INTRODUCTION TO AI, ITS IMPLEMENTATION AND IMPLICATIONS

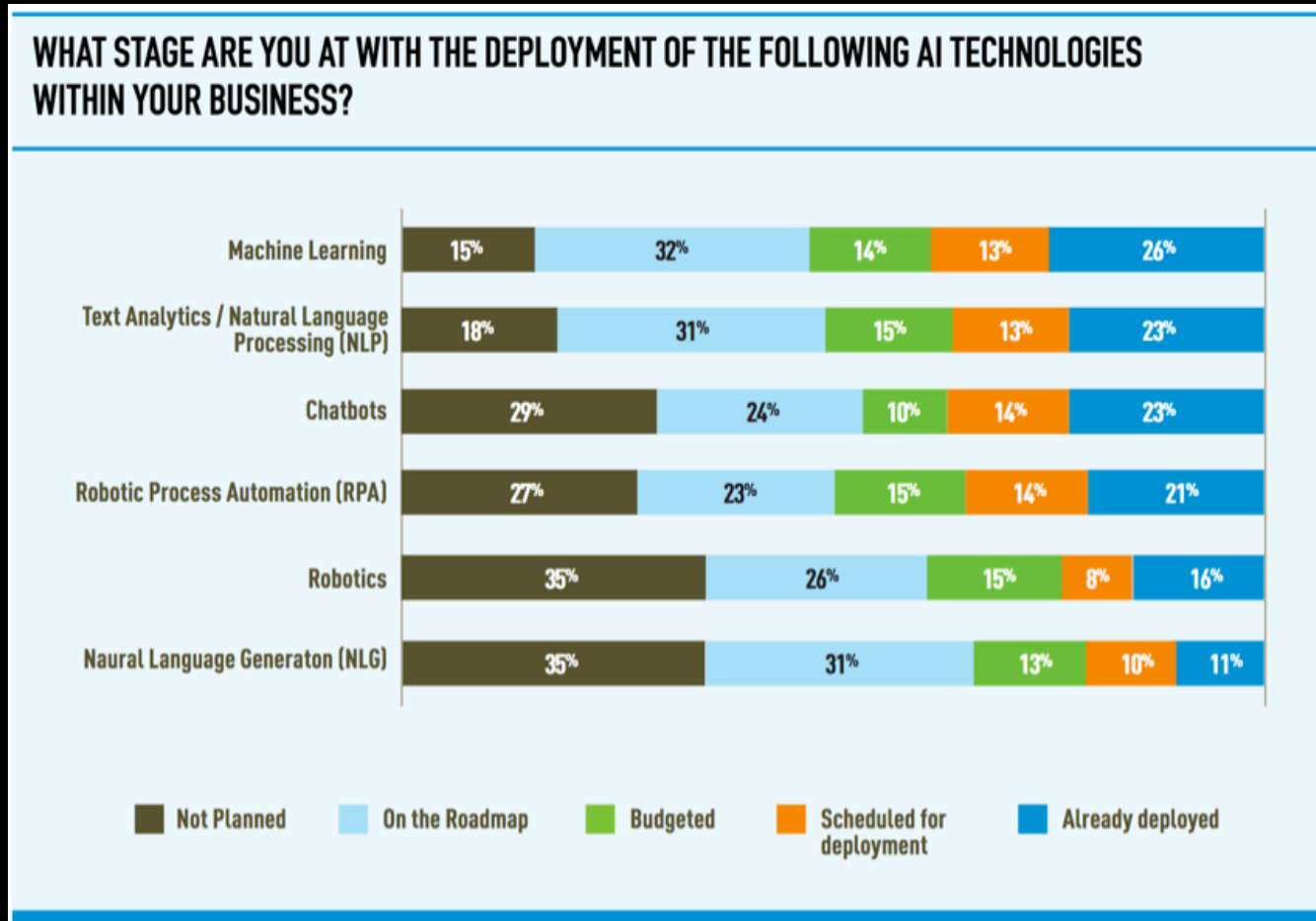Keith Bear

Fellow, Centre for Alternative Finance

UNIVERSITY OF CAMBRIDGE
Judge Business School
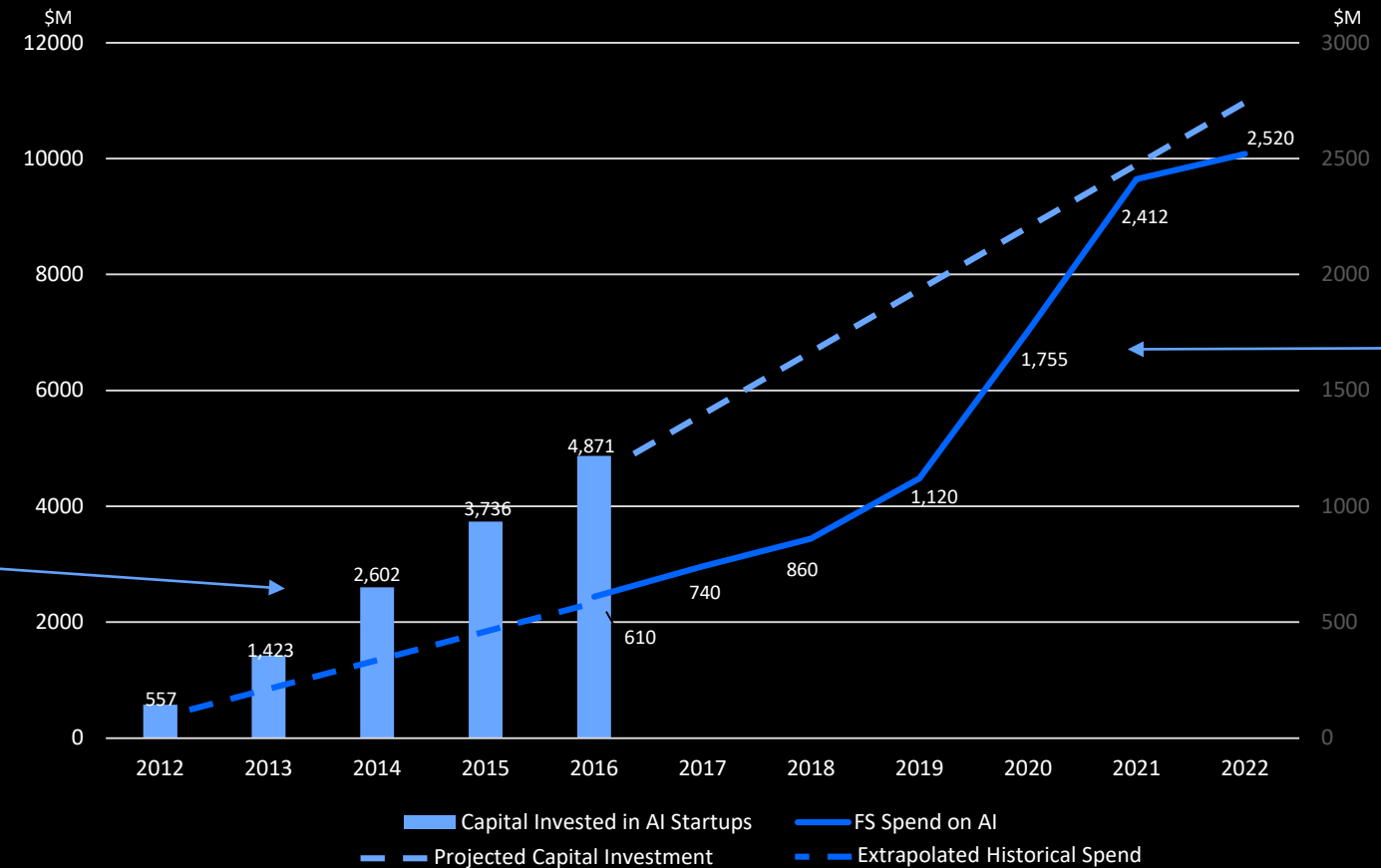
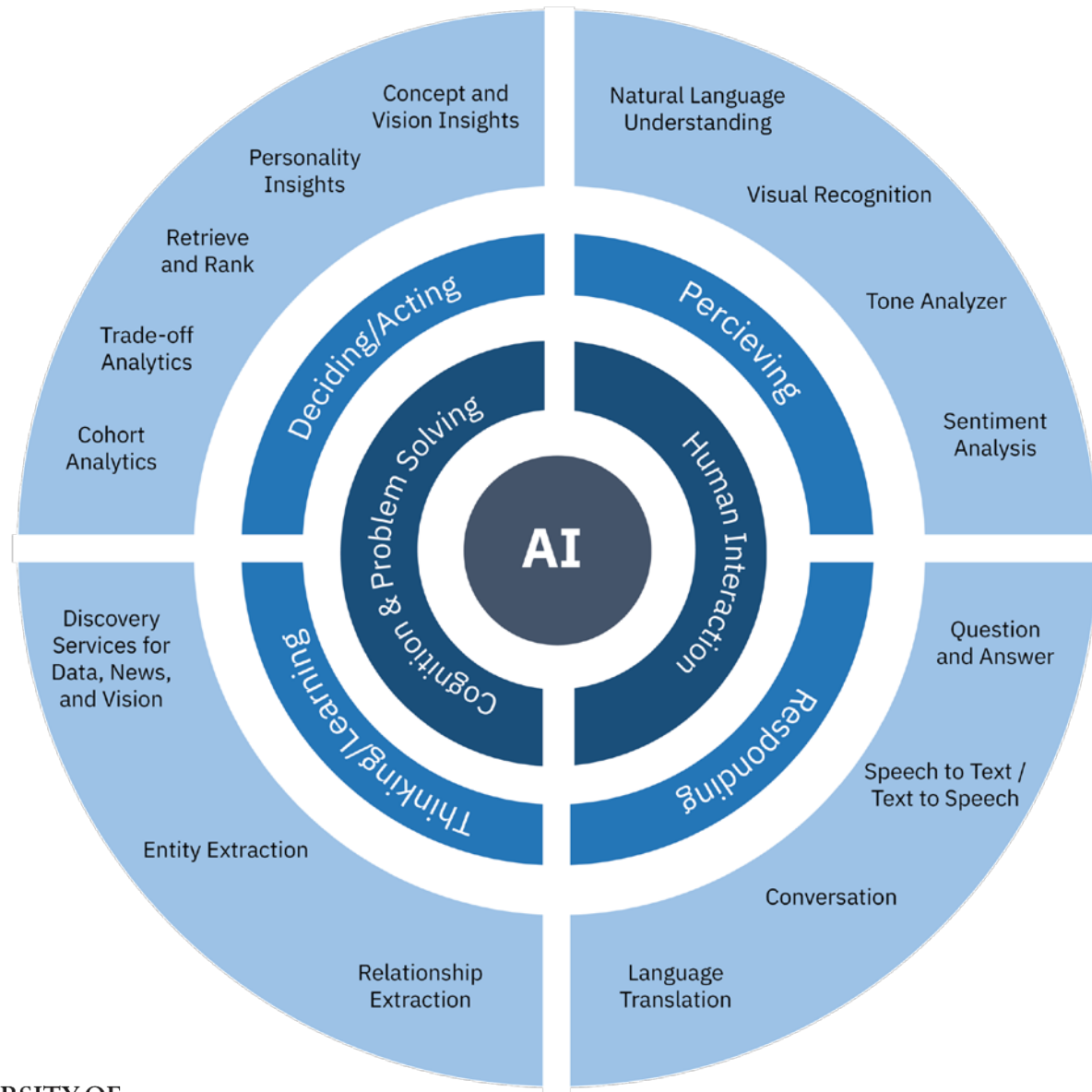# 75% of financial institutions had some form of AI implemented by YE 2018
Financial Services industry spend on AI is anticipated to grow at a 28% CAGR from 2016-2022

WHAT STAGE ARE YOU AT WITH THE DEPLOYMENT OF THE FOLLOWING AI TECHNOLOGIES WITHIN YOUR BUSINESS?

Technology	Not Planned	On the Roadmap	Budgeted	Scheduled for deployment	Already deployed
Machine Learning	15%	32%	14%	13%	26%
Text Analytics / Natural Language Processing (NLP)	18%	31%	15%	13%	23%
Chatbots	29%	24%	10%	14%	23%
Robotic Process Automation (RPA)	27%	23%	15%	14%	21%
Robotics	35%	26%	15%	8%	16%
Naural Language Generaton (NLG)	35%	31%	13%	10%	11%

Artificial Intelligence Historical Investments and Financial Services Spending Projections

Capital Invested in AI Startups ($M): 2012: 557; 2013: 1,423; 2014: 2,602; 2015: 3,736; 2016: 4,871

FS Spend on AI / Projected: 2016: 610; 2017: 740; 2018: 860; 2019: 1,120; 2020: 1,755; 2021: 2,412; 2022: 2,520

Legend: Capital Invested in AI Startups; FS Spend on AI; Projected Capital Investment; Extrapolated Historical Spend
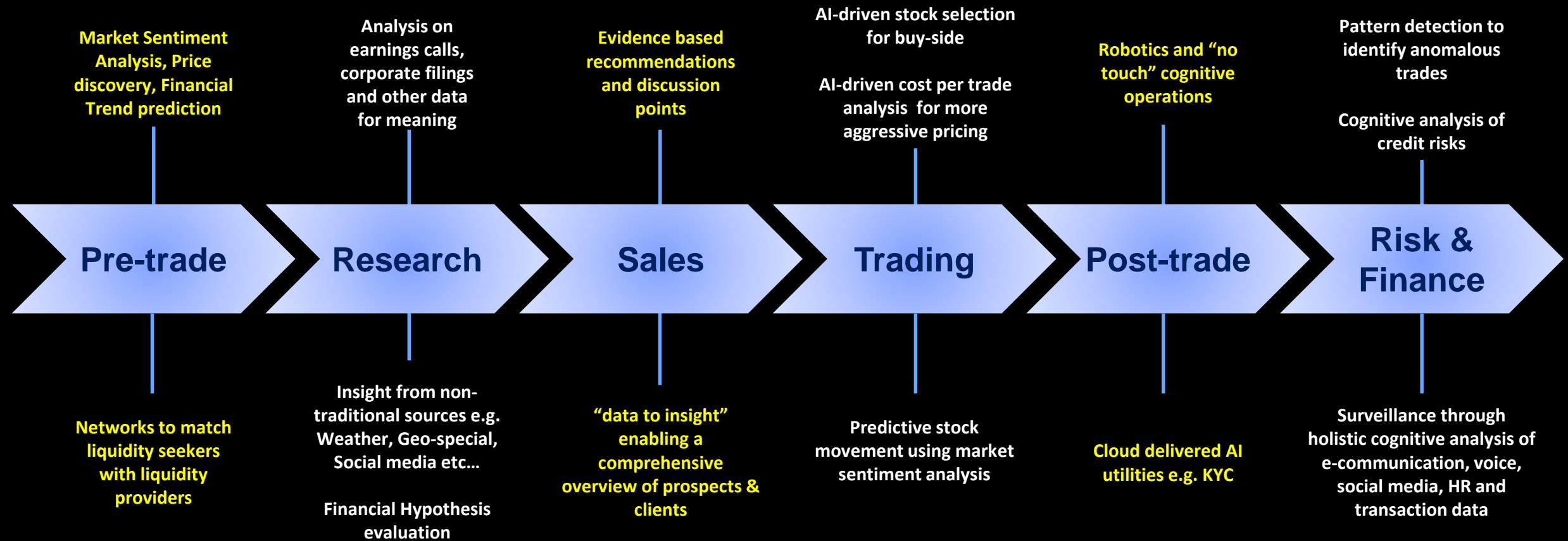
AI is a composite of multiple capabilities. Perception-based capabilities such as natural language processing have led to an upsurge in adoption. However hurdles remain in terms of bias and auditability.

Ref: IBM and McKinsey

Sample risks at each stage	Sample controls
Conceptualization Potentially unethical use cases Insufficient learning feedback loop	Use-case charters and core data and analytics development principles (with clear risk tiering) Real-time monitoring and response
Data management Incomplete or inaccurate data Unsecured "protected" data Other regulatory noncompliance	Data-quality metrics and assurance measures Privacy protections
Model development Nonrepresentative data Biased or discriminatory model outcomes Model instability or performance degradation	Transparency and explainability requirements Fairness review Real-time performance analysis Model testing and validation
Model implementation Implementation errors Poor technology-environment design Insufficient training and skill building	Implementation and user testing Skill testing and systematic monitoring of training results
Model use and decision making Technology-environment malfunction Slow detection of/response to performance issues Cybersecurity threats Failure at the human–machine interface	Performance monitoring (particularly for data flows) Access management and other cyberprotections Capture and analysis of errors, near misses, and overrides

As an example: Capital markets being transformed by AI

Market Sentiment Analysis, Price discovery, Financial Trend prediction

Analysis on earnings calls, corporate filings and other data for meaning

Evidence based recommendations and discussion points

AI-driven stock selection for buy-side

AI-driven cost per trade analysis for more aggressive pricing

Robotics and "no touch" cognitive operations

Pattern detection to identify anomalous trades

Cognitive analysis of credit risks

Pre-trade → Research → Sales → Trading → Post-trade → Risk & Finance

Networks to match liquidity seekers with liquidity providers

Insight from non-traditional sources e.g. Weather, Geo-special, Social media etc...

Financial Hypothesis evaluation

"data to insight" enabling a comprehensive overview of prospects & clients

Predictive stock movement using market sentiment analysis

Cloud delivered AI utilities e.g. KYC

Surveillance through holistic cognitive analysis of e-communication, voice, social media, HR and transaction data

Research at the heart of core AI

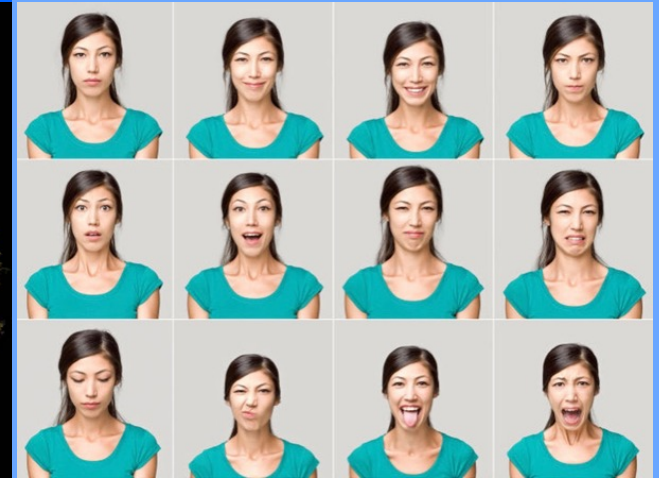## Signal Comprehension

From video and text to rich human perception

Learning and Reasoning

From scalable machine learning to making a case

Interaction

Understanding language, tone, emotion, and context

"A green bird sitting on top of a bowl"

Psycholinguistic personality analysis

Congratulations on a great victory. We all watched from the United States and you did a terrific job. The way you came from behind, somebody who wasn't given much of a chance, and you ended up winning easily. It's a fantastic achievement. Congratulations.

Well it's very nice of you to say that. I will say that we do a lot for Ukraine. We spend a lot of effort and a lot of time.1 Much more than the European countries are doing and they should be helping you more than they are. Germany does almost nothing for you. All they do is talk and I think it's something that you should really ask them about. When I was speaking to Angela Merkel she talks Ukraine, but she doesn't do anything. A lot of the European countries are the same way so I think it's something you want to look at but the United States has been very very good to Ukraine. I wouldn't say that it's reciprocal necessarily because things are happening that are not good but the United States has been very very good to Ukraine

I would like you to do us a favor though because our country has been through a lot and Ukraine knows a lot about it. I would like you to find out what happened with this whole situation with Ukraine, they say Crowdstrike... I guess you have one of your wealthy people... The server, they say Ukraine has it. There are a lot of things that went on, the whole situation. I think you're surrounding yourself with some of the same people. I would like to have the Attorney General call you or your people and I would like you to get to the bottom of it3. As you saw yesterday, that whole nonsense ended with a very poor performance by a man named Robert Mueller, an incompetent performance, but they say a lot of it started with Ukraine. Whatever you can do, it's very important that you do it if that's possible.
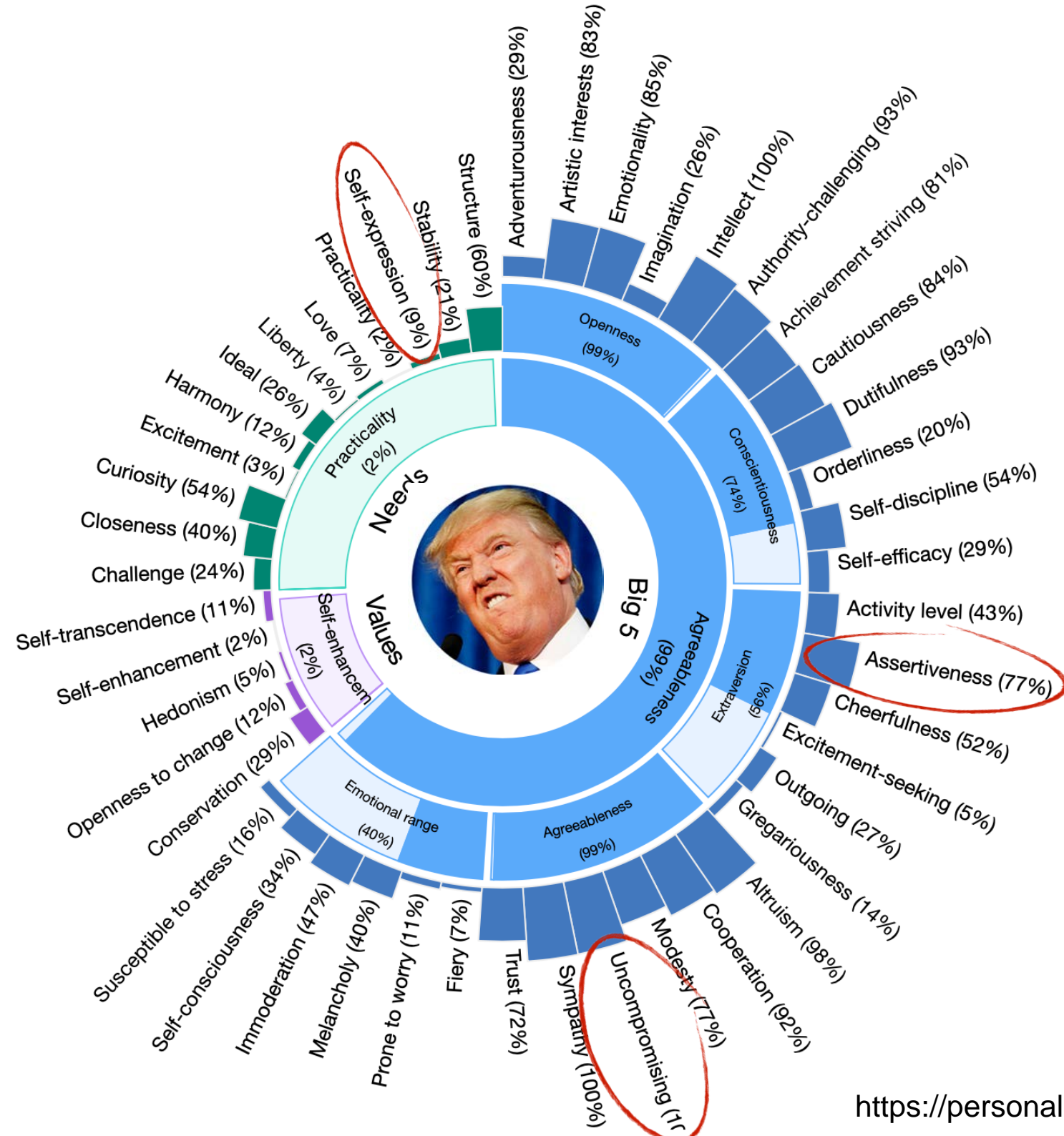
Good because I heard you had a prosecutor who was very good and he was shut down and that's really unfair. A lot of people are talking about that, the way they shut your very good prosecutor down and you had some very bad people involved. Mr. Giuliani is a highly respected man. He was the mayor of New York City, a great mayor, and I would like him to call you. I will ask him to call you along with the Attorney General. Rudy very much knows what's happening and he is a very capable guy. If you could speak to him that would be great.4 The former ambassador from the United States, the woman, was bad news and the people she was dealing with in the Ukraine were bad news so I just want to let you know that. The other thing, There's a lot of talk about Biden's son, that Biden stopped the prosecution and a lot of people want to find out about that so whatever you can do with the Attorney General would be great. Biden went around bragging that he stopped the prosecution so if you can look into it... It sounds horrible to me.

Well, she's going to go through some things. I will have Mr. Giuliani give you a call and I am also going to have Attorney General Barr call and we will get to the bottom of it. I'm sure you will figure it out. I heard the prosecutor was treated very badly and he was a very fair prosecutor so good luck with everything. Your economy is going to get better and better I predict. You have a lot of assets. It's a great country. I have many Ukrainian friends, their incredible people.

Good. Well, thank you very much and I appreciate that. I will tell Rudy and Attorney General Barr to call. Thank you. Whenever you would like to come to the White House, feel free to call. Give us a date and we'll work that out. I look forward to seeing you. Okay, we can work that out. I look forward to seeing you in Washington and maybe in Poland because I think we are going to be there at that time

Congratulations on a fantastic job you've done. The whole world was watching. I'm not sure it was so much of an upset but congratulations.
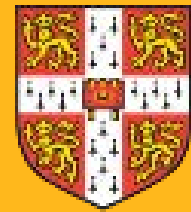
The result…

CCAF/WEF AI Survey – Due End of Q4 2019

Survey Profile

- 150+ respondents from 37 countries
- Representing from $1.5-2 tn annual revenues
- Respondents are 50% Incumbents, 50% FinTech/TechFin

	Deposits and Lending	Payments	Insurance	Investment Management	Capital Markets	Market Infrastructure
Applications, Technology & Data						
Business model creation and transformation						
Regulatory & Strategic implications						

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