# T-Shaped Teams: The Roadmap for AI and Big Data Adoption in Investments
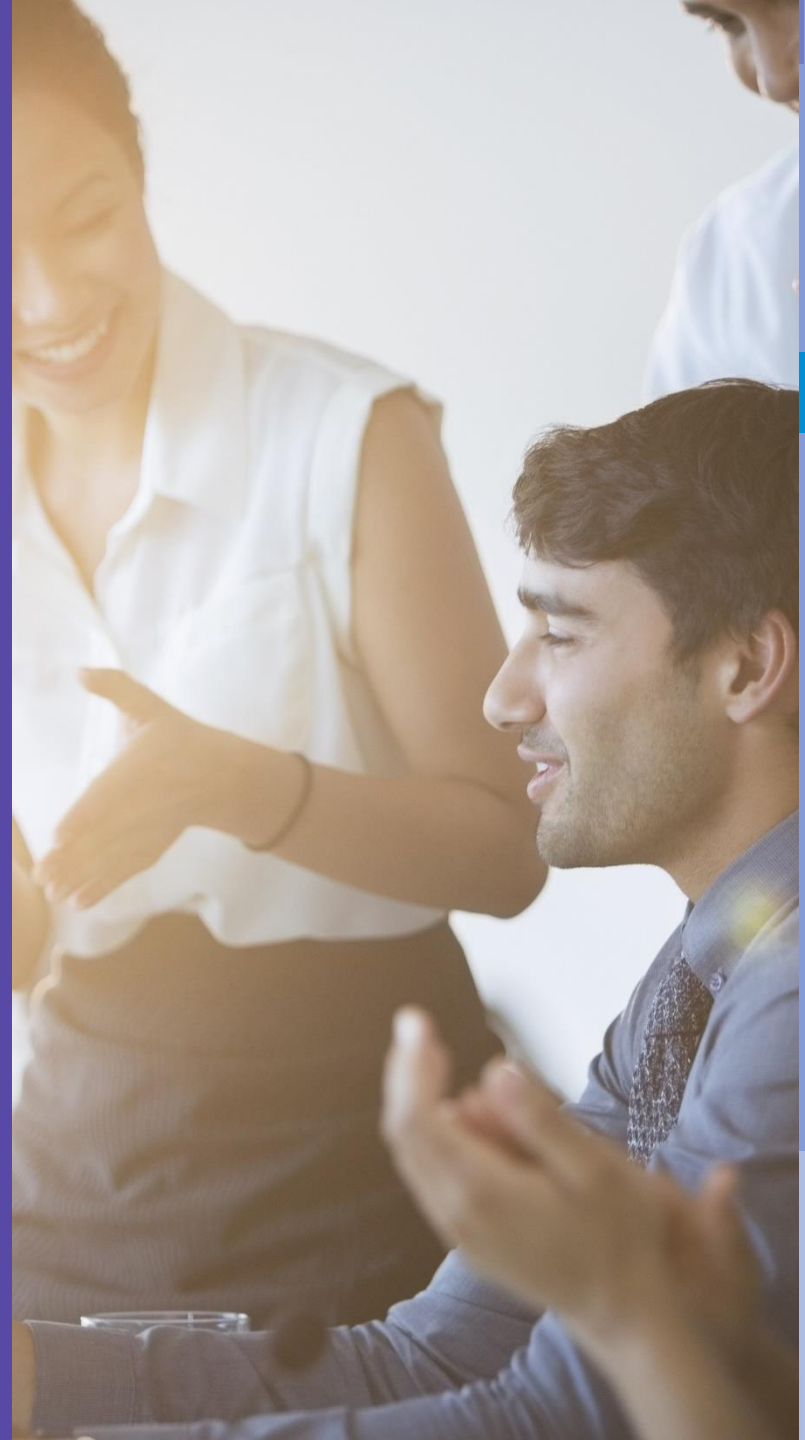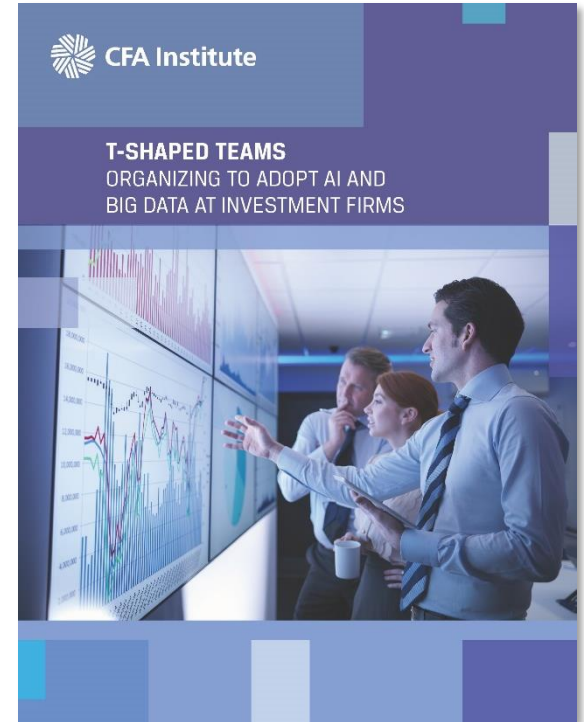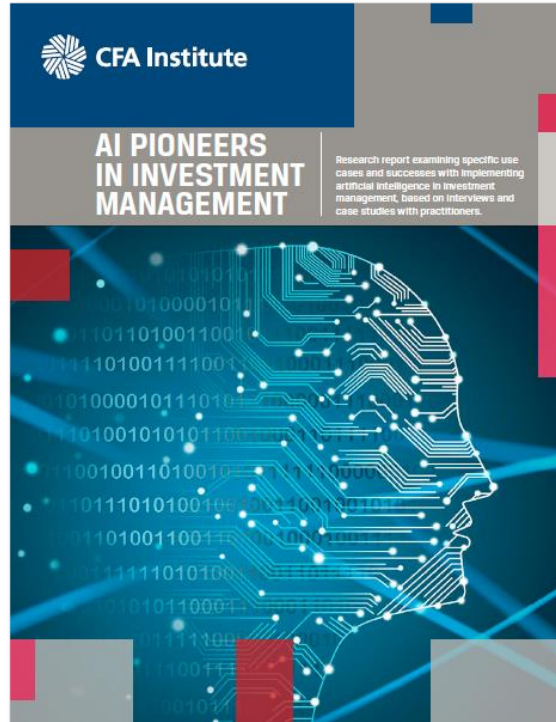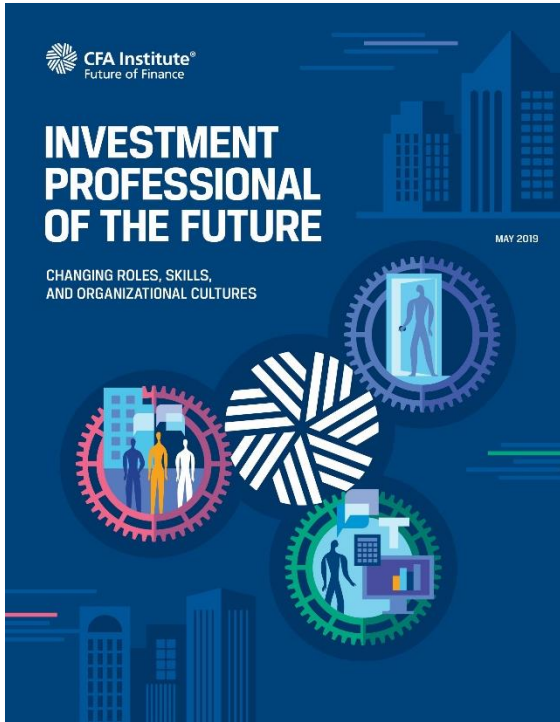
Larry Cao, CFA

Senior Director, Industry Research

CFA Institute

15 September 2021

**CFA Institute**

# OVERVIEW

1. From T-Shaped Skills to T-Shaped Teams

2. The Early Stage of AI and Big Data Adoption

3. The Intermediate Stage of AI and Big Data Adoption

4. The Advanced Stage of AI and Big Data Adoption

# RELATED CFA INSTITUTE PUBLICATIONS

# 1
# FROM T-SHAPED SKILLS TO T-SHAPED TEAMS

# AI AND BIG DATA IN INVESTMENTS

AI and big data have the potential to bring about the most significant change to the investment management industry that current professionals will experience in their careers.

Successful investment firms of the future will start to strategically plan integration of AI and big data techniques into their investment processes.

Successful investment professionals will understand and exploit the opportunities brought about by these new technologies and applications, enabled by collaborative organizational cultures, cognitive diversity, and T-shaped teams.

Source: CFA Institute *AI Pioneers in Investment Management*

# THE FINTECH PYRAMID

**FINTECH**

TIME

VISION

TECHNOLOGY

TALENT

COST

**FIN**
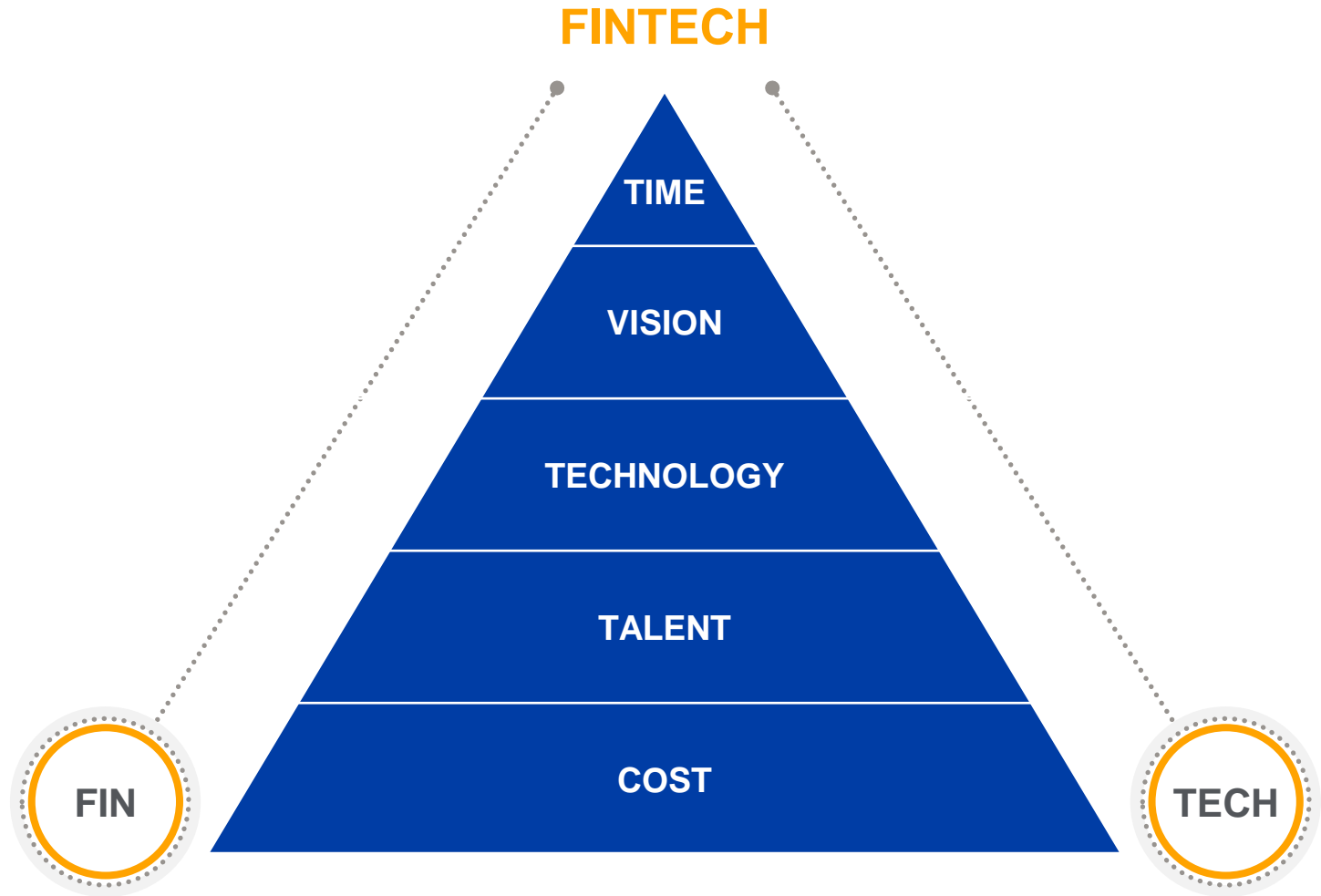
**TECH**

Source: CFA Institute *AI Pioneers in Investment Management*

# BUILDING T-SHAPED TEAM
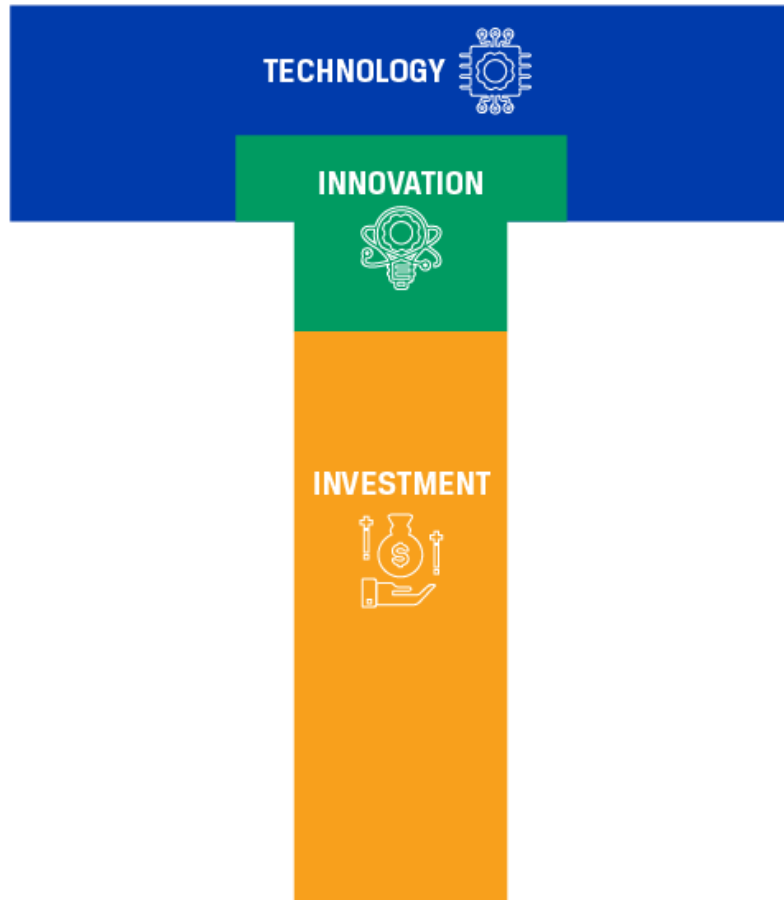


## SIGNIFICANT TYPES OF ROLES AT INVESTMENT FIRMS OF THE FUTURE

### TECHNOLOGY

- Data scientist
- Application engineer

### INNOVATION

- Investment thinking and process innovator
- Knowledge engineer
- Innovation facilitator

### INVESTMENT

- Investment decision maker
- Investment researcher
- Private wealth manager

Source: CFA Institute *AI Pioneers in Investment Management*

# FROM T-SHAPED SKILLS TO T-SHAPED TEAMS

**Professional with both investment and data science skills**

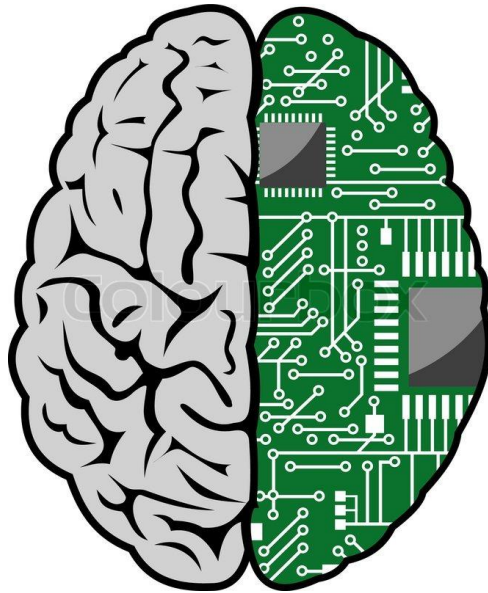**Team with co-ordinated investment and technology capabilities**
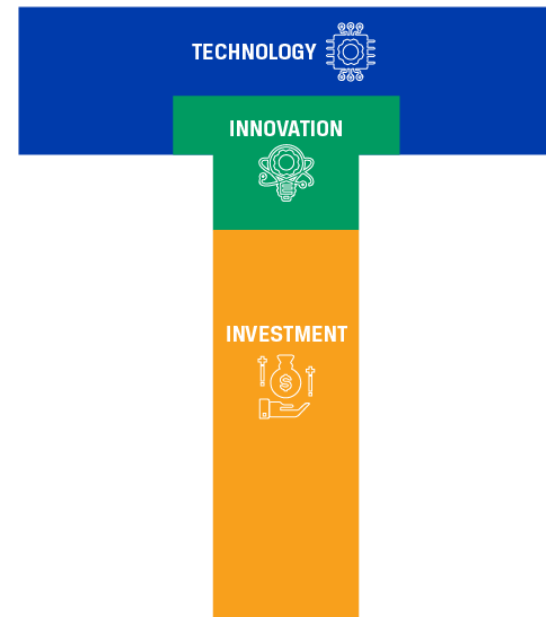
# THE INNOVATION FUNCTION

**Mission critical collaboration between the investment/business and data science functions**

**Setting of the team's tempo and accountability for project success by the innovation function**

**Communications Facilitator/Translator between**
- Investment and technology functions
- The T-team and the C-suite project sponsors

**Strategic Planning/Project Management**
- Team goals and firm AI and big data adoption strategies
- Collaboration focus areas and projects prioritization

# SKILL SET FOR THE INNOVATION FUNCTION

**Strategic Planning and Project Management Skills**

**Investment**

**50–50 split between investment and technology**

**Technology**

**Good Communication Skills**
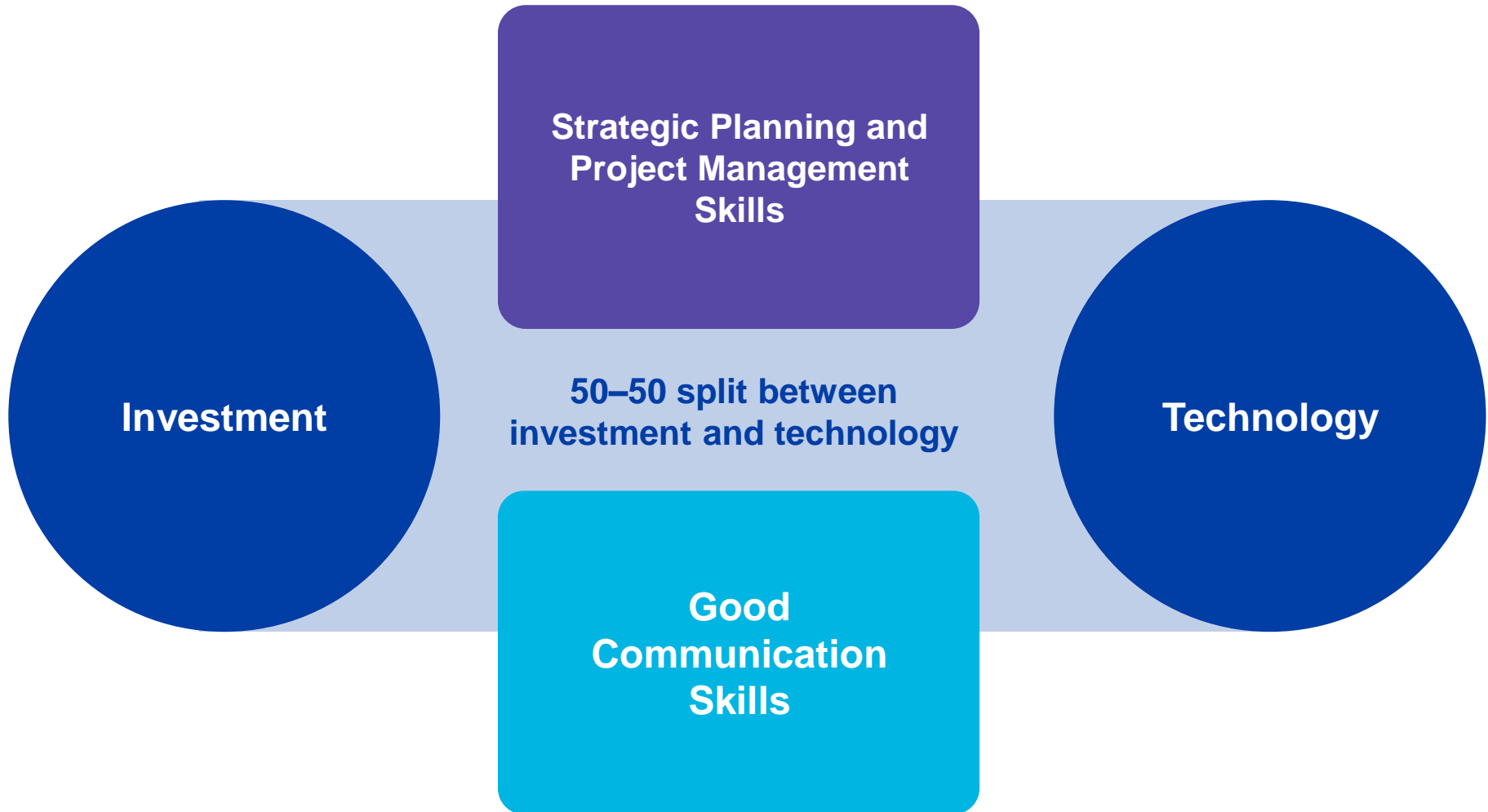
# THE INDUSTRY IS CATCHING UP TO THIS NEED

**Early adopters**

Professionals, without specific training or degrees, found by serendipity

**More firms are moving in the right direction**

In addition to AI builders, executives of early adopters are also seeking "AI translators," including business leaders, "who bridge the divide between the business and technical staff" - **Deloitte, 2020**

"A relatively new class of expert, analytics translators," are expected to "play a role in identifying roadblocks" and to "bridge the data engineers and scientists from the technical realm with the people from the business realm" - **McKinsey, 2020**
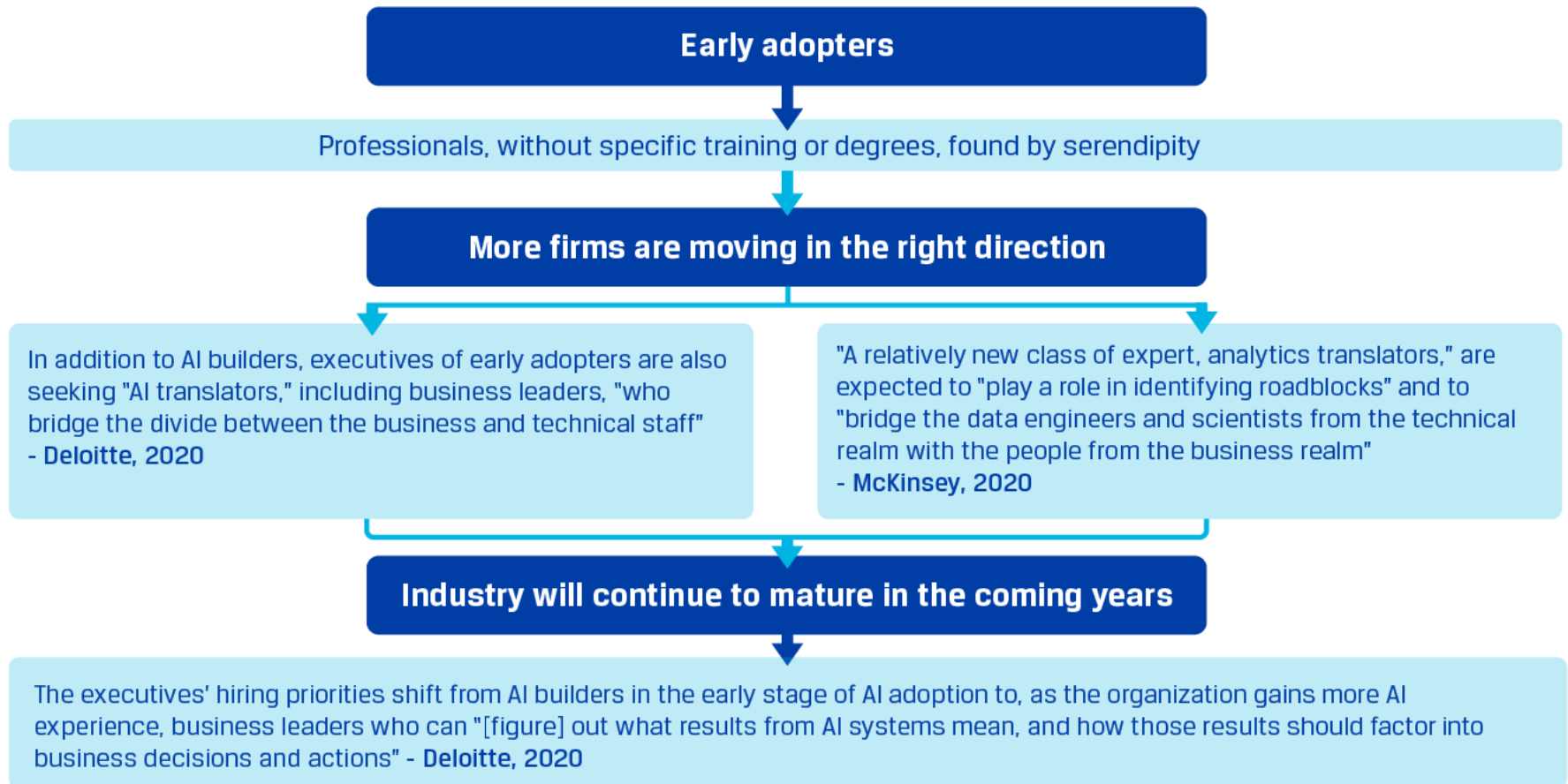
**Industry will continue to mature in the coming years**

The executives' hiring priorities shift from AI builders in the early stage of AI adoption to, as the organization gains more AI experience, business leaders who can "[figure] out what results from AI systems mean, and how those results should factor into business decisions and actions" - **Deloitte, 2020**

Source: Hupfer 2020, pp. 7-8; Fountaine, McCarthy, and Saleh 2019

# THE INVESTMENT FUNCTION IN THE AGE OF AI

Data science has evolved to become a major discipline of scientific investigation, not something that someone from a completely different background can easily pick up without a formal education and, more importantly, on-the-job training to gain the relevant experience.

A stellar staff of the investment function should understand the AI + HI philosophy and as such be interested in participating in AI adoption projects.

They would also ideally have a strong sense of curiosity, both about how to improve their own investment process and how AI can help. Learning Python can certainly help them communicate with the data science team or at least appreciate the hard work that the team does.

# THE RISK OF RELYING ON T-SHAPED SKILLS

AI in investments is a serious commitment and not something that one professional with T-shaped skills in investment and data science can handle.

We have come across many cases where such professionals failed to pull off an AI adoption project.

| WHEN THEY "SUCCEED"… | WHEN THEY FAIL… |
| --- | --- |
| • Peer review and cross-functional testing?<br>• Doing model development part time? | • Organizational support?<br>• Backup resources to develop an alternative model or organizational will to continue pursuing such projects? |

Source: Hupfer 2020, pp. 7-8; Fountaine, McCarthy, and Saleh 2019

# THE TECHNOLOGY FUNCTION: WHO & WHERE

Hiring data scientists is often the first step when investment firms embark on the AI journey.

Firms with mostly a fundamental investment function just starting out on the AI journey may care more about the data scientists' understanding of the investment process and be less picky about the science pedigree.

Firms more experienced in this area tend to have a larger number of PhDs in STEM (science, technology, engineering, and mathematics) from top universities. What matters more than their degrees, though, is their experience working on data projects.

**On-the-Job Training**
Even these experienced data science professionals may take a few years after joining investment firms to become productive at a higher level, as they still need to learn the peculiarities of financial data as well as integrate into the firm.

**Hiring Externally**
These applications are so new that they are usually not in textbooks or taught at even the best universities. The cutting-edge work in data science is often carried out at tech giants and top firms in their respective industries.

# 2

# THE EARLY STAGE ON THE AI AND BIG DATA ADOPTION JOURNEY

# WHAT DEFINES EARLY-STAGE FINANCIAL INSTITUTIONS?

## SENIOR MANAGEMENT SUPPORT

- Secure long-term commitments in both financial and human resources

## WHOLISTIC STRATEGY

- Ensure long-term business success
- Ensure relevance of the AI and big data projects

## ORGANIZATIONAL STRUCTURE

- Transition from relying on professionals with T-shaped skills to T-shaped teams

# WHAT SHOULD EARLY-STAGE FIRMS FOCUS ON?

## BUILD A T-SHAPED TEAM

**The head of innovation function should**
- have credibility with the investment and technology functions
- identify areas of the investment business that need the most help from data science
- develop the technology roadmap for the AI and big data applications that deliver on those objectives

## DEVELOP SUPPORTING PROCESSES

**The new structure needs new processes to work**
- create effective processes that help both functions engage
- give an "equal" say in these processes to both functions
- allow for many rounds of trial and error in early-stage firms before finding a suitable set of processes

## FIND AND SCORE QUICK WINS

**When selecting the first projects**
- balance the impact on the investment process, the technical feasibility, and related time/resource commitment
- the early wins and failures have far reaching consequences for the strategy
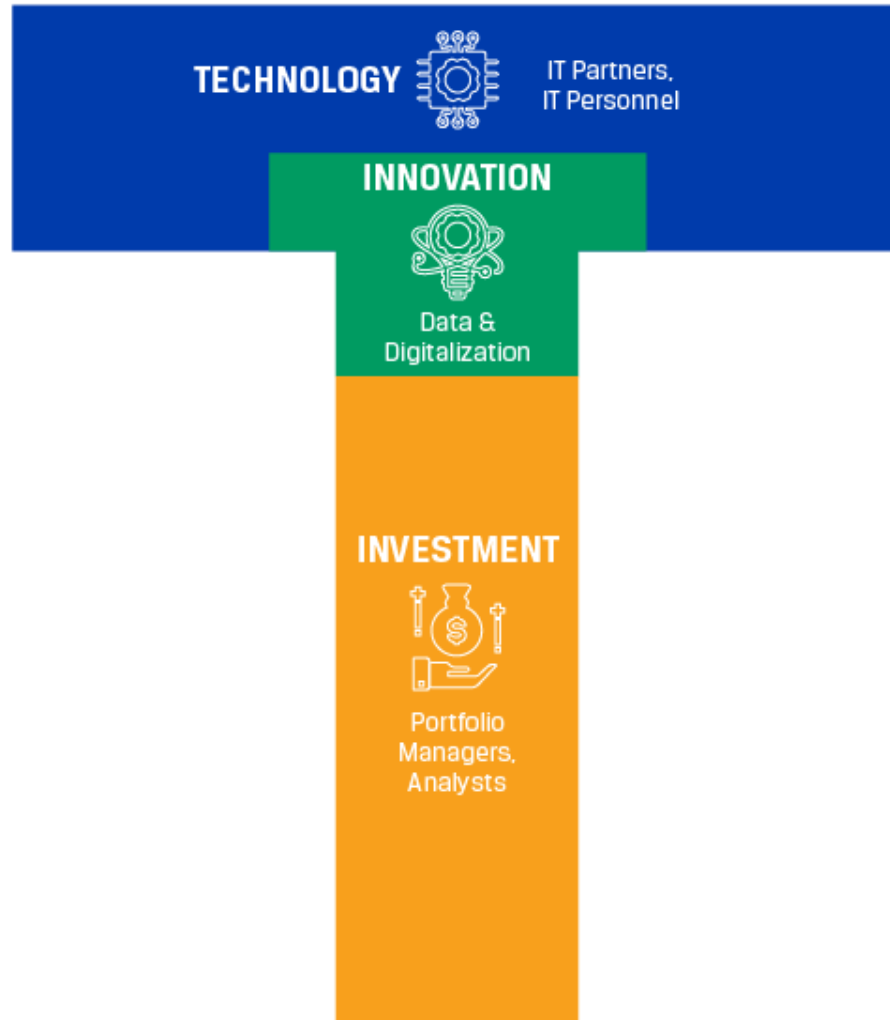
# CASE STUDY: UOB ASSET MANAGEMENT

Singapore-based Asset Manager
with USD 27 billion AUM

Rigorous and fundamental research plus
systematic portfolio construction process

# UOBAM'S T-SHAPED TEAM

# SKILL SETS OF THE DD UNIT MEMBERS

## PROFILE A

- CFA charterholder
- Equity and futures market maker
- Master's degree in information technology
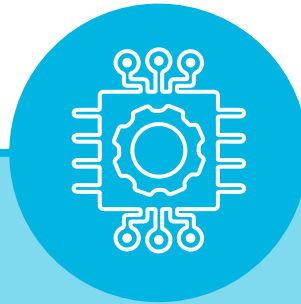
## PROFILE B

- Degree in economics
- Experience using AI in a technology company

# SOURCES OF TECHNOLOGY SOLUTIONS

## Fintech Companies

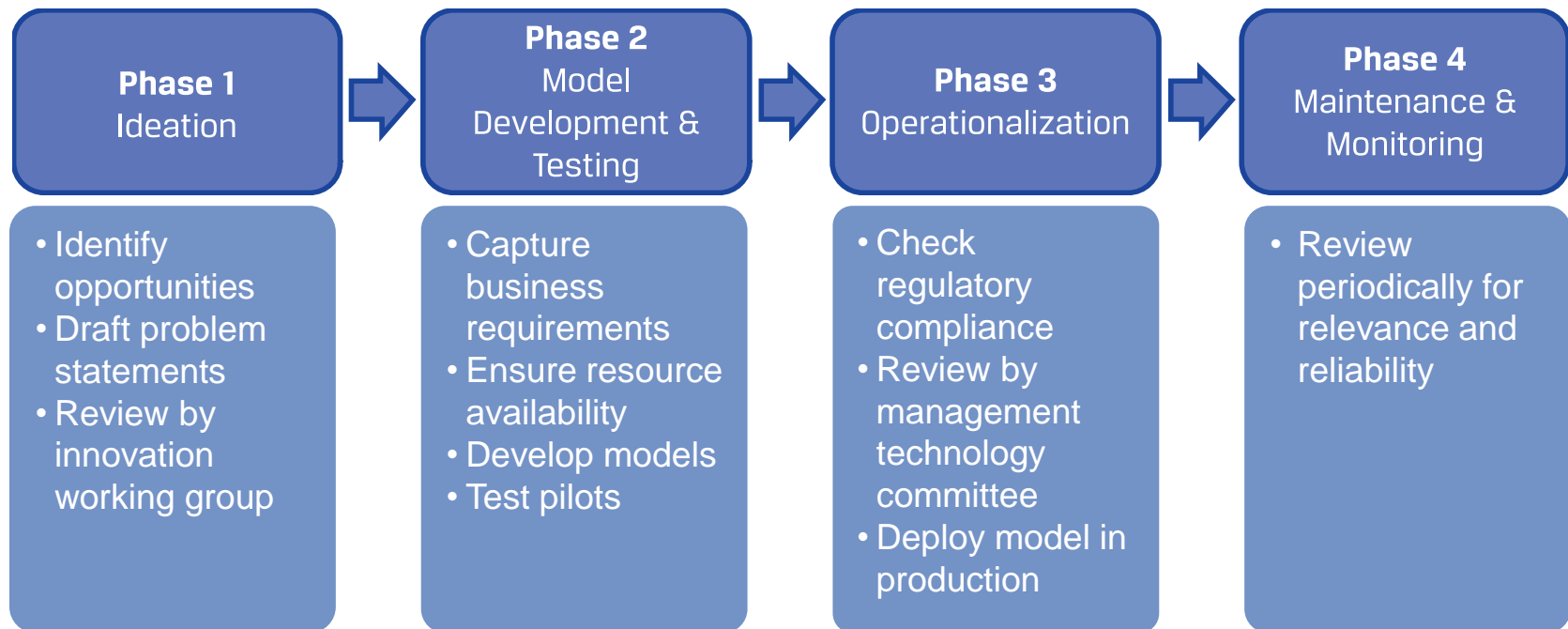- Proven solutions
- Quick results

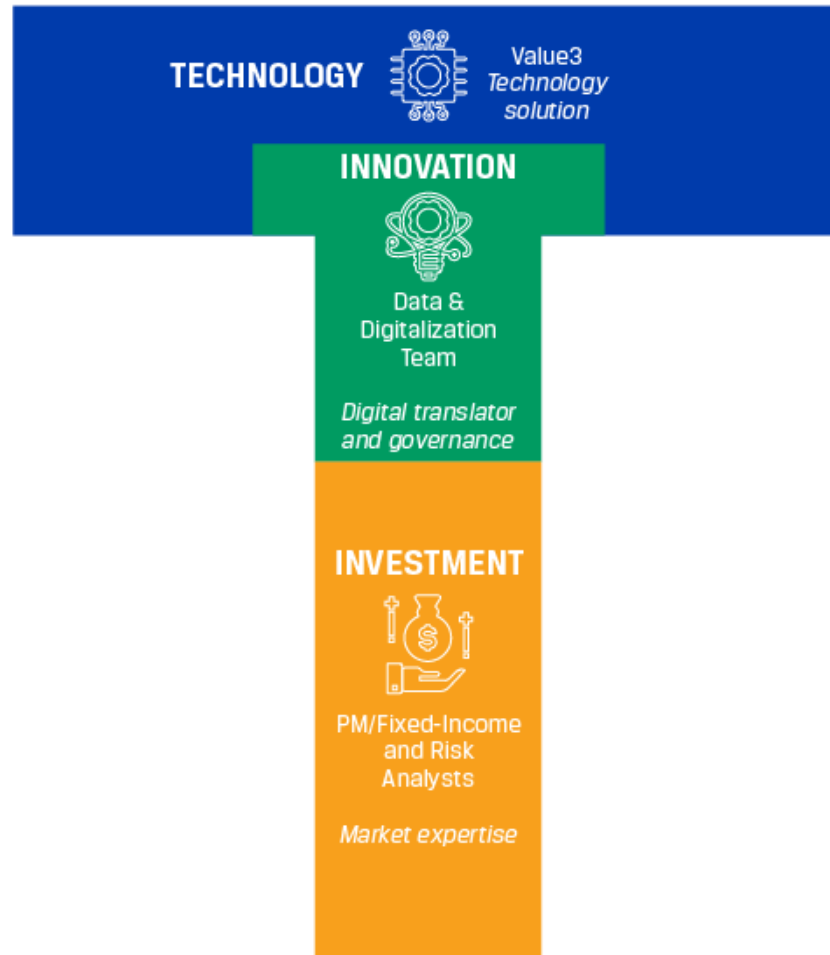## UOB Group Technology

- Technology roadmaps

## UOB Data Management Office

- Capability building

# AI ADOPTION WORKFLOW

**Phase 1**
Ideation

**Phase 2**
Model Development & Testing

**Phase 3**
Operationalization

**Phase 4**
Maintenance & Monitoring

- Identify opportunities
- Draft problem statements
- Review by innovation working group

- Capture business requirements
- Ensure resource availability
- Develop models
- Test pilots

- Check regulatory compliance
- Review by management technology committee
- Deploy model in production

- Review periodically for relevance and reliability

# ENGAGEMENT OF FINTECH COMPANIES

**3**

# THE INTERMEDIATE STAGE ON THE AI AND BIG DATA ADOPTION JOURNEY

# THE DEFINITION AND FOCUS OF INTERMEDIATE-STAGE FINANCIAL INSTITUTIONS

**Senior Management**

**Head of Innovation Function**



Build Out the **Team**

- More defined roles
- Higher caliber staff

Hone the **Process**

- Greater demand on the efficacy and efficiency of processes

Juggle Multiple Projects and **Scale**

- Increased organizational buy-in
- More leeway to take on higher-impact and higher-commitment projects

# CASE STUDY: NN INVESTMENT PARTNERS

Netherlands-based Asset Manager with EUR 300 billion AUM

Use AI such as ML/NLP and unstructured data sets to capture regime shifts and new drivers of factor premia
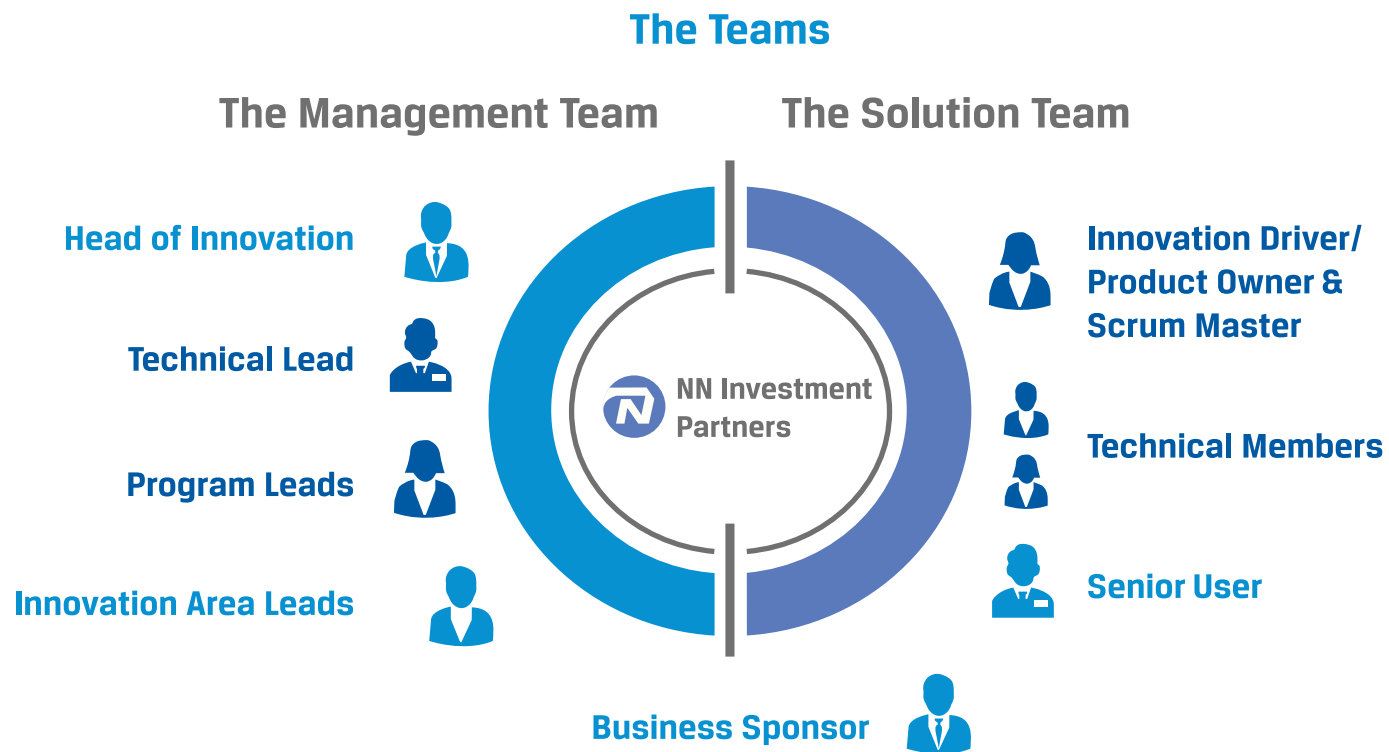
# ORGANIZING FRAMEWORK

Get access to data that brings fresh insights

Build new data engineering capabilities and new analytical competencies

Experiment with applying emerging technology and work with new behavioral finance hypotheses

# THE NN IP INNOVATION FUNCTION

● Reporting to Tech & Ops          ● Reporting to Investments

**The Teams**

**The Management Team**          **The Solution Team**

**Head of Innovation**

**Technical Lead**

**NN Investment Partners**

**Program Leads**

**Innovation Area Leads**

**Innovation Driver/ Product Owner & Scrum Master**

**Technical Members**

**Senior User**

**Business Sponsor**

# ROLES AND RESPONSIBILITIES

| | Technical Skills | Innovation Skills | Investment Skills |
|---|---|---|---|
| Tech & Ops Department | • Software Engineers<br>• Data Engineers & Scientists<br>• Scrum Masters | | |
| Innovation Platform | • Technical Lead<br>• Technical Members | • Program Leads<br>• Innovation Drivers | • Head of Innovation<br>• Innovation Area Leads |
| Investment Team | • Quantitative Researchers | | • Head of Investment Team<br>• Portfolio Managers<br>• Analysts & Strategists<br>• Economists |

# THE INNOVATION PROCESS

**BUSINESS INNOVATION**

Ideate → Explore → Experiment → Execute → BAU

# 4

# THE ADVANCED STAGE ON THE AI AND BIG DATA ADOPTION JOURNEY

# WHAT DEFINES ADVANCED-STAGE FINANCIAL INSTITUTIONS?

AI and Big Data Penetration
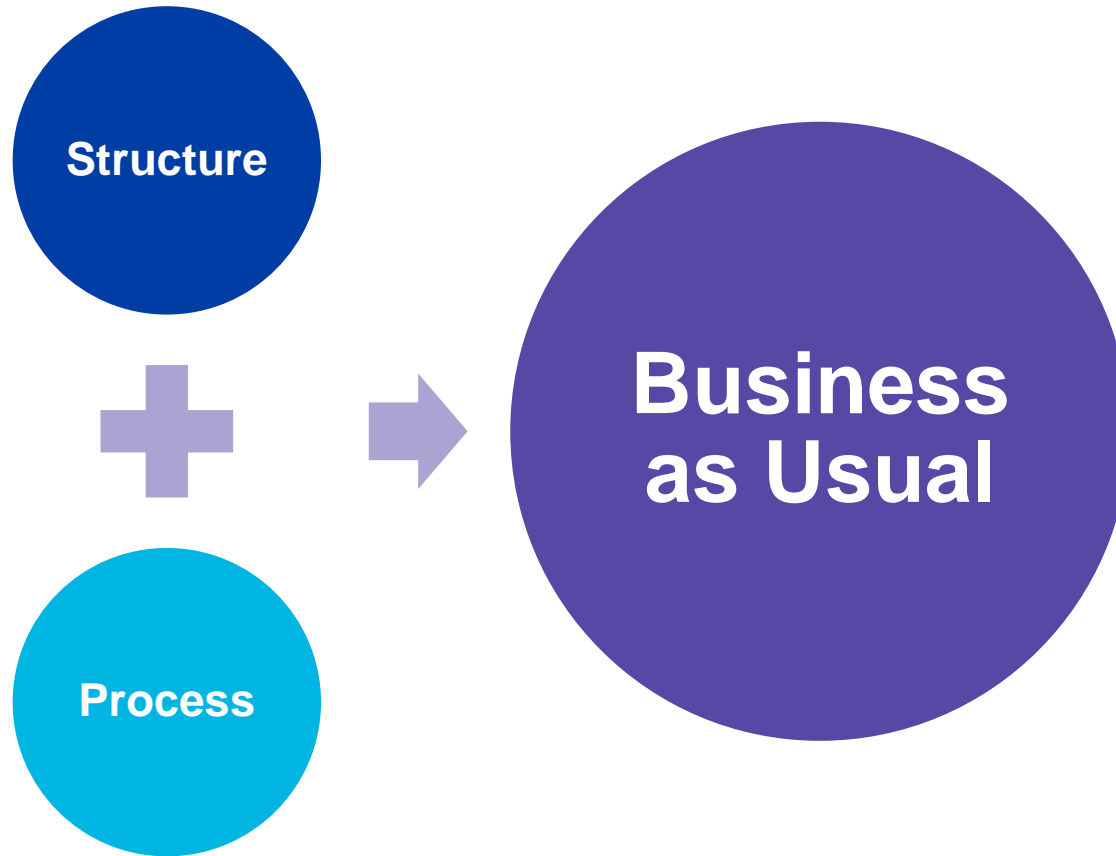
Technology Sophistication

# WHAT DEFINES ADVANCED-STAGE FINANCIAL INSTITUTIONS?

**Structure**

**+**

**Process**

**→**

**Business as Usual**

# CASE STUDY: MAN GROUP

Global asset manager (HQ London) with USD 135 billion AUM

Systematic and discretionary investment subsidiaries share common trading/technology platforms that leverage ML capabilities

# MAN AHL TEAM



**Technology Function**

**Research and Investment**

**Data Implementation**

# RESEARCH PROCESS

| Stage | Oversight |
|---|---|
| Stage 1: Idea generation and paper trading (backtesting) | |
| *Milestone 1: Research Review* | Two independent reviewers with appropriate expertise. Are research results strong enough to embark on production version? |
| Stage 2: Test trading—Implementation | |
| *Milestone 2: Test-In Review* | Same people from Research Review.<br><br>Representatives from technology, risk, compliance, and trade execution.<br><br>All checks to be passed before test trading starts. |
| Stage 3: Test trading—Conclusion | |
| *Milestone 3: Test-Out Review* | CIO, CRO/risk officer, CCO/compliance officer, technology, execution.<br><br>Has the strategy performed as expected?<br><br>Have all issues been resolved? |
| Stage 4: Client trading eligibility | Allocation of AUM within a suitable client program (typically relatively small proportion of risk budget initially). |

# MAN GLG TEAM



**Discretionary Team
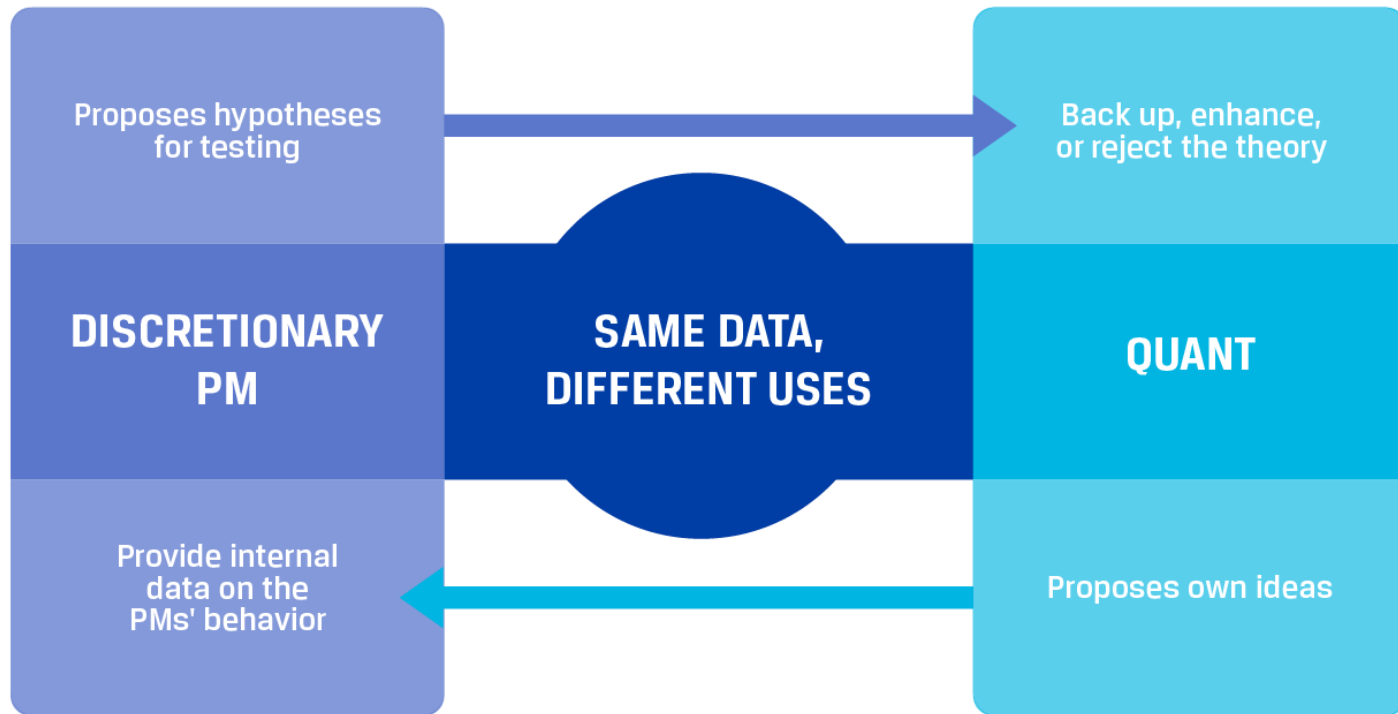Portfolio managers
and analysts**

**Quant researchers
and technologists**

**Discretionary Team
Portfolio managers
and analysts**

# RESEARCH PROCESS



Proposes hypotheses for testing

DISCRETIONARY PM

Provide internal data on the PMs' behavior

SAME DATA, DIFFERENT USES

Back up, enhance, or reject the theory

QUANT

Proposes own ideas
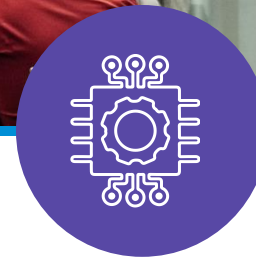
# MAN GROUP CENTRALIZED RESOURCES

## Data Science Team

- Data sourcing and strategy
- Data scientist
- Data science engineering
- Data management

## Execution Team

- Execution research
- Execution technology
- Trading

## Technology Function

- Databases and data platform tools
- Computer infrastructure for trading platforms
- Computing cluster for research

**T-SHAPED TEAMS**
ORGANIZING TO ADOPT AI AND
BIG DATA AT INVESTMENT FIRMS

**Read the report at**
https://cfainst.is/tshaped