
Predict short-term asset price movement (lasso, etc.)	9%
Predict short-term asset price based on macro data	9%
Find most profitable strategies (deep learning)	8%
Identify prevailing factors (ML, PCA, etc.)	8%
Predict asset-price direction or signals from noisy data	6%
NONE	69%

Source: CFA Institute, AI Pioneers in Investment Management

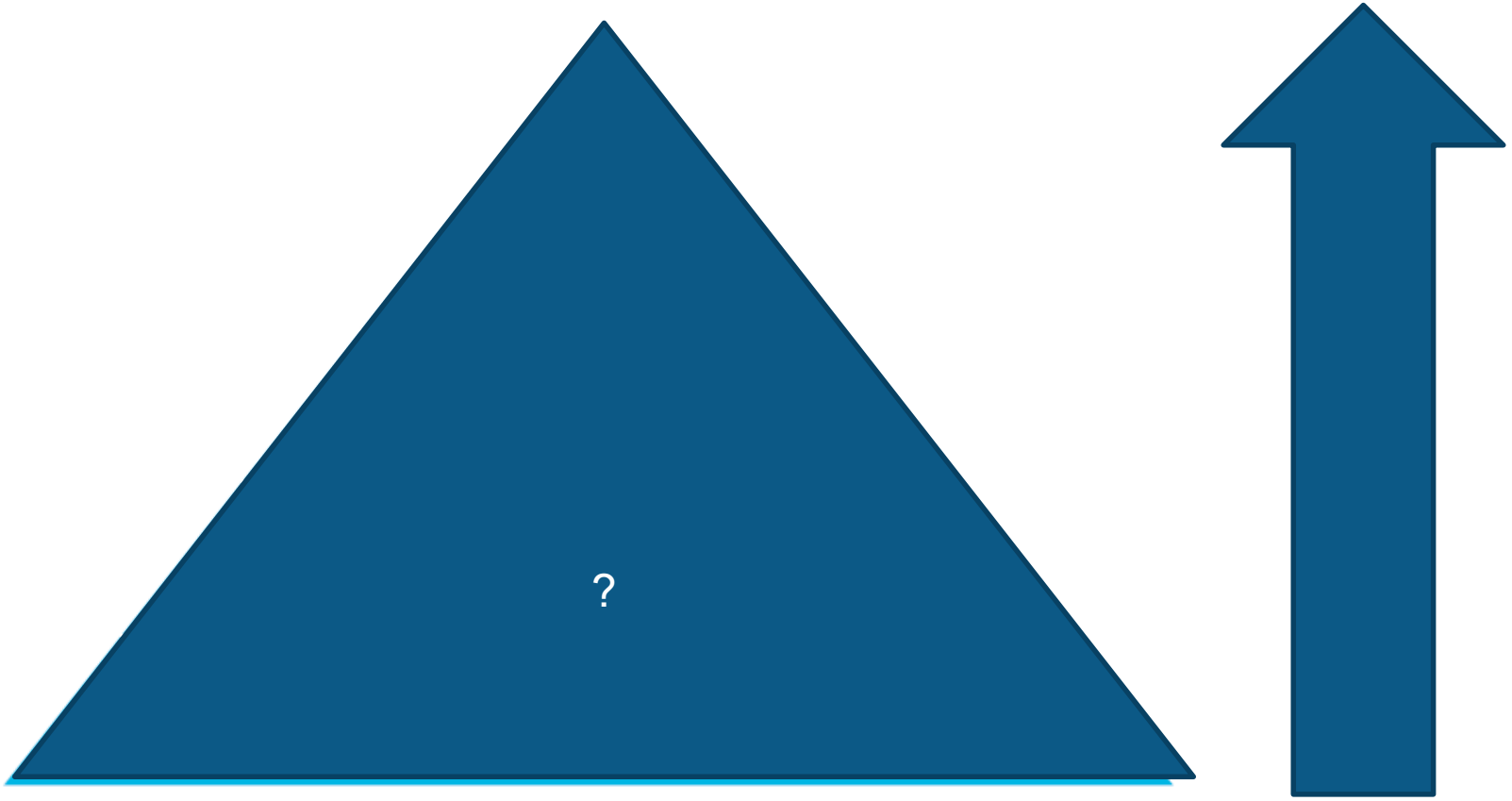
Unstructured data use is the most popular

For those who use AI/ML, unstructured and alternative data are the most popular than AI/ML



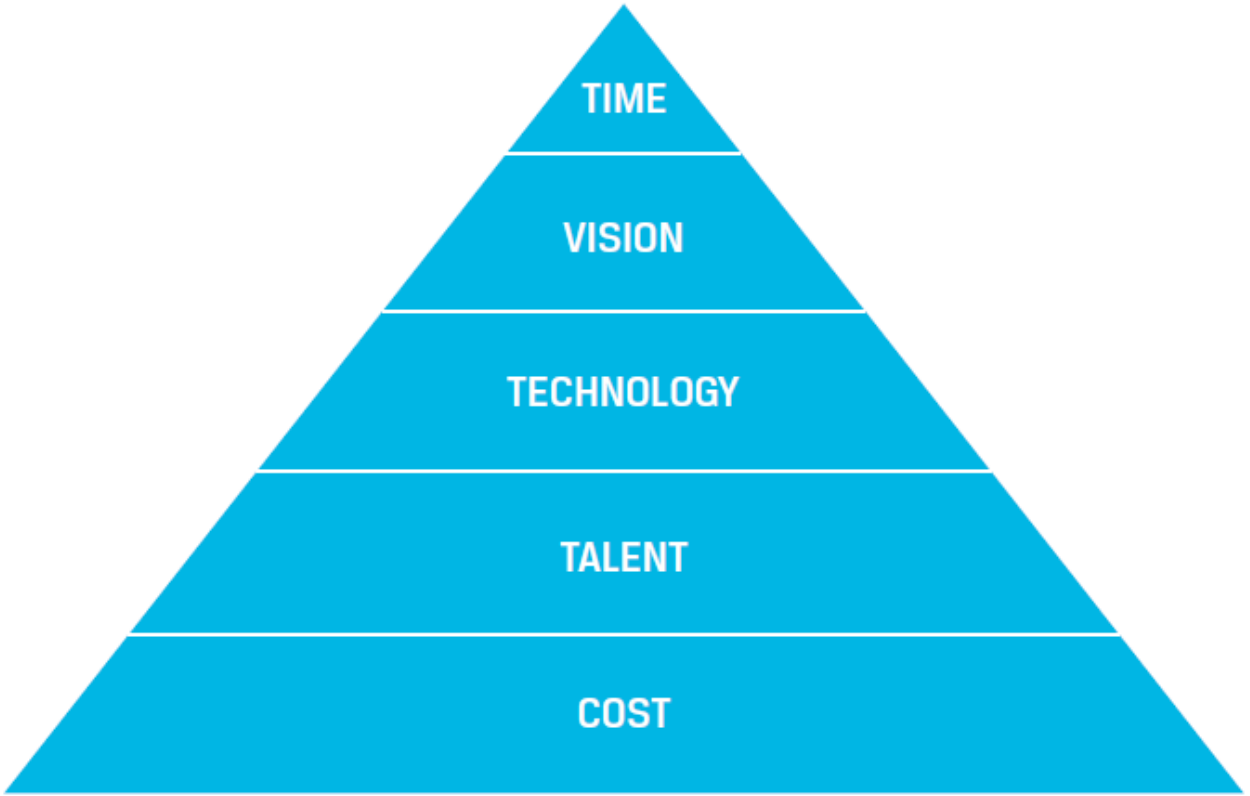
Source: CFA Institute, AI Pioneers in Investment Management

Challenges in applying Fintech: Your Input



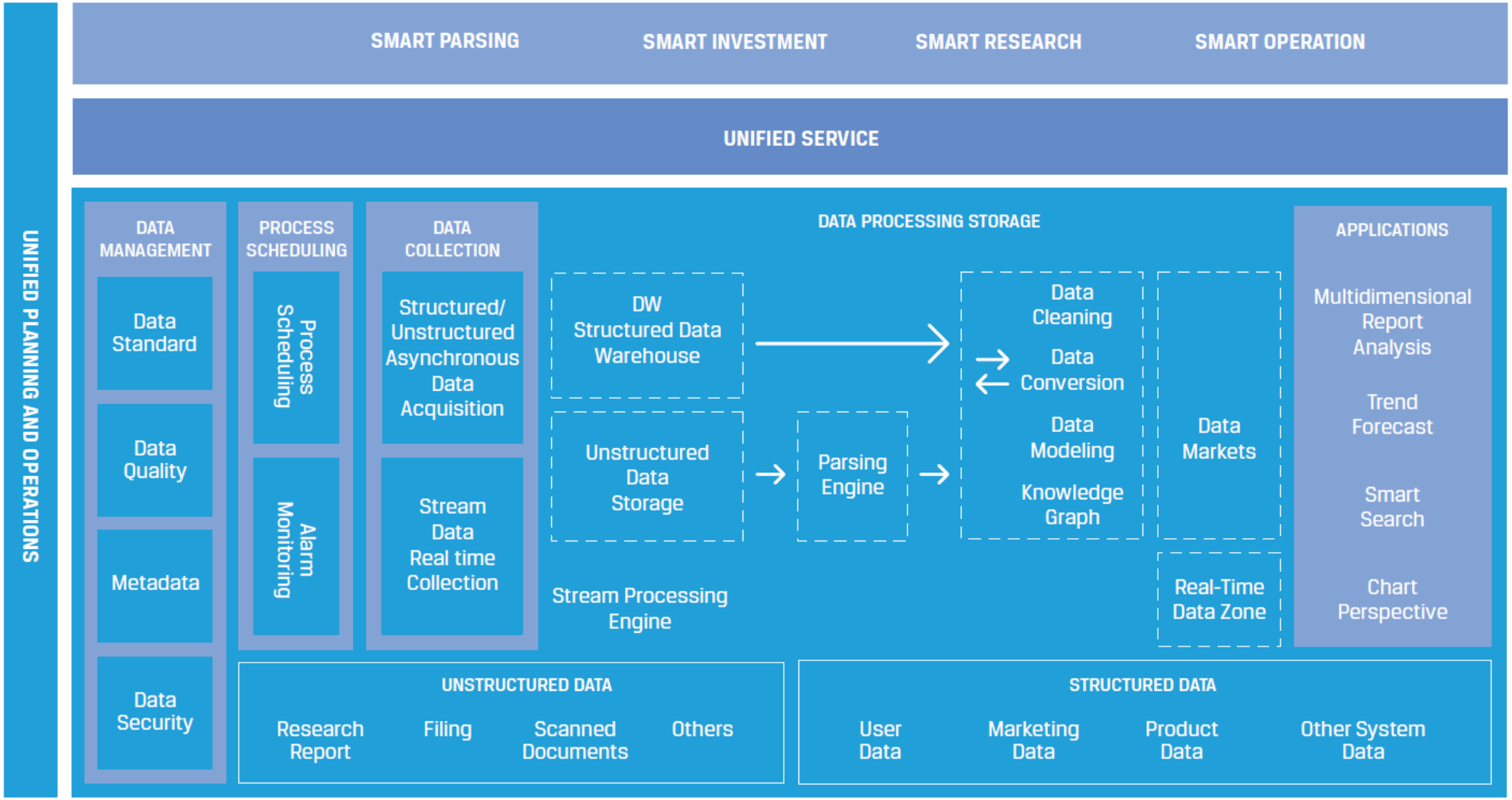
Source: CFA Institute, AI Pioneers in Investment Management

Challenges in applying Fintech



Source: CFA Institute, AI Pioneers in Investment Management

The Process Information



Source: CFA Institute, AI Pioneers in Investment Management

APPLICATION: ROBO-ADVISORY

Areas related to Investments

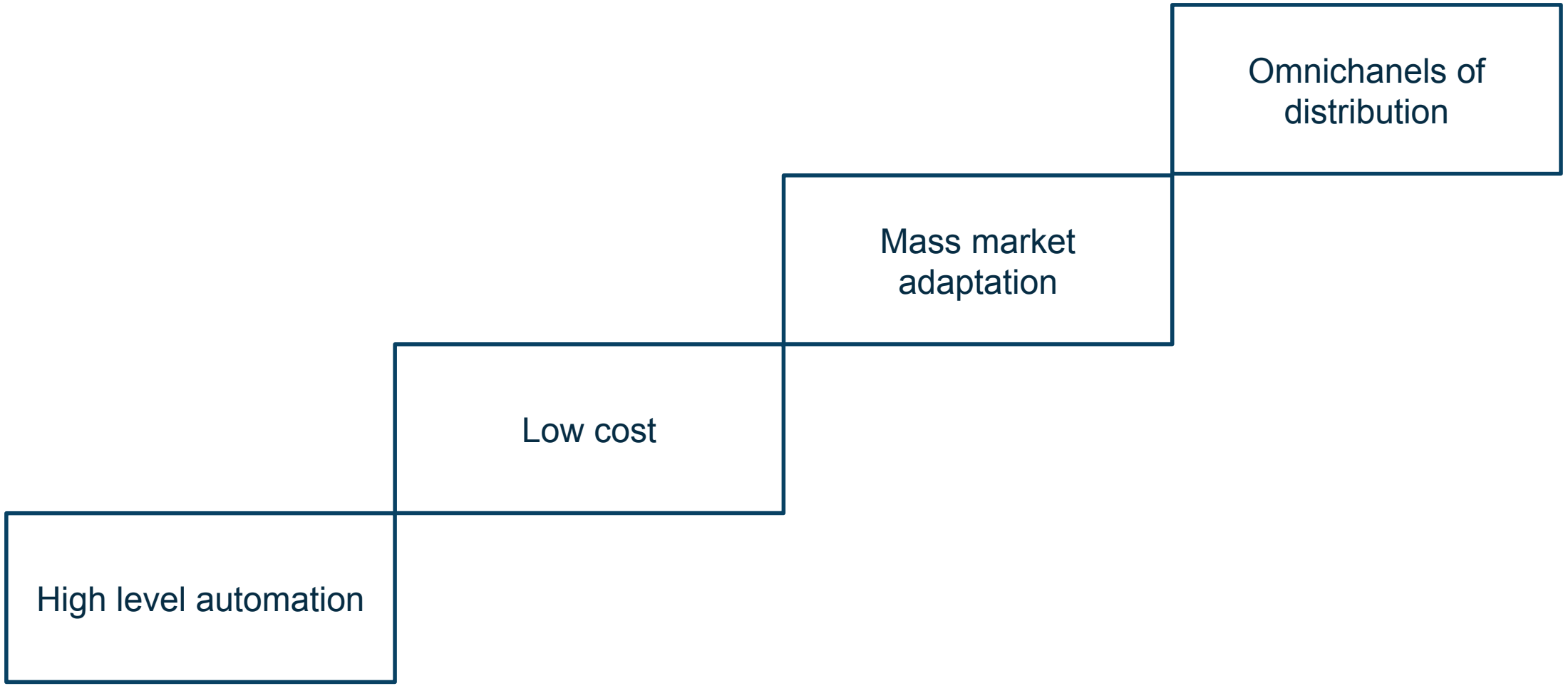
Robo-advisors: Trendy name old techniques

Table 3 Occurrence of different methodological frameworks within the Robo Advisors analyzed

Methodological framework	Occurrence (%)
Modern Portfolio Theory	39.7
Sample Portfolios	27.4
Constant Portfolio Weights	13.7
Factor Investing	2.7
Liability-Driven Investing	2.7
Risk Parity	1.4
Full-Scale Optimization	1.4
Constant Proportion Portfolio Insurance	1.4
Mean Reversion Trading	1.4
Other	8.2

Source: Robo Advisors: quantitative methods inside the robots, Journal of Asset Management (19) 2018

Benefits


Omnichanels of distribution
Mass market adaptation
Low cost
High level automation

Models for Portfolio Allocation

Robo-advisors

Mean-Variance Portfolio
- Markowitz Portfolios
- Efficient portfolios

Index models
- Single/Multiple Index Models
- CAPM
- APT

Quant Investing

Factor Models
- 3 (5) Fama-French model
- 3+1 FF +Cahart model
- Multifactor Investing
- Smart Betas

Big Data/AI Investing
- Alternative Premium Investing
- ESG Investing
- Climate Risk Modeling

Using same statistical techniques but with much more computational power

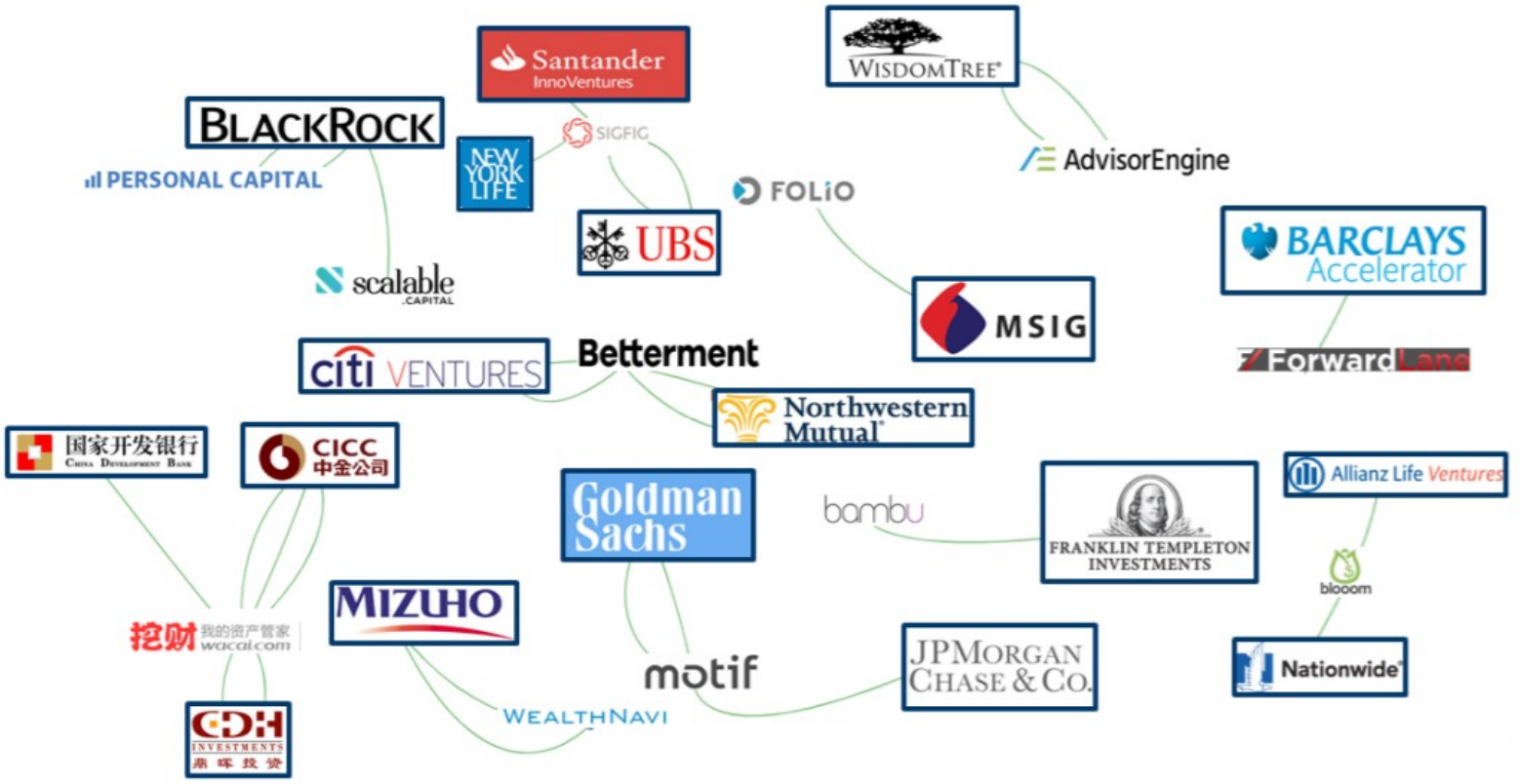
APPENDIX

World's four largest quant investing companies

- Bridgewater
- AQR
- Two Sigma
- Renaissance
- ManGroup (bought Numeric)

Who supported what?

Q1'12 – Q4'17 (11/14/17)



CBINSIGHTS

Lines represent equity investment rounds 41

Banks developing their own Robo-Advisor, rather than white labels