

金融科技



Tamkang  
University  
淡江大學

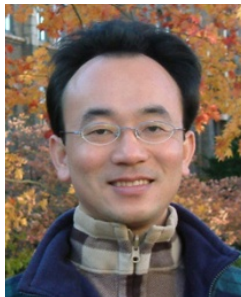
FinTech: Financial Technology

金融科技財富管理：機器人理財顧問  
(Robo-Advisors for  
Wealth Management in Fintech)

1052FinTech09

MIS EMBA (M2263) (8595)

Fri, 12,13,14 (19:20-22:10) (D409)



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2017-05-19



# 課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2017/02/17	Fintech 金融科技課程介紹 (Course Orientation for Fintech: Financial Technology)
2	2017/02/24	Fintech 金融科技的演進：貨幣與金融服務 (Evolution of Fintech: Money and Financial Services)
3	2017/03/03	Fintech 金融科技：金融服務科技創新 (Fintech: Technology Innovation in Financial Services)
4	2017/03/10	Fintech 金融科技與金融服務價值鏈 (Fintech and Financial Services Value Chain)
5	2017/03/17	Fintech 金融科技商業模式創新 (Fintech Business Models Innovation)
6	2017/03/24	Fintech 金融科技個案研究 I (Case Study on Fintech I)

# 課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2017/03/31	金融服務消費者心理與行為 (Consumer Psychology and Behavior on Financial Services)
8	2017/04/07	教學行政觀摩日 (Off-campus study)
9	2017/04/14	區塊鏈技術 (Blockchain Technology) [Invited Speaker: Dr. Raymund Lin, IBM (林俊叡 博士，IBM)]
10	2017/04/21	期中報告 (Midterm Project Report)
11	2017/04/28	Python Pandas財務大數據分析 (Finance Big Data Analytics with Pandas in Python)
12	2017/05/05	人工智慧與深度學習金融科技 (Artificial Intelligence and Deep Learning for Fintech)

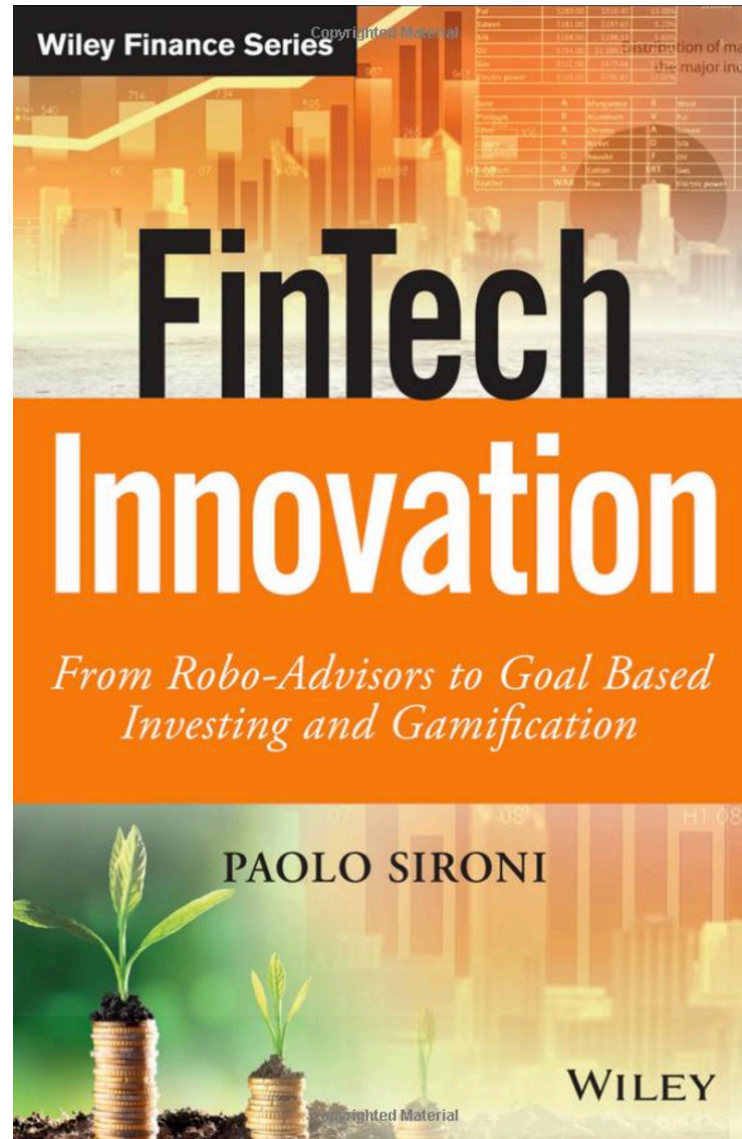
# 課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2017/05/12	Fintech 金融科技個案研究 II (Case Study on Fintech II)
14	2017/05/19	金融科技財富管理：機器人理財顧問 (Robo-Advisors for Wealth Management in Fintech)
15	2017/05/26	投資組合最佳化與程式交易 (Portfolio Optimization and Algorithmic Trading)
16	2017/06/02	金融科技智慧問答系統 (Intelligent Question Answering System for Fintech)
17	2017/06/09	期末報告 I (Final Project Presentation I)
18	2017/06/16	期末報告 II (Final Project Presentation II)



**Robo-Advisors  
for  
Wealth Management  
in  
Fintech**

# FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification, Paolo Sironi, Wiley, 2016



# Financial Technology

## FinTech

“providing  
financial services  
by making use of  
software and  
modern technology”

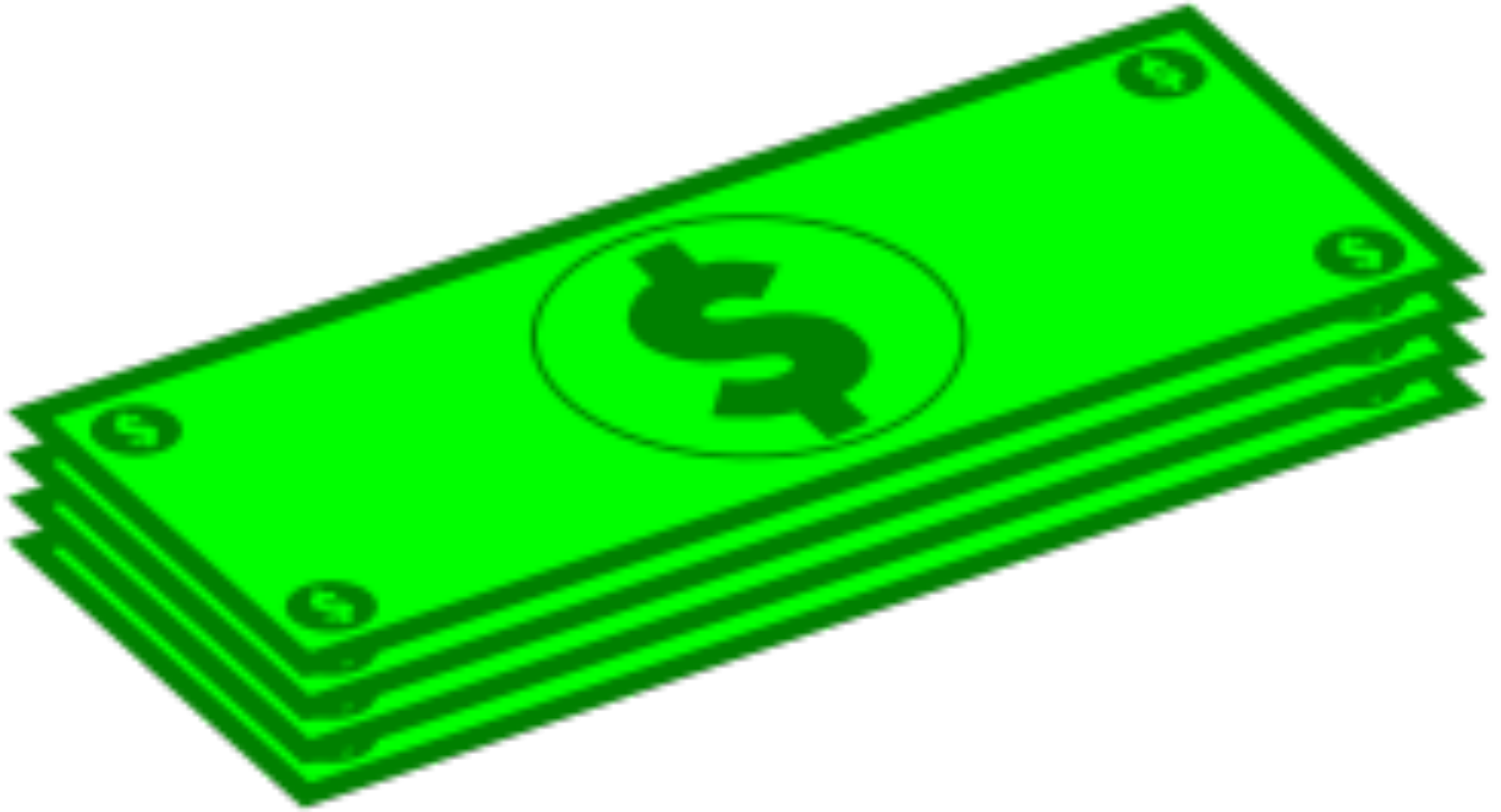
# Financial Services

# Financial Services



**Money**

# Money



**Money**

**Makes**

**Money**



# Treasure

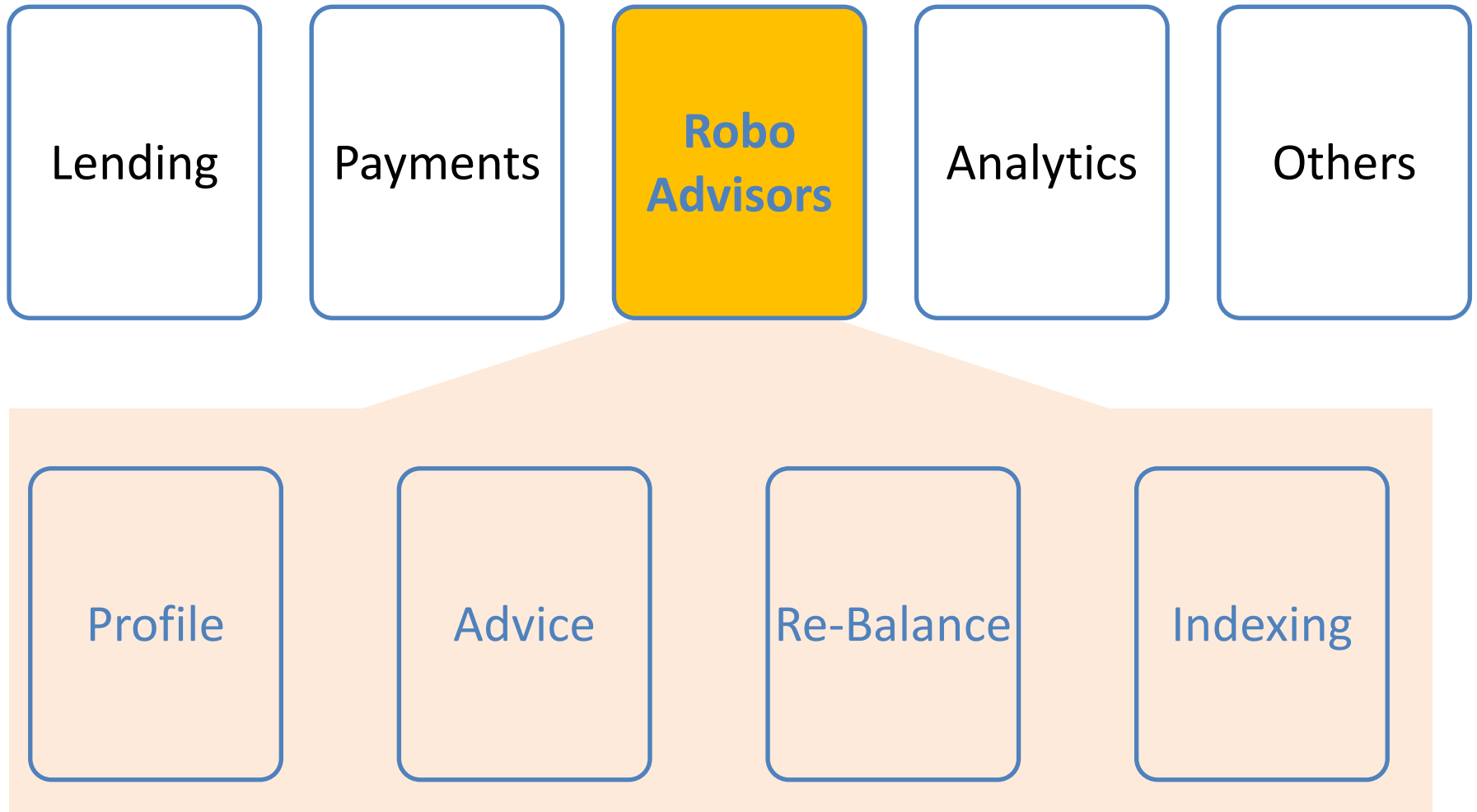


# Wealth Management

# **Fintech Robo Advisors**

# Big Data Driven Disruption: Robo-Advisor

# FinTech high-level classification

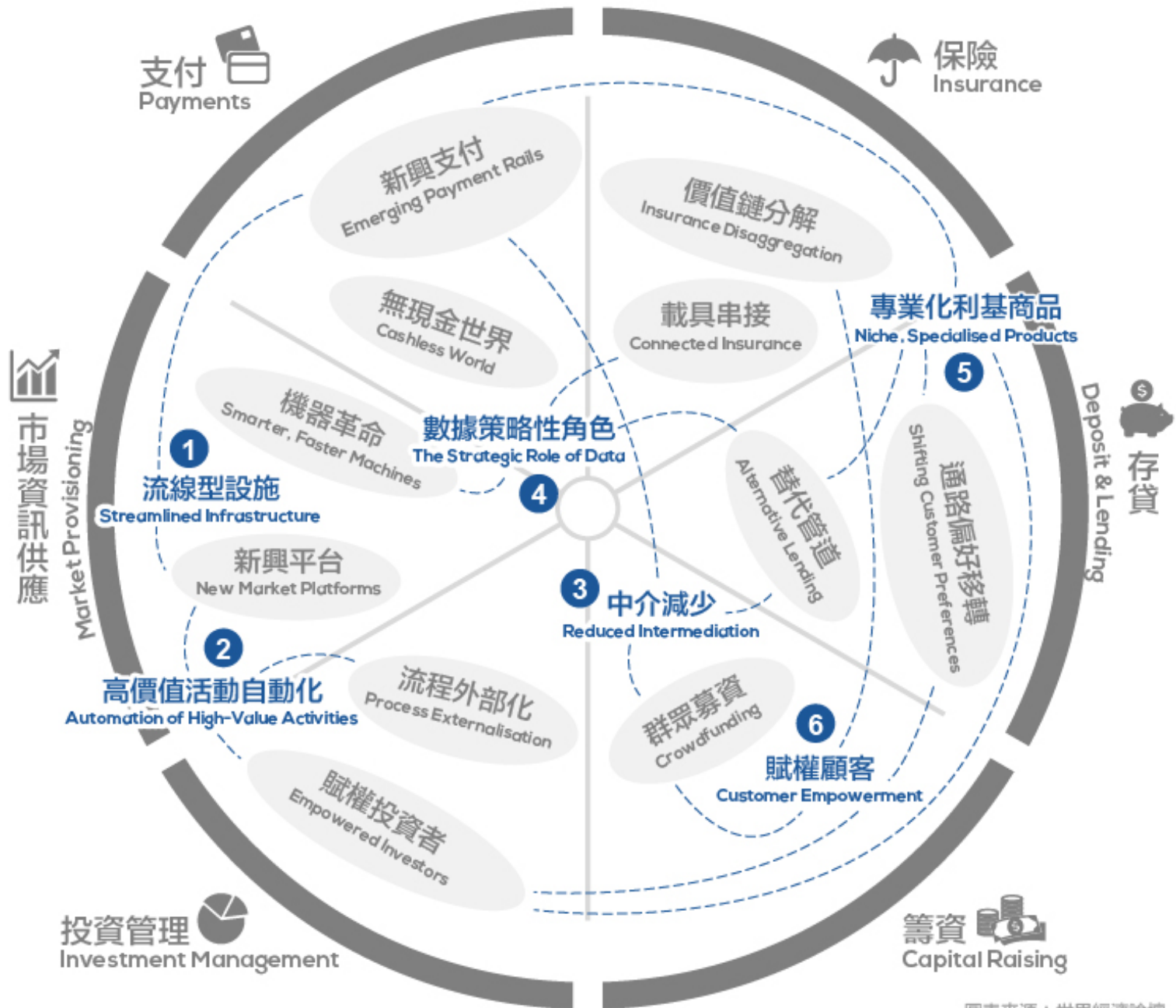


# FinTech: Financial Services Innovation



# FinTech: Financial Services Innovation







1. Payments
2. Insurance
3. Deposits & Lending
4. Capital Raising
- 5. Investment Management**
6. Market Provisioning



圖表來源：世界經濟論壇

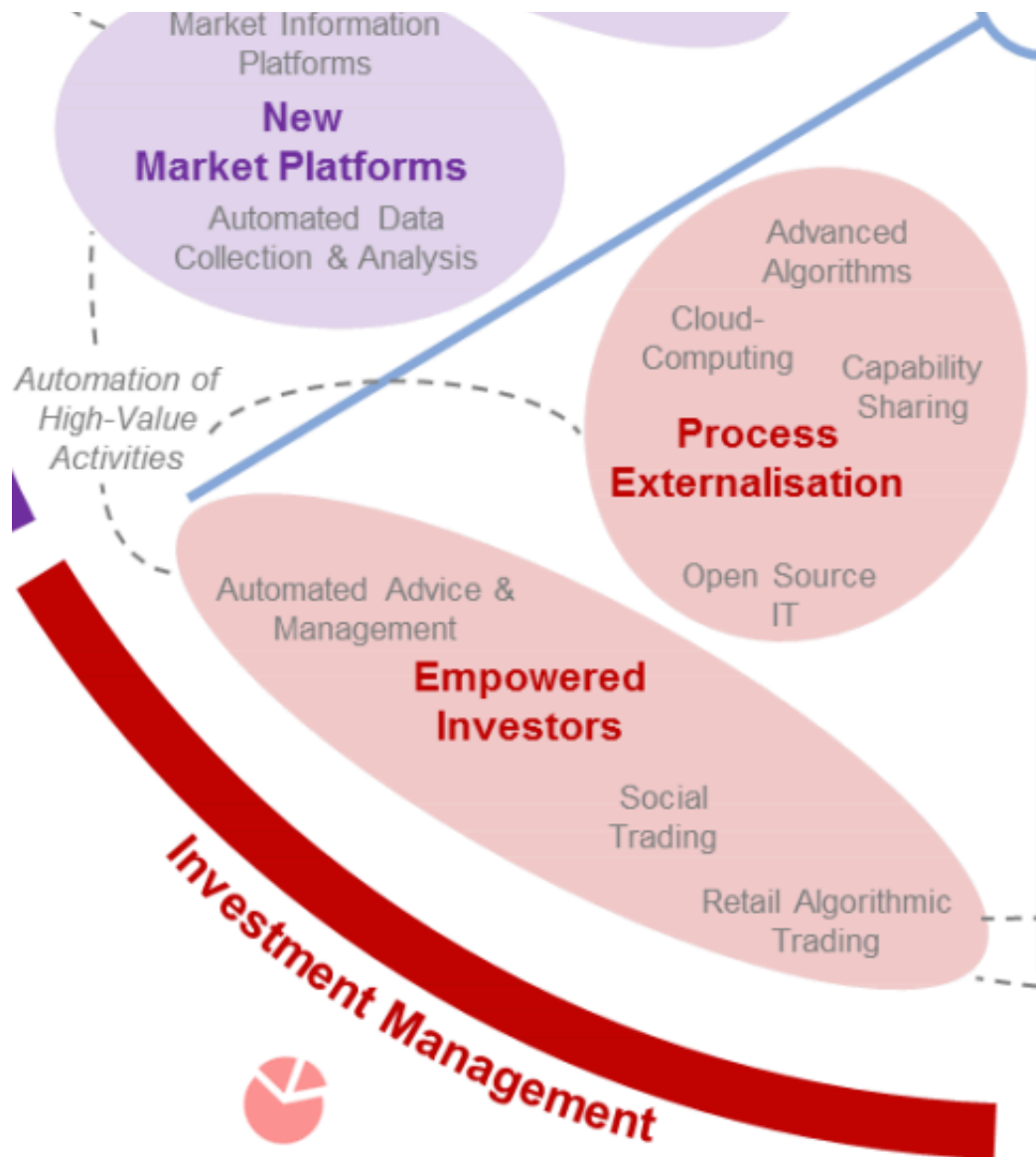


# FinTech: Financial Services Innovation

功能	創新項目
 支付 Payments	無現金世界 (Cashless World) 新興支付 (Emerging Payment Rails)
 保險 Insurance	價值鏈裂解 (Insurance Disaggregation) 保險串接裝置 (Connected Insurance)
 存貸 Deposit & Lending	替代管道 (Alternative Lending) 通路偏好移轉 (Shifting Customer Preferences)
 籌資 Capital Raising	群眾募資 (Crowdfunding)
 投資管理 Investment Management	賦權投資者 (Empowered Investors) 流程外部化 (Process Externalisation)
 市場資訊供應 Market Provisioning	機器革命 (Smarter, Faster Machines) 新興平台 (New Market Platforms)

圖表來源：Fugle團隊整理

# 5 FinTech: Investment Management



# 5 FinTech: Investment Management Empowered Investors Process Externalization

投資管理



創新

關鍵趨勢

**賦權投資者**  
Empowered  
Investors

社群交易、機器推薦與財富管理、零售演算法交易 (Retail Algorithmic Trading)

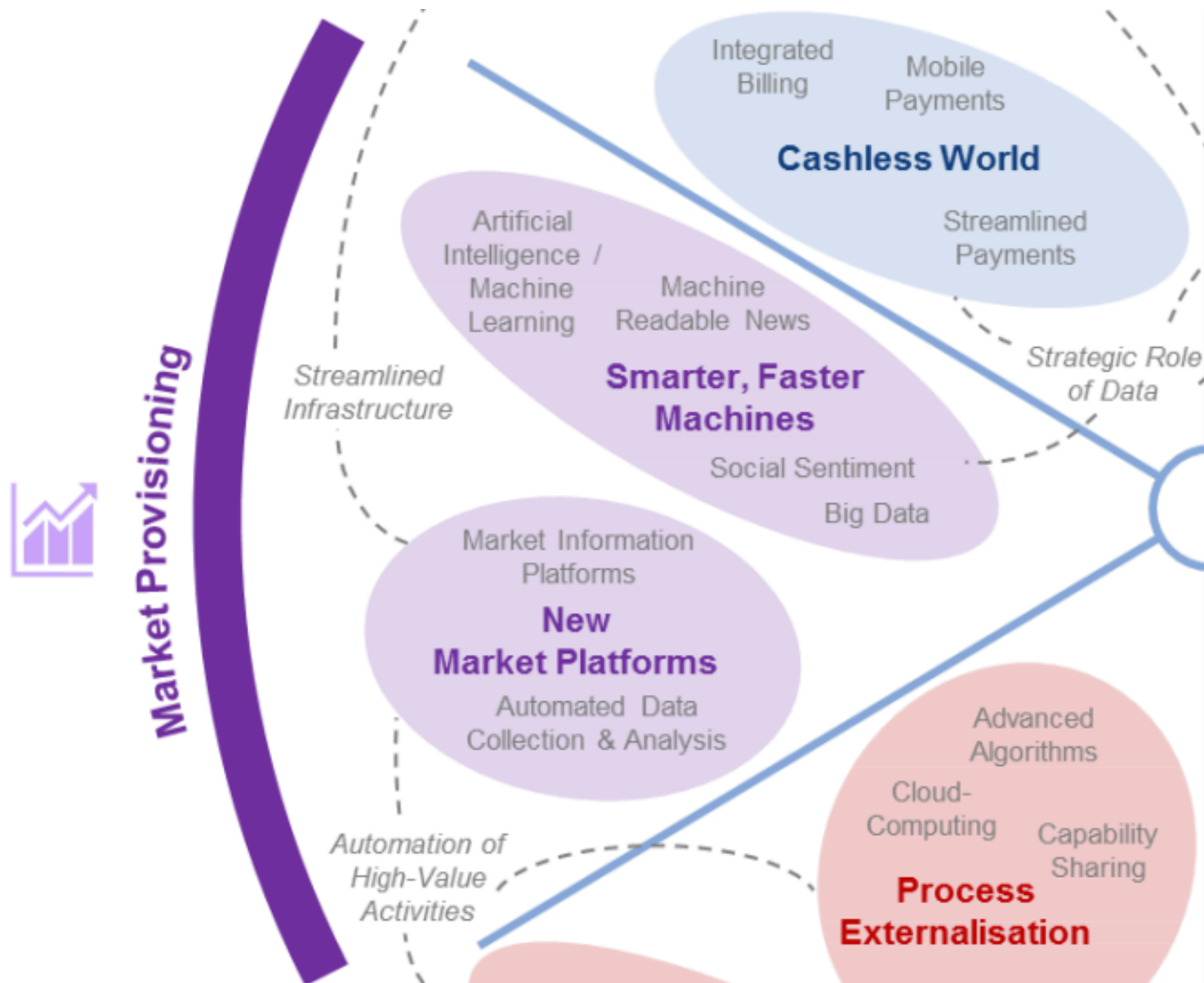
**流程外部化**  
Process  
Externalisation

流程即服務 (Process-as-a-Service, PaaS)、能力共享 (Capability Sharing)、進階分析、自然語言

圖表來源：Fugle團隊整理

# 6

# FinTech: Market Provisioning



# 6

## FinTech: Market Provisioning Smarter, Faster Machines New Market Platforms

市場資訊供應



創新

關鍵趨勢

**機器革命**  
Smarter, Faster  
Machines

機器易用數據 (Machine Accessible Data)、人工智慧 / 機器學習、大數據

**新興平台**  
New Market  
Platforms

固定收益商品平台 ALGOMI、基金 / 組合型基金平台 NOVUS、私募 / 創投平台 BISON、未公發股權平台 LIQUITY、原物料商品與衍生性合約平台 ClauseMatch

圖表來源：Fugle團隊整理

# Fintech: Financial Technology

## **Disrupting Banking:** **The Fintech Startups** **That Are Unbundling** **Wells Fargo, Citi and** **Bank of America**



# Fintech: Unbundling the Bank

## Unbundling of a Bank



# Fintech: Unbundling the Bank

## Wealth Management: Wealthfront





# Wealthfront: Fintech Robo Advisor



Why Wealthfront ▾

Products ▾

Who we are ▾

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The most tax-efficient, low-cost, hassle-free way to invest

Invest with Wealthfront

See Our Journey

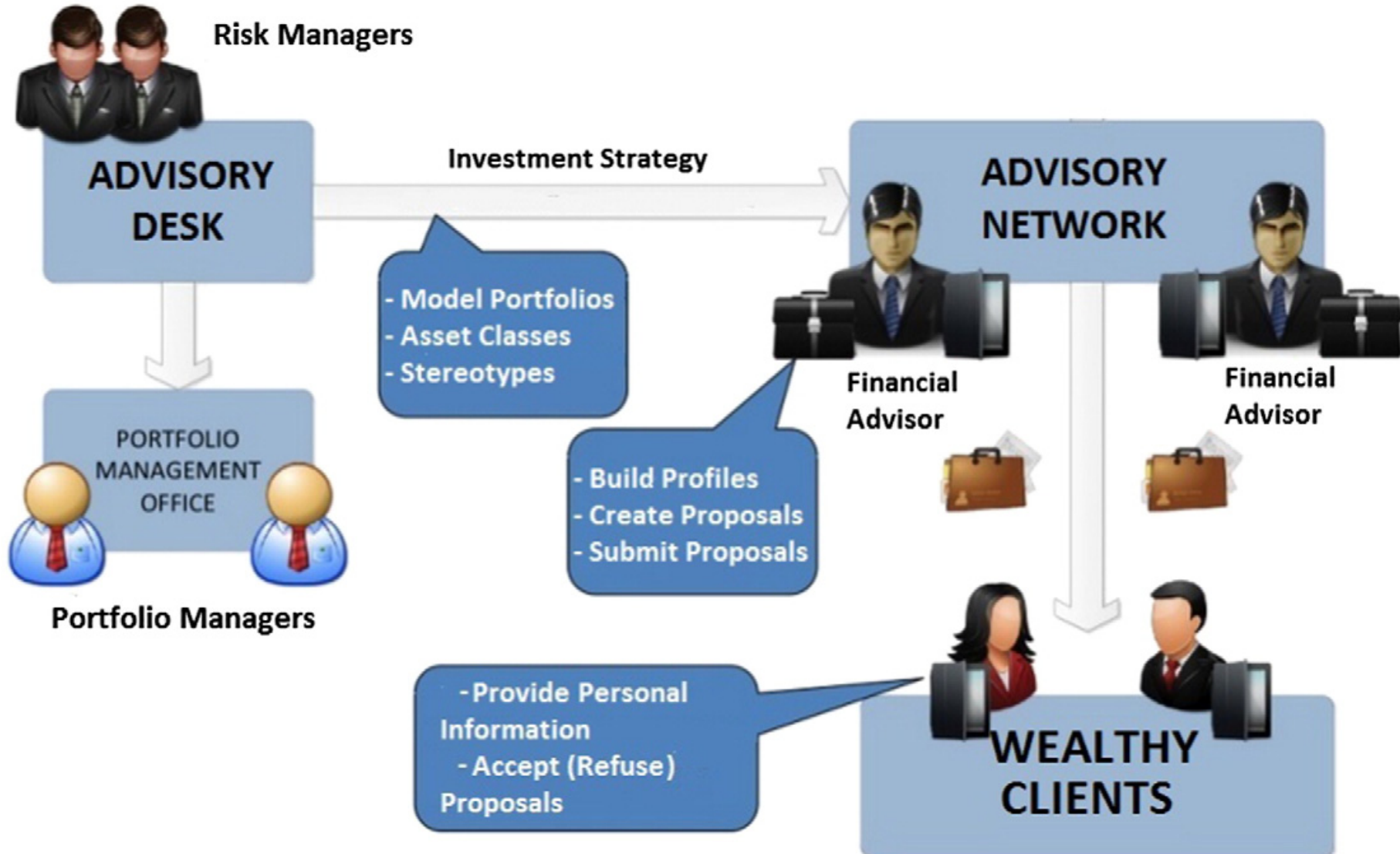


Do you have the time to invest well?

Wealthfront invests your money for you with a minimal amount of work. We monitor your portfolio every day to look for opportunities to rebalance or harvest tax losses. Are you doing the same?

<https://www.wealthfront.com/>

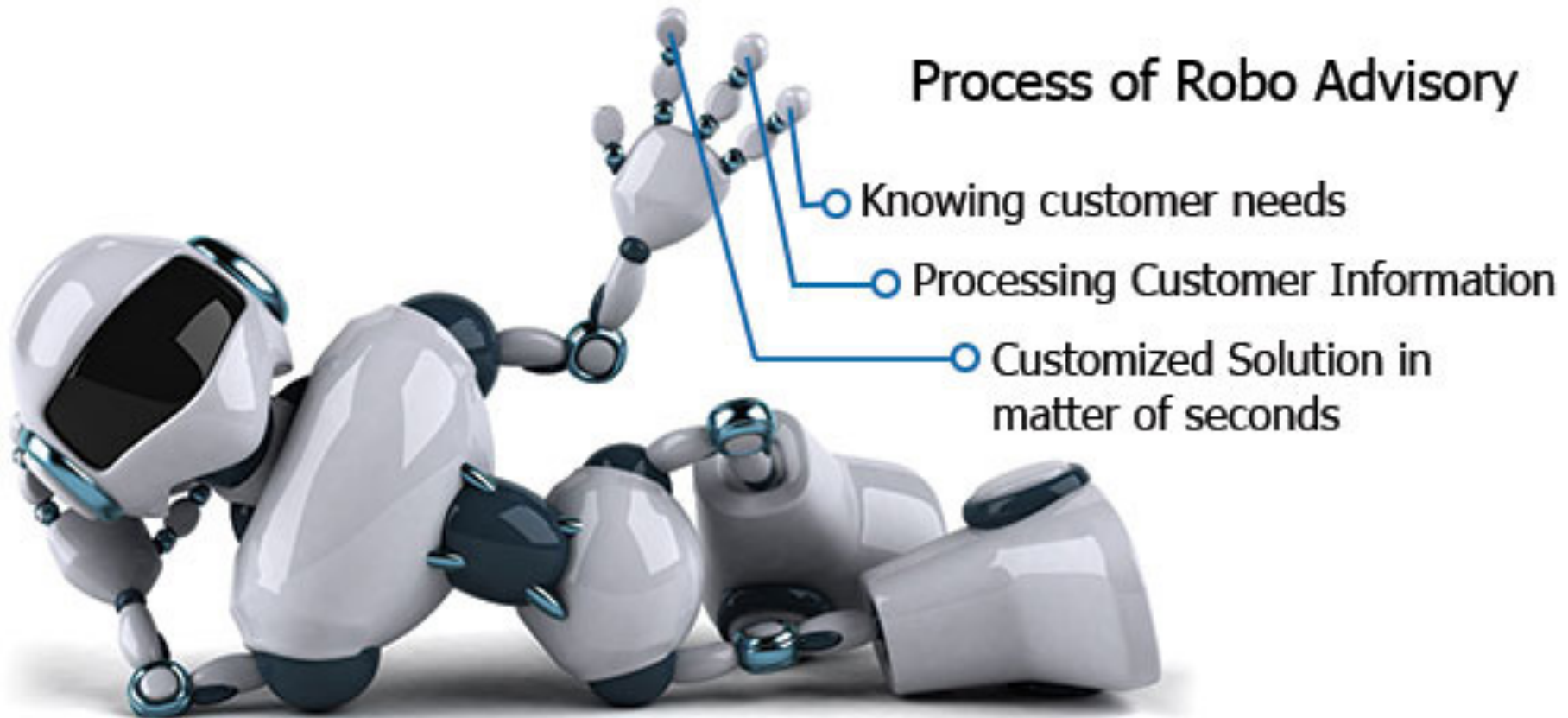
# A classic workflow for financial recommendations



Source: Musto, C., Semeraro, G., Lops, P., de Gemmis, M., & Lekkas, G. (2015).

Personalized finance advisory through case-based recommender systems and diversification strategies. *Decision Support Systems*, 77, 100-111.

# Process of Robo Advisors



# Benefits of Robo Advisors

## Benefits of Robo Advisors

- Unbiased Advice —
- No minimum Investment required —
- Low Charges —
- Transparency —
- Customised Solutions —



# Robo-Advisor Business Models

- **Full service online Robo-advisor**
  - 100% automated without any human element
- **Hybrid Robo-advisor model**
  - being pioneered by firms like Vanguard & Charles Schwab
- **Pure online advisor**
  - primarily human in nature

# Robo-Advisor Business Models

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  - primarily human in nature

# Usecases of Robo-Advisors

1. Determine individual **Client profiles & preferences**
2. Identify **appropriate financial products**
3. Establish correct **Investment Mix** for the client's profile
4. Using a **algorithmic approach**, choose the appropriate **securities** for each client account
5. Continuously **monitor the portfolio & transactions** within it to tune performance
6. Provide **value added services**
7. Ensure the **best user experience** by handling a whole range of financial services



# Business Requirements for a Robo-Advisor (RA)

1. Collect Individual Client Data
2. Client Segmentation
3. Algorithm Based Investment Allocation
4. Portfolio Rebalancing
5. Tax Loss Harvesting
6. A Single View of a Client's Financial History



# Algorithms for a Robo-Advisor (RA)

- Leverage **data science** & **statistical modeling** to automatically allocate client wealth across different asset classes (such as domestic/foreign stocks, bonds & real estate related securities) to **automatically rebalance portfolio** positions based on changing market conditions or client preferences.
  - These investment decisions are also made based on detailed **behavioral understanding** of a client's **financial journey metrics**
    - Age, Risk Appetite & other related information.

# Algorithms for a Robo-Advisor (RA)

- RA platforms also provide 24 × 7 tracking of **market movements** to use that to track **rebalancing decisions** from not just a portfolio standpoint but also from a taxation standpoint.

# Algorithms for a Robo-Advisor (RA)

- A **mixture** of different **algorithms** can be used such as **Modern Portfolio Theory (MPT)**, **Capital Asset Pricing Model (CAPM)**, the **Black Litterman Model**, the **Fama-French** etc.
  - These are used to allocate assets as well as to adjust positions based on market movements and conditions.

# Robo-Advisor (RA) Sample Portfolios

## Sample Portfolios – for an aggressive investor

### 1. Equity – 85%

A) US Domestic Stock (50%)

– Large Cap – 30%, Medium Cap – 10% , Small Cap – 10%, Dividend Stocks – 0%

B) Foreign Stock – (35%)

– Emerging Markets – 18%, Developed Markets – 17%

### 2. Fixed Income – 5%

A) Developed Market Bonds – 2%

B) US Bonds – 1%

C) International Bonds – 1%

D) Emerging Markets Bonds – 1%

### 3. Other – 5%

A) Real Estate – 3%

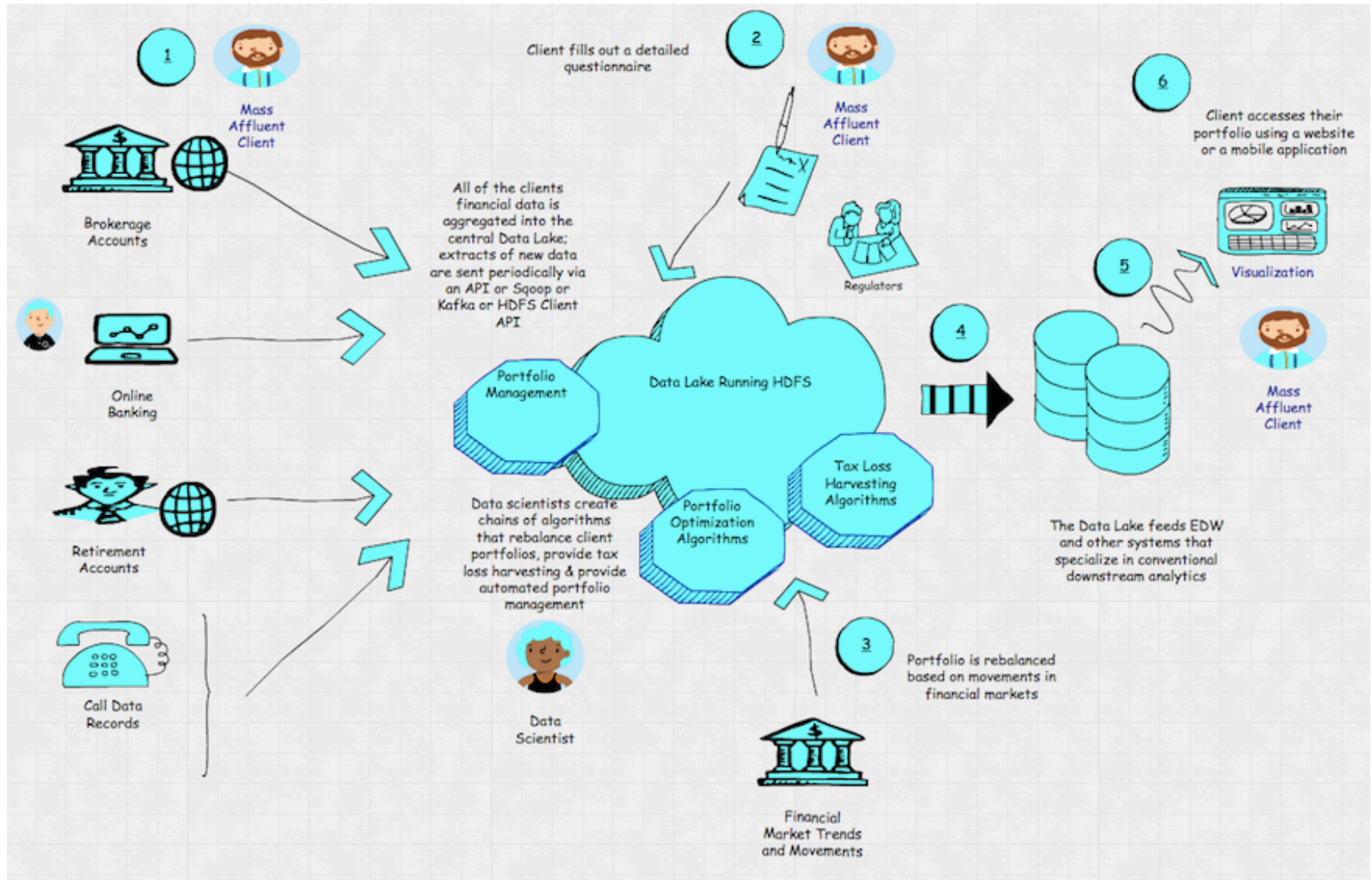
B) Currencies – 0%

C) Gold and Precious Metals – 0%

D) Commodities – 2%

### 4. Cash – 5%

# Architecture of a Robo-Advisor (RA)



# Robo-Advisor



wealthfront



Betterment

# Wealthfront: Fintech Robo Advisor



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Products ▾

Who we are ▾

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Grow your wealth  
Invest in your life

Access proven investment strategies, tailored advice, and premium financial services - all powered by technology.

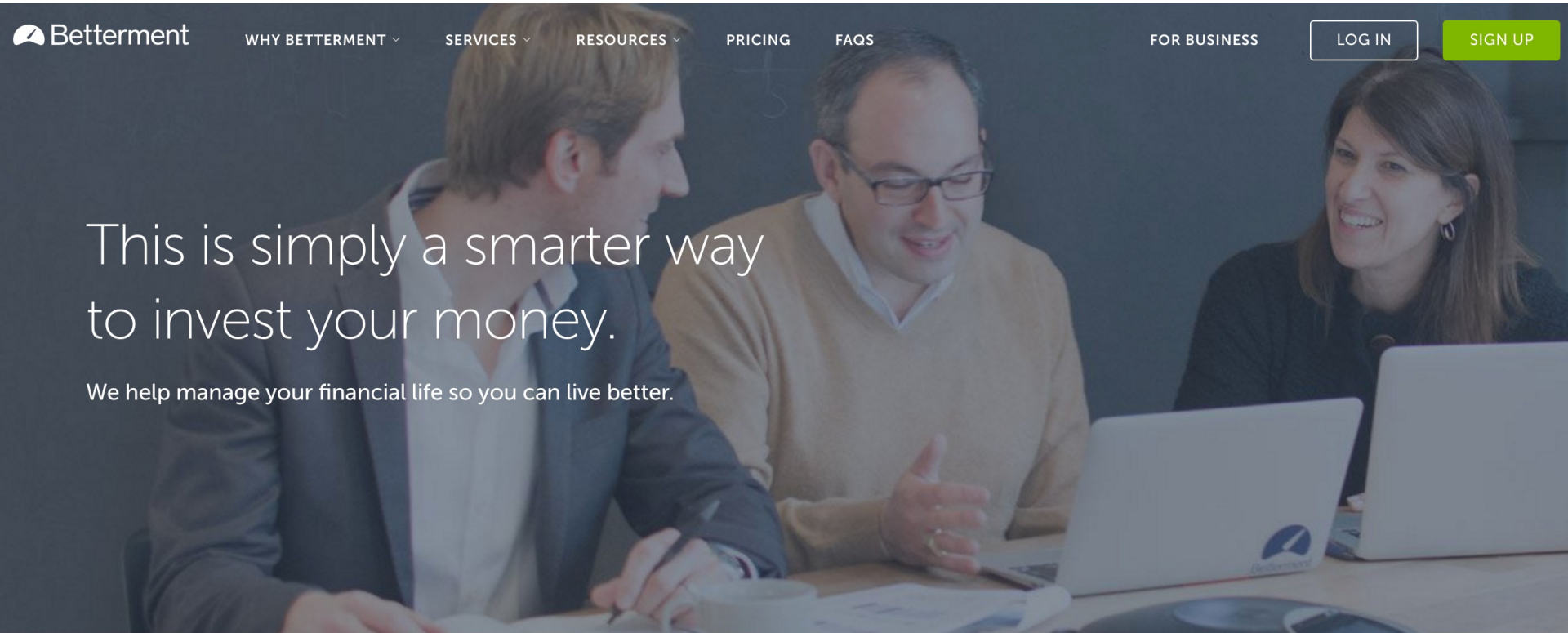
Invest with Wealthfront

Explore your options





# Betterment: Fintech Robo Advisor



 Betterment

WHY BETTERMENT ▾

SERVICES ▾

RESOURCES ▾

PRICING

FAQS

FOR BUSINESS

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This is simply a smarter way to invest your money.

We help manage your financial life so you can live better.



We can help you get started. Schedule your free 15 minute call today. [Schedule a call >](#)



Increase after-tax returns.



No hidden fees.





Satisfaction guaranteed.



Access to licensed experts.



# Betterment vs. Wealthfront

	 Betterment	 wealthfront
Robo-Advisor		
Investor Junkie Rating	4.5 star	5 star
Promotions	<a href="#"><u>One Month Free</u></a>	<a href="#"><u>First \$15k for Free</u></a>
Fees	0.25%/yr	None first \$10k;
		0.25%/yr for more
Minimum Deposit	None	\$500
<b>Human Advisors</b>	Yes — Additional Fee	<b>No</b>
Automatic Rebalancing	Yes	Yes
Tax Loss Harvesting	Yes	Yes
Direct Indexing	No	Yes
Fractional Shares	Yes	No
Assets Under Management	\$8.0B	\$5.0B

# Wealthfront:

## 0.25%

### Flat annual advisory fee

- **No** trading commissions or **hidden fees**
- Portfolio of **low-cost ETFs**
- Your first **\$10,000** managed free

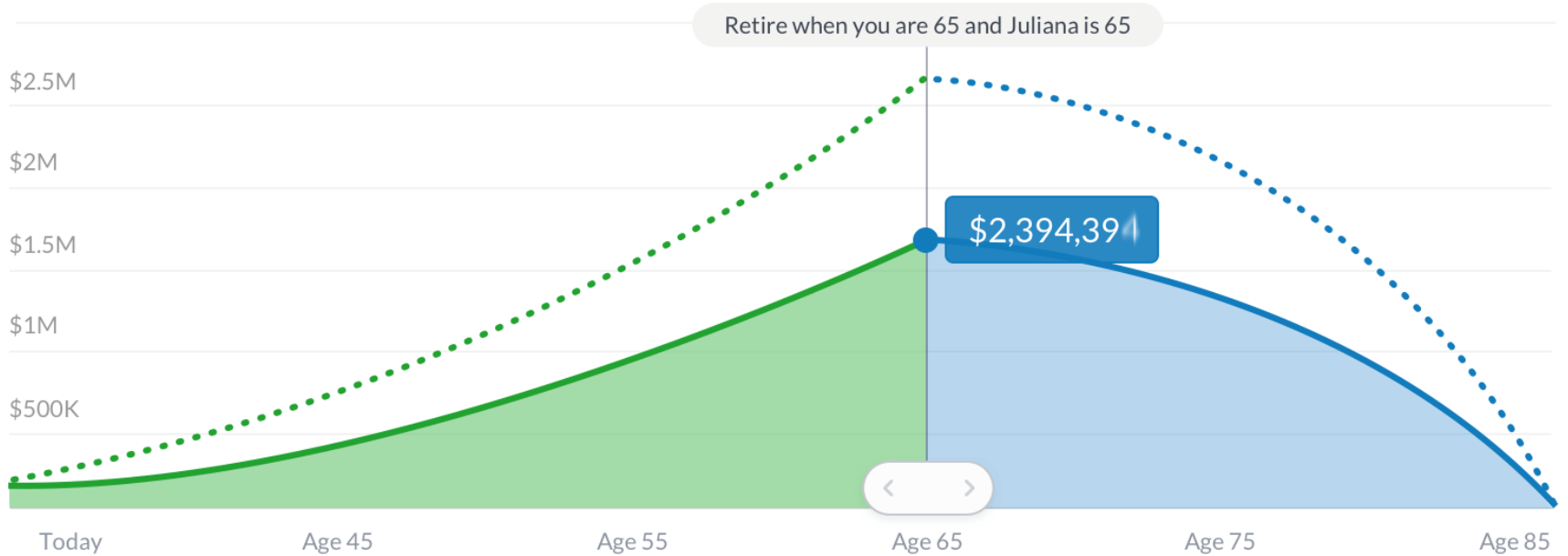
# Wealthfront

Powering your financial life with technology



# Wealthfront Robo Advisor

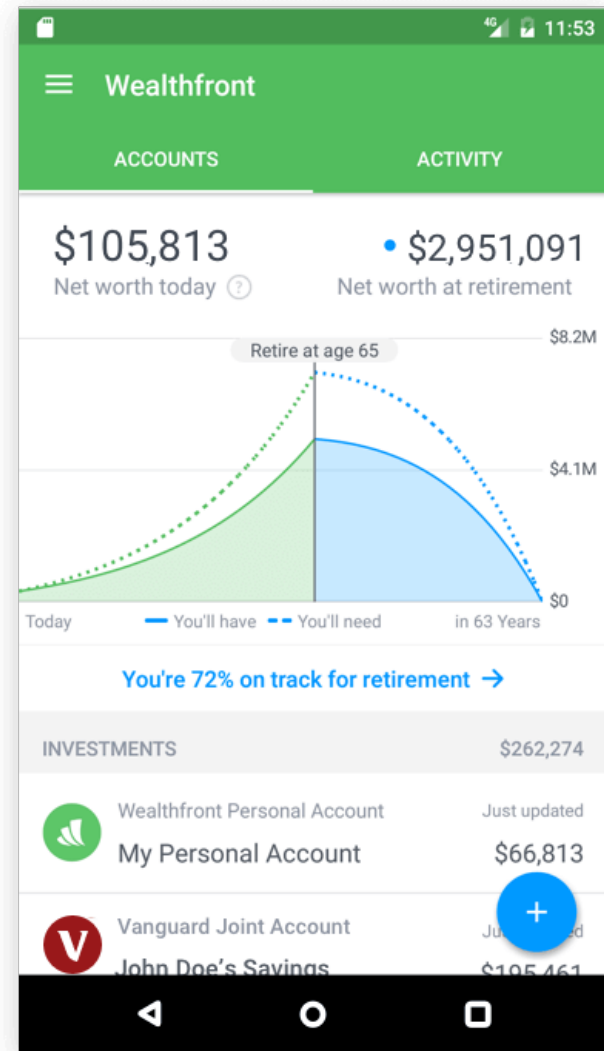
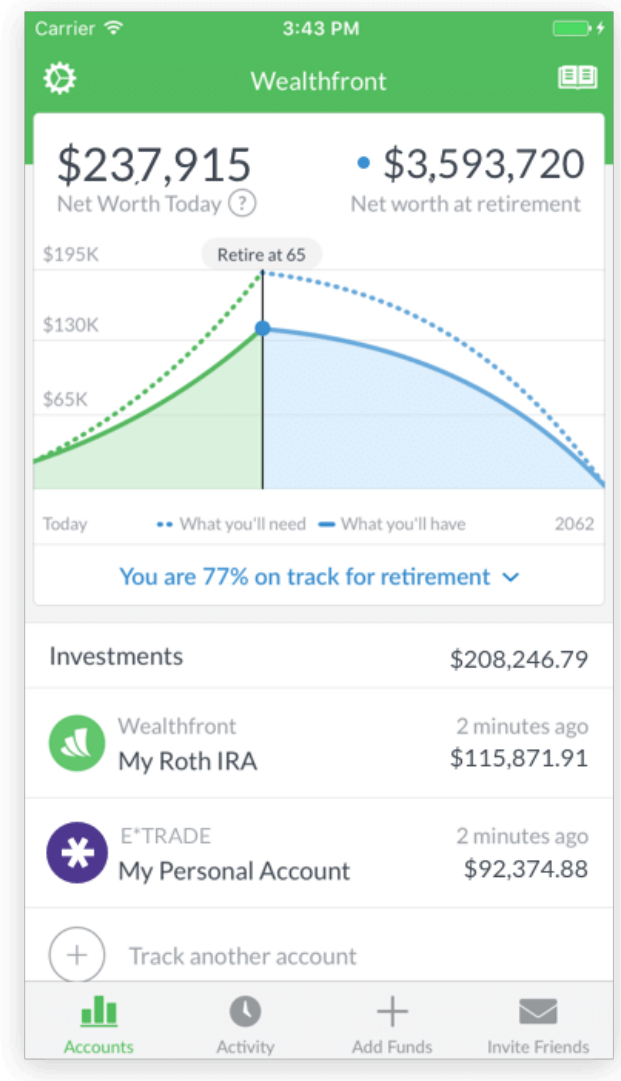
You're on track to have \$8,000 per month to spend in retirement. That's 76% of your target.



✓ My assumptions

— What you'll have    ... What you'll need

# Wealthfront Robo Advisor



# Financial Revolution with Fintech

## A financial services revolution

### Consumer Trends



1. Simplification



2. Transparency



3. Analytics



4. Reduced Friction

# Millennial Personal Finance: 63 Fintech Startups Targeting Millennials

## Fin Tech Startups for Millennials

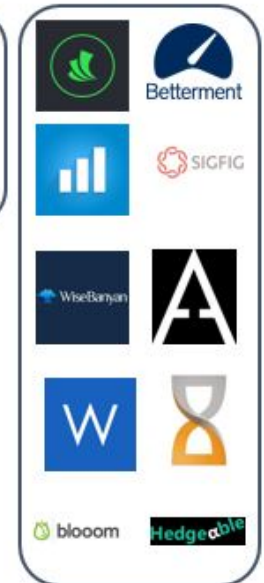
### Savings & Finances Tracking



### Personal Investing



### Wealth Management



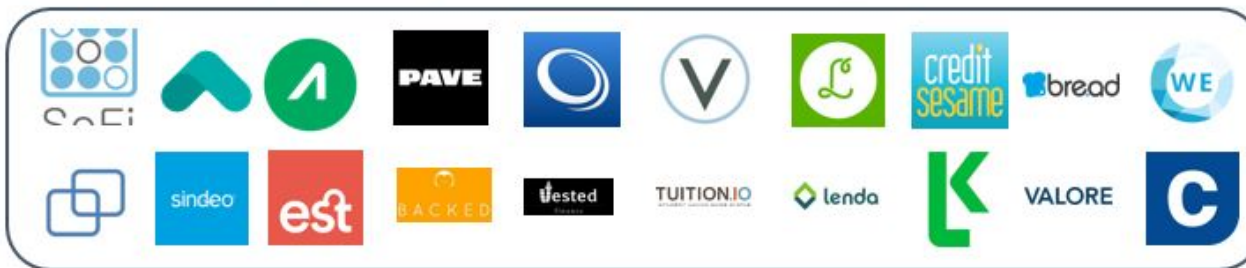
### Insurance



### Crowdfunding



# MILLENNIALS



### Loans & Credit Risk



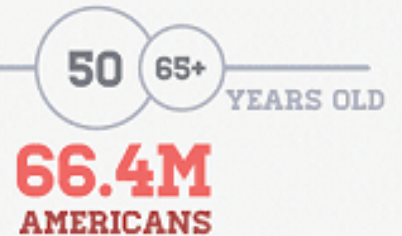
### Payments & Banking

### Acquired Companies



# Marketing to Millennials

## GENERATIONS OVERVIEW





# Marketing to Millennials

## MILLENNIAL PERSONAS



### DIGITAL WINDOW SHOPPERS

Less engaged online than other millennials



**23%**

of the millennial population

42% 58%



female majority



### DIGITAL SOCIALITES

Highly social and engaged online



**26%**

of the millennial population

45% 55%



female majority



### DYNAMIC MEDIA JUNKIES

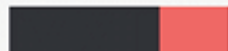
Extremely tech savvy and engaged with online video and streamed content



**23%**

of the millennial population

64% 36%



male majority



### CASUALLY ENGAGED

Least engaged in digital world, more likely to be unemployed



**17%**

of the millennial population

53% 47%



male majority



### EMERGING TECHNOCRACY

Strongly engaged digitally and highly influential



**15%**

of the millennial population

57% 43%



male majority

# Marketing to Millennials

## BEST PRACTICES FOR MARKETING TO MILLENNIALS



### OPTIMIZED MOBILE

Mobile is the **BEST WAY TO REACH MILLENNIALS** - they have the highest rates of ownership of smartphones of all generations



### MULTI-PLATFORM

Millennials **CONSUME CONTENT ACROSS MULTIPLE DEVICES**, so marketers need to create content with a multi-platform strategy. For example, **55%** are watching videos several times a day on multiple devices



### PERSONALIZATION

**85%** of Millennials are **MORE LIKELY TO MAKE A PURCHASE IF IT IS PERSONALIZED** to their interests, both in-store and with digital displays



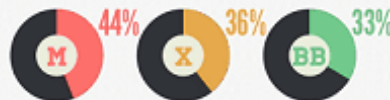
### SOCIAL MEDIA PRESENCE

Millennials are **MORE LIKELY TO USE SOCIAL MEDIA DAILY** with 62% reporting that brand engagement is more likely to make them a loyal customer



### BE AUTHENTIC

Millennials are willing to share good advertising, but **DISLIKE WHEN ADVERTISING FEELS DECEPTIVE**



believe brands say something about who they are, their values and where they fit



### INFORMATIONAL BLOGS

one in three millennials choose **BLOGS** as the top media source **BEFORE MAKING A PURCHASE**. Traditional media sources like TV and magazines have less impact on this generation

# Fintech for Millennials

Fintech Category	#Company
Crowdfunding	2
Insurance (Non-Health)	4
Loans & Credit Risk	20
Mobile Banking & Payments	8
Personal Investing	10
Savings & Finances Tracking	10
Wealth Management	9
Total	63

# Fintech: Wealth Management

Company	Select Investors
Wealthfront	DAG Ventures, Index Ventures, Greylock Partners, The Social+Capital Partnership
Betterment	Bessemer Venture Partners, Athemis Group, Menlo Ventures
SigFig	Doll Capital Management, Union Square Ventures, Bain Capital Ventures
Aspiration	Renren, GSV Capital, Capricorn Investment Group, IGSB
Bloom	Commerce Ventures, DST Systems, Hyde Park VP, QED Investors, UMB Financial
Rebalance IRA	N/A
Hedgeable	SixThirty
WiseBanyan	VegasTech Fund
Personal Capital	Institutional Venture Partners, Venrock, Crosslink Capital

# Fintech: Personal Investing

Company	Select Investors
eToro	BRM Group, Ping An Ventures, Spark Capital
Openfolio	FinTech Collective
DriveWealth	Route 66 Ventures
Tip'd Off	Raj Parekh, Bill Crane, Shaun Coleman
Kapitall	Bendigo Partners, Linden Venture Fund
Stash	N/A
Stox	SingulariTeam
Robinhood	Google Ventures, Index Ventures, Andreessen Horowitz, Ribbit Capital, NEA
Motif Investing	Norwest Venture Partners, Foundation Capital, Ignition Capital, Goldman Sachs
Loyal3	DNS Capital

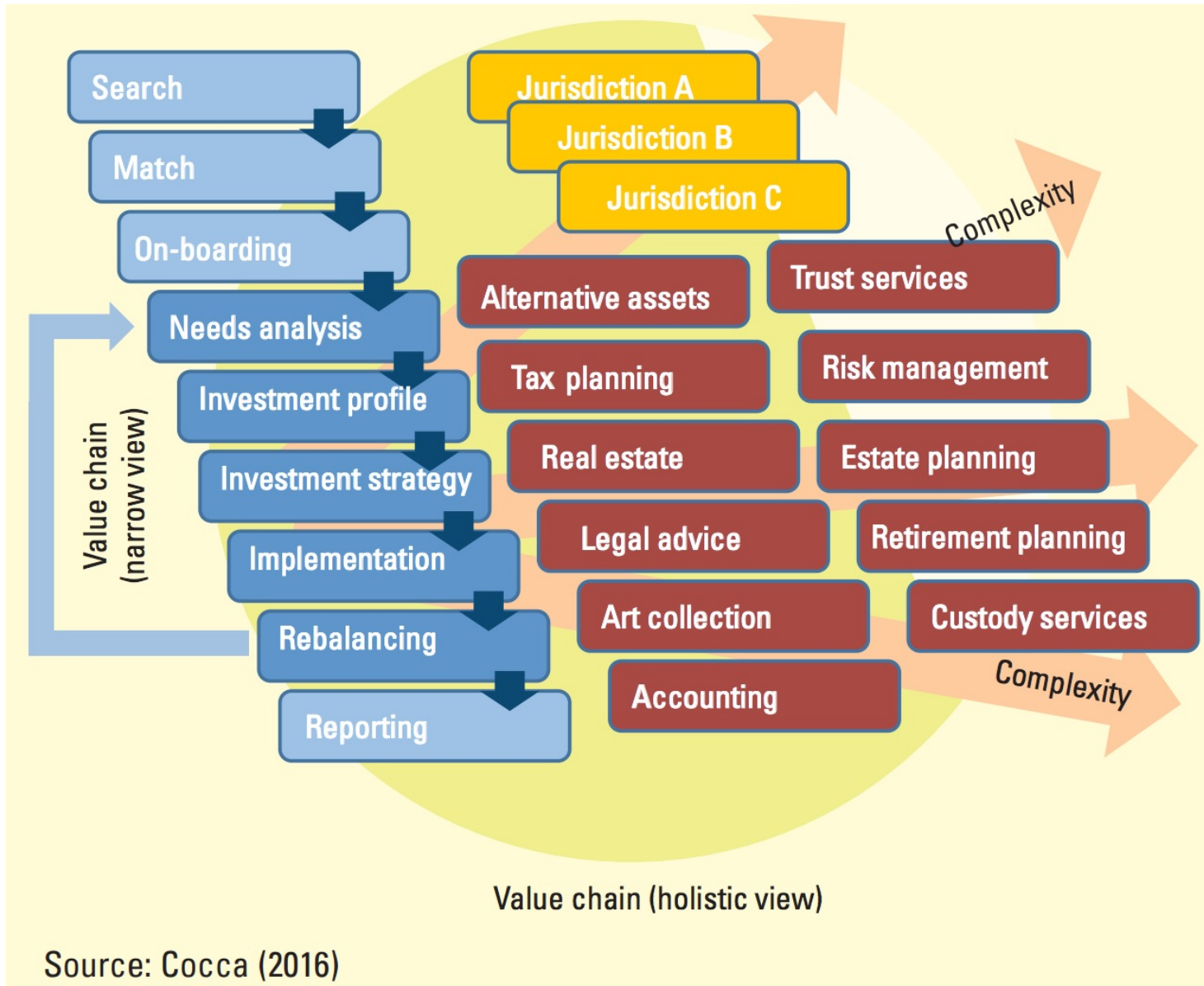
# Wealthfront

## Investment Methodology

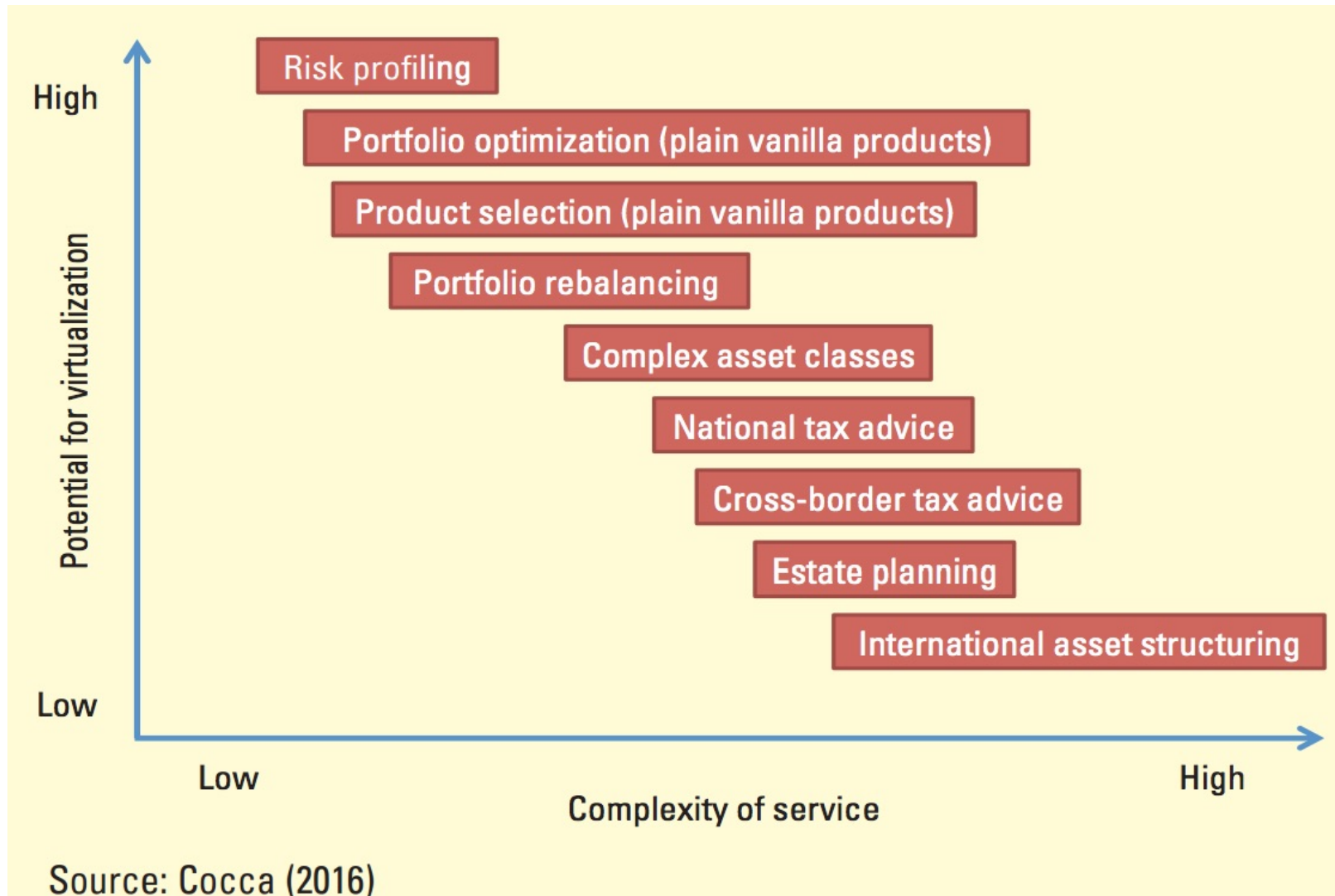
1. Identify an ideal **set of asset classes** for the current investment environment
2. Select **low cost ETFs** to represent each asset class
3. Determine your **risk tolerance** to create the **appropriate portfolio** for you
4. Apply **Modern Portfolio Theory** to allocate among the chosen **asset classes** for your **risk tolerance**
5. Monitor and periodically **rebalance** your portfolio



# Wealth Management Value Chain

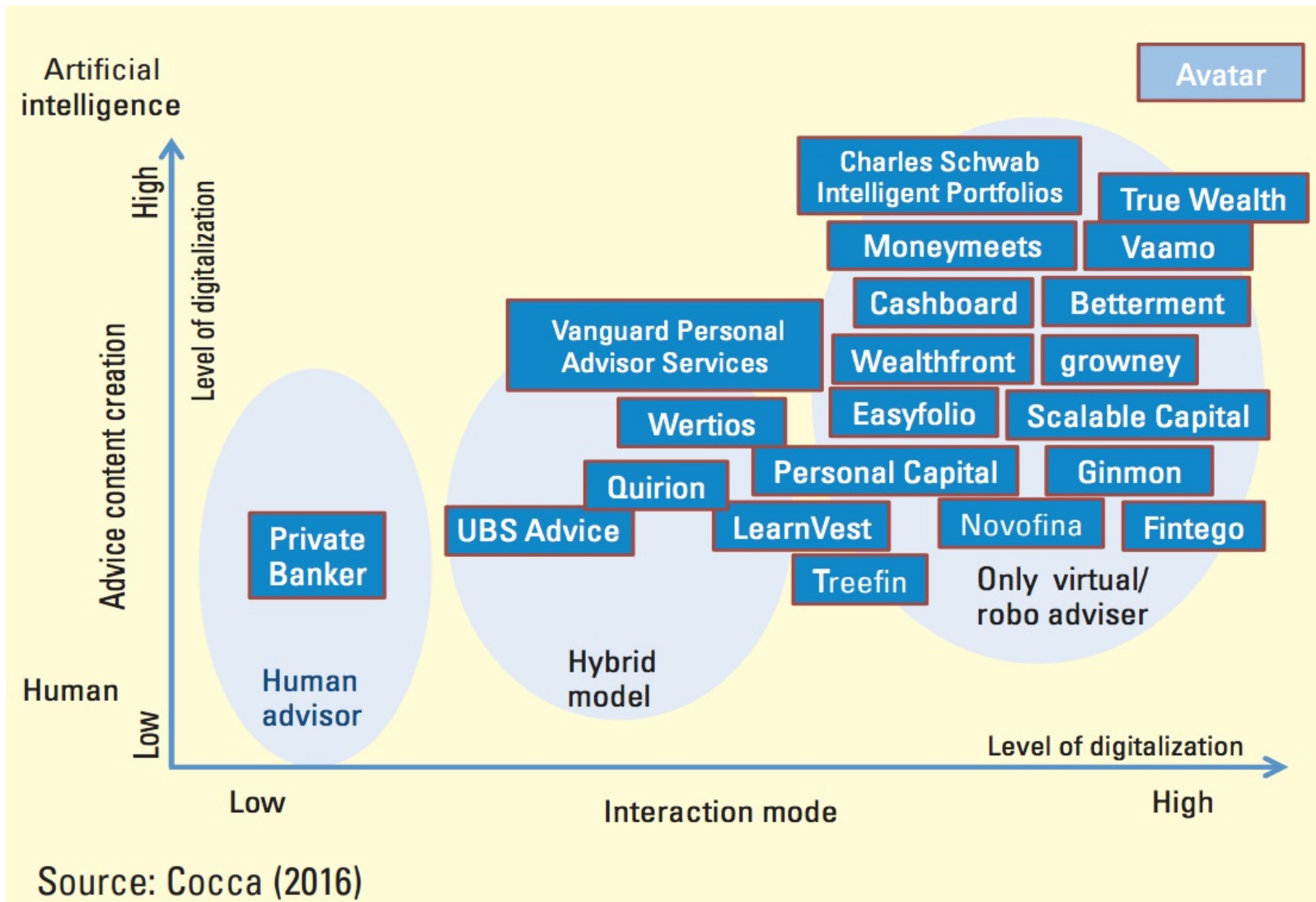


# Wealth Management Service and Potential for virtualization



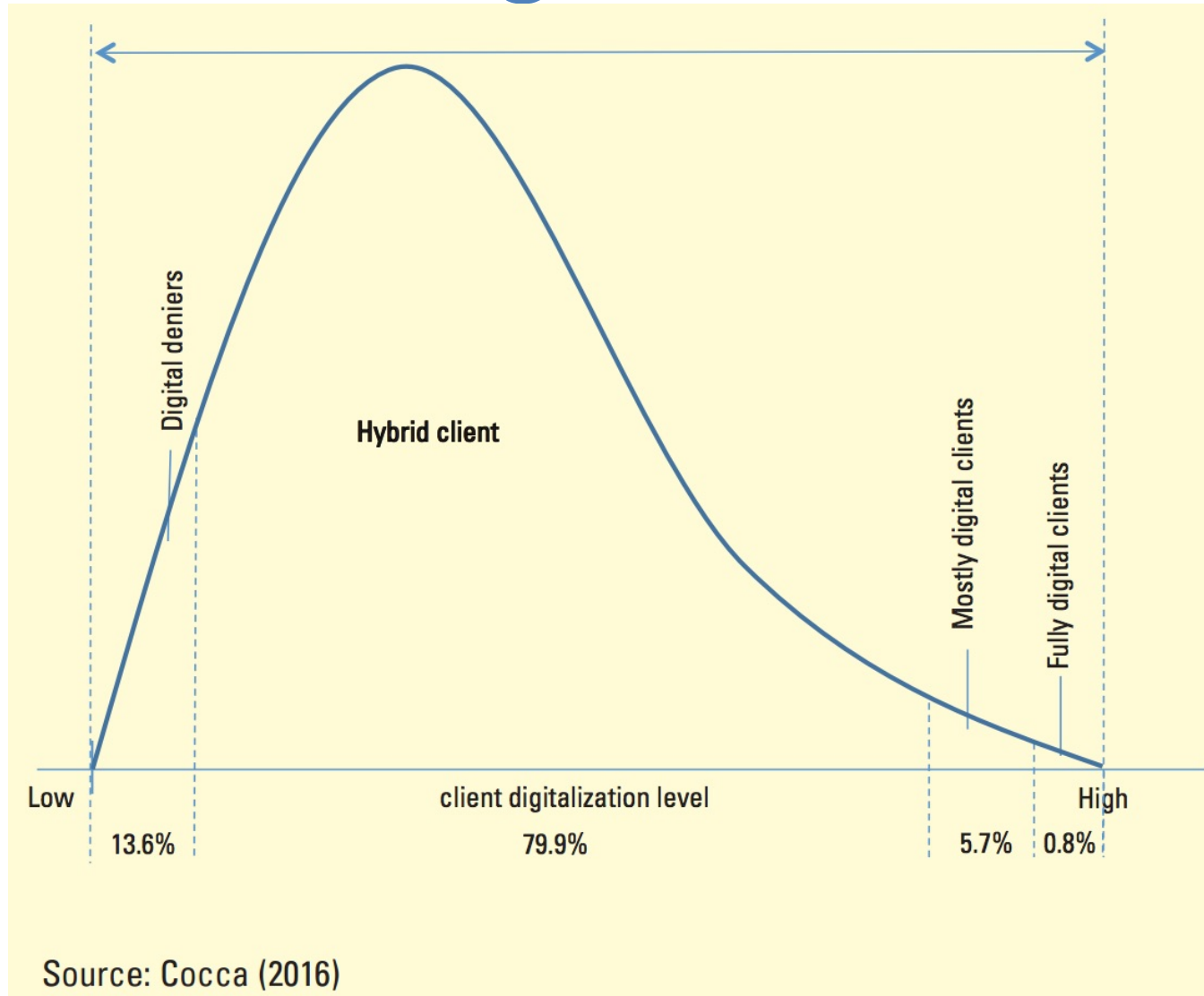


# AI and Robo Advisor Virtualization Dimensions



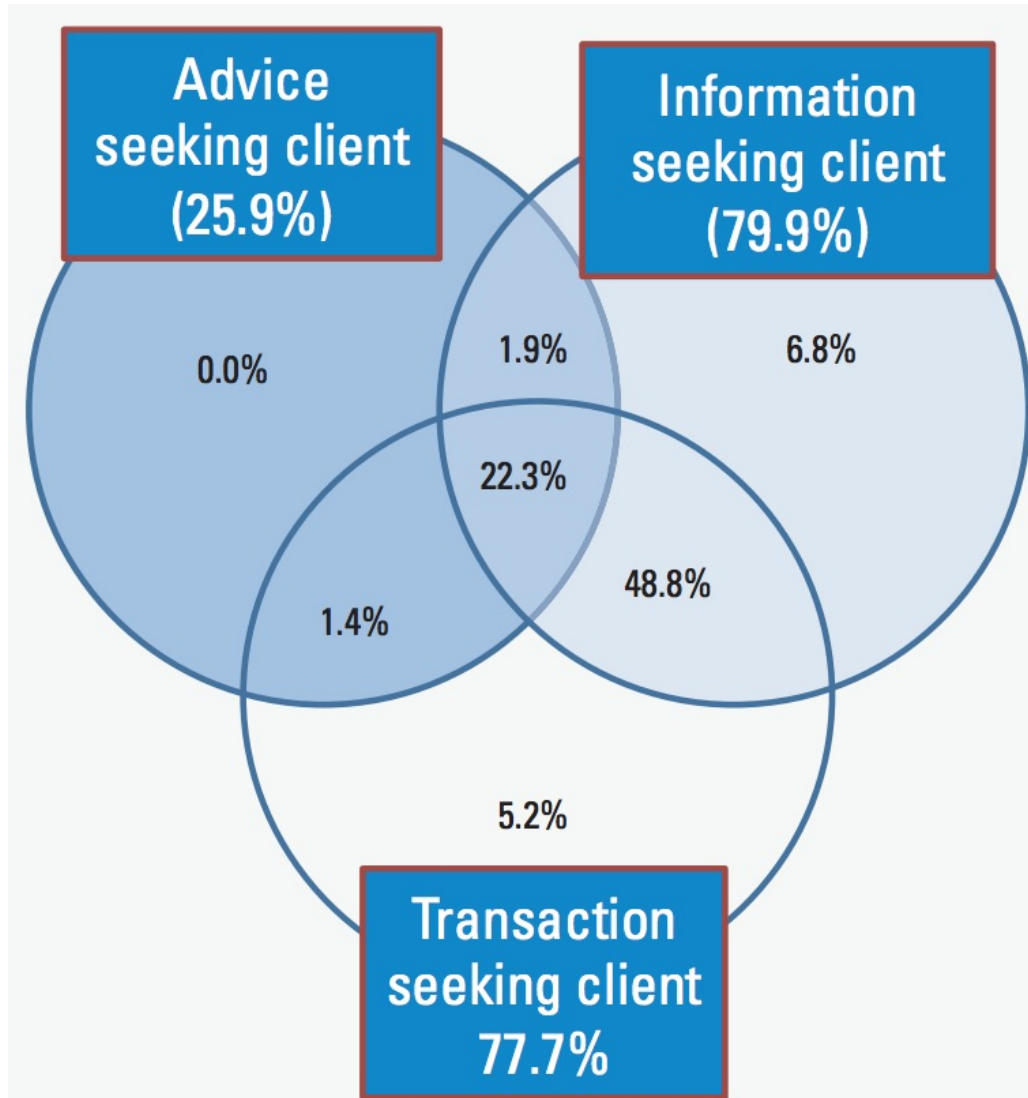
Source: Cocca, Teodoro (2016). "Potential and Limitations of Virtual Advice in Wealth Management." Journal of Financial Transformation, 44, 45-57.

# Degree of Digitalization of Wealth Management Customers



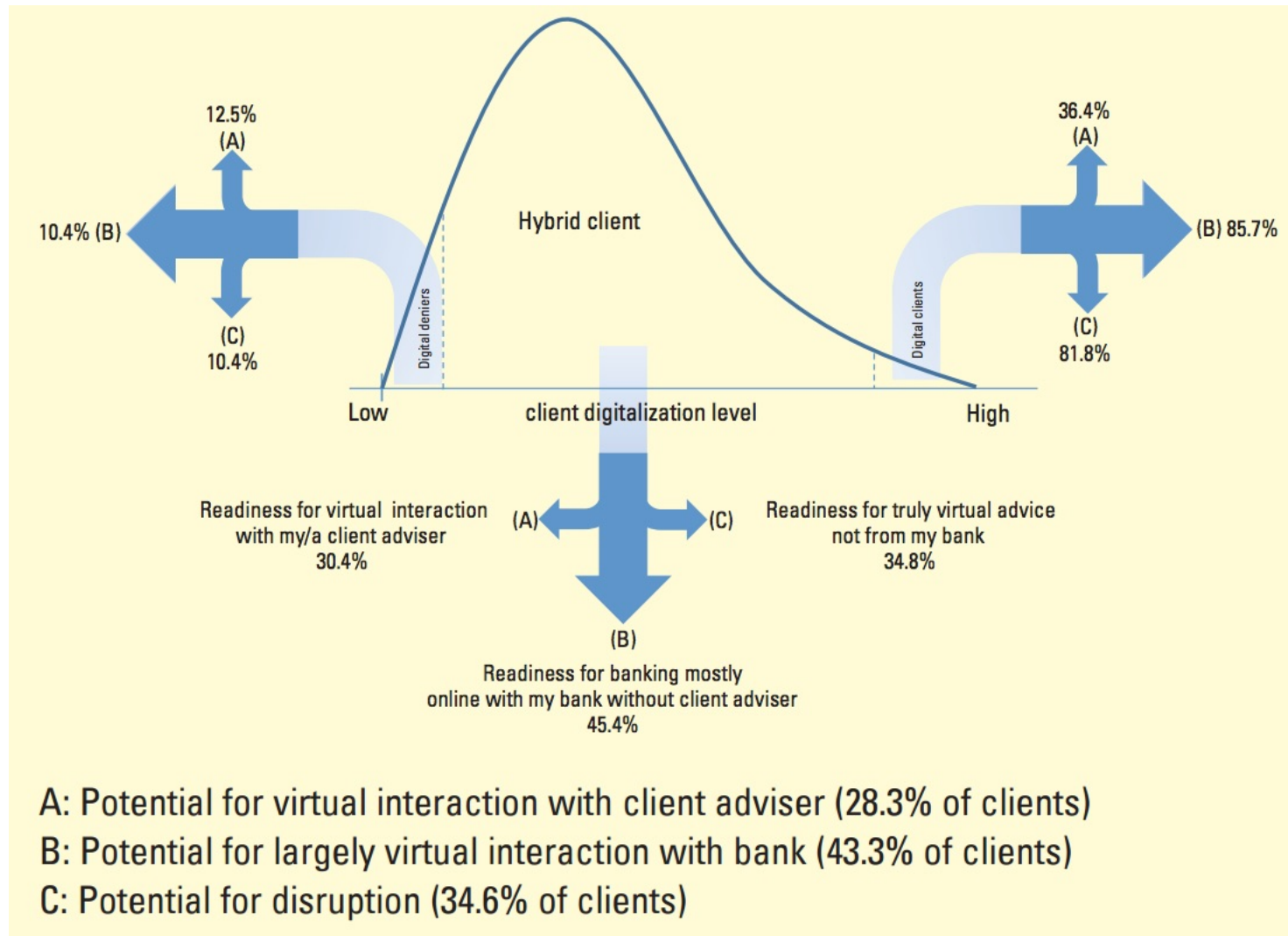
Source: Cocca, Teodoro (2016). "Potential and Limitations of Virtual Advice in Wealth Management." Journal of Financial Transformation, 44, 45-57.

# Use of Online Services by Hybrid Customers

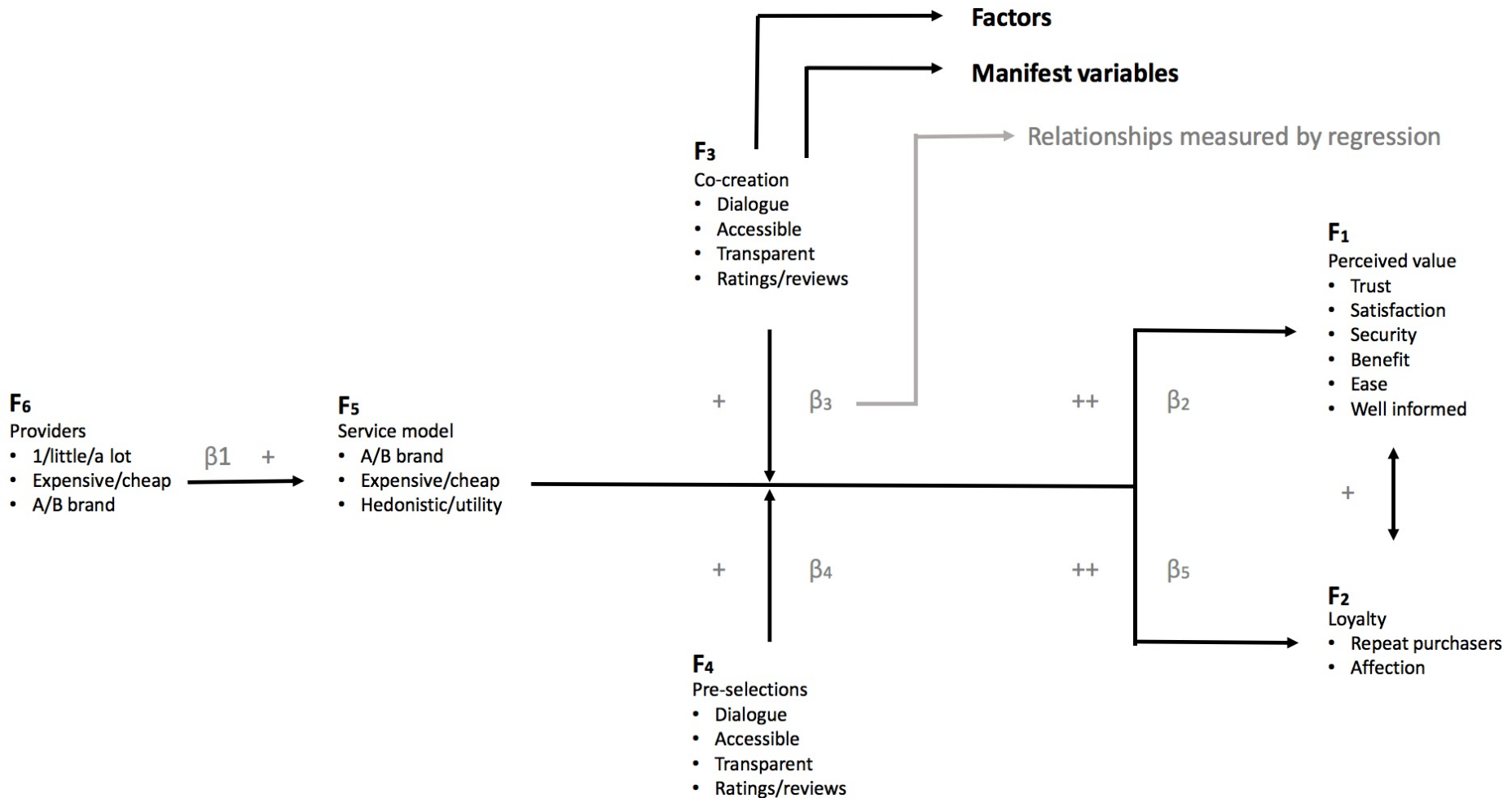


Source: Cocca, Teodoro (2016). "Potential and Limitations of Virtual Advice in Wealth Management." Journal of Financial Transformation, 44, 45-57.

# Use of Online Services by Hybrid Customers



# Explaining Customer Experience of Digital Financial Advice



# Bot Platform Ecosystem

# The bot platform ecosystem and the emerging giants

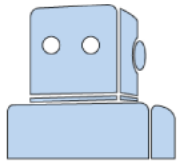
Nearly every large software company has announced some sort of bot strategy in the last year. Here's a look at a handful of leading platforms that developers might use to send messages, interpret natural language, and deploy bots, with the emerging bot-ecosystem giants highlighted.

## General AI agents with platforms

Developer access available now or announced



## Bot frameworks and deployment platforms



Wit.ai  
Facebook



BotKit  
Howdy



Chatfuel

AUTOMAT

Automat



Bot Framework  
Microsoft



Api.ai  
Google



Pandorabots



MindMeld



Gupshup



Sequel



# References

- Susanne Chishti and Janos Barberis (2016), “The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries”, Wiley.
- Paolo Sironi (2016), “FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification”, Wiley.
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- Rubino, J. (2016). My Favorite Robot. *CFA Institute Magazine*, 27(3), 43-46.
- Cocca, Teodoro (2016). "Potential and Limitations of Virtual Advice in Wealth Management." *Journal of Financial Transformation*, 44, 45-57.
- Van Thiel, Diederick, and Fred Van Raaij (2017). "Explaining Customer Experience of Digital Financial Advice." *Economics* 5, no. 1, 69-84.