



PANTHERA
SOLUTIONS

BEHAVIORAL CONSIDERATIONS FOR INVESTMENT DECISIONS

MCAA WORKSHOP

CONTACT



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**CORE
COMPETENCE**

APPLIED BEHAVIORAL FINANCE

300+ PUBLICATIONS

INNOVATION LEADER IN
APPLIED BEHAVIORAL
FINANCE



ENTERPRISING
INVESTOR

The
Journal of
Portfolio
Management



IPE Institutional
& INVESTMENT

e-fundresearch.com
INVESTOR'S INDEPENDENT SOURCE

Börsen-Zeitung
Zeitung für die Finanzmärkte

dpn
DEUTSCHE
PENSIONS &
INVESTMENTNACHRICHTEN

INSTITUTIONAL-
money.com

KURIER

ASSET
STANDARD

Das unabhängige Magazin für Anlageberater
FONDS
professionell

Observer
OECD

EXPERT
INVESTOR

WIENER ZEITUNG

FONDS
exklusiv

BörseGo AG

private banking
magazin

DAS KNOW-HOW-MAGAZIN ZUR KAPITALANLAGE
INVESTMENT

citywire

finanzwelt
Das Fachmagazin der Finanzbranche

INVESTMENT INTELLIGENCE FOR THE FUND PROFESSIONAL
INVESTMENT EUROPE

Börsen-Kurier
ÖSTERREICH'S WOCHENZEITUNG FÜR FINANZ UND WIRTSCHAFT
SEIT 1922

Die Presse

CLEAR PATH
ANALYSIS

PROMISE

NO BIASES

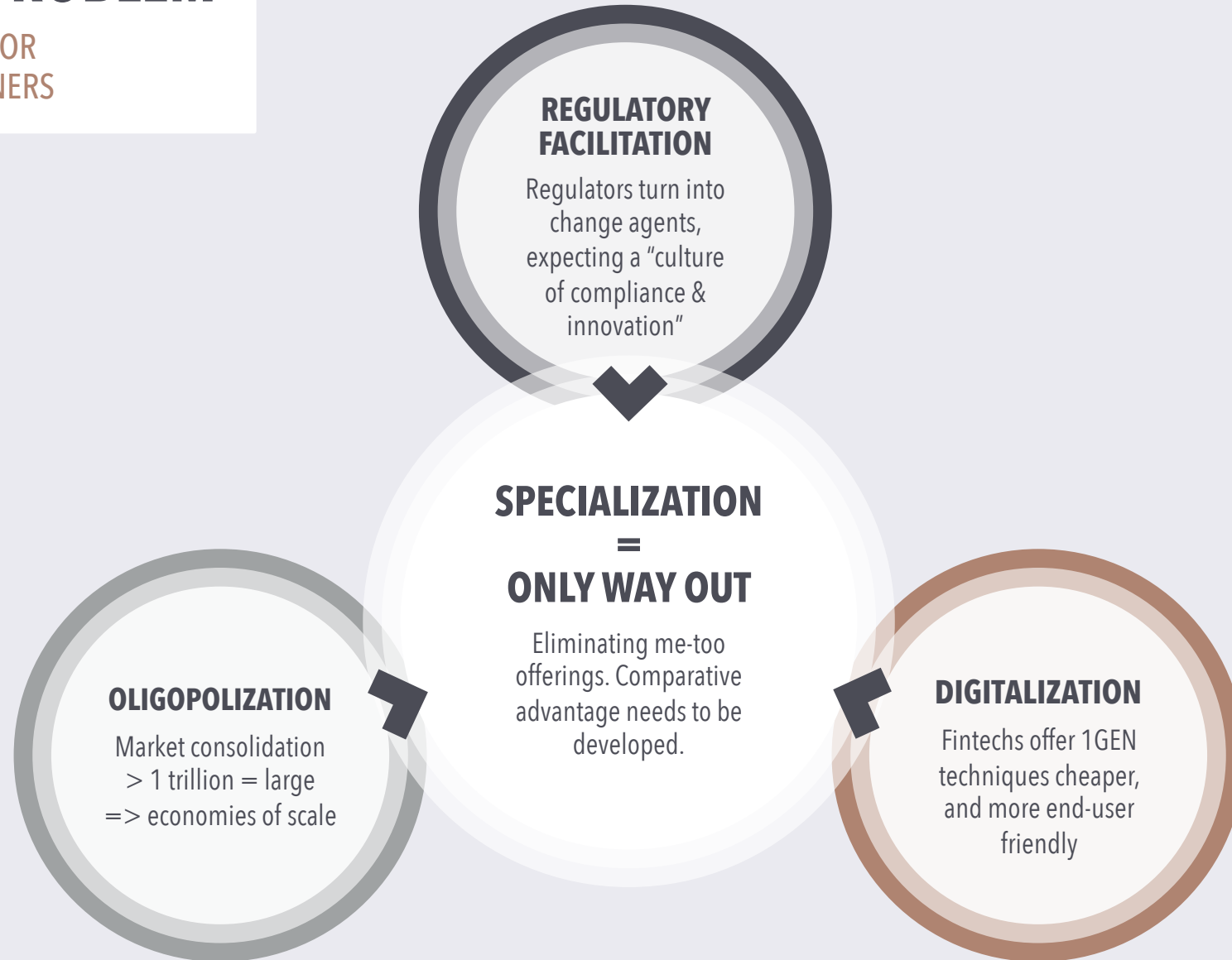
CONCLUSIO

**MORE TALK
THAN WALK**

MANAGERIAL PROBLEM

MANAGERIAL PROBLEM

COMPETITION LANDSCAPE FOR
ASSET MANAGERS AND OWNERS



**ME-TOO
STRATEGIES
DOMINATE**

ASSET MANAGEMENT
INDUSTRY

**114.131
MUTUAL
FUNDS**

**\$ 49.3T
AUM**

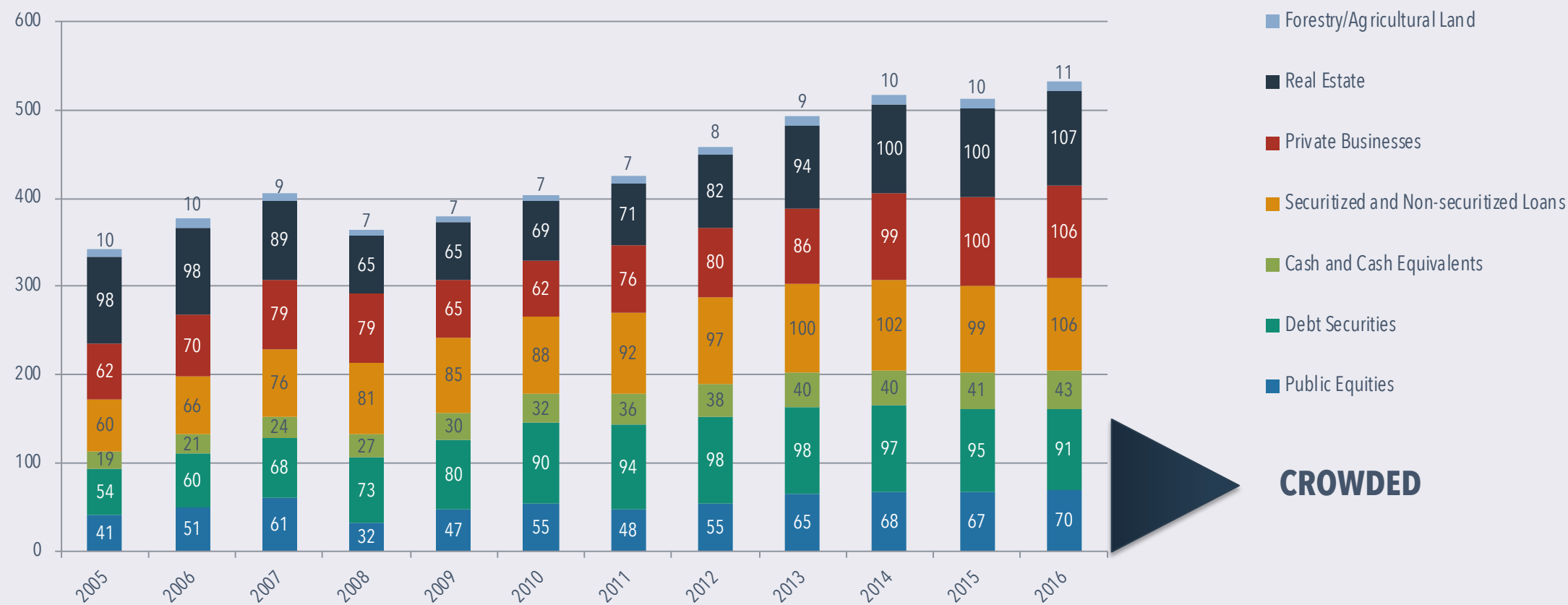
**87%
TRADITIONAL**

SOURCE: ICI FACTBOOK (2018)

THE GLOBAL CAPITAL STOCK

MARKET PORTFOLIO PROXY

GLOBAL CAPITAL STOCK IN TRILLION USD



CROWDED

Gadzinski, G.; Schuller, M.; Vacchino, A. (2018)

**HOW DOES
THE INDUSTRY
REACT?**

**COST
REDUCTION**

**PSEUDO-
INNOVATION**

**PEER
COMPARISON**

SLOW ADOPTION RATES

KNOWLEDGE
MANAGEMENT
BEGINNERS

**MANAGING
CHANGE IN
ASSET
MANAGEMENT**

SIFMA, 2018

**KNOWLEDGE
MANAGEMENT
IN ASSET
MANAGEMENT**

MONK, 2015

**EVERYONE
FEELS BETTER
THAN THE
AVERAGE**

How
difficult
it really is

How easy it looks

• Everyone
thinks they
can do it

SOLUTION

**COMPARATIVE ADVANTAGE
THROUGH SPECIALIZATION**

**MORE TALK
THAN WALK**

**MOST SCARCE
RESSOURCE
IN LIFE?**

TIME

MONEY

ATTENTION

WE ARE PRIMATES

Classification of *Homo sapiens* within the order Primates

species
sapiens

contained forms:

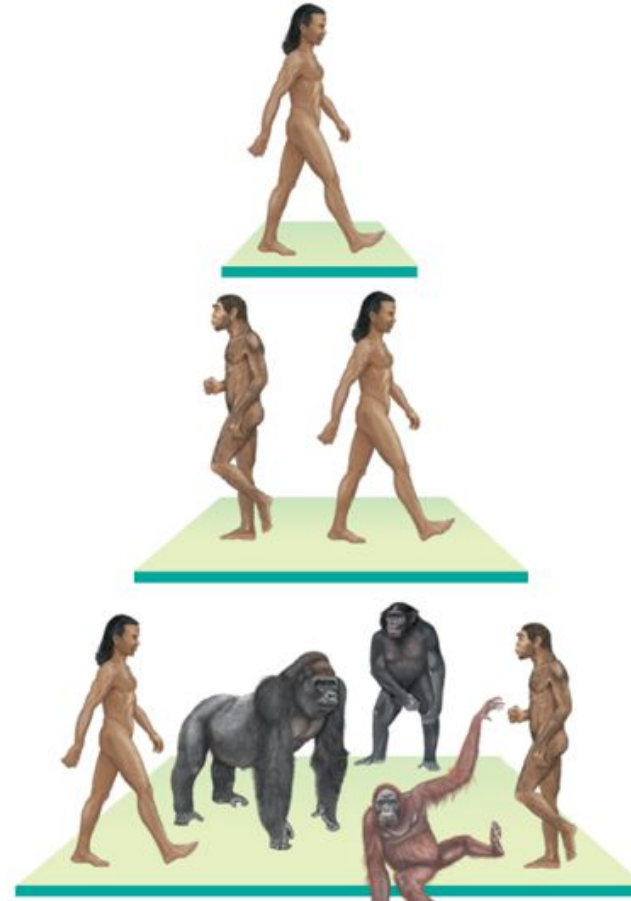
modern humans

genus
Homo

modern and
archaic humans

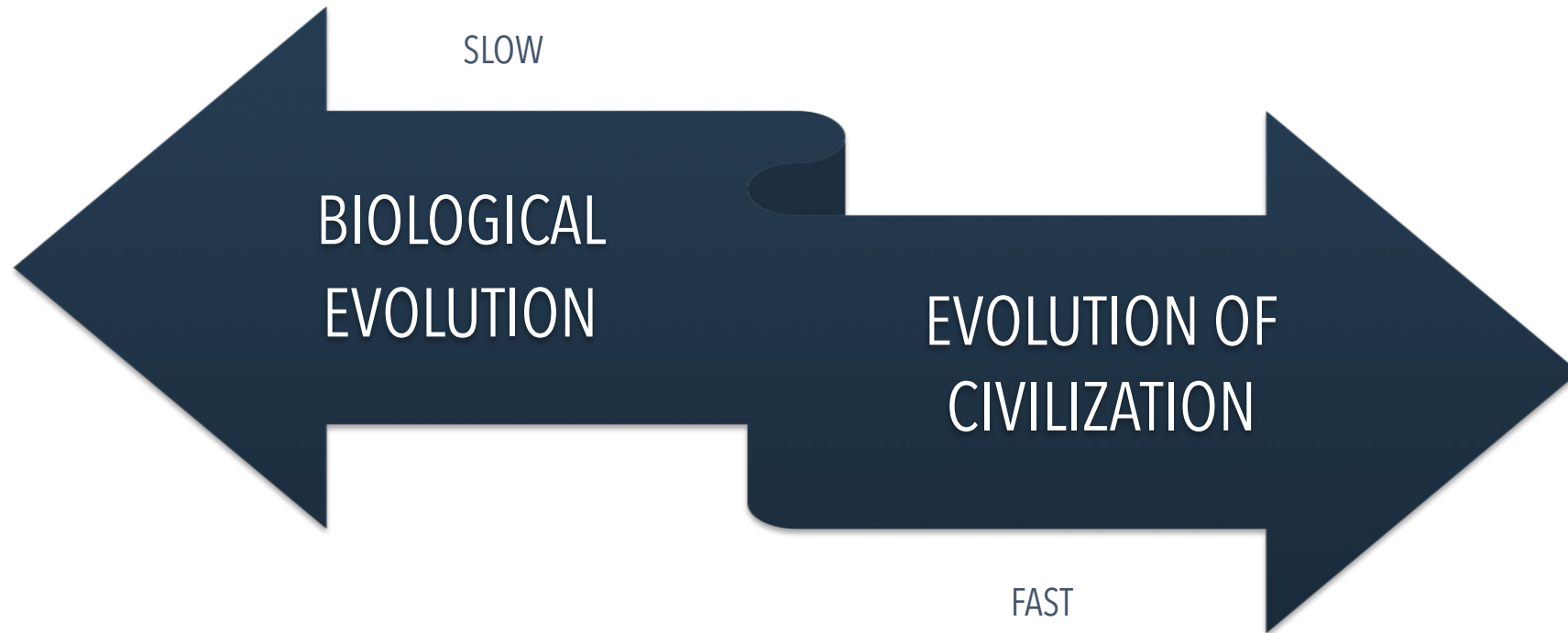
family
Hominidae

humans and
great apes

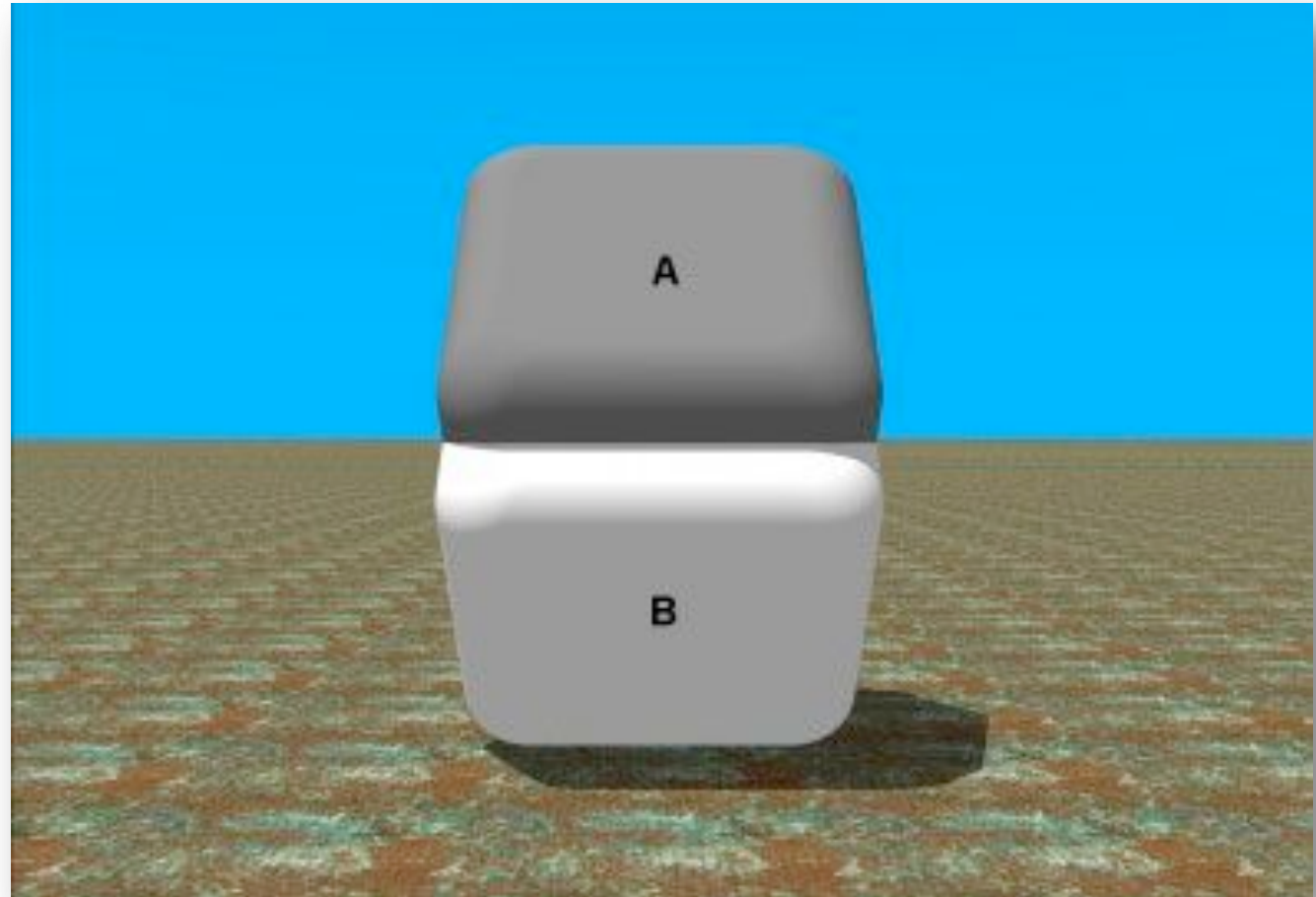


WE ARE PRIMATES

THE PROBLEM



**BACKGROUND
COLOR OF
A & B?**



**A
WINNERS
GAME**



**A
LOSERS
GAME**

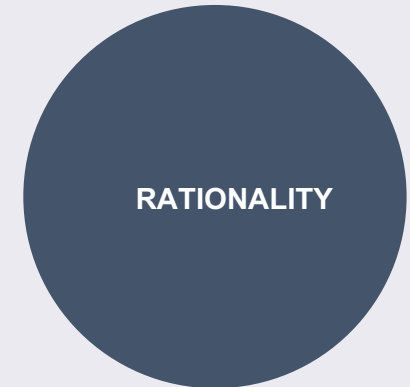
PROFESSIONAL INVESTING

mistake



BOUNDED RATIONALITY

WE BETTER ACCEPT



FOCUS

WHAT TO FOCUS ON

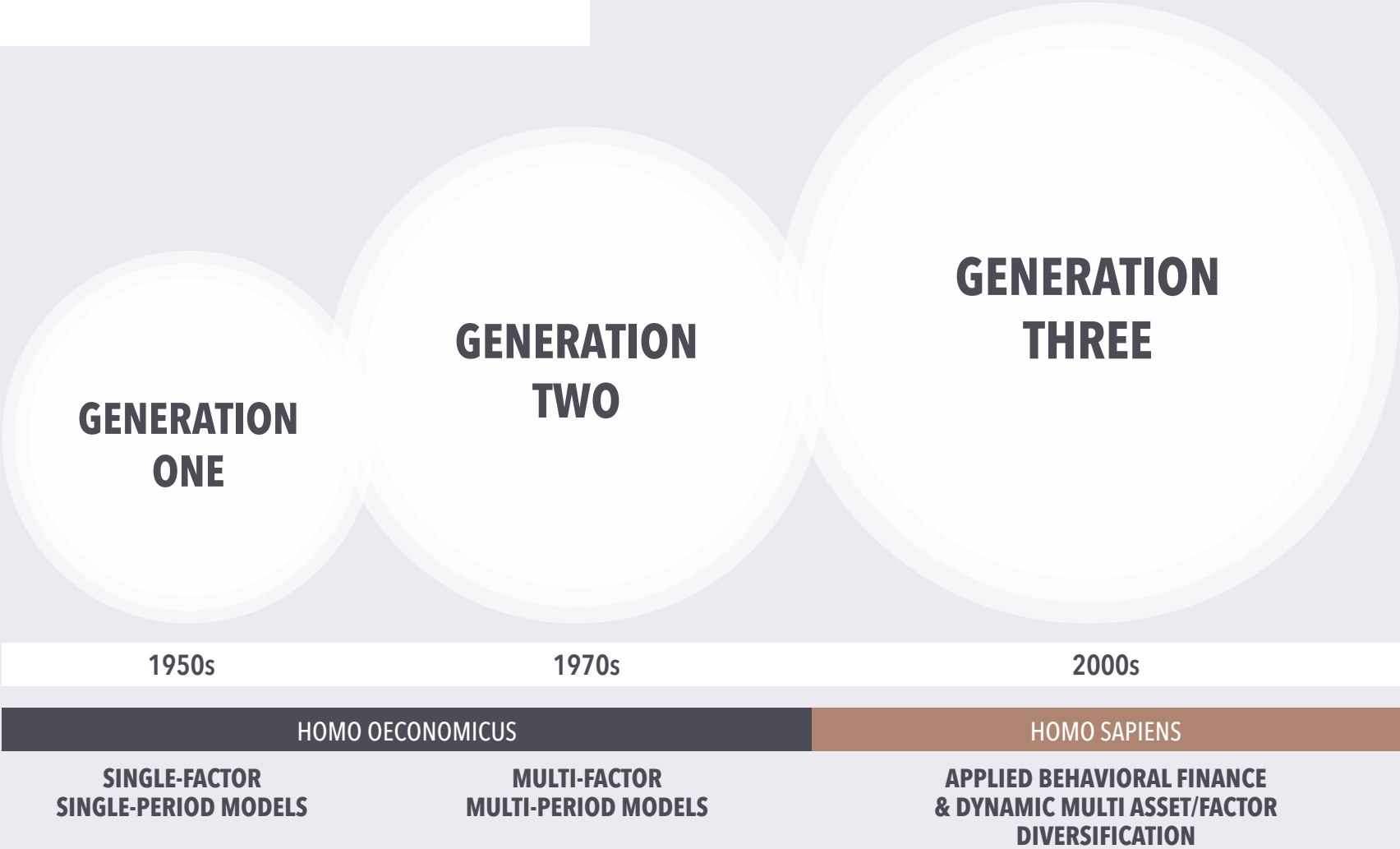
MAXIMIZE
SKILL

MINIMIZE
LUCK

OUTDATED OPTIMIZATION TECHNIQUES STILL WIDELY USED

ASSET ALLOCATION GENERATIONS AT A GLANCE

LITERATURE / Markowitz, H. (1952); Tobin, J. (1958);
Mandelbrot, B. (1963); Sharpe, W. (1964); Fama, E.
(1965); Jensen, M. (1978); Ross (1976) Kahneman, D.;
Tversky, A. (1979); Shiller, R. (1981); Mandelbrot, B.
(2006); Shiller, R.; Akerlof, G. (2009/2015);



**DOGMATIC
PERSISTENCE
OF SCHOOLS
OF THOUGHT**

CONCEPT OF HUMANKIND MARKET PARTICIPANT



UNTAPPED BEHAVIORAL ALPHA



Factors for structural underperformance
Source: Panthera Solutions, Vanguard, Carl Richards

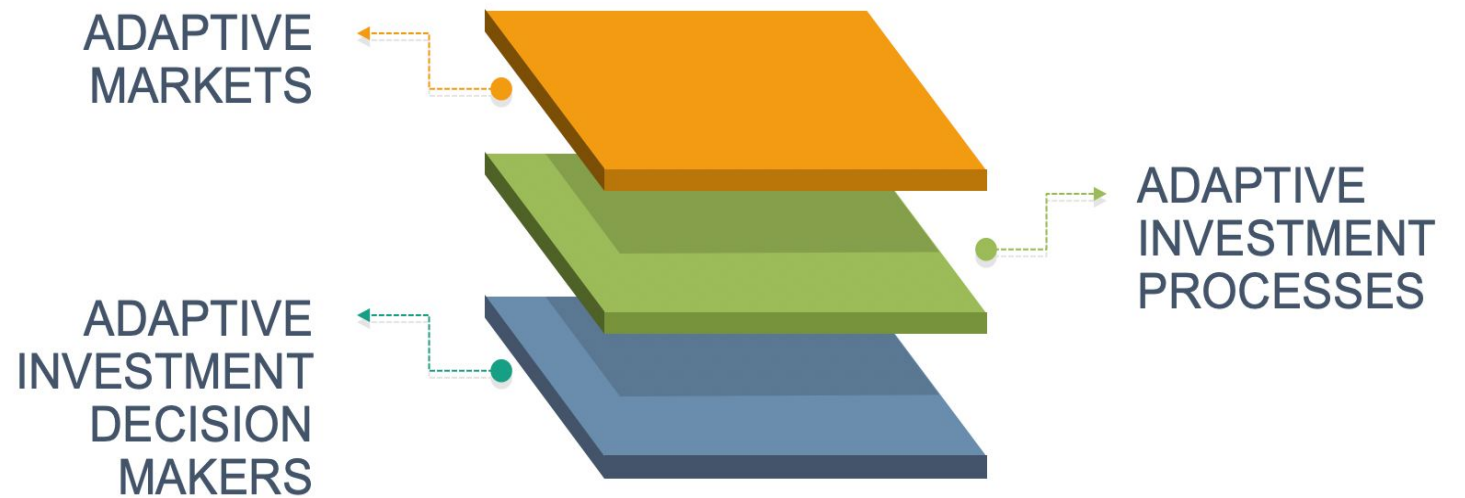
LITERATURE

Clare (2010); Dalbar (2012); Friesen (2007); Shina (2005); Bullard (2009); Dichev (2010); Barber (2000); Bogle (2002); Essentia (2017);

HOW TO SPECIALIZE?

**PRINCIPAL VS AGENT
CULTURE VS PROCESS**

**ADAPTIVE
MARKETS
REQUIRE
ADAPTIVE
INTERACTION**



Lo, A. (2004)

**ADAPTIVE
MARKETS
REQUIRE
ADAPTIVE
INTERACTION**

**CAPITAL MARKETS ARE COMPLEX,
ADAPTIVE SYSTEMS WITH A HIGH LEVEL OF
ENDOGENEOUS DYNAMIC, DRIVEN BY A
LARGE NUMBER OF HETEROGENEOUS
MARKET PARTICIPANTS WITH IMPERFECT
INFORMATION AND BOUNDED
RATIONALITY.**

Lo, A. (2004)

RE-DEFINING RISK

COMPARATIVE ADVANTAGE THROUGH SPECIALIZATION DRIVEN BY
MOST-EVIDENCE-BASED INVESTMENT DECISIONS

VOLA-BASED RISKS

RISK PREMIA

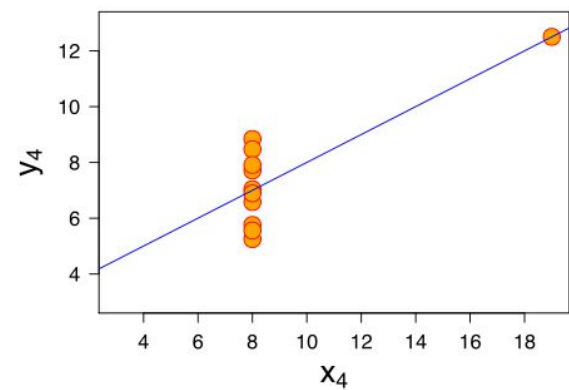
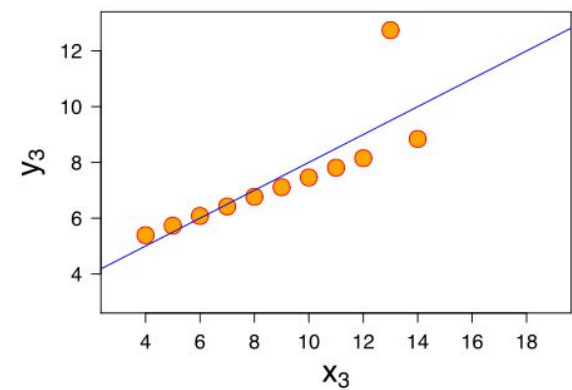
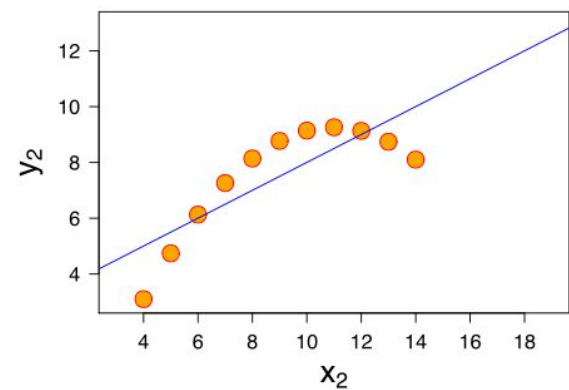
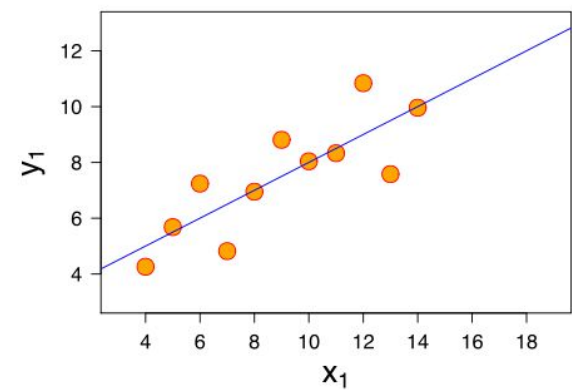
QUANTITATIVE RISKS

QUALITATIVE RISKS

ALL RISK FACTORS ARE TO BE CONSIDERED

RE-DEFINING RISK

COMPARATIVE ADVANTAGE THROUGH SPECIALIZATION DRIVEN BY MOST-EVIDENCE-BASED INVESTMENT DECISIONS

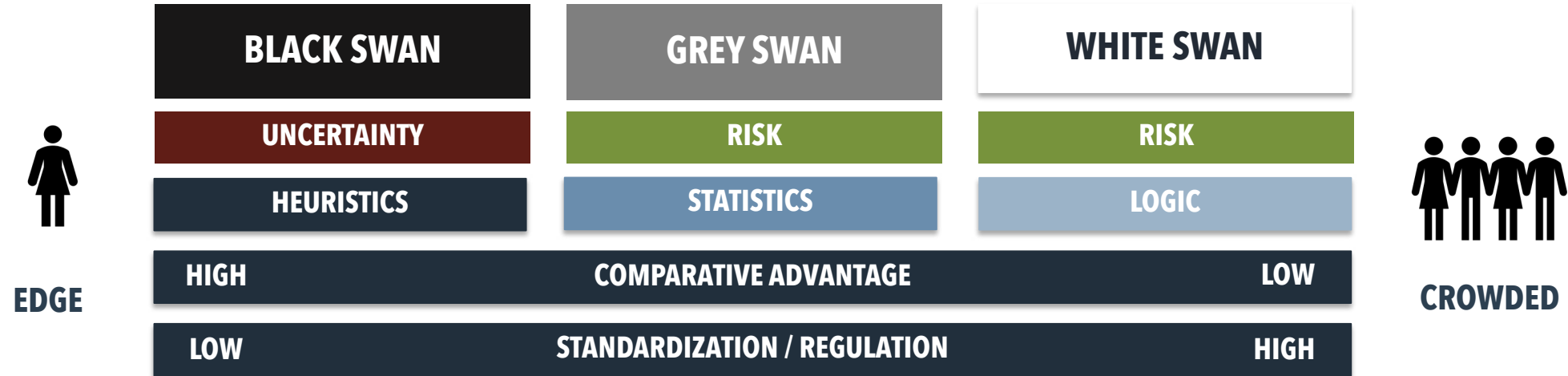


Anscombe's quartet comprises four datasets that have nearly identical simple statistical properties, yet appear very different when graphed. Each dataset consists of eleven (x,y) points. They were constructed in 1973 by the statistician Francis Anscombe to demonstrate both the importance of graphing data before analyzing it and the effect of outliers on statistical properties.

Property	Value
Mean of x in each case	9 (exact)
Sample variance of x in each case	11 (exact)
Mean of y in each case	7.50 (to 2 decimal places)
Sample variance of y in each case	4.122 or 4.127 (to 3 decimal places)
Correlation between x and y in each case	0.816 (to 3 decimal places)
Linear regression line in each case	$y = 3.00 + 0.500x$ (to 2 and 3 decimal)

ASSET ALLOCATION

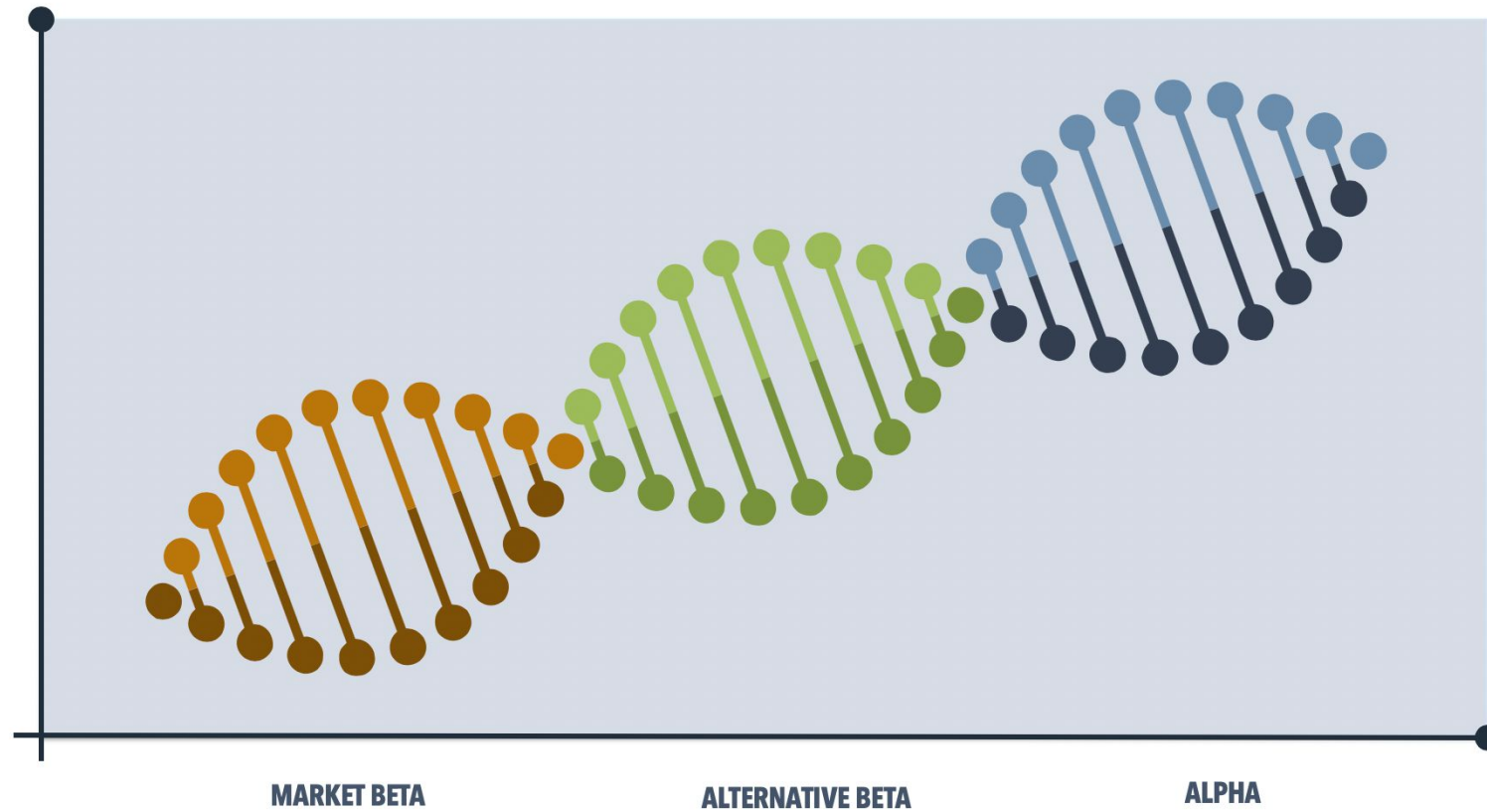
WHERE TO FIND A COMPETITIVE ADVANTAGE?



FIRST PRINCIPLE THINKING

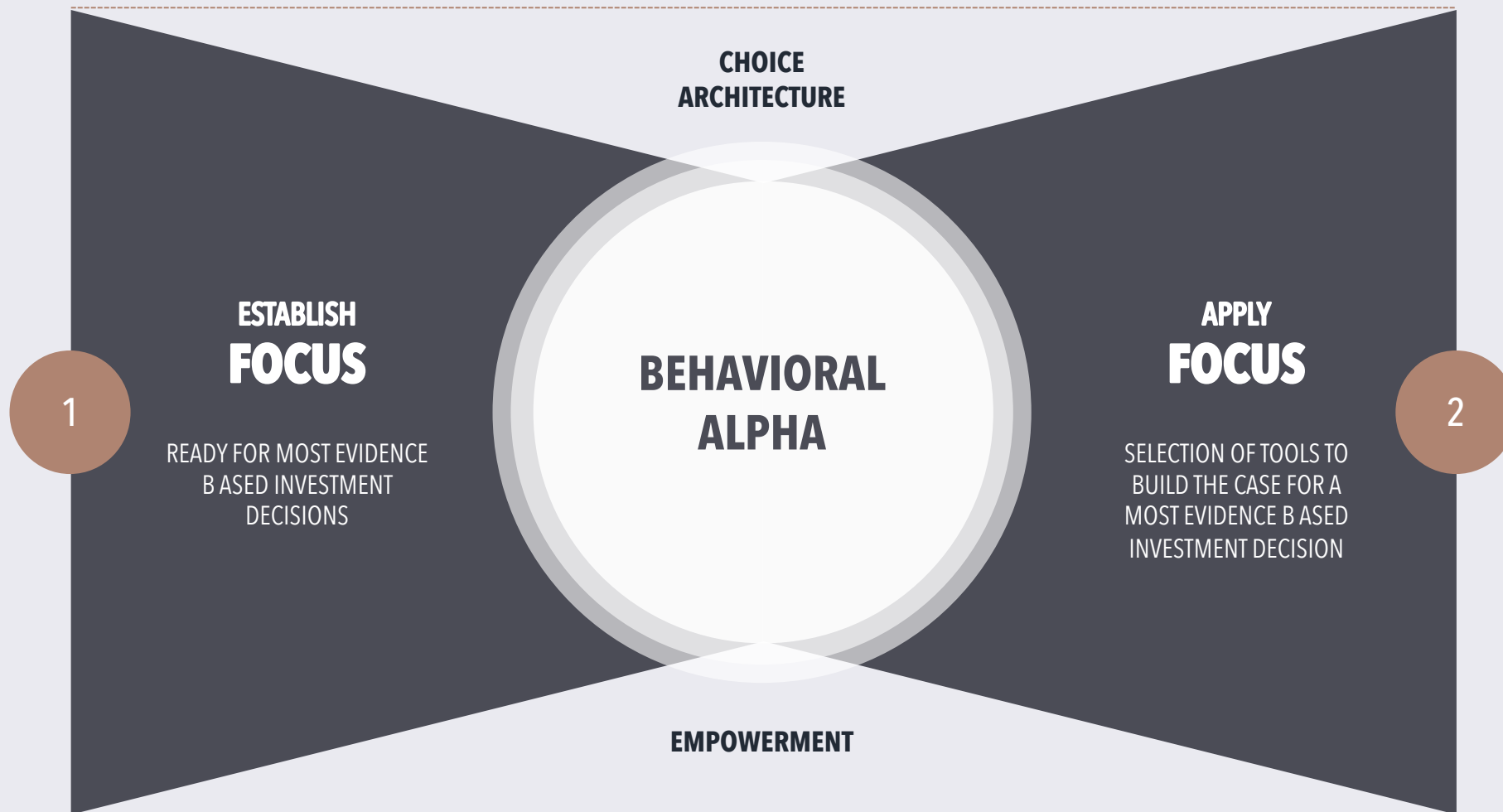
INTRODUCTION OF CREATIVE & CRITICAL THINKING

CREATIVE THINKING
&
CRITICAL THINKING



EXPLOITING BEHAVIORAL ALPHA

INTERVENTION & APPLICATION FRAMEWORK



**BERLIN, WE HAVE A
PROBLEM**

ACADEMIC PROBLEM

BEHAVIORAL SCHOOLS OF THOUGHT ARE FRAGMENTED

HEURISTICS & BIASES "NUDGING"

LITERATURE

Gilovich, T. & Griffin, D. & Kahneman, D. (2002)
Thaler, R. H., & Sunstein, C. (2008)
Thaler, R. (2018)

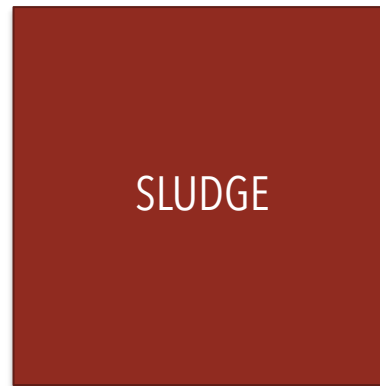
MANAGING COGNITIVE BIASES

FAST & FRUGAL HEURISTICS "EMPOWERING"

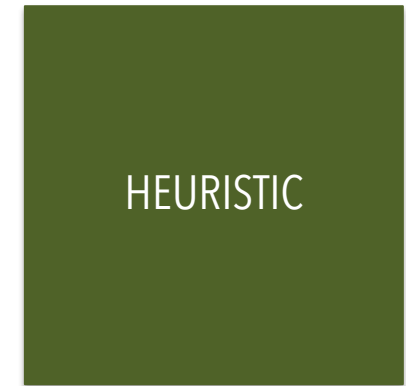
LITERATURE

Gigerenzer, G.; Gassmaier, G. (2011)
Mousavi, S; Gigerenzer, G. (2014)
Hertwig/Grüne, Yanoff (2017)

TWO DOMINANT SCHOOLS OF THOUGHT



DESTRUCTIVE



CONSTRUCTIVE

TEMPORARY EFFECT

DEBIASING

LASTING EFFECT

EMPOWERMENT

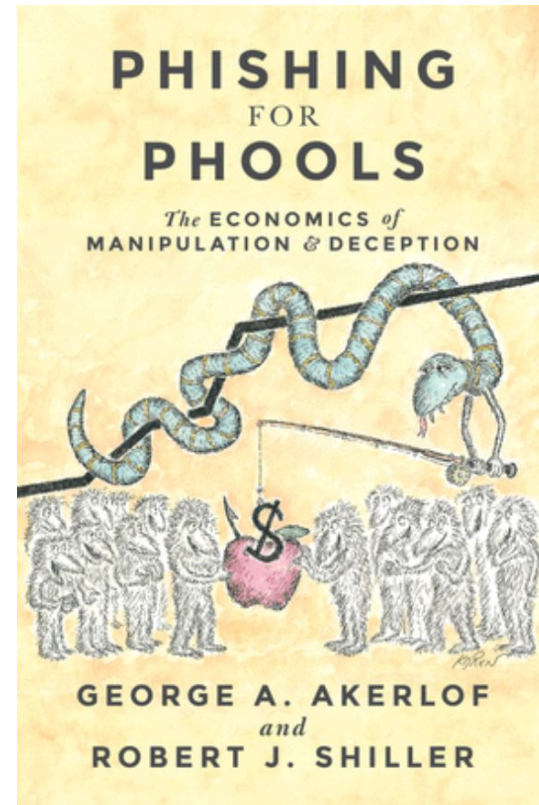
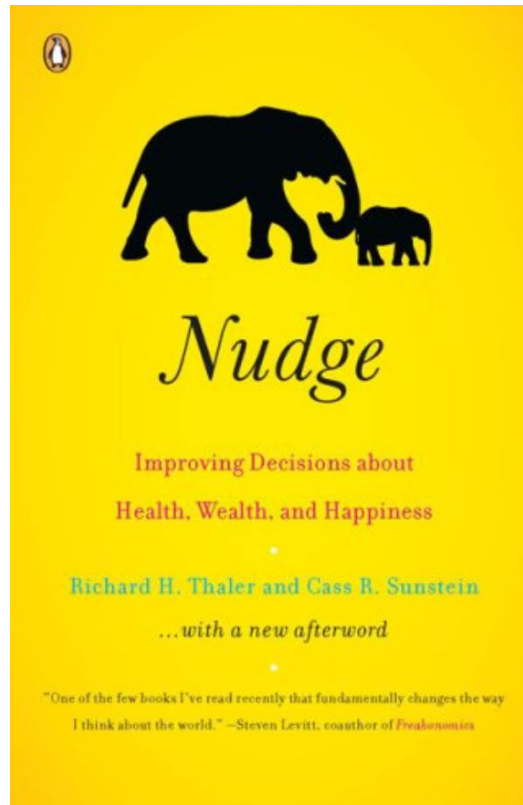
MOST EVIDENCE-BASED

= MOST RATIONAL INVESTMENT DECISIONS



QUELLE: PROF. GERHARD ROTH

NUDGES & SLUDGES EXPLAINED



**INTERPLAY
BETWEEN
CHOICE
ARCHITECTURE
&
EMPOWERMENT**

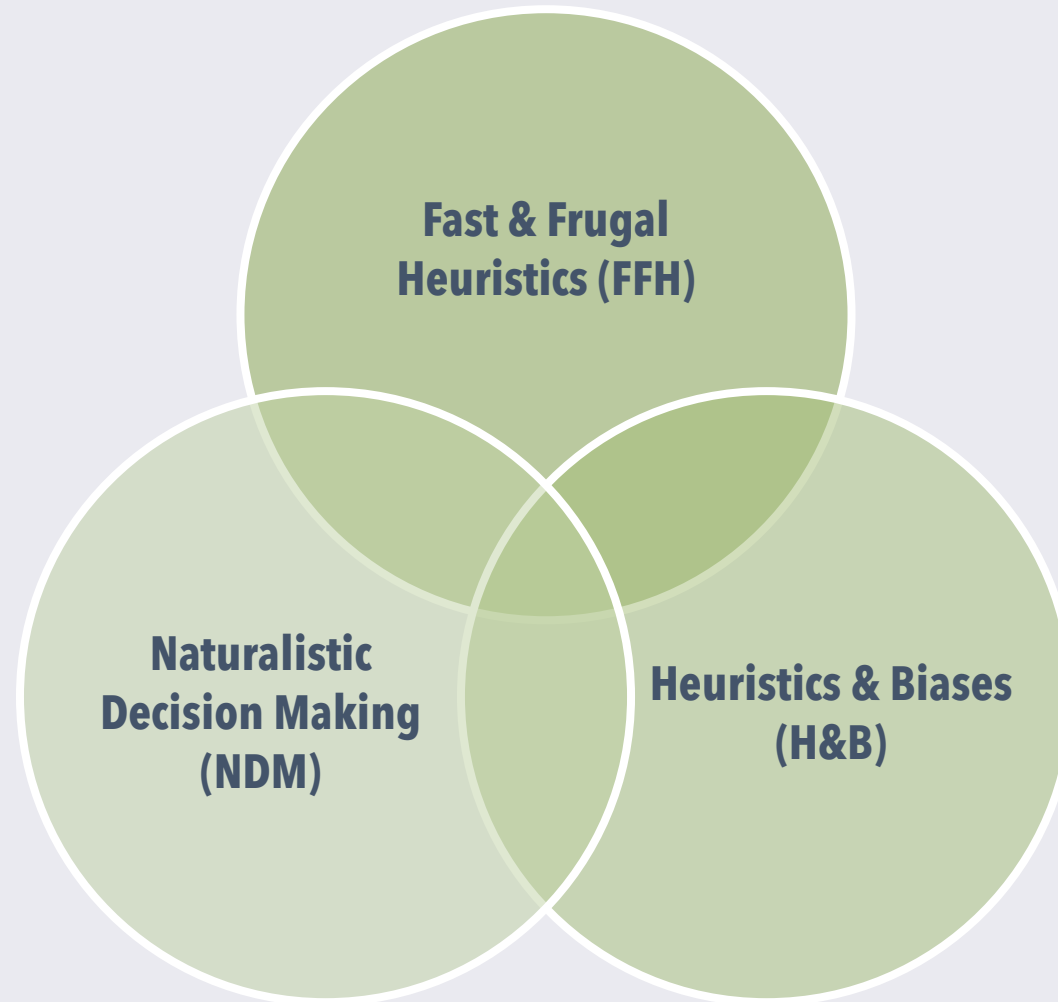


TRADITIONAL
SEPARATED RESEARCH

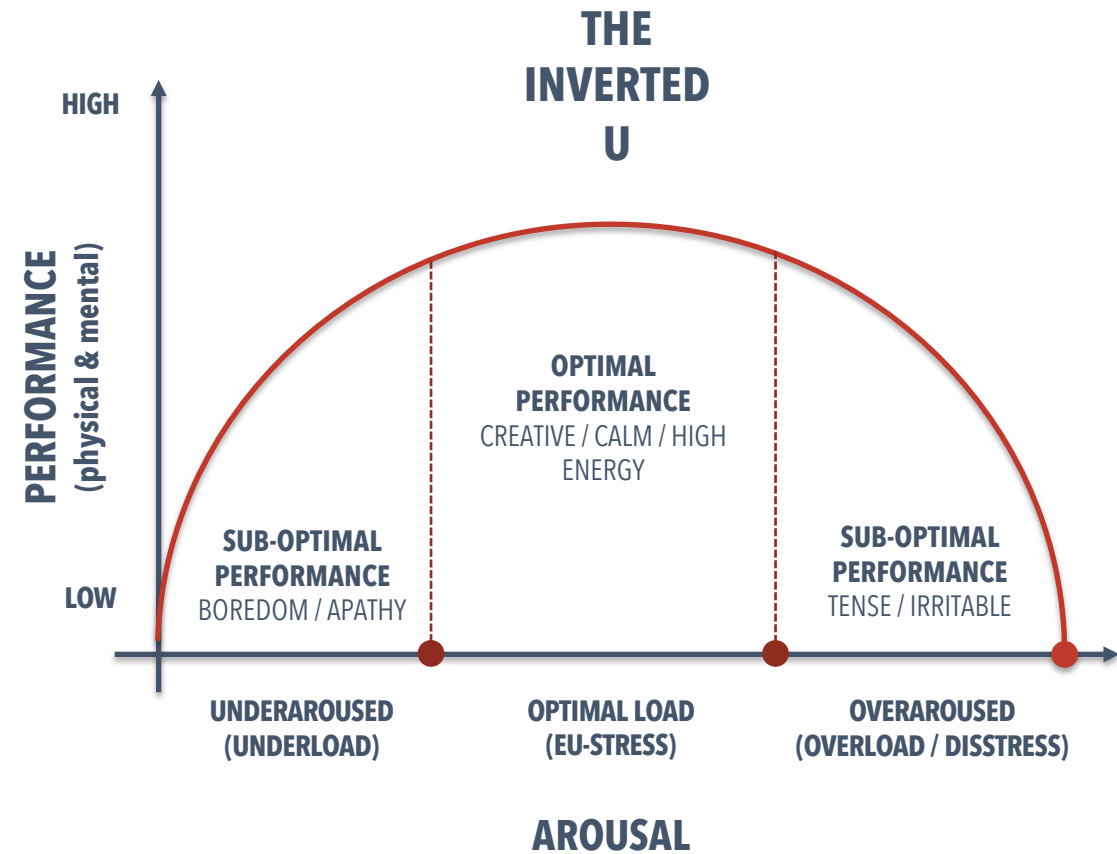
RECENT TREND
INTEGRATED RESEARCH
SEE CHOICE ARCHITECTURE/ ECOLOGICAL RATIONALITY

INTEGRATING BEHAVIORAL SCHOOLS

COMPARATIVE ADVANTAGE THROUGH SPECIALIZATION DRIVEN BY
MOST-EVIDENCE-BASED INVESTMENT DECISIONS



AROUSAL AMBIGUITY TOLERANCE



DIFFERENT NAMES AT DIFFERENT TIMES

- **Kurt Hahn (1908)** Schöpferische Leidenschaft
- **Maria Montessori (1907)** „Montessori Phänomenon“ Polarisation der Aufmerksamkeit
- **Hans Scheuer (1950)** „Entrücktsein vom aktuellen Tagesgeschehen“ (Kriterien für das Wesen des Spiels)
- **Abraham Maslow (1964)** Peak Experience

MOST EVIDENCE-BASED

= MOST RATIONAL INVESTMENT DECISIONS



**MOST
EVIDENCE-
BASED**

**LEVELS OF
CONSCIOUSNESS**

CONSCIOUSNESS/S2

PRECONSCIOUSNESS/S1

UNCONSCIOUSNESS/S1

DRIVERS

INTELLECT/REASON

INTELLECT/REASON

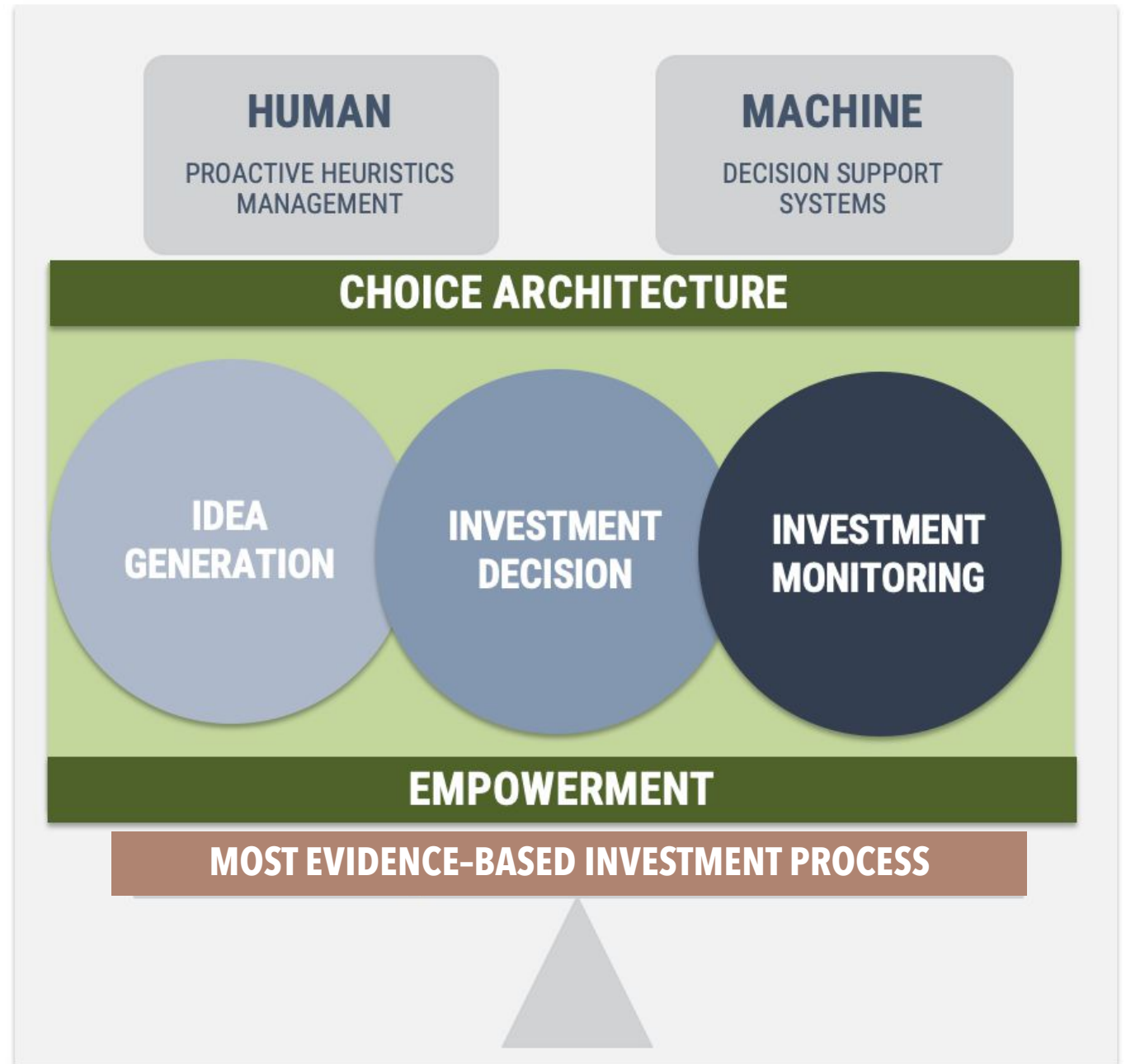
LIMBIC SYSTEM

**STRENGTHEN
INTERPLAY**

TAME

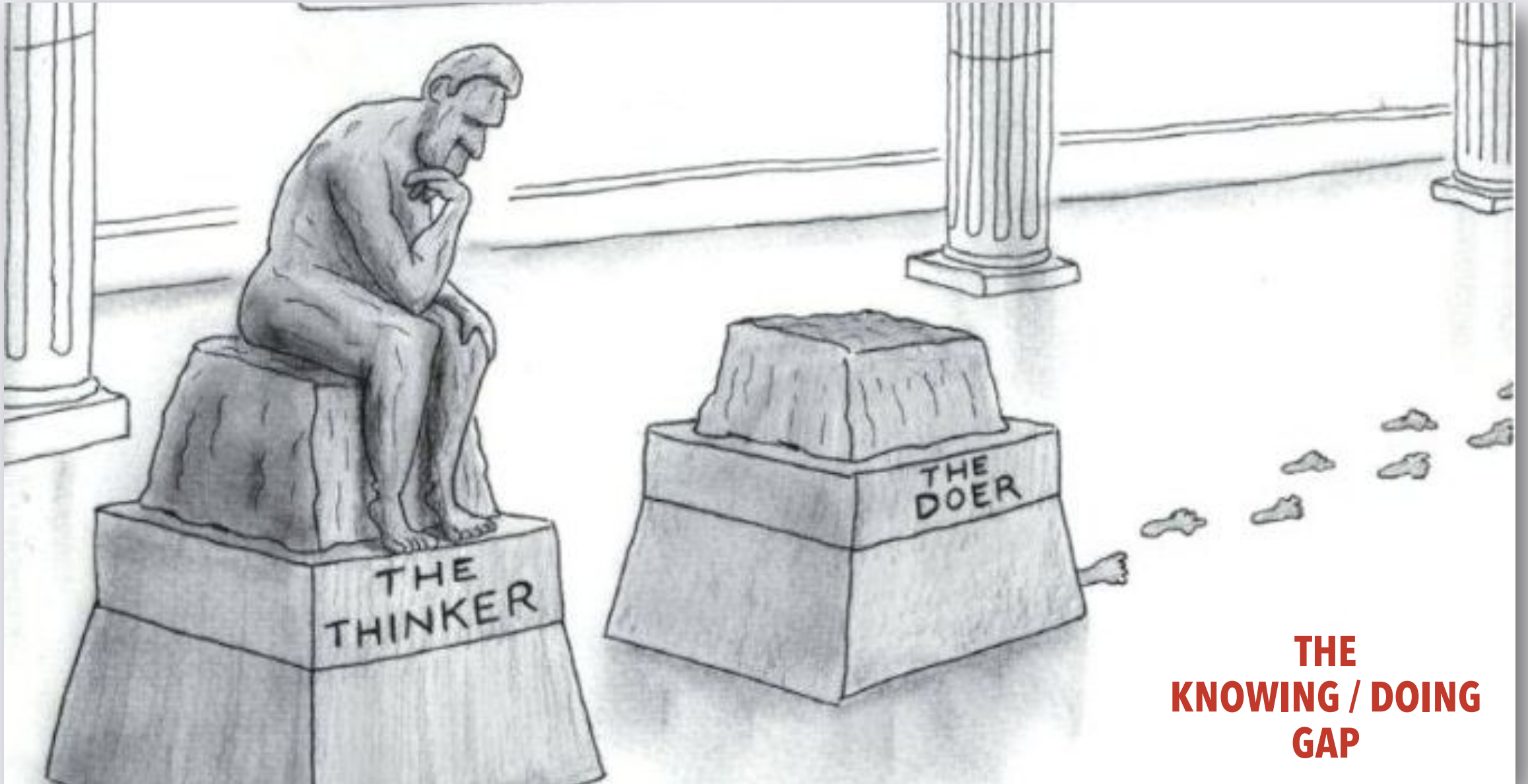
**MOST
EVIDENCE-
BASED**

**ECOLOGICAL
RATIONALITY**



HOW TO SPECIALIZE

THE KNOWING-DOING GAP



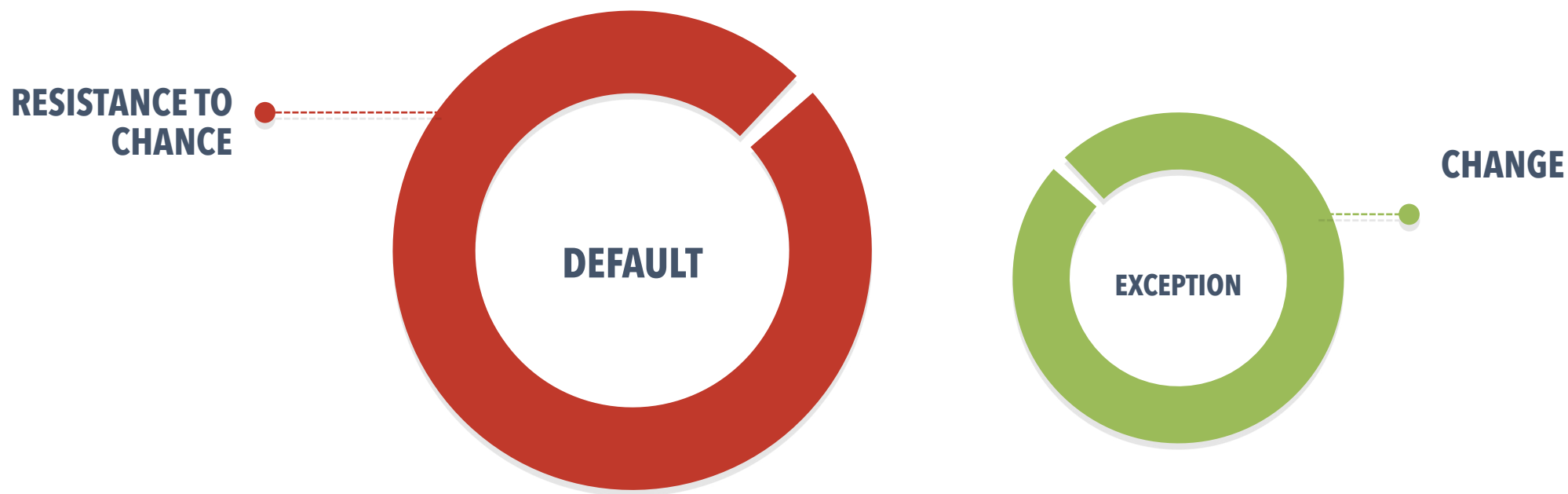
**THE
KNOWING / DOING
GAP**

ACADEMIC-MANAGERIAL PROBLEM

THE KNOWING-DOING GAP IN BEHAVIORAL FINANCE

LITERATURE

Epstein, S. (2005);
Kegan, R. & Lahey, L. (2009)



HOW TO MINIMIZE THE KNOWING-DOING GAP

LITERATURE

Heifetz, R (2009)

Kegan, R. & Lahey, L. (2009)

McAdams, D. & McLean, A. (2013)



MOST EFFECTIVE

**HOW TO
MINIMIZE THE
KNOWING-
DOING GAP**

**INTUITION-
DRIVEN
HEURISTICS**

GAMIFICATION

NUDGES





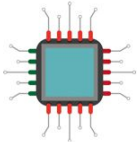
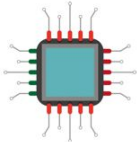
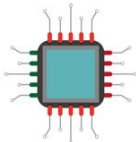
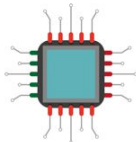
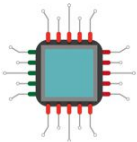
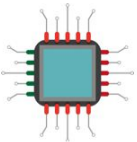
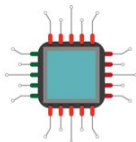
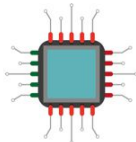




**CHOICE
ARCHITECTURE**

SIMPLE RULES

HUMAN DECISION MAKER VERSUS MACHINE

HUMAN DECISION MAKER AND MACHINE

PRIMACY OF HUMAN
DECISION MAKER IS INTACT.

	CURIOSITY	MORALITY	INTERFERENCE	NOVELTY	COST	RECALL	SPEED	MATH
GOOD								
BAD								

Egan, D. (2018)

INVESTMENT COMMITTEE PRINCIPLES

CONCRETE PRINCIPLES TO TEST

7

INTRODUCTION OF INVESTMENT COMMITTEE PRINCIPLES

INVESTMENT COMMITTEE PRINCIPLES

CHOICE ARCHITECTURE

1. MAXIMIZE COGNITIVE DIVERSITY IN IC COMPOSITION
2. ESTABLISH ADVOCATUS DIABOLI FOR CRITICAL APPRAISAL
3. SCHEDULE IC BEFORE NOON
4. DOCUMENT TO LEARN

EMPOWERMENT

5. POSITION MODERATOR AS FACILITATOR
6. RISK MANAGER TO CHALLENGE ON TECHNICALITIES & METHODS
7. VISUALIZE PROVIDED CONTENT AND CONCLUSIONS

1

MAXIMIZE COGNITIVE DIVERSITY

CHOICE ARCHITECTURE



IMPACT OF SURROUNDINGS

**AVOIDING CONVERGENCE
OF BEHAVIOR**

2

**ESTABLISH
ADVOCATUS
DIABOLI FOR
CRITICAL
APPRAISAL**

CHOICE ARCHITECTURE

**MAXIMIZING SKILL
BEHAVIORAL ALPHA**

EMMANUEL ROMAN [2018](#) (PIMCO)

**I THINK INVESTORS DON'T SPEND
ENOUGH TIME BEING
INTROSPECTIVE ABOUT WHAT THEIR
EDGE IS OR NOT - WHAT THEY ARE
GOOD AT VERSUS OTHER PEOPLE.**



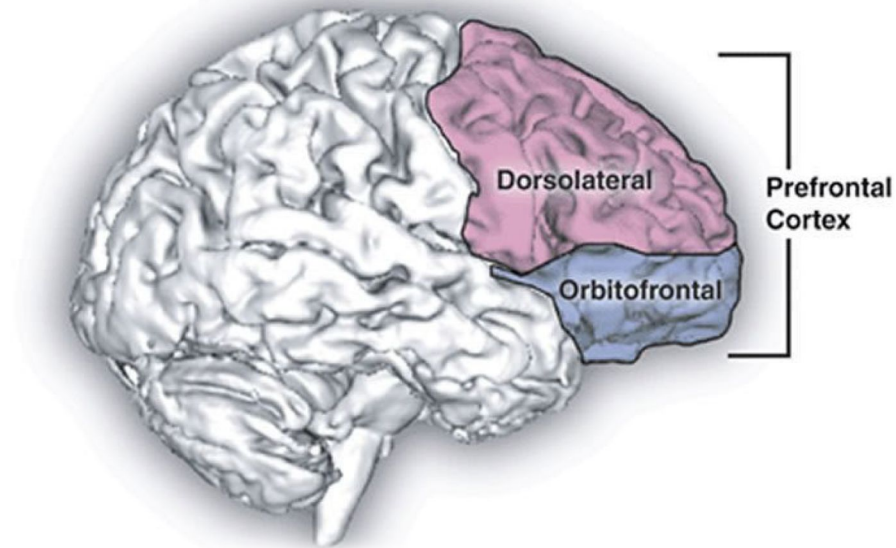
3

**SCHEDULE IC
BEFORE NOON**

CHOICE ARCHITECTURE

**LIMITED FREE WILL
DO NOT BET ON WILLPOWER**

**PREFRONTAL CORTEX
ONLY 4% OF OUR BRAIN VOLUME**



**EASTERN PHILOSOPHY
METAPHOR**

Interplay between the elephant and the rider, where the rider (consciousness) tries to control the elephant (subconsciousness).

4

DOCUMENT TO LEARN

CHOICE ARCHITECTURE



FALSE MEMORIES

QUOTE - SALVADOR DALÍ (1955)

AVOID HARKING
HARKING = HYPOTHESIZING AFTER THE FACT
FACILITATE EVIDENCE-BASED INDIVIDUAL LEARNING
SEE FUZZY-TRACE THEORY („FALSE MEMORIES“)

**THE DIFFERENCE
BETWEEN FALSE MEMORIES AND
TRUE ONES IS THE SAME AS FOR
JEWELS: IT IS ALWAYS THE FALSE
ONES THAT LOOK THE MOST REAL,
THE MOST BRILLIANT.**

4

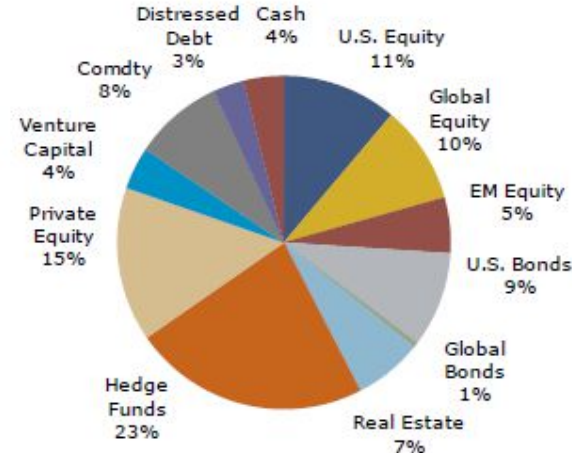
DOCUMENT TO LEARN

CHOICE ARCHITECTURE

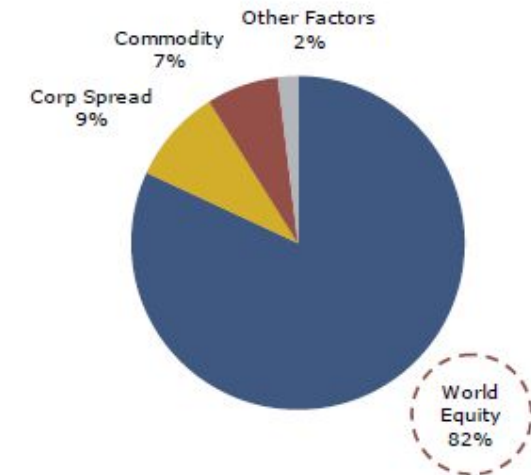
„FIRST PRINCIPLE THINKING“

Asset Class Diversification does not Equate to Risk Diversification

“Endowment Style” Portfolio Asset Allocation
(by market value weight)



Risk Allocation
(by contribution to estimated volatility)

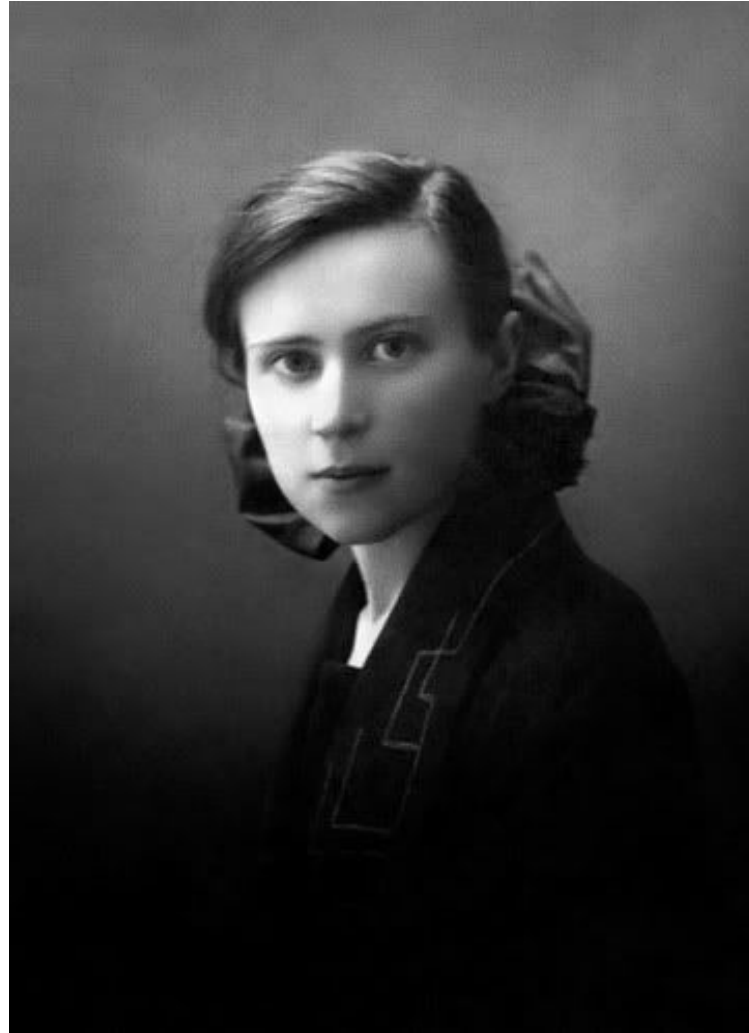


SOURCE: “Endowment Style” portfolio represents the asset allocation of US University Endowments with >\$1bn in assets, published by 2010 NACUBO-Commonfund Study of Endowments, PIMCO
Hypothetical example for illustrative purposes only.

5

**POSITION
MODERATOR
AS FACILITATOR**

EMPOWERMENT



Bljuma Wulfowna Seigarnik

MINIMIZE ZEIGARNIK EFFECT

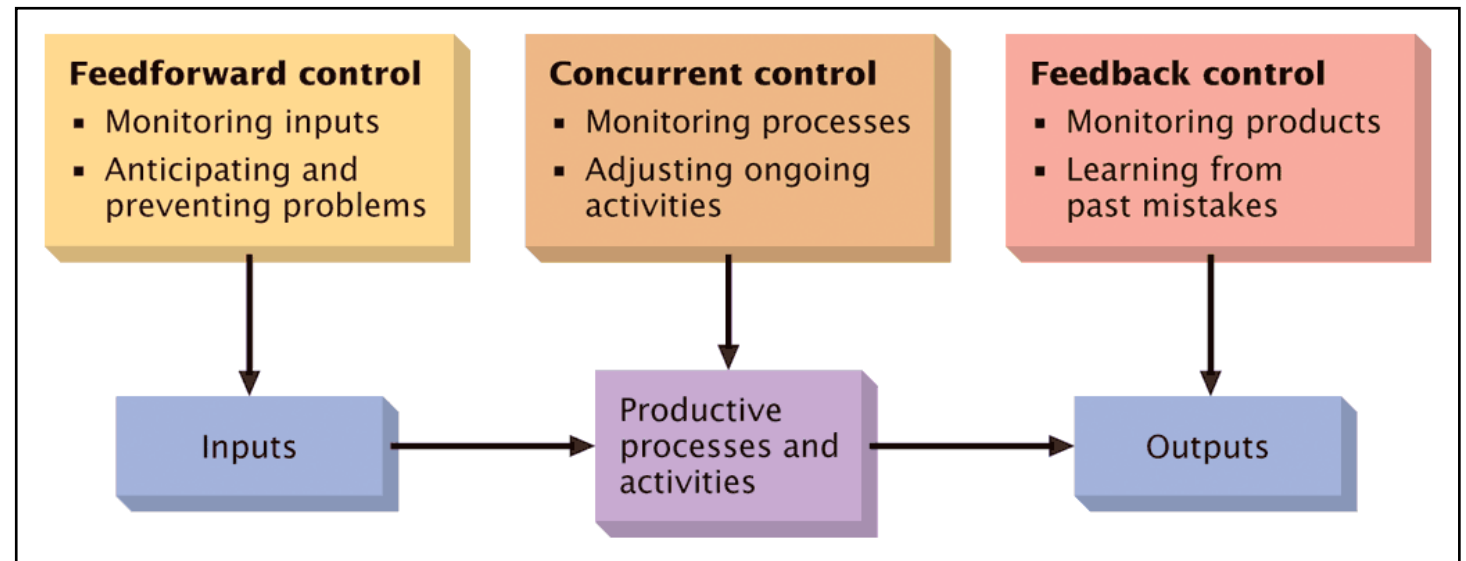
*When we leave things
unfinished, we can't quite let go
of them mentally.*

6

**RISK MANAGER
= CHALLENGER**

EMPOWERMENT

TOTAL QUALITY MANAGEMENT



7

VISUALIZE CONTENT

EMPOWERMENT

MINIMIZING THE KNOWING-DOING GAP INFORMATION OVERLOAD VS FILTER FAILURE

QUOTE – GERD GIGERENZER, [2014](#)

**THE PROBLEM
IS NOT THAT PEOPLE ARE
STUPID.**

**THE PROBLEM IS THAT
INFORMATION IS OFTEN
PRESENTED IN A
MISLEADING WAY.**



SIMULATION

**SIMULATION
SETTING**

**30 ´ PREP
15-30 ´ DEBATE**

**CONGRATULATIONS.
YOU ARE AN INVESTMENT COMMITTEE MEMBER OF
A EUR 10 BN PENSION FUND.**

**YOU PREPARE FOR THE UPCOMING MEETING. THE
CIO INTENDS TO GAIN CLARITY ON WHETHER/HOW
TO INVEST IN THE UPCOMING 5G TECHNOLOGY.**

GROUP A

REASON YOUR CASE **IN FAVOR** OF INVESTING IN
5G-LINKED COMPANIES

GROUP B

REASON YOUR CASE **AGAINST** AN INVESTMENT IN
5G-LINKED COMPANIES

THE 5G CASE

How 5G will change your life

The roll out of 5G networks is underway, yet dbDig primary research shows US smartphone users are relatively ambivalent. The issue is that unlike the 3G and 4G roll-outs, there is no 'killer application' for 5G smartphones yet. But 5G's biggest effects could be outside smartphones. It will enable predictive maintenance on cars, virtual reality films, autonomous cars, and other Smart City applications. And that is before considering the industrial Smart Factory applications that are already being built. In fact, the consumer internet industry will likely be a 'late cycle' beneficiary of 5G and we note that equity investors took time to warm to 3G and 4G.

Siemens case study

At the forefront of 5G's application to the Industrial Internet of Things is Siemens and its cloud-based MindSphere system. Integrating the 5G network into this system will make it possible to capture the data generated by one million sensors per square kilometre in factory complexes. To gain first-mover advantage, some clients are already adjusting their factories with a view to incorporating wireless robots that can move around a production line. The goal is a complex that can operate itself, learn and integrate with suppliers. It also enables 'digital twins' to provide predictive maintenance information directly to consumers.

The politics of 5G

In the middle of the geopolitical battleground between the US and China is 5G, and particularly Huawei. While the rhetoric has oscillated between hard and soft, both countries are considering how to build out industries that have been hit with restrictions, or are at risk. At the same time, the international clout of the US, and the increasing influence of China through its Belt and Road Initiative, have left other countries caught up in the dispute. Many are wrestling with the issue of how to take a side, or avoid it completely. But the issue is just as much about economics as geopolitics.

Europe needs to expand its digital infrastructure

Europe significantly lags the US when it comes to digital infrastructure and targets have been missed. It also sits behind China which is progressing with its "made in China 2025" strategy. The risk for Europe is that this underperformance becomes self-reinforcing as companies look elsewhere to invest. Compounding Europe's problems is the notable divergence in the digital infrastructure between different countries. We look at some of the reasons for this underperformance and posit some solutions. Given the government investment required, the final result will depend on political priorities.

Distraction economics

As 5G makes the world even more connected, there is a growing awareness that distractions are bad for the economy. In fact, slower productivity growth and GDP in developed countries has coincided with the rise of email and smartphones. Indeed, some suggest the US economy loses \$1tn each year due to too much information and interruption. Feeding into the economic impact is the realisation of the mental health implications of over-communication. For example, studies show that people who are forced to work without email report increased collaboration with colleagues, significantly less stress, and, importantly, feel far more productive.

THE 5G CASE

Peak speed and economic growth

The increased speed of communications has usually gone hand-in-hand with economic growth. But even though large quantities of information can now be sent instantly around the world, it does not mean slower growth. That is because the latest technology is allowing an unprecedented spread of communications. In particular, that is directly leading to increased education rates in developing countries. In fact, if current increases in education rates continue, the 200m additional educated workers that enter the workforce over the next three decades will compensate for most of the expected decline in the workforce in the more-developed world due to demographic problems.

Satellite vs streaming

Elon Musk's SpaceX is rapidly reducing the cost of launching a satellite into orbit. That is helpful for the traditional television industry as it deals with competition from streaming services. It is true that streaming is becoming cheaper. Indeed, if cost deflation continues at its current rate, a majority of global channels will be better off going online-only by the end of next year. The proportion is the highest in Europe. But still, satellite has its place. It is still the best way to access the greatest number of subscribers, the quality is easier to guarantee, and piracy concerns are lessened.

The emerging market technology skip

Our recent trek in the Indian Himalayas showed what an impact new communications technology is having on a huge swathe of the population that has, until recently, been largely excluded from the global economy. Smartphones have been the 'technology skip' – they are cheap and run on new, fast networks. They enable micro-entrepreneurship without the need for other, more expensive computing equipment. But despite there being a billion eyeballs now watching screens in India, the path towards monetising that viewership is diverging from that in developed markets. Content still needs to remain free or low-cost, making advertising key – a huge challenge for broadcasters and content owners.

The 'golden age' of television and its uncertain future

Our present day has been described as the 'golden age' of television with huge amounts of money being invested in original content by providers with very deep pockets. Some worry that 5G will stimulate even more competition and cause spectacular failures. But traditional television habits are changing and new models are emerging. As today's market fragments, more content providers are able to target specific audiences and still remain viable. In addition, both traditional cable and free-to-air networks are investing heavily in data and analytics to evolve their advertising models. Rather than being something to fear, new business models should be seen as an opportunity.

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Who wants to live in a Smart City?

It is an intriguing paradox that while better data use can unquestionably improve people's lives, citizens are pushing back against their data being used by companies and governments. That has led to several Smart City projects, which will be reliant on 5G networks, to be delayed. That is just one of many reasons why pre-planned Smart Cities may have to be built from scratch. But if that happens, some worry the 'gilded cities' will widen the inequality gap. Yet, the technology-skill complementarity that has boosted top-end wages may weaken as several extraordinary one-off factors that have hurt low-paid workers in developed markets have recently diminished.

The future of news

Two decades ago, newspaper editors were told the internet age meant they had to give away content for free, create click-bait, and support it all with any advertising they could find. It hasn't turned out that way. Fears of fake news, the shift to quality, and the lack of patience for distraction has led to growing numbers of subscribers at some of the world's best-known mastheads. Yet, the shift is not complete. Communications and 5G technology are likely to have five impacts on the news media: the return of regional reporting with new funding models, less focus on speed, a reduction in the number of news sources people read, the acceptance of automation, and the return of television news, in a curated format.

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