

Financial Technologies to Enhance Social Security

금융기술을 통한 사회보장 강화

4-University Rotational Conference on FinTech

April 12, 2018

Woo Chang Kim

Associate Professor, ISysE, KAIST

Head, KAIST Center for Wealth Management Technologies

wkim@kaist.ac.kr

<http://felab.kaist.ac.kr>

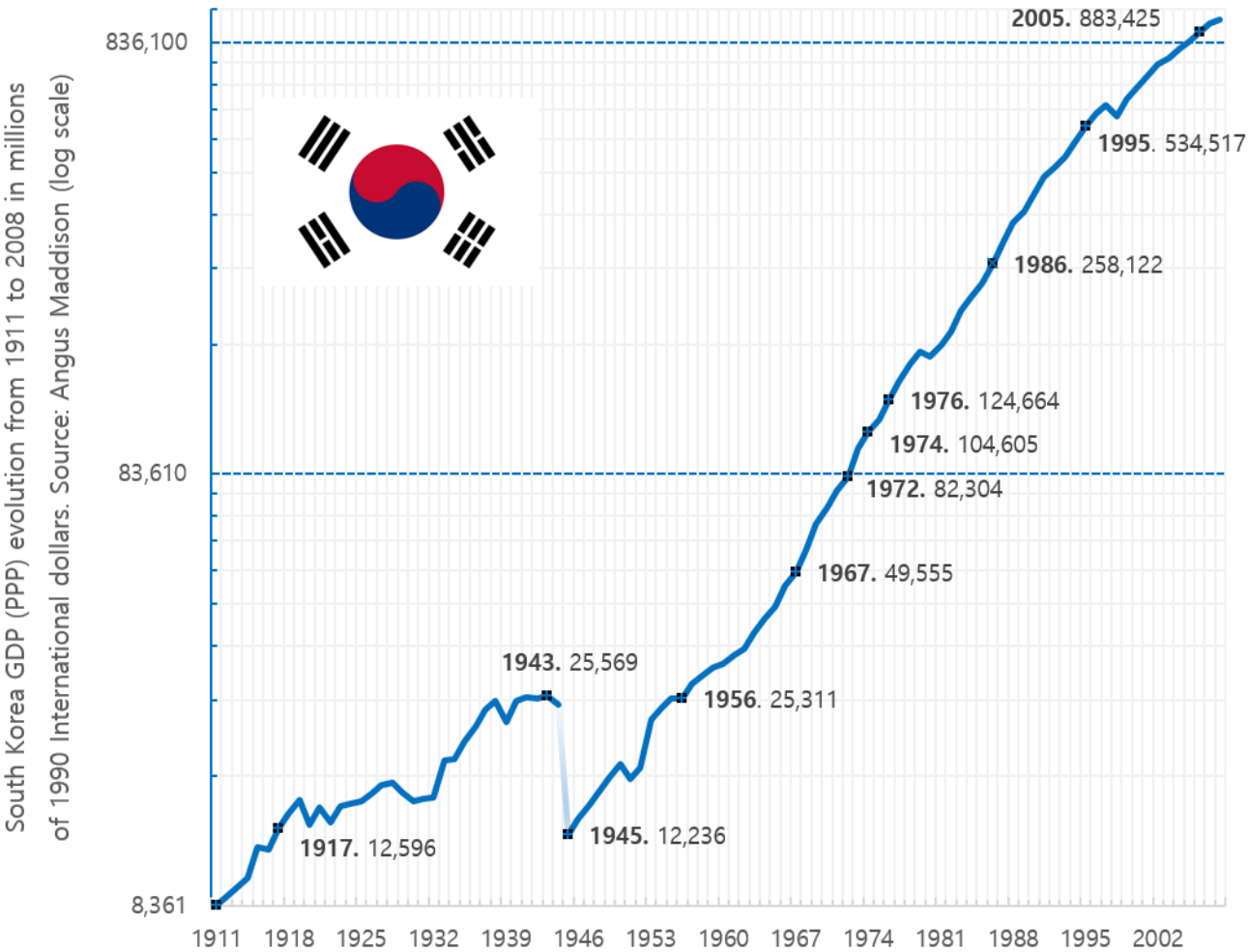
<http://wmt.kaist.ac.kr>

Contents

- Korea, and Its Success Story
- Cost of Long Life
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- Issues
- Technologies
- Implications

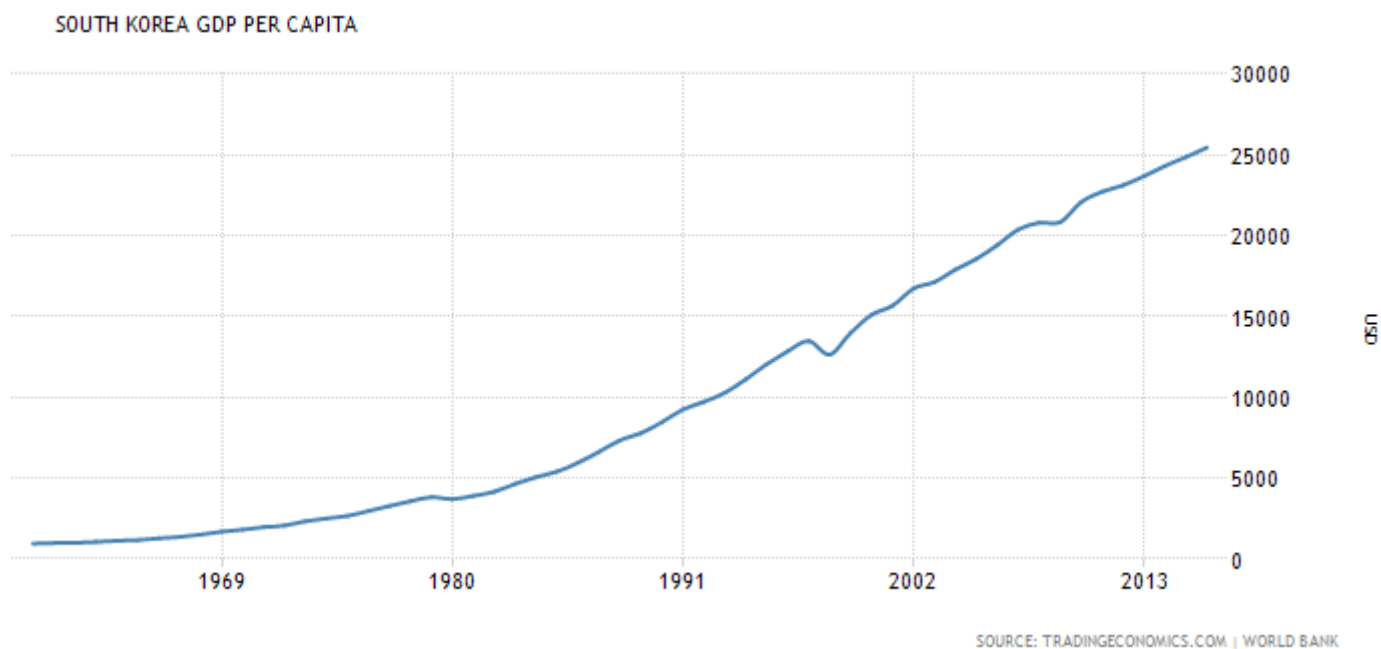
KOREA, AND ITS SUCCESS STORY

Miracle of Han River



Source: World Bank

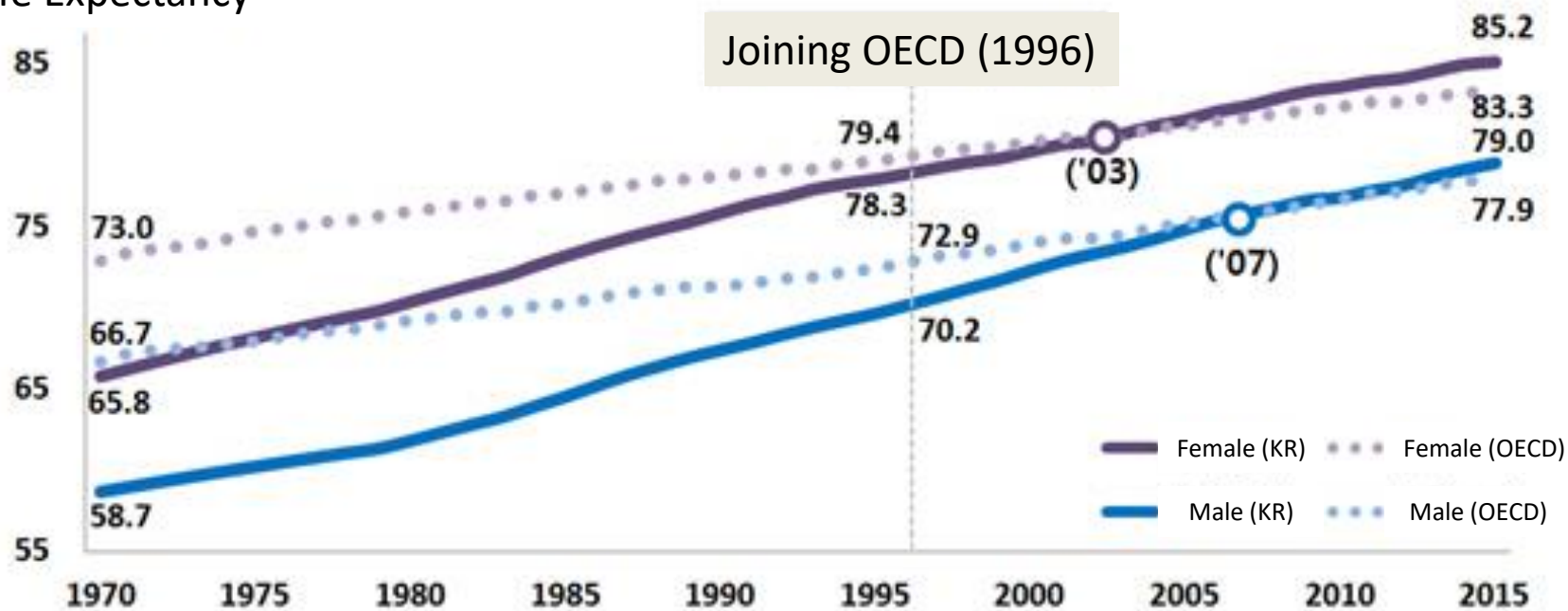
Miracle of Han River



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Extended Life Expectancy

Life Expectancy

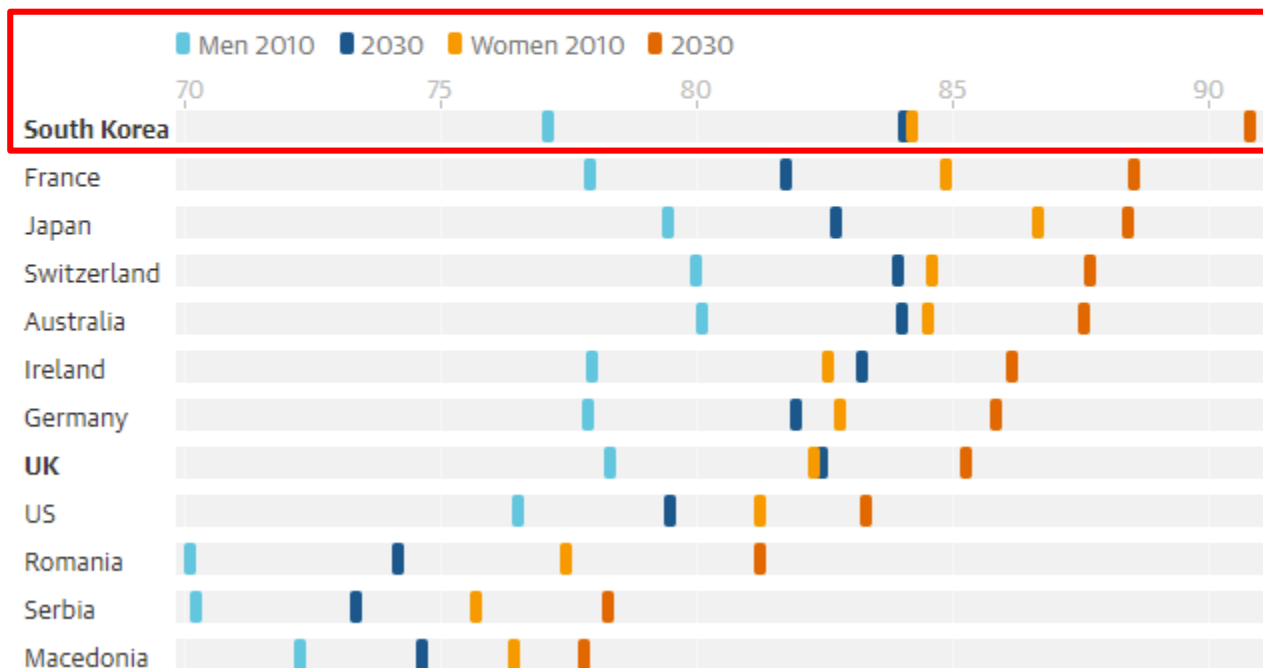


World Longest-Living: Korean Female born in 2030

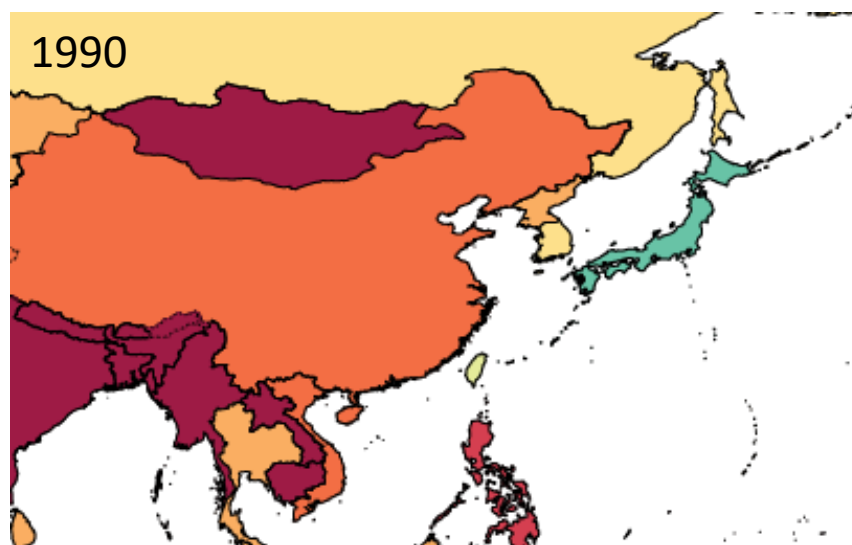
Life expectancy forecast to exceed 90 years in coming decades

Among developed nations, South Korea is likely to see the largest increase in life expectancy, with women born in 2030 averaging 90.8 years, 6.6 years longer than those born in 2010

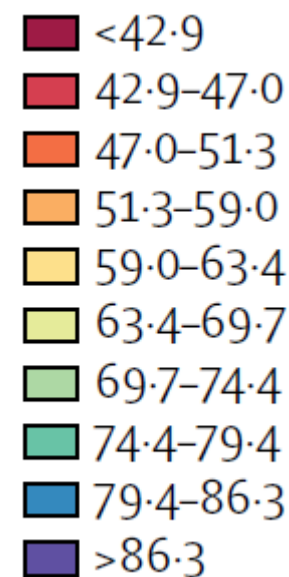
Life expectancy at birth, selected countries



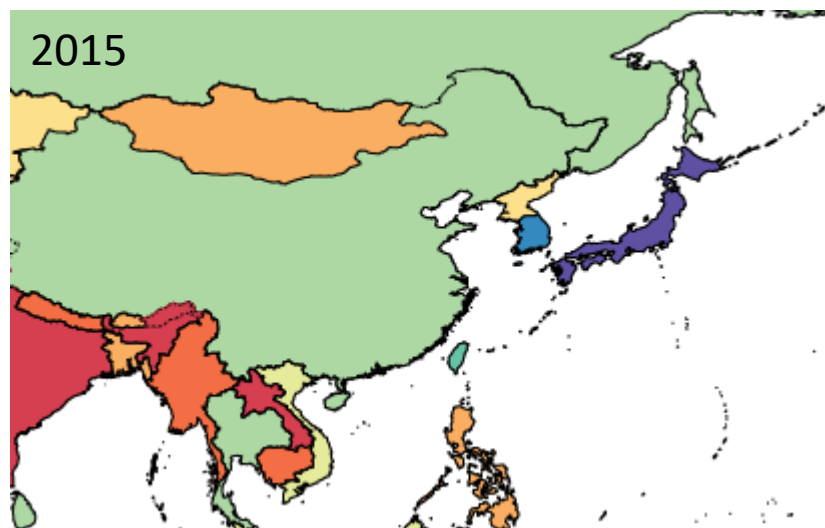
Reason: Improved “Universal Healthcare System”



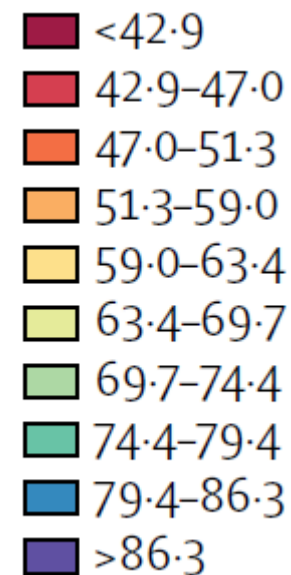
Healthcare Accessibility and Quality Index



Reason: Improved “Universal Healthcare System”



Healthcare Accessibility and Quality Index



Korea now has top 5 HAQ Index score among countries with 20 million or more population.

COST OF LONG LIFE

Worst Poverty Rate for Retirees

한국 노인빈곤 OECD '최악'...연금소득은 '최하위권'

Worst poverty rate for retirees among OECD Countries

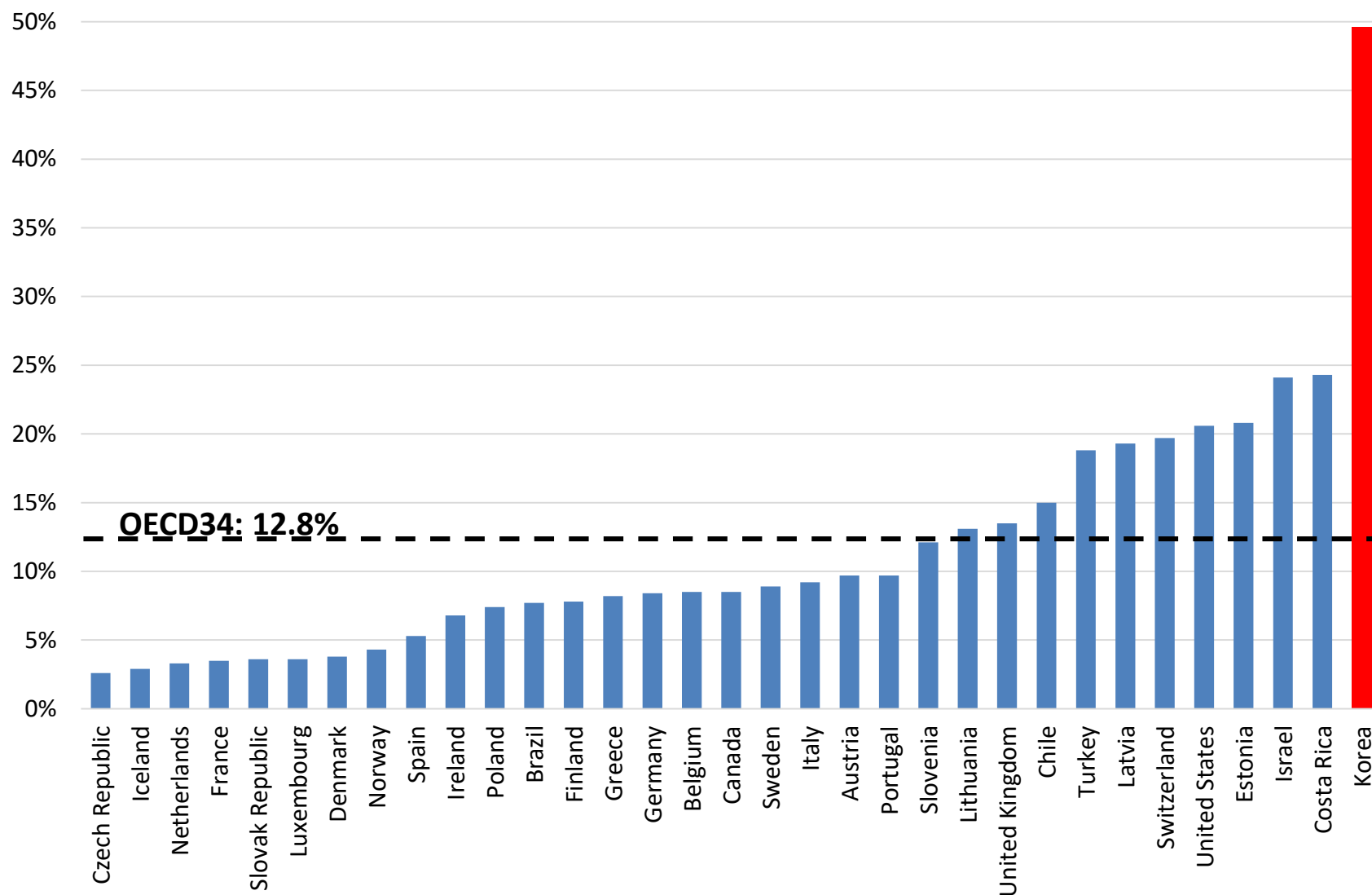


빈곤율 48.6%로 압도적으로 높아...연금 소득대체율 45.2%로 평균 이하

Retirees' poverty rate: 48.6%, Income replacement rate: 45.2%

Worst Poverty Rate for Retirees, with a Big Margin

Poverty rates among the over-65s (노후빈곤율) in 2013



It's Getting Worse

6 out of 10 middle class: "will be poor after retirement"

최신기사

중산층 10명 중 6명꼴 "은퇴 후 빈곤층 될 것"

송고시간 | 2017/12/07 11:27

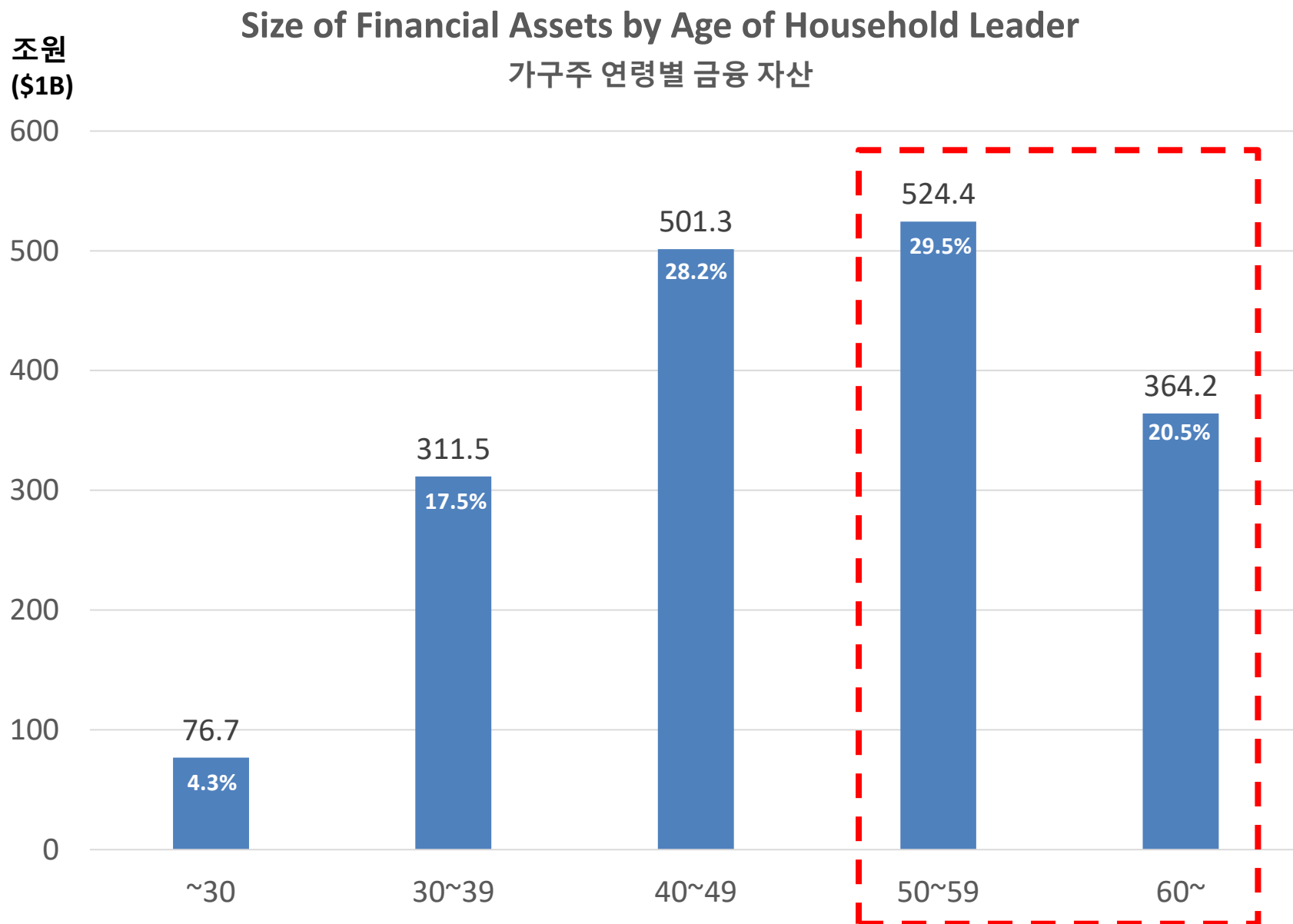


NH투자증권 설문조사 분석..."노후준비 부실"

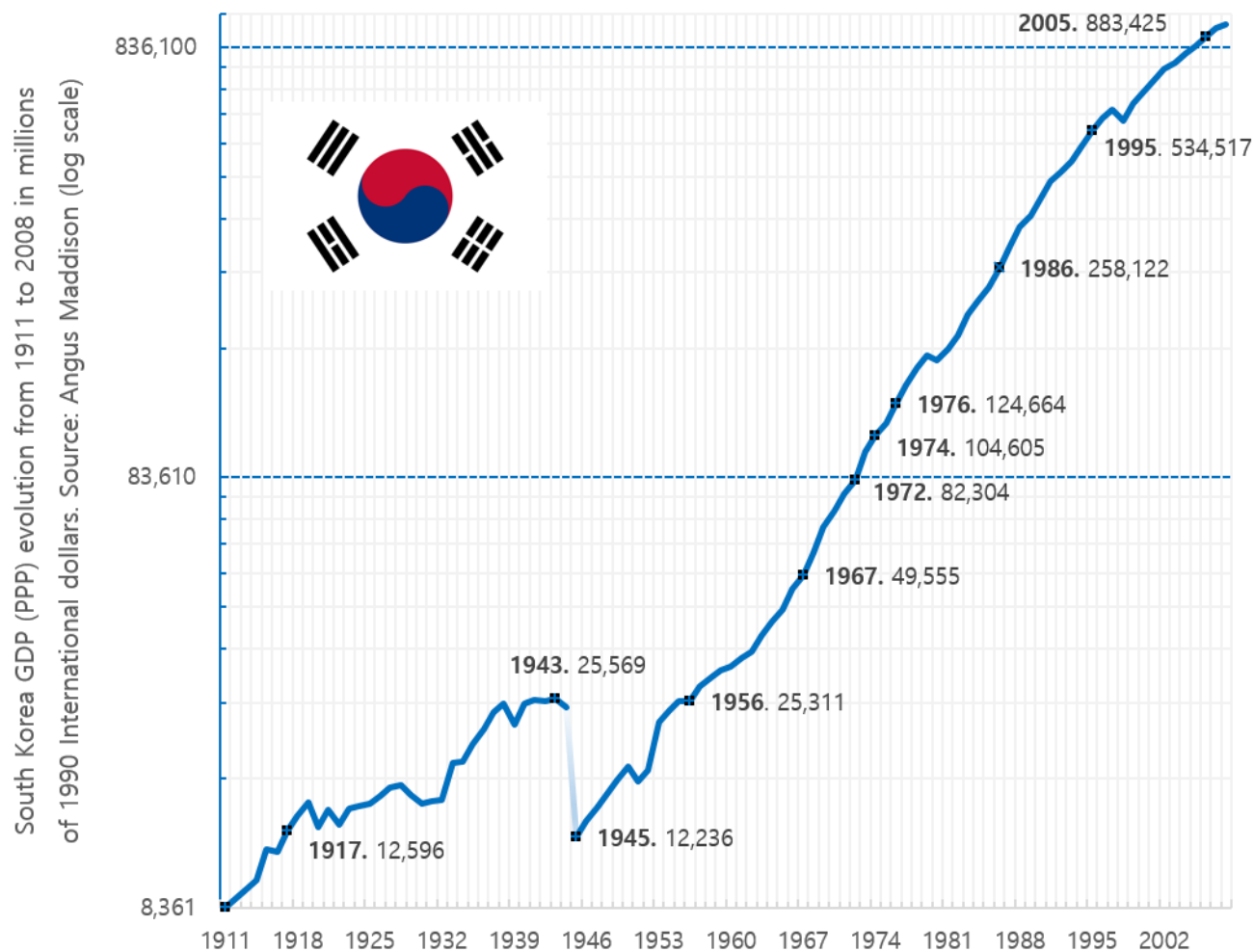
(서울=연합뉴스) 유현민 기자 = 우리나라 중산층의 노후준비가 부실해 10명 중 6명이 은퇴 후 실제 빈곤층이 될 가능성이 크다는 조사 결과가 나왔다.

NH투자증권 100세시대연구소는 7일 설문조사 결과를 분석한 '2018 중산층 보고서'에서 조사에 참여한 중산층 가운데 은퇴 후 소득이 150만원 이하가 될 것이라는 응답자 비율이 61.7%에 달했다고 밝혔다.

Do We Not Have Money?



What About Miracle of Han River?



Main Cause: Change in Social Structure



i Women pray for students sitting exams. Prof Shin believes many people's savings are inadequate because they prioritised spending on their children's education. Photograph: Lee Jin-man/AP



Ironically, part of the reason for their plight may be the cost of supporting their own offspring. “While they were still working,” says Shin, “many elderly people were unable to put aside enough savings for later in life because they spent too much on their children’s education.”

Main Cause: Change in Social Structure

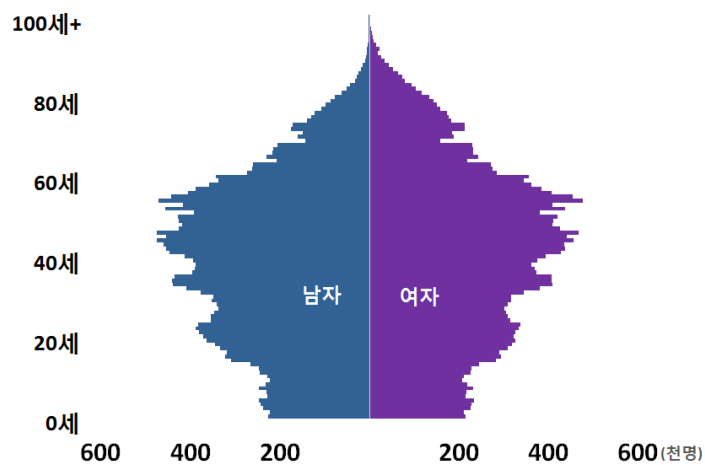
Fundamental Cause:

People failed to be prepared when they were economically active
=> Failure of life time wealth management / financial planning

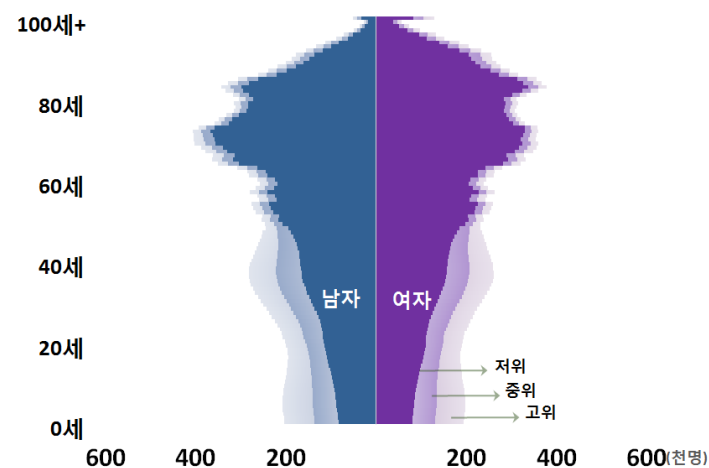
준비할 경제적 역량이 있는 젊은 시기에 준비 실패
=> 생애주기 자산관리의 실패

Unsustainable Society

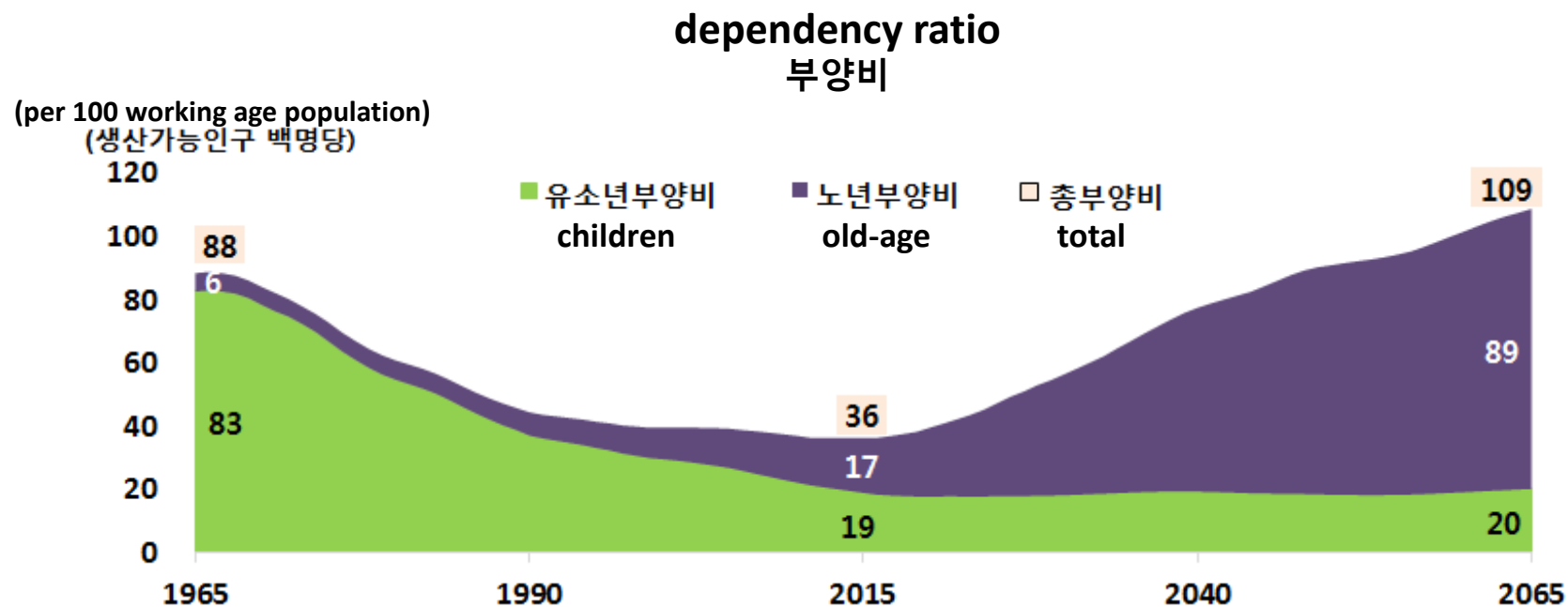
Population pyramid: 2015



Population pyramid: 2035



Unsustainable Society



“The Most Critical Challenge”

We have to solve it.

But how?

SOLUTIONS

Cause

Fundamental Cause:

People failed to be prepared when they were economically active
=> Failure of life time wealth management / financial planning

준비할 경제적 역량이 있는 젊은 시기에 준비 실패
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But it is very difficult and requires high-level expertise...

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And professional services are very expensive...

Solution

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But it is very difficult and requires high-level expertise...

And professional services are very expensive...

Let's provide personalized life-time wealth management service to “everyone”

Solution by Engineers

Fundamental Cause:

People failed to be prepared when they were economically active
=> Failure of life time wealth management / financial planning

준비할 경제적 역량이 있는 젊은 시기에 준비 실패
=> 생애주기 자산관리의 실패

But it is very difficult and requires high-level expertise...

And professional services are very expensive...

**Let's provide personalized life-time wealth management service to “everyone”
by reducing service cost with technologies!!!**

Universal Healthcare : Increased Life Expectancy



Universal Healthcare : Increased Life Expectancy

= **Wealth Management Service for Everyone: Enhanced Social Security**



=



ISSUES

Q1) How Much Do I Need?

How Much Money Do I Need to Retire?

by Carolyn O'Hara, **AARP The Magazine**

Q1) How Much Do I Need?

How Much Money Do I Need to Retire?

It all depends on what you've saved and how well you wish to live

by Carolyn O'Hara, **AARP The Magazine**

Q2) How Much Should I Save?

How Much Of Your Income Should You Save?



Rob Berger, CONTRIBUTOR

I write about building wealth and achieving financial freedom. [FULL BIO](#) ✓

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TWEET THIS

Q2) How Much Should I Save?

How Much Of Your Income Should You Save?



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TWEET THIS



A one percent difference in returns can add five years or more to the time it will take to retire.

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A one percent difference in returns can add five years or more to the time it will take to retire.

= Saving one more percent can reduce five or more years to retire

Q2) How Much Should I Save? = How Much Can I Spend?

How Much Of Your Income Should You Save?



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TWEET THIS



A one percent difference in returns can add five years or more to the time it will take to retire.

= Saving one more percent can reduce five or more years to retire

= Spending one more percent can add five or more years to retire

Q2) How Much Should I Save? = How Much Can I Spend?



Carpe Diem!! Spend every dime you earn!!

vs.



Stupid!! Save every dime you earn!!

Q2) How Much Should I Save? = How Much Can I Spend?



Carpe Diem!! Spend every dime you earn!!

vs.



Stupid!! Save every dime you earn!!

What is the optimal balance between saving and spending?

Q3) Where to Invest? And How Much to Where?

Complete Transactions of the New York Stock Exchange
Friday, July 8, 1932

D.J. BOND AVERAGES

10 Year	104.00
20 Year	103.00
30 Year	102.00
40 Year	101.00
50 Year	100.00
60 Year	99.00
70 Year	98.00
80 Year	97.00
90 Year	96.00
100 Year	95.00

GOLD MOVEMENT

Gold	134.00
Silver	12.00
Copper	1.00
Iron	0.50
Lead	0.25
Zinc	0.15
Nickel	0.10
Aluminum	0.05
Steel	0.02
Coal	0.01
Oil	0.00

DOW-JONES AVERAGE

Dow Jones	11.00
Industrial	10.00
Commercial	9.00
Financial	8.00
Transportation	7.00
Utilities	6.00
Chemicals	5.00
Textiles	4.00
Food	3.00
Drugs	2.00
Metals	1.00
Others	0.00

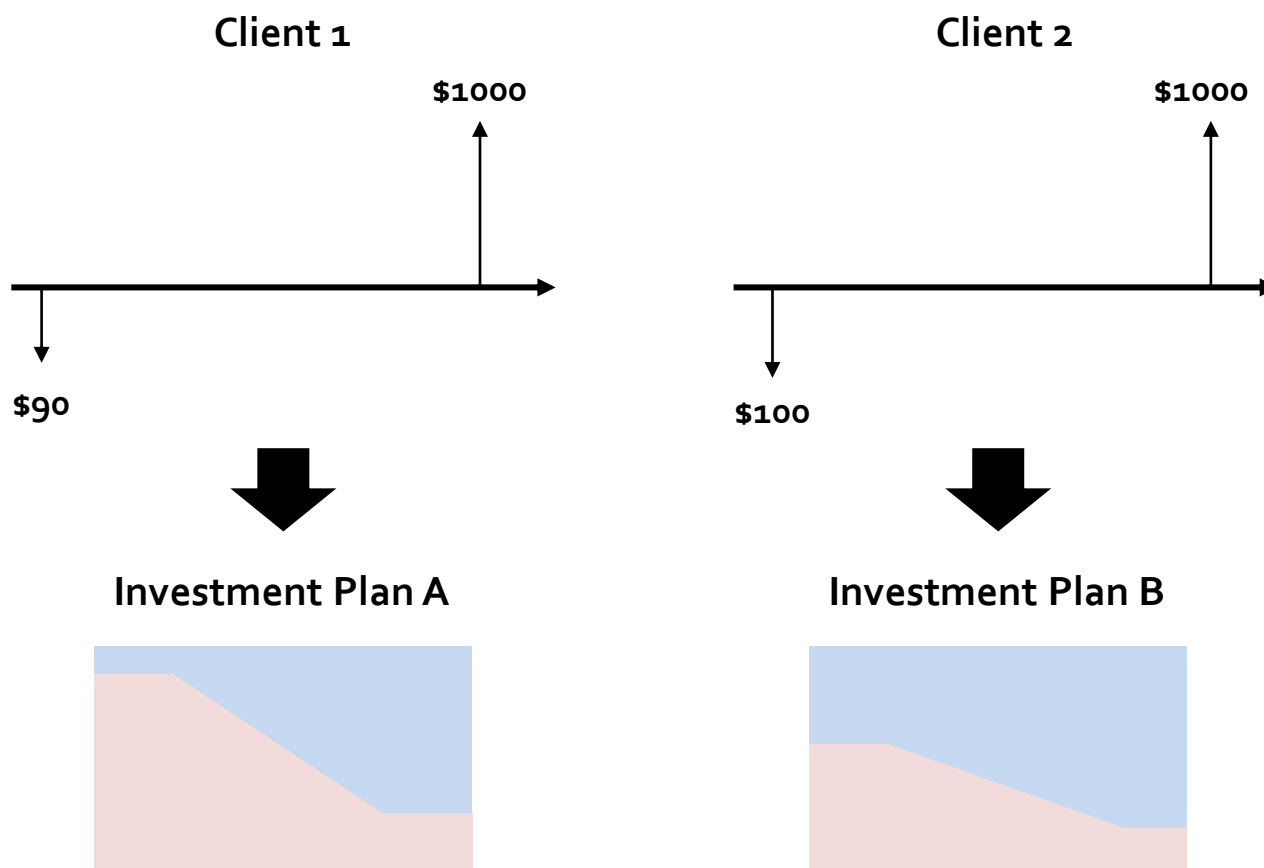
The main table contains a comprehensive list of stock transactions, including columns for stock names, prices, and volumes. The data is organized into multiple columns, with each column representing a different stock or group of stocks. The table is a detailed record of the day's trading activity on the New York Stock Exchange.

Q3) Where to Invest? And How Much to Where?

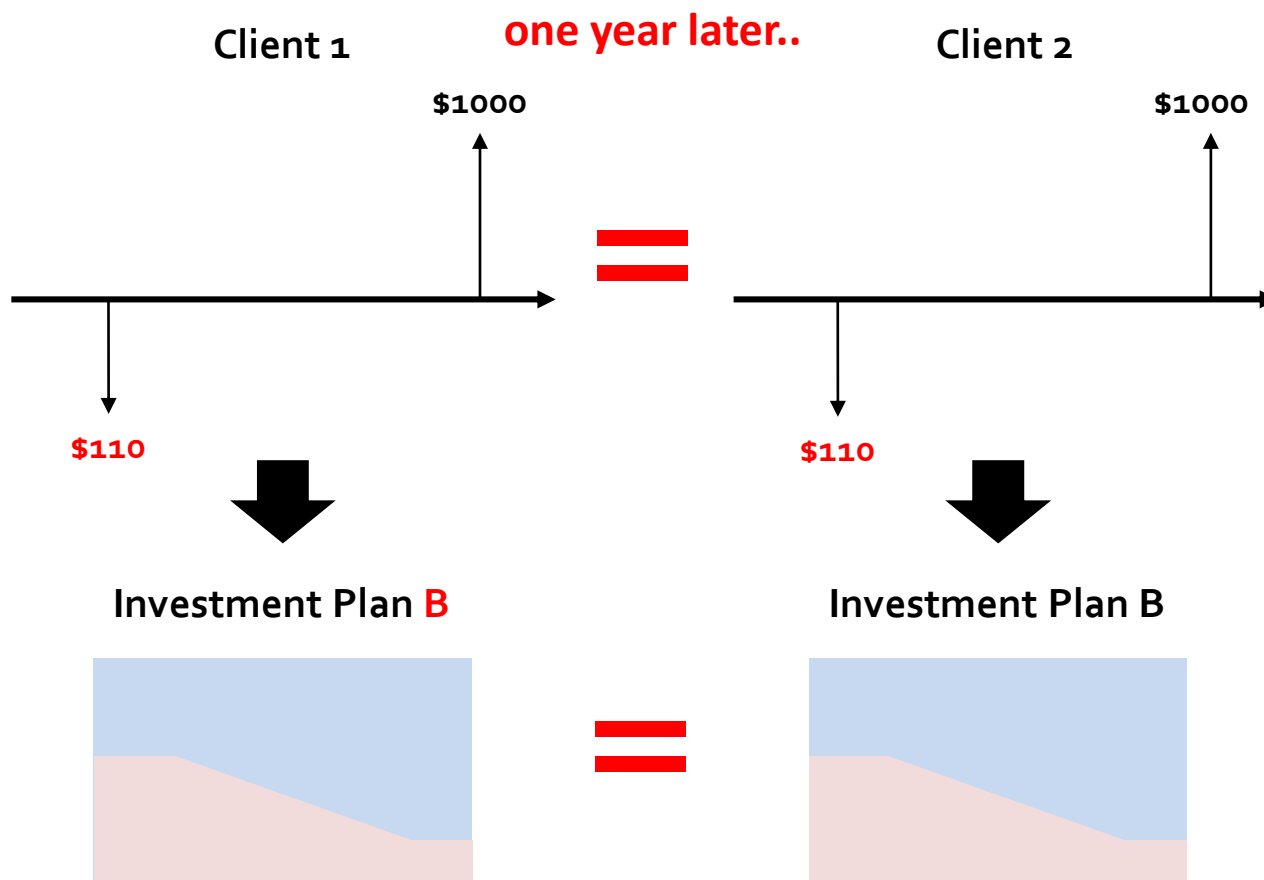
Lift-time wealth management is much harder...

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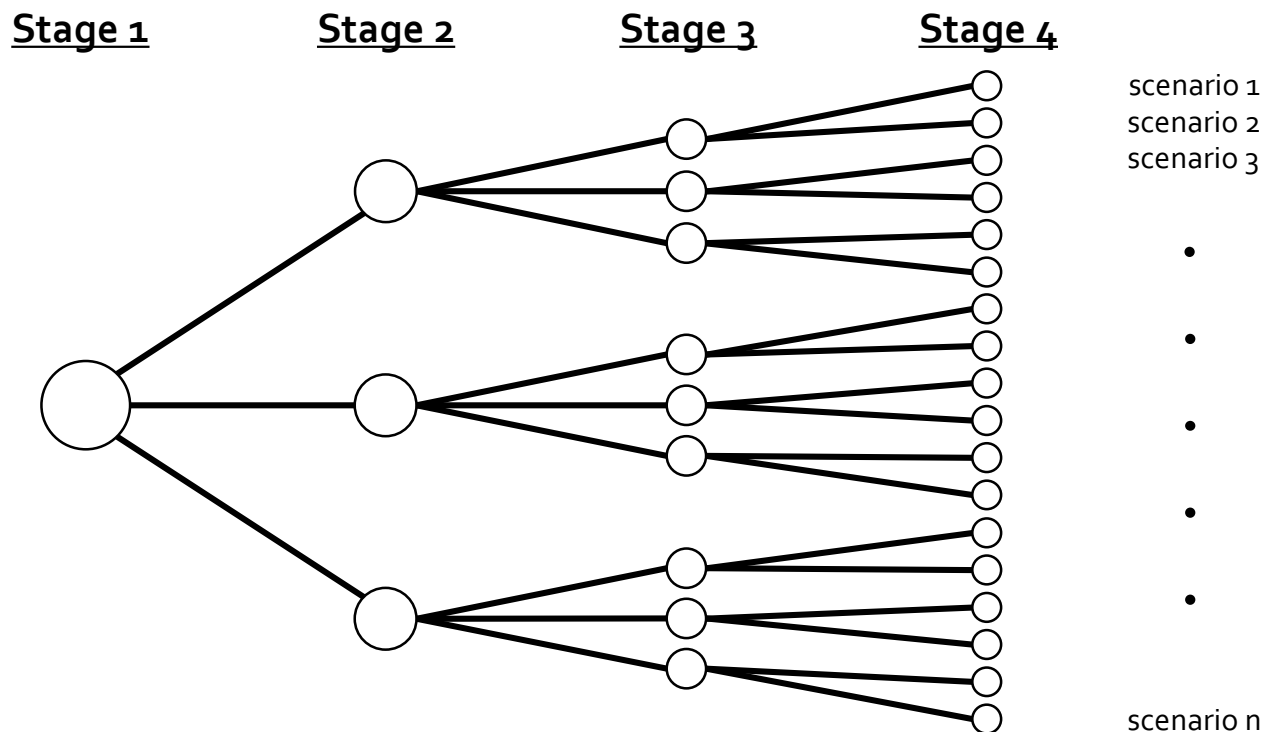


Q3) Where to Invest? And How Much to Where?



Bellman's principle of optimality must hold

Q3) Where to Invest? And How Much to Where?



- **Important Feature)** Stochastic model with recourse decisions
 - Therefore, the model should be prepared for many possible scenarios and decision nodes (both for **asset allocation** and **withdrawal decisions**)

And Many More Issues...

And Many More Issues...

Moreover, these problems are **NOT** independent

And Many More Issues...

Moreover, these problems are **NOT** independent

They should be solved in an **integrated** fashion!!

And Many More Issues...

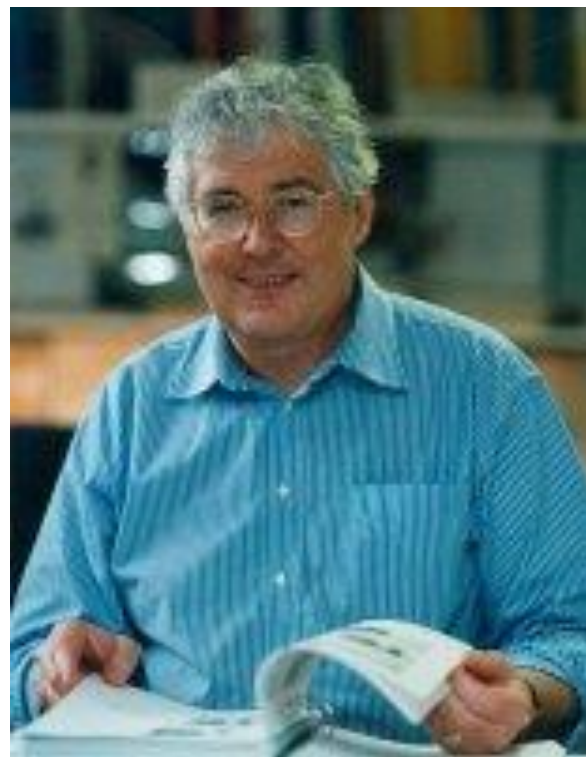
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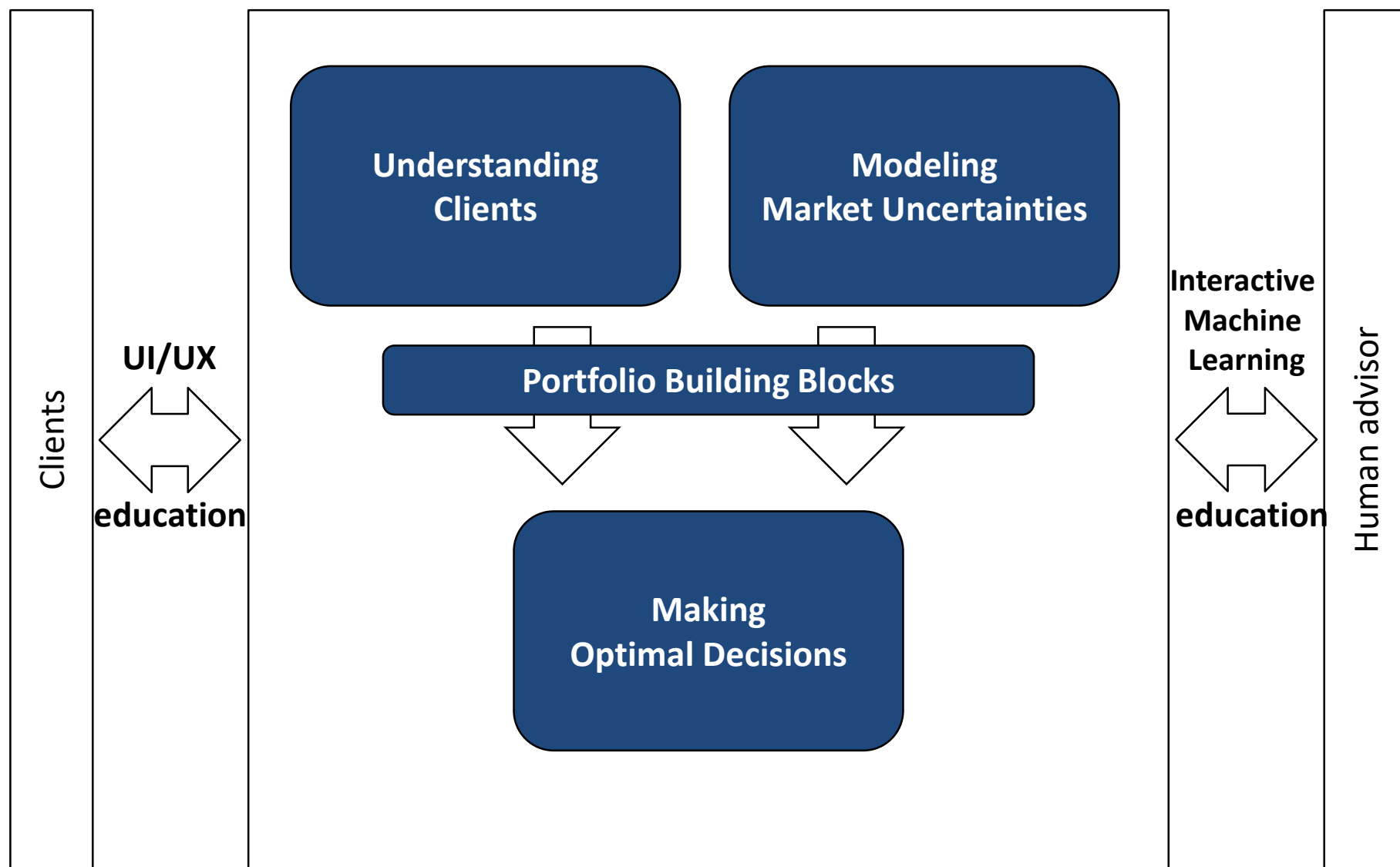
**Personalized Asset Liability Management
or
Goal-Based Investing**

We Have Pioneers of Field in This Very Room

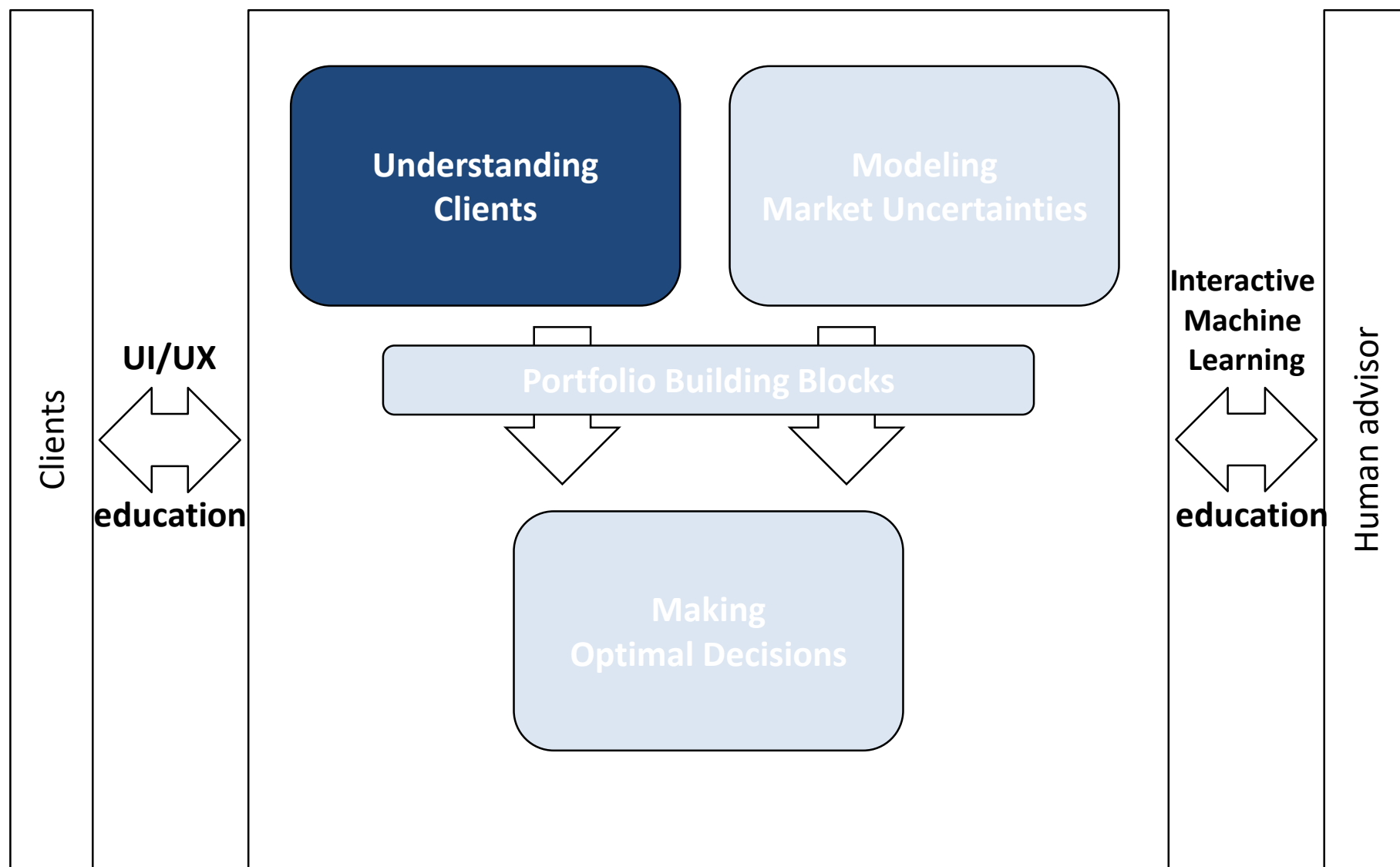


TECHNOLOGIES

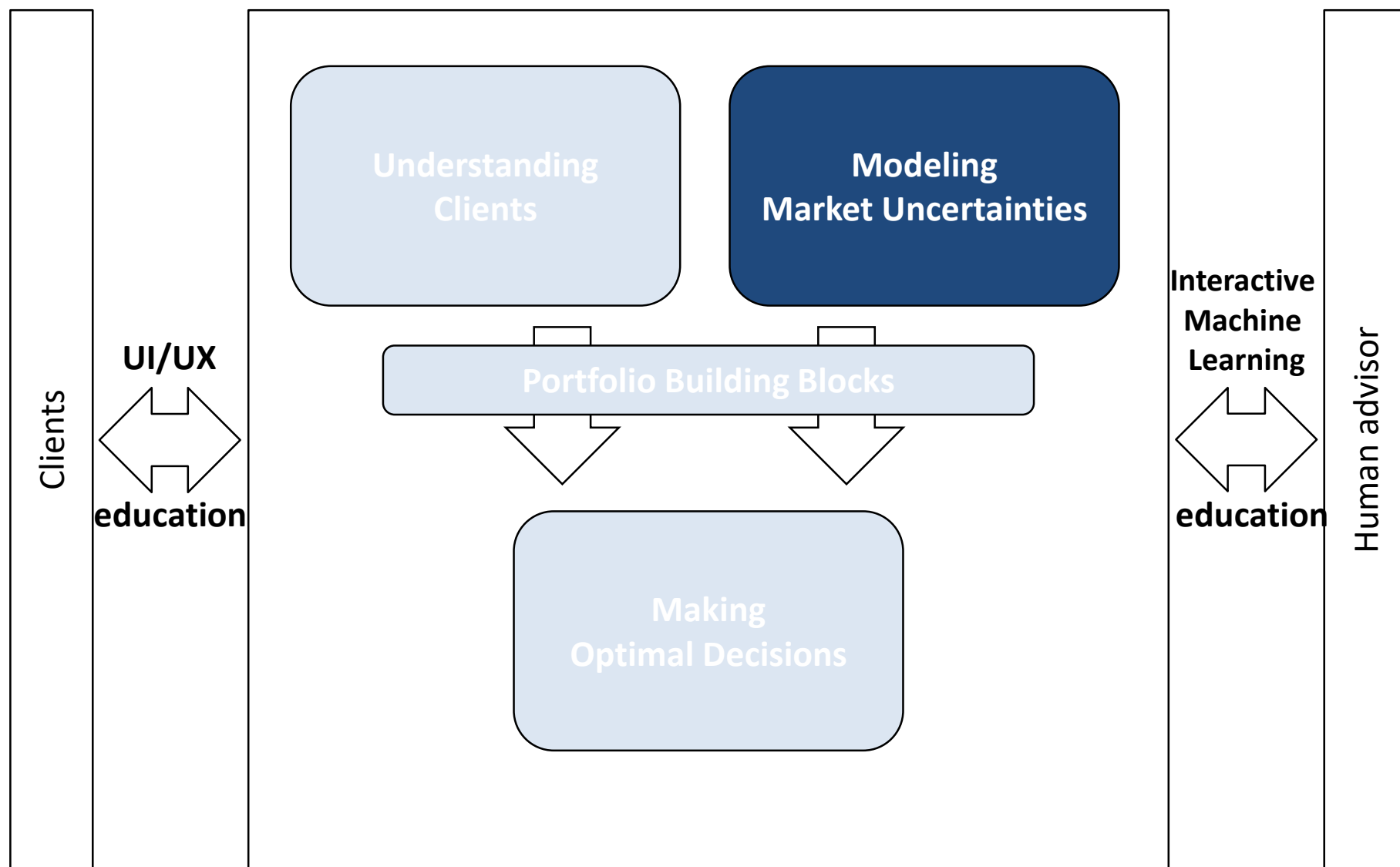
R&D Roadmap @ KAIST Center for WMT



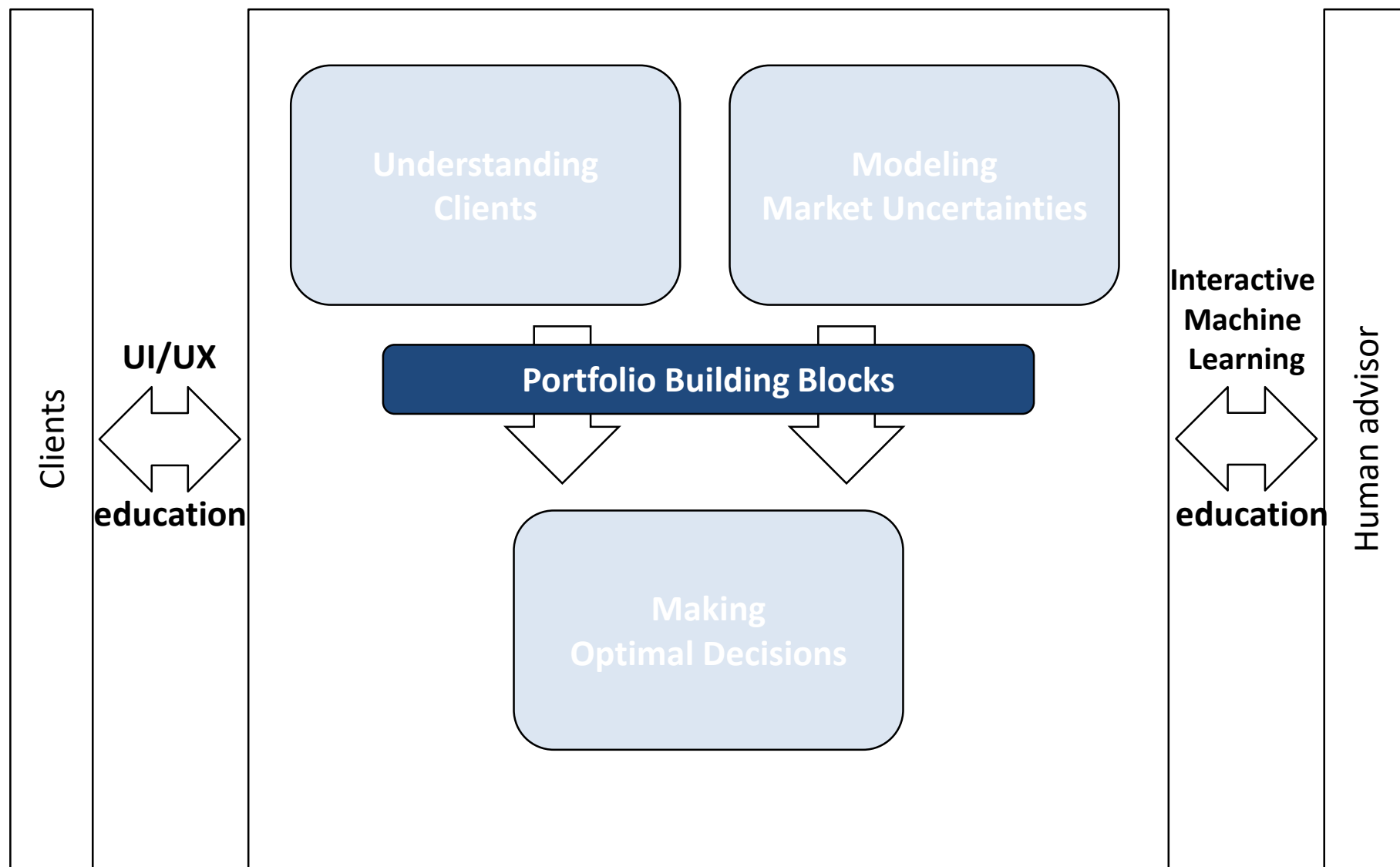
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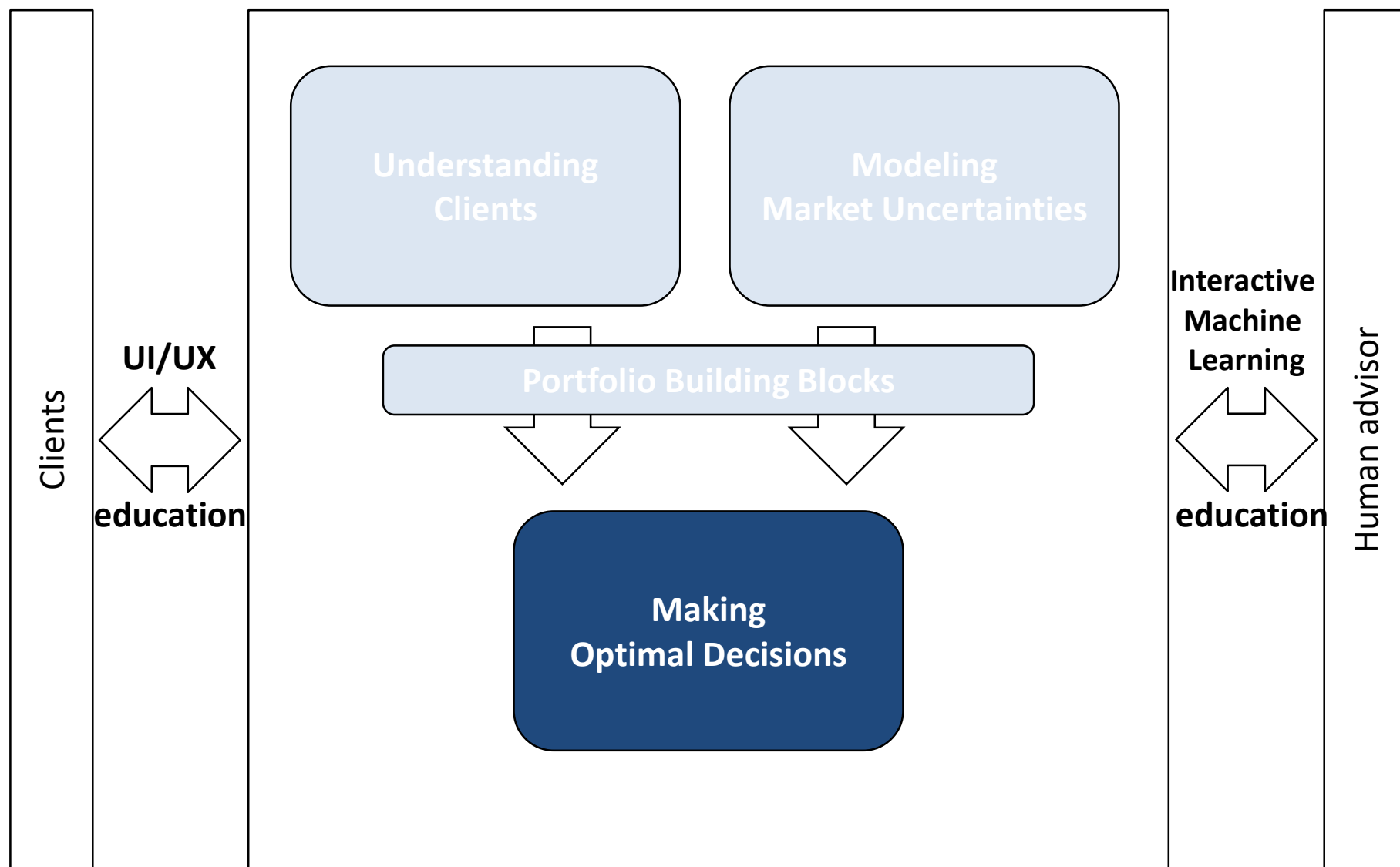
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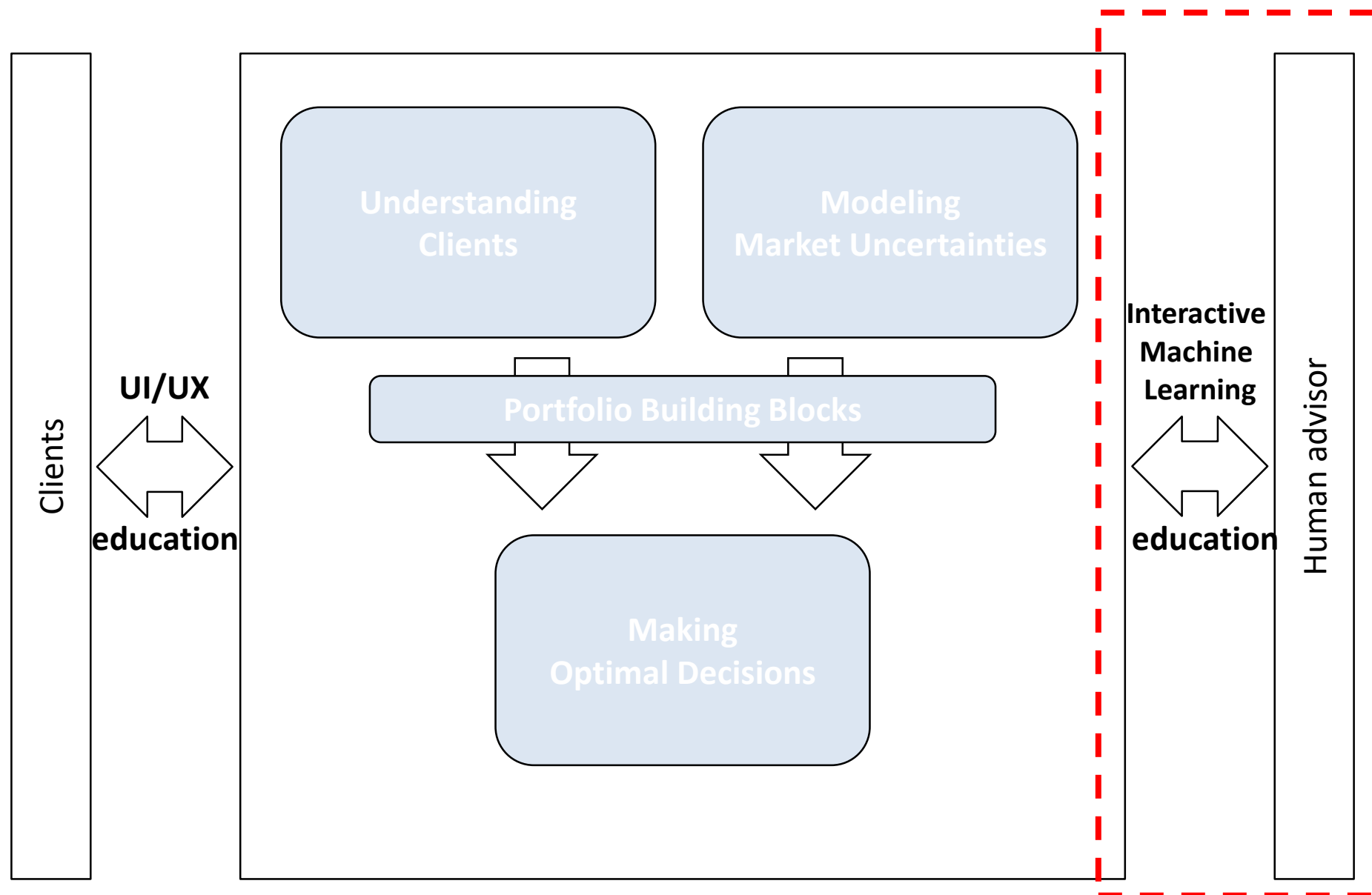
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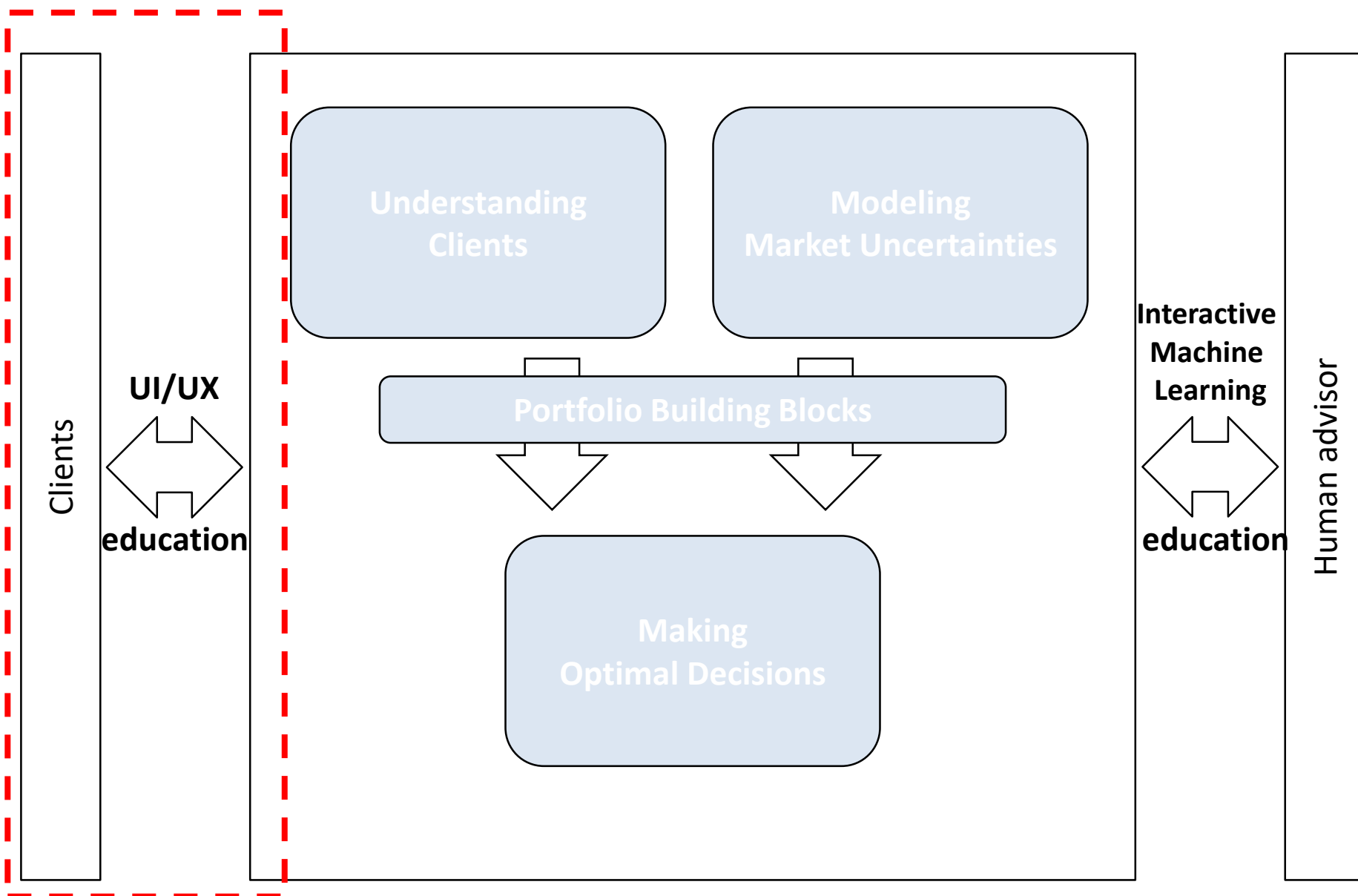
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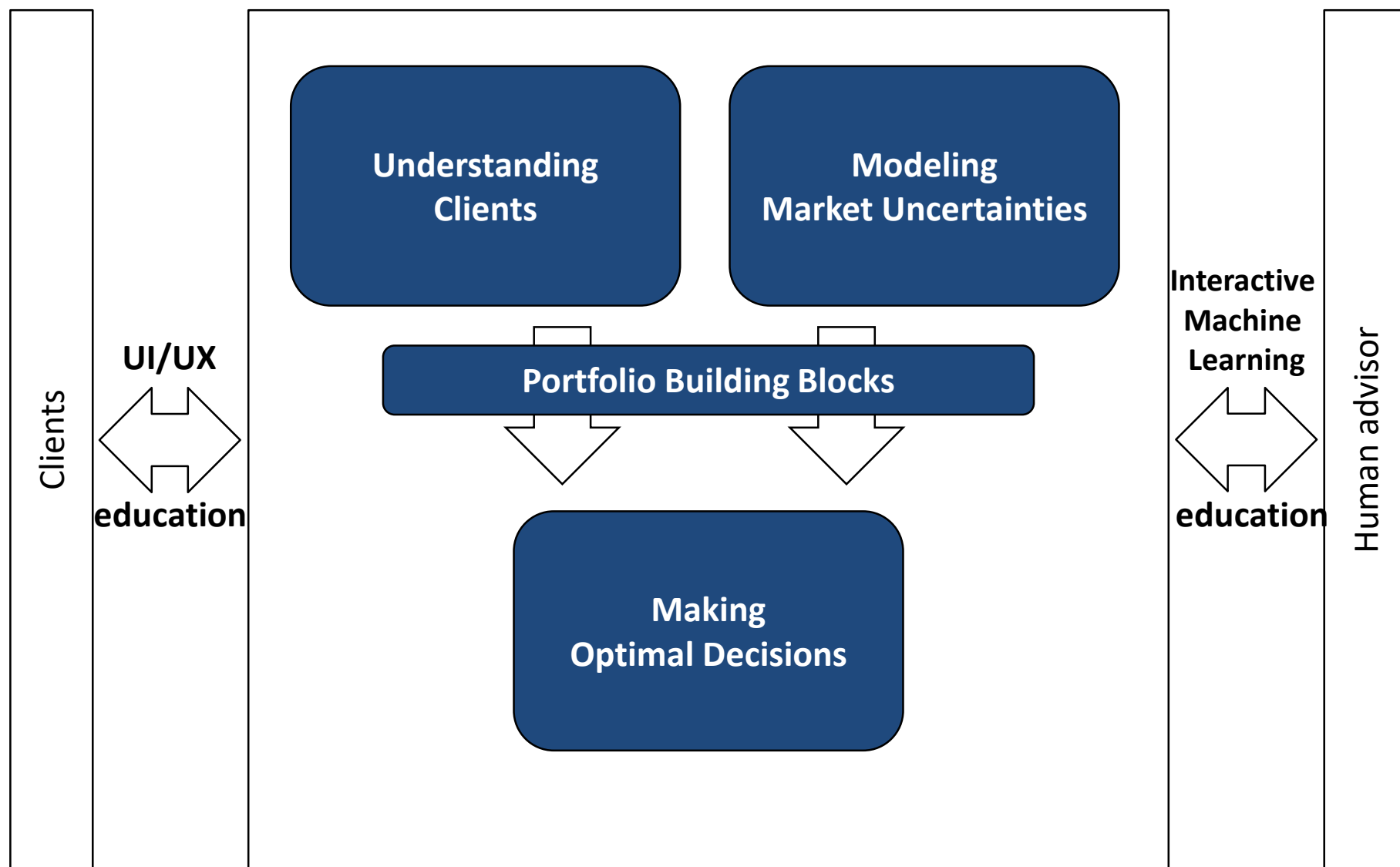
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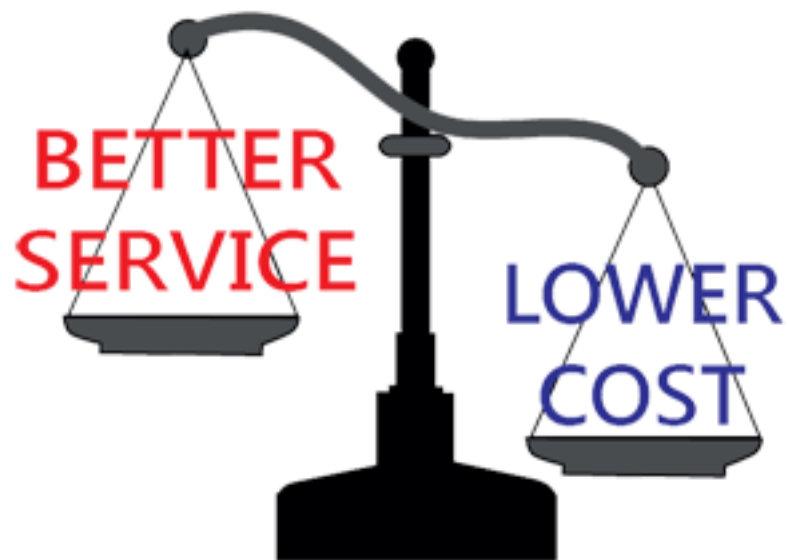


R&D Roadmap @ KAIST Center for WMT



IMPLICATIONS

From Client Perspective

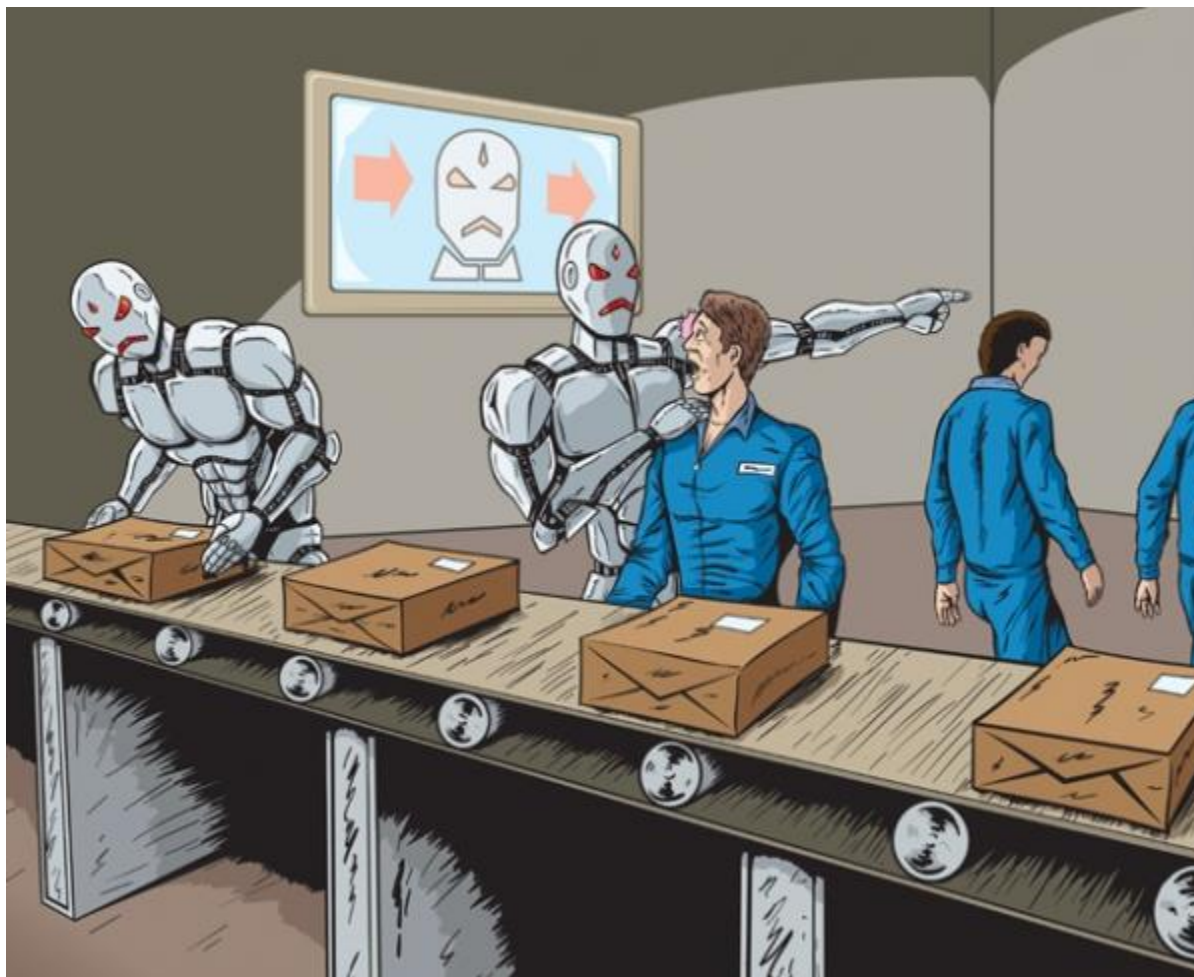


From Client Perspective

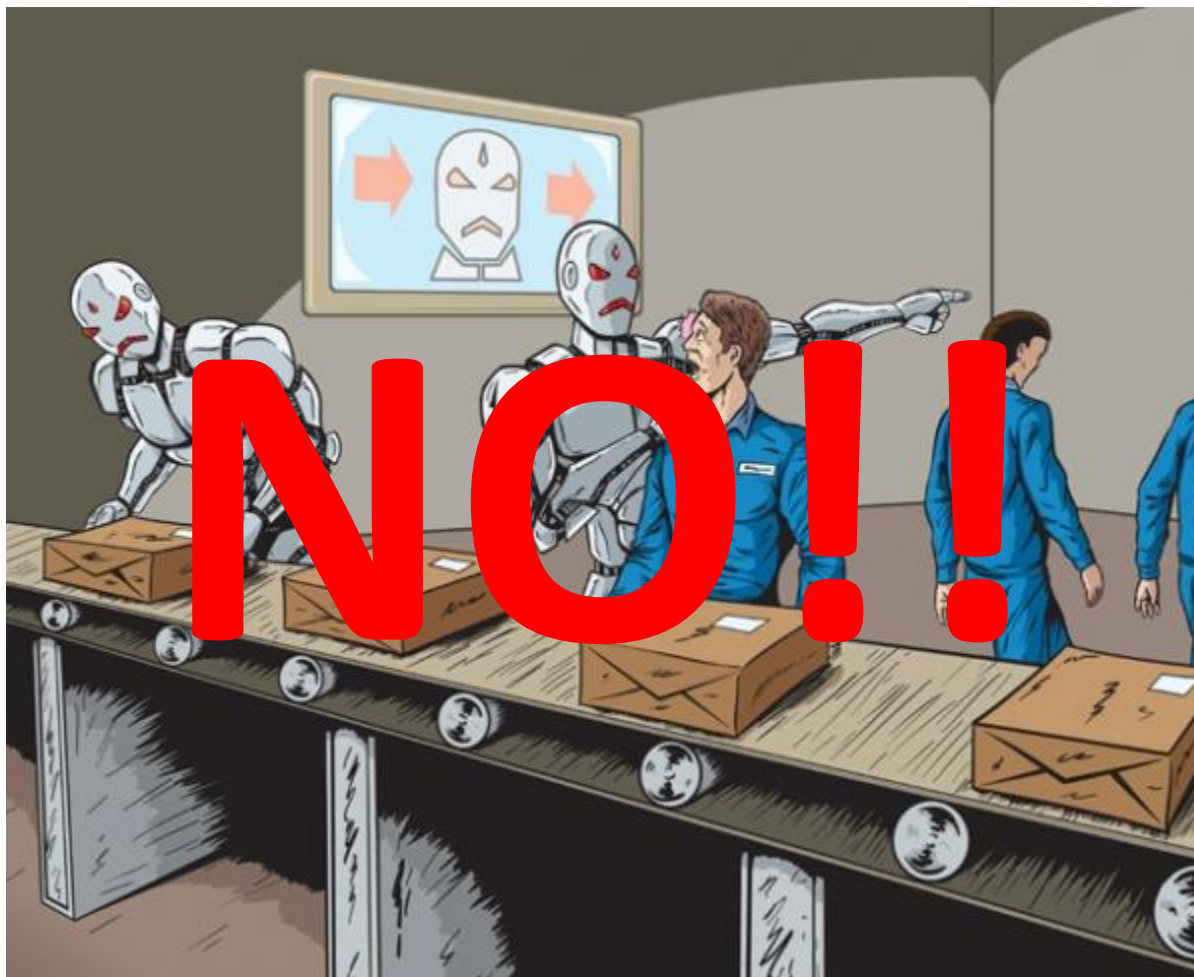
Higher chance to stay financially healthy



From Industry Perspective



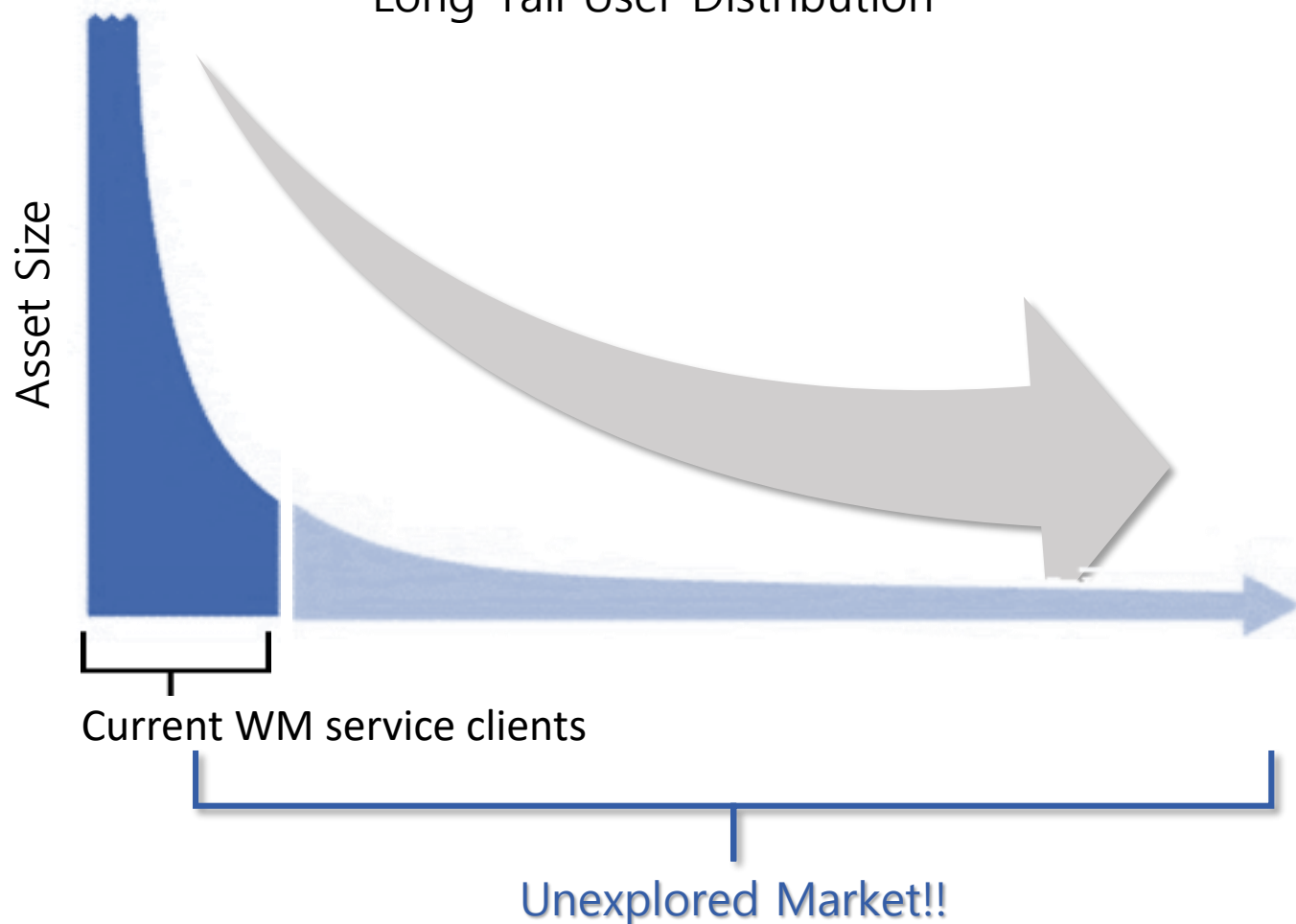
From Industry Perspective



From Industry Perspective

By utilizing advanced portfolio technologies, we can reduce WM service cost significantly, which will allow us to provide service to much larger client base.

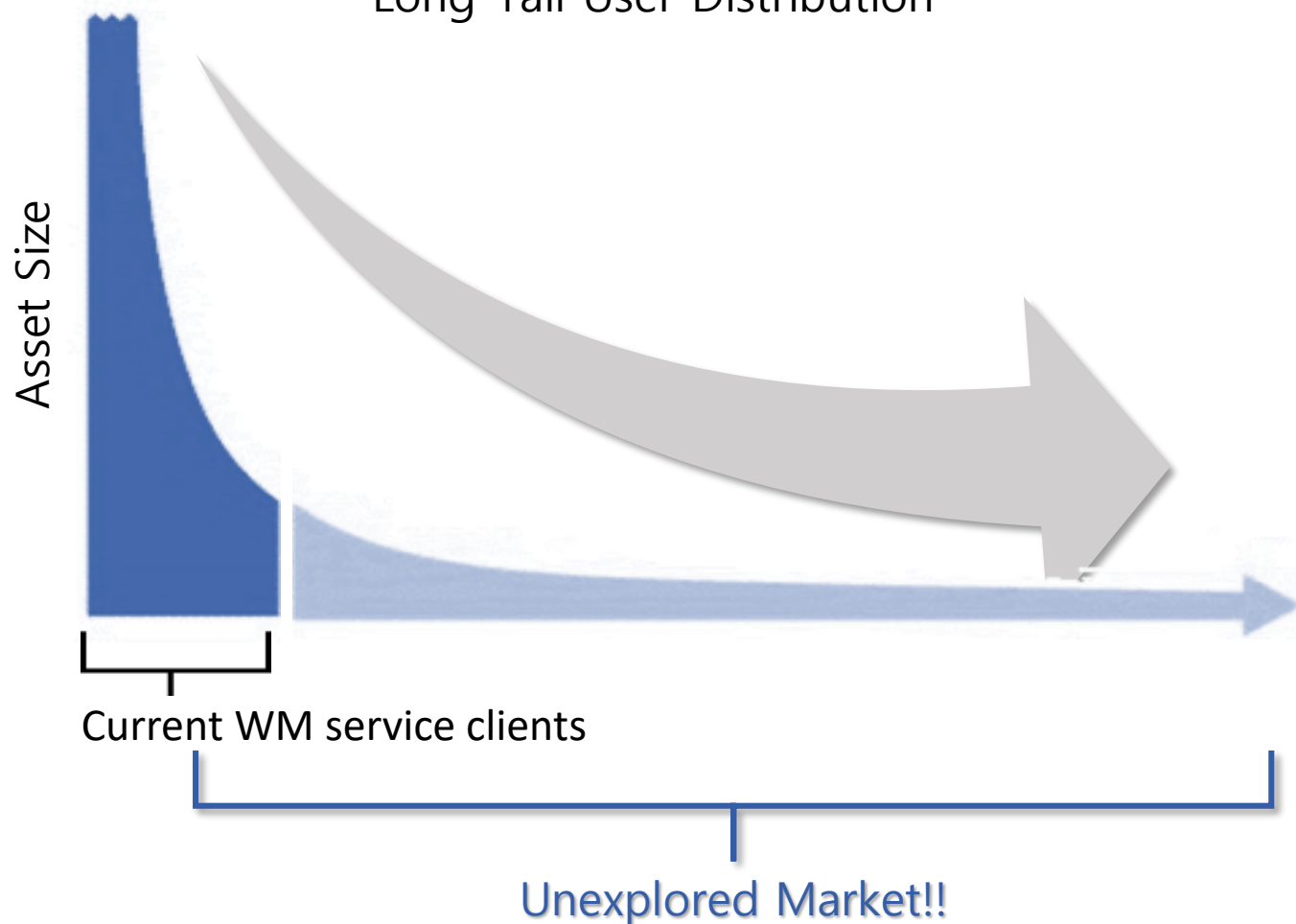
Long-Tail User Distribution



From Industry Perspective

By utilizing advanced portfolio technologies, we can reduce WM service cost significantly, which will allow us to provide service to much larger client base.

Long-Tail User Distribution



= More business opportunity = **More jobs**

From Industry Perspective

Chosun Biz
2018. 4. 11 (수)

뉴스 증권 부동산 정책·금융 기업 오피니언

2% return from retirement accounts while market rallied by 20%

마켓 ▾
분석과 전망

코스피 20% 올랐는데 퇴직연금 수익률은 2% '찜뚱'

김유정 기자 ▾

기사 100자평(0)

↓ ✉ 📄 + 크게 | - 작게

입력 : 2018.03.22 06:00

지난해 코스피지수가 20% 넘게 상승했지만 퇴직연금 수익률은 2%에도 못미친 것으로 나타났다.

22일 금융감독원은 2017년 퇴직연금 연간수익률이 1.88%를 기록했다고 밝혔다. 지난해 1.58%보다 0.30% 포인트 올랐지만 코스피지수 상승률(21.76%)과 비교하면 시장 수익률에 크게 못미치는 실적이다.

From Industry Perspective



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김유정 기자 ▾

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Helps clients to take proper level of risks = easy to provide good services

From Industry Perspective



Centralized quality control for wealth management service

From Industry Perspective

- Beginning of business value chain in asset management industry
 - Client comes to the asset manager with a certain amount of money

From Industry Perspective

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- With proper technologies, we can let the clients know
 - How much they need

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=> asset managers now can instruct clients how much to invest!!

From Industry Perspective

- Beginning of business value chain in asset management industry
 - Client comes to the asset manager with a certain amount of money
- With proper technologies, we can let the clients know
 - How much they need
 - How much they should save

=> asset managers now can instruct clients how much to invest!!
- Beginning of business value chain in asset management industry
 - No need to wait until client comes in
 - When client incurs income, they can be instructed how much to invest

=> extension of business value chain!!

From Public Perspective

Universal Healthcare : Increased Life Expectancy

= **Wealth Management Service for Everyone: Enhanced Social Security**



=



From Public Perspective

Universal Healthcare : Increased Life Expectancy

= **Wealth Management Service for Everyone: Enhanced Social Security**

- ⇒ **Less public expenditure**
- ⇒ **More stable fiscal health of nation**
- ⇒ **Better support for those who are in need**
- ⇒ **More sustainable society**



=



State of the Art in Robo-Advising Systems

Theories already exist thanks to pioneers and their colleagues

And they are ready to be deployed in the real world

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Of course, there might be more practical problems to be addressed, but we should be able to solve them

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Of course, there might be more practical problems to be addressed, but we should be able to solve them

And that is why we are here

So, Welcome, and

Enjoy the
Conference!!