

Internet Economics and Financial Technology  
*Computer Science COMSM0019*

**Lecture 16:**  
**Prediction Markets &**  
**The Crowd Economy**

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# Part I: Prediction Markets



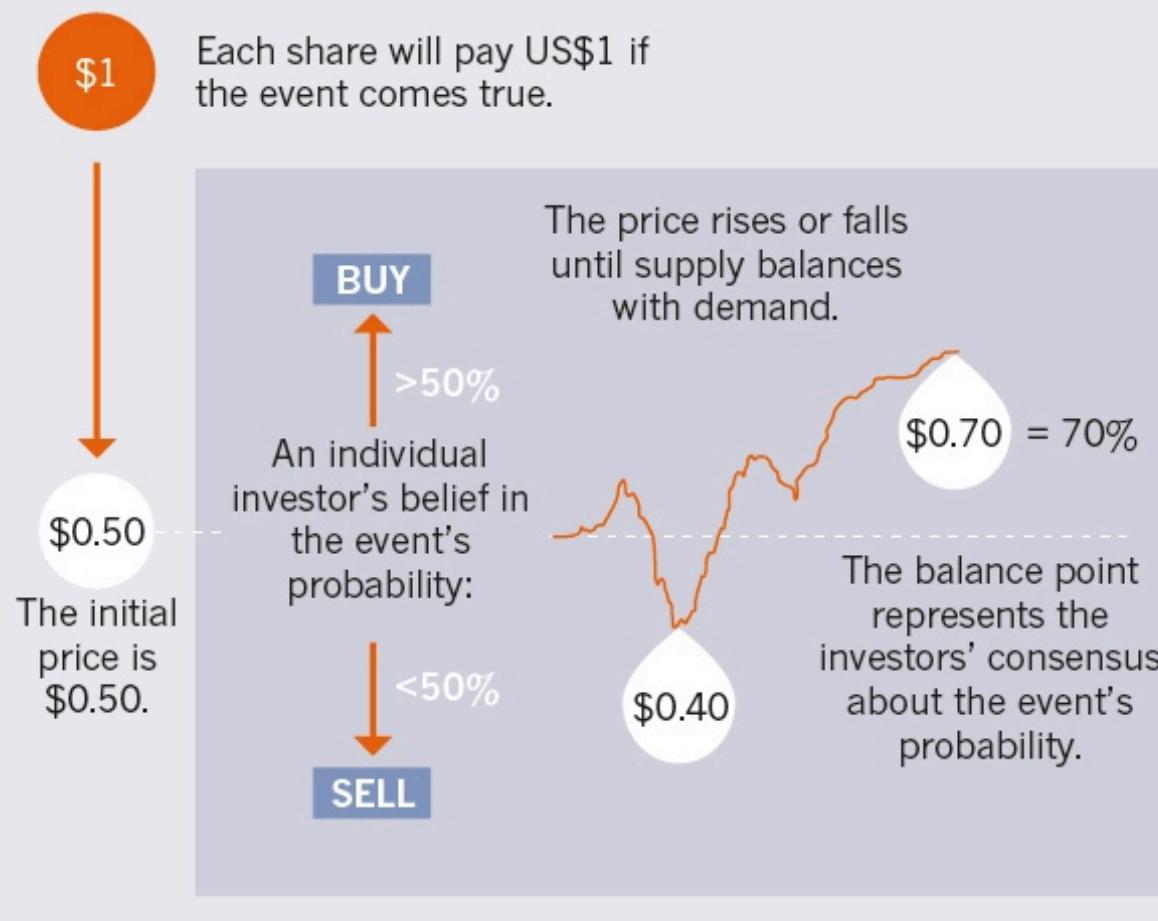
- To elicit *crowd intelligence* through the *financial market* mechanism
  - Markets created for the purpose of *trading the outcome of events*

# Prediction Markets

- Imagine you are interested in predicting the **outcome** of an *uncertain event* in the *future*, e.g.:
  - Will it snow in Bristol on Christmas day 2019 ?
  - Will there be a second independence referendum on Scotland leaving the UK before 23:59:59 on 31/12/20 ?
  - Will the Democrat or Republican nominee become the next POTUS ?
  - What share of the vote will the Democrat nominee receive at the next US presidential election?
- Each event is uncertain, but eventually we *will* know the outcome
  - (i.e., **outcomes are verifiable**)
- What is the best way to predict what will happen?
  - One approach is to use a **prediction market**
  - These are **similar to betting markets** (odds in betting markets are often a reasonable forecast of event outcomes)

# HOW A MARKET PREDICTS

Prediction markets use investors' opinions to generate a price for 'shares' in a given event.



Adam Mann, The power of prediction markets, Nature News, 18 Oct, 2016

<https://www.nature.com/news/the-power-of-prediction-markets-1.20820>

# Prediction Markets

- Trading of units (“shares”) which **pay out** based on the **outcome** of a real-world event, such as the result of an election.
- Two kinds of markets:
  - Winner-takes-all (**WTA**): fixed value payout if something happens, such as a given candidate wins an election (payout is zero otherwise).
  - Vote share (**VS**): % payout based on a quantitative outcome (such as share of seats in an election, or share of vote, with payout proportional to the outcome).
- Market is run as a **CDA** – participants can state what prices they are willing to buy/sell at and a trade takes place when crossing occurs.
- Current trade price is considered a measure of the (**believed**) probability of a given event by traders (i.e., the **collective prediction** of the crowd).
- Put your money where your mouth is:
  - You have to pay to play and risk losing money
  - This keeps you honest: money (even small amounts) speaks louder than opinion polls!

# The Iowa Electronic Markets (IEM)

- Opened 1988, University of Iowa, Tippie College of Business
  - <https://iemweb.biz.uiowa.edu/about/>
- Small-scale real-money futures markets where contract payoffs depend on economic / political events
  - Not-for-profit: research and teaching
  - Stakes are small (hard limit of \$500 per trader)
  - Low numbers of traders (typically in the low thousands).
- IEM is *not* considered as *gambling* (but most others are)
  - IEM is the only prediction market in US with a license to allow real-money trading
  - Other well known real-money prediction markets (which US residents can trade) include:
    - InTrade: Ireland, 2001-2013. In 2012 US government stopped US residents trading on the platform.
    - iPredict: New Zealand, 2014-current. Each market max 5000 traders, \$850 spend.
- Play money prediction markets are legal (e.g., The Hollywood Stock Exchange, predicting Oscar winners, box office receipts, etc.)

# IEM Prediction Market: Winner-Takes-All (WTA) Example (1/2)

Predict which of two candidates, A and B, will win an election:

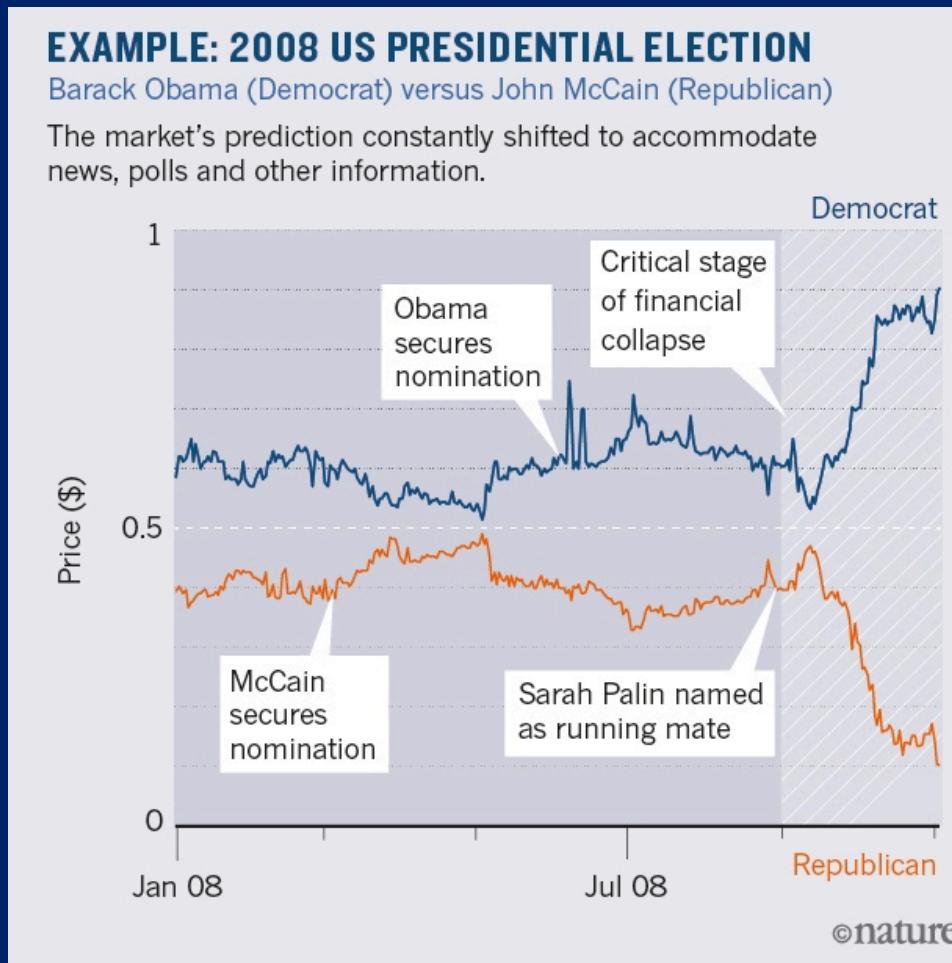
- Outcomes  $\text{win}(A)$  and  $\text{win}(B)$  are *mutually exclusive* (this is necessary)
- Create two **futures contracts** (“shares”),  $C_A$  and  $C_B$ , such that:
  - Each share of  $C_A$  will pay out \$1 if A wins, \$0 otherwise
  - Each share of  $C_B$  will pay out \$1 if B wins, \$0 otherwise
- Contracts are *initially offered as pairs* ( a “bundle” ). At any time, a trader can buy a bundle, which includes **one share of  $C_A$**  and **one share of  $C_B$**  for a **total price of \$1**
- Bundles (**one share of  $C_A$**  and **one share of  $C_B$** ) can also be sold back to the operator (IEM) at any time, for total sale price of \$1
- In the IEM, individual shares of each contract can be bought and sold at any time, but you can only:
  - **sell** shares that you already own (*short selling is not allowed*)
  - **buy** shares with money you already have (*buying on margin is not allowed*)

# IEM Prediction Market: Winner-Takes-All (WTA) Example (2/2)

Predict which of two candidates, A and B, will win an election:

- Securities are traded using a CDA mechanism. For each “share”, enter a limit order with direction (buy/sell), limit price (max/min), and quantity to trade.
- Basic trading strategy: if your *opinion* is that candidate A will win with probability  $p$  ( i.e., your expected value for A winning is  $p$  ), then:
  - Buy  $C_A$  when price  $C_A < p$ , Buy  $C_B$  when price  $C_B < 1 - p$
  - Sell  $C_A$  when price  $C_A > p$ , Sell  $C_B$  when price  $C_B > 1 - p$
- The current prices of  $C_A$  and  $C_B$  can be considered as the *collective belief* of the probability of outcomes: “A will win” and “B will win”.
- The market trades until the event outcome occurs. At this point the market is closed and holders of each “share” of the correct outcome receives payment.

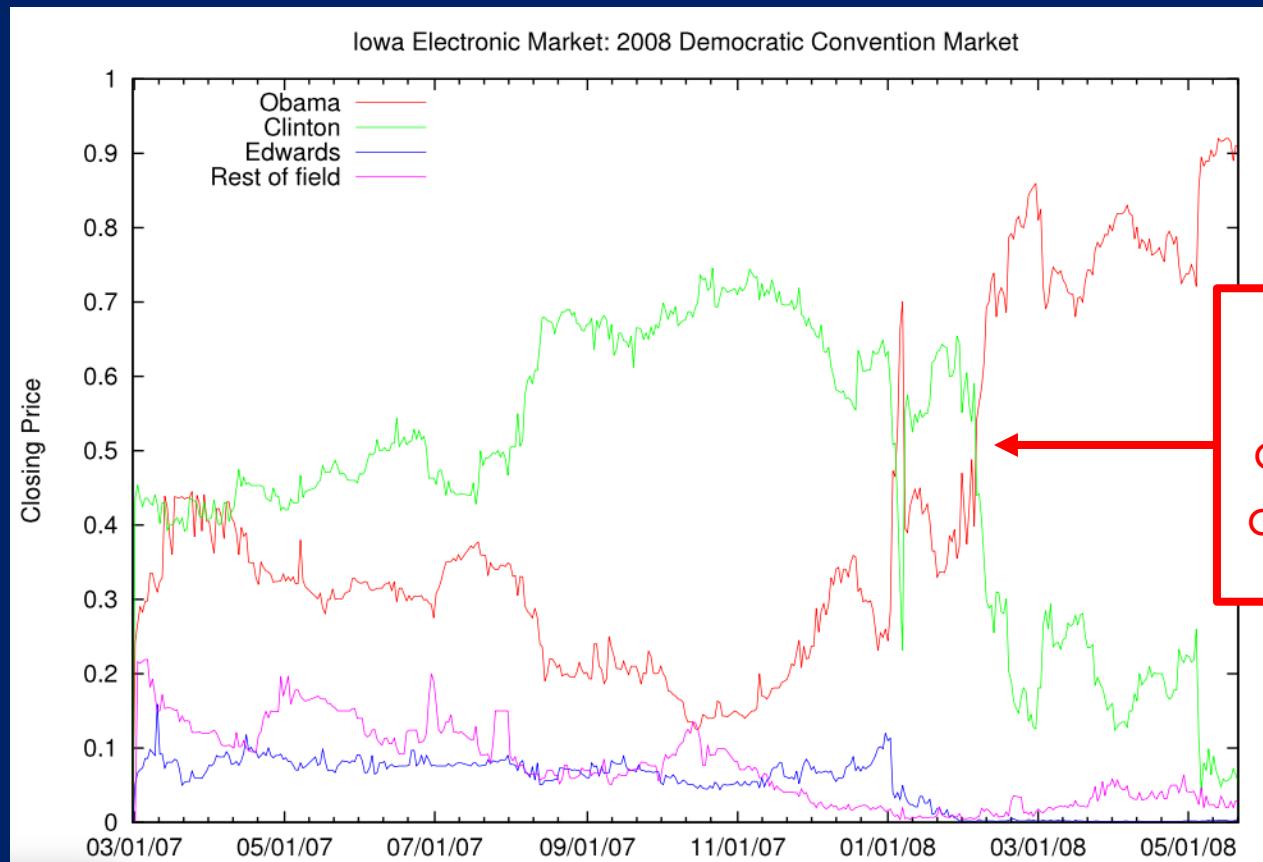
# Correctly predicting 2008 US Presidential Election



Adam Mann, The power of prediction markets, Nature News, 18 Oct, 2016

<https://www.nature.com/news/the-power-of-prediction-markets-1.20820>

# Prediction markets with multiple ( $n > 2$ ) outcomes



## "Super Tuesday"

Feb 5, 2008, Presidential Primaries.  
Obama wins 13 to Hilary Clinton's 10.  
Opinion swings in favour of an Obama victory, which proved to be correct.

- Prediction markets work equally well with multiple outcomes:  $O_1, O_2, \dots, O_n$
- Issue a contract (a “share”) for each separate (mutually exclusive) outcome

# QUESTION:

- A WTA prediction market has two binary futures contracts:
  - Snow: It *will* snow in Bristol on Christmas Day (Pay out: T/F = \$1 / \$0)
  - Not Snow: It *will not* snow in Bristol on Christmas Day (Pay out: T/F = \$1 / \$0)
- Markets are currently trading at:
  - Snow: \$ 0.60
  - Not Snow: \$ 0.30
- QUESTION: What should you do? Why?  
( Think about this for a minute, before moving on )

# An Arbitrage Opportunity

- Arbitrage is the act of simultaneously buying/selling across markets for **risk free profit** (when prices are such that there is an opportunity to guarantee a profit)
- Arbitrage has the effect of aligning markets (removing **inefficiencies**)
- Continuing the example on the previous page...
  - A prediction market has two binary futures: Snow/Not Snow
  - Markets are currently trading at: Snow: \$0.60; Not Snow: \$0.30
  - Total cost (Snow + Not Snow) = \$0.90
  - If you buy both, you know that one of them is guaranteed to pay out \$1.00 on Christmas day, which will make you a guaranteed risk-free profit of \$0.10 per share.
- Buying both “shares” is likely to raise their prices (due to increased demand).
- Therefore, soon the total cost (Snow + Not Snow) will equilibrate at \$1
  - In this way, arbitrage aligns the market (we say the signal is “arbed” away)
  - Arbitrage also works when both stocks are over-priced (i.e., sum prices > \$1)

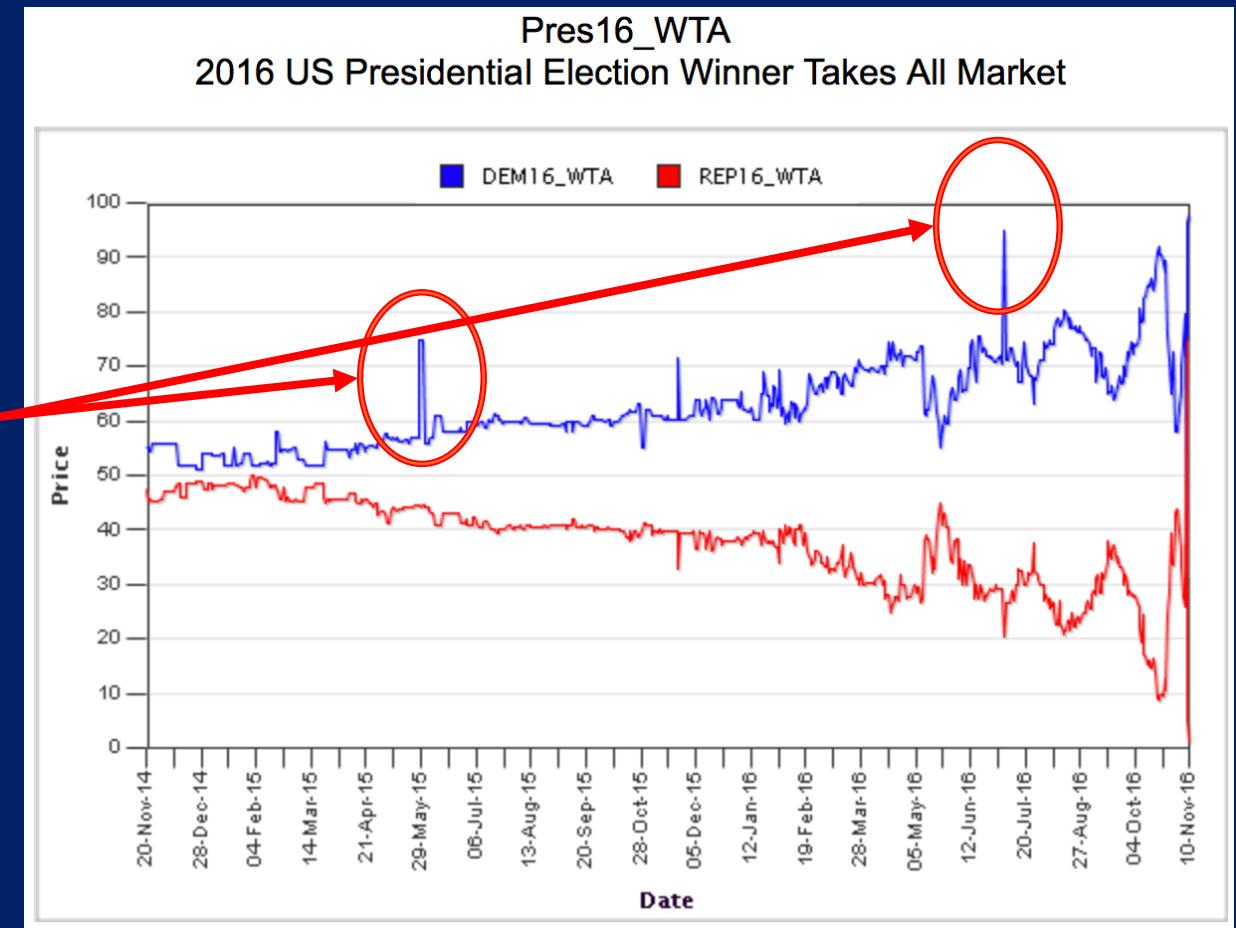
# IEM – Vote Share (VS) Market

- A VS market runs in a similar fashion to a WTA market. The only difference is the description of the payouts of the futures contracts
- A VS contract pays out in proportion to the percentage of votes
- For example: a VS market for the 2020 US Presidential election has two contracts, defined as follows:
  - UDEM20\_VS: Pays \$1 times the Democratic Nominee's share of the two-party popular vote in the 2020 U.S. Presidential election
  - UREP20\_VS: Pays \$1 times the Republican Nominee's share of the two-party popular vote in the 2020 U.S. Presidential election
  - If, say, the final result of the election is 55% vote to Democrat, and 45% vote to Republican, then UDEM20\_VS pays \$0.55, and UREP20\_VS pays \$0.45.
- The market price of the security can be interpreted as the market's prediction for the vote share of a candidate.

# Note: predictions are *not* always correct. (WTA market)

## Arbitrage opportunity alert!

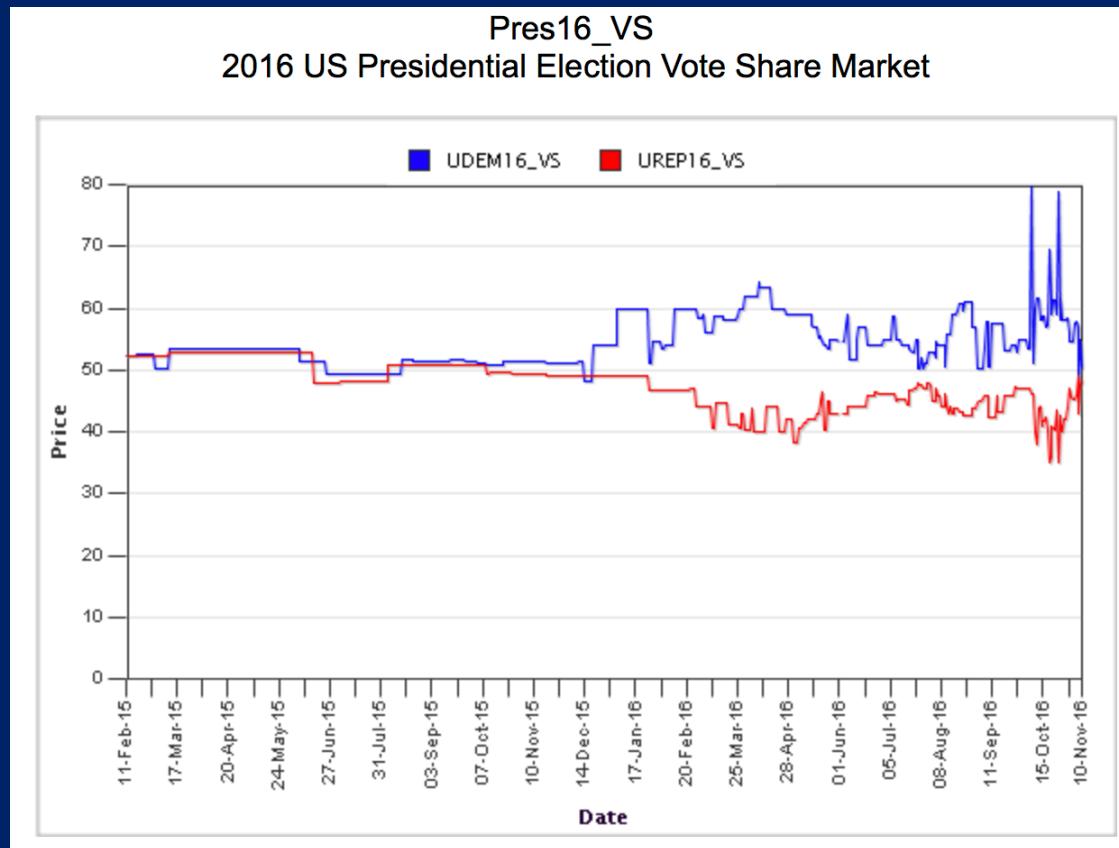
- Sum value > 100.
- Buy a bundle (one of each share) from IEM for fixed price = 100. Then immediately sell both at current market price for a risk-free profit.
- Be quick – it won't last long.
- You snooze, you lose!



*Sorry, Hillary, better luck next time...*

[https://iemweb.biz.uiowa.edu/graphs/graph\\_PRES16\\_WTA.cfm](https://iemweb.biz.uiowa.edu/graphs/graph_PRES16_WTA.cfm)

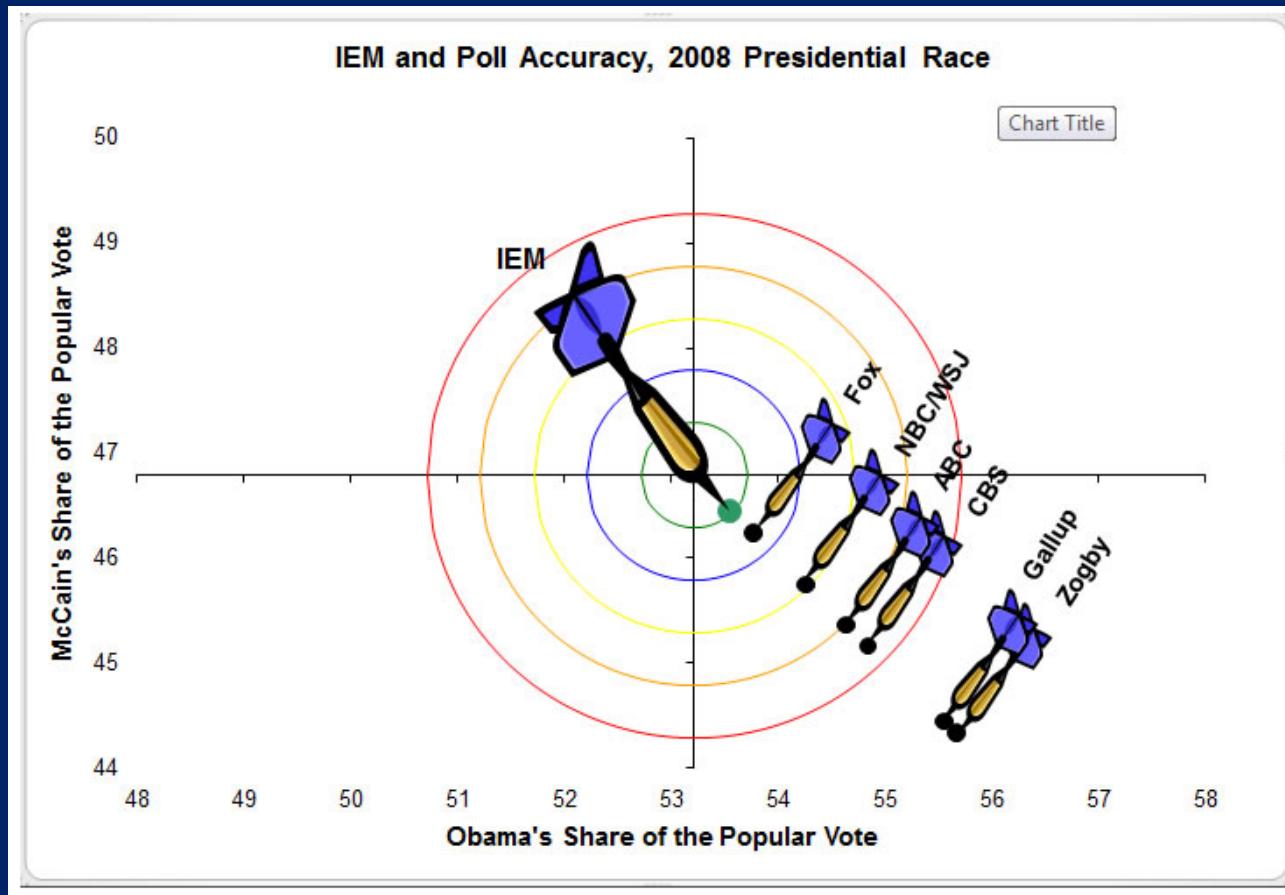
Note: predictions are *not* always correct. (VS market)



- Although, this is actually pretty close to the final result of the 2016 US election
- Clinton ( Democrat, blue ) received **51.1%** of the two-party popular vote share

[https://iemweb.biz.uiowa.edu/graphs/graph\\_Pres16\\_VS.cfm](https://iemweb.biz.uiowa.edu/graphs/graph_Pres16_VS.cfm)

...but they *can be* spectacularly accurate (VS market)

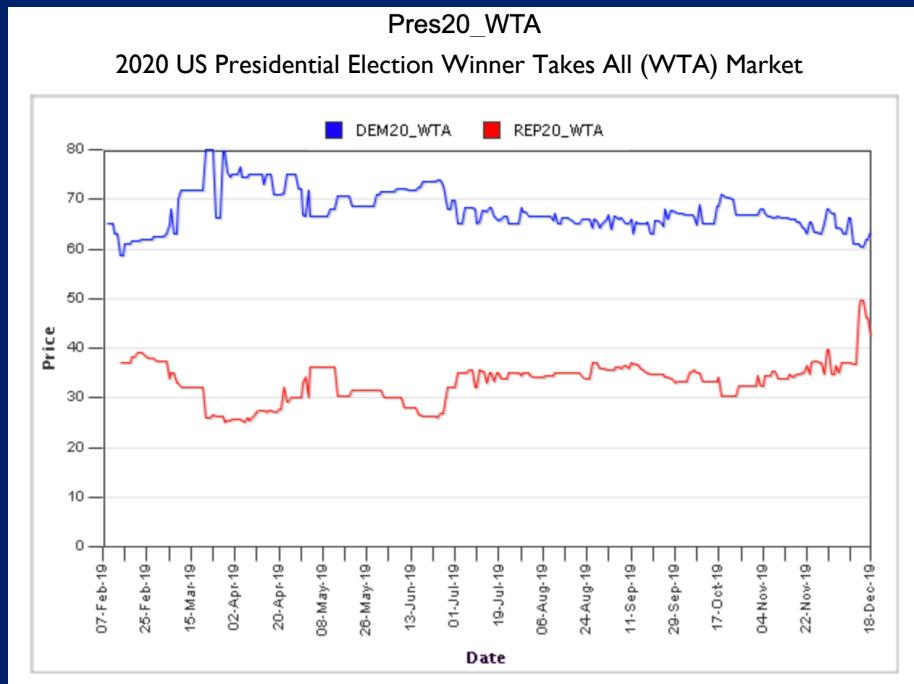


2008 Presidential Race: IEM outperformed all major opinion polls

Why? Money talks – less psychological bias / game playing than we see in opinion polls

<https://iemweb.biz.uiowa.edu/media/08Pres.html>

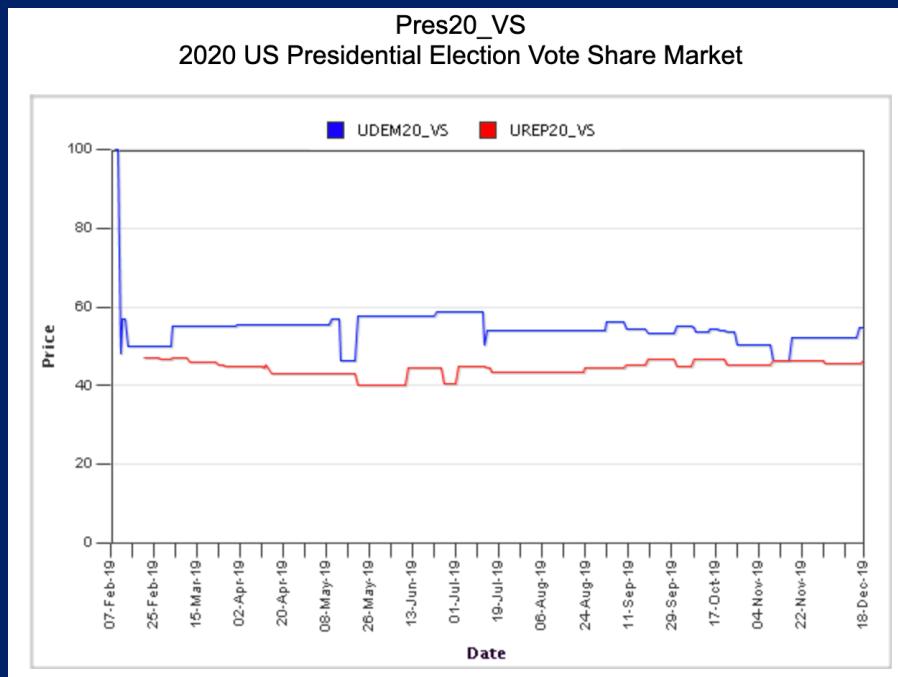
# 2020 US Presidential Election: IEM's Current Predictions (19<sup>th</sup> Dec. 2019)



[https://iemweb.biz.uiowa.edu/graphs/graph\\_PRES20\\_WTA.cfm](https://iemweb.biz.uiowa.edu/graphs/graph_PRES20_WTA.cfm)

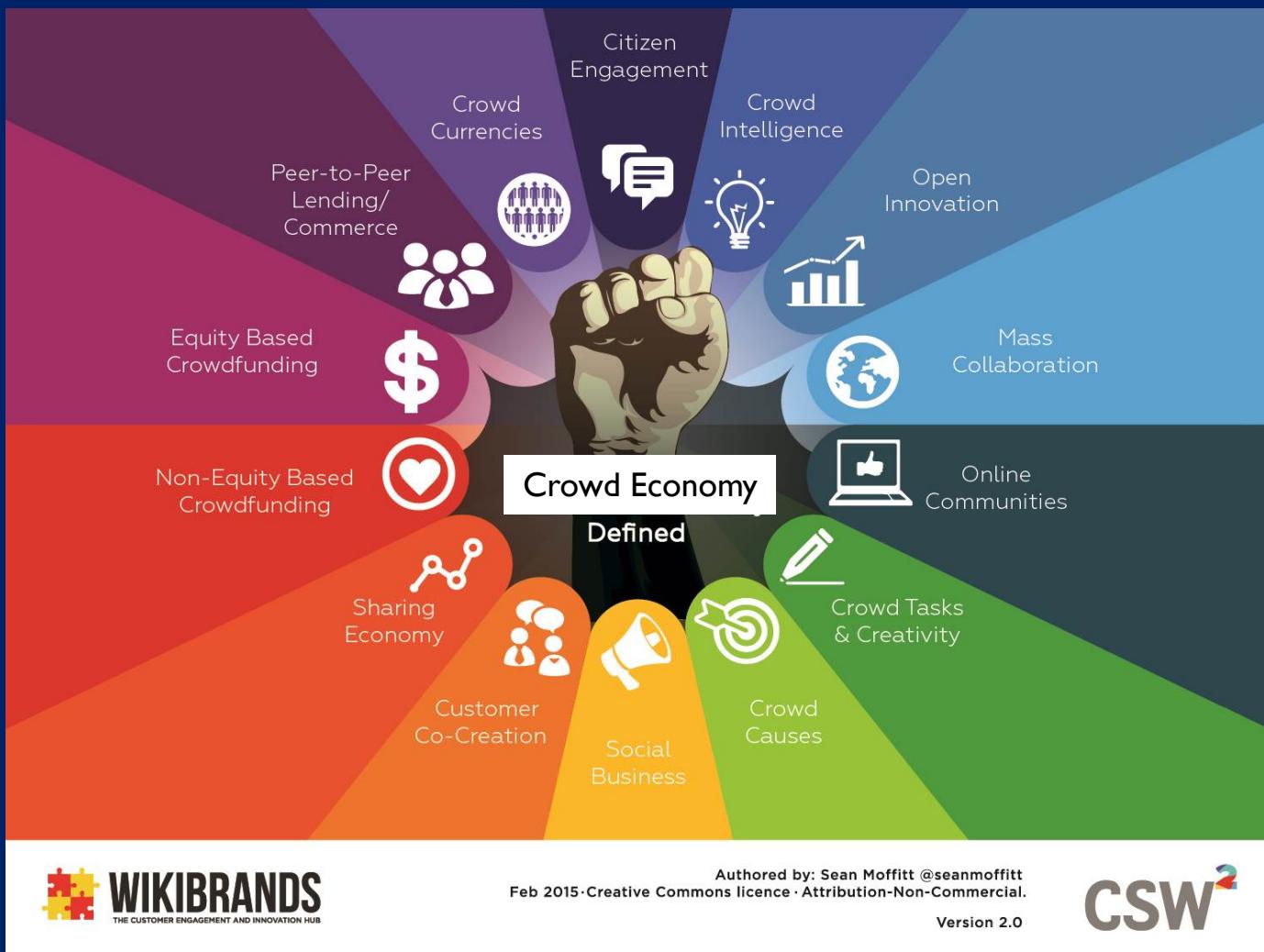
Democrats are favourite to win: 62%

Vote share 55% : 45% in favour  
of Democrats

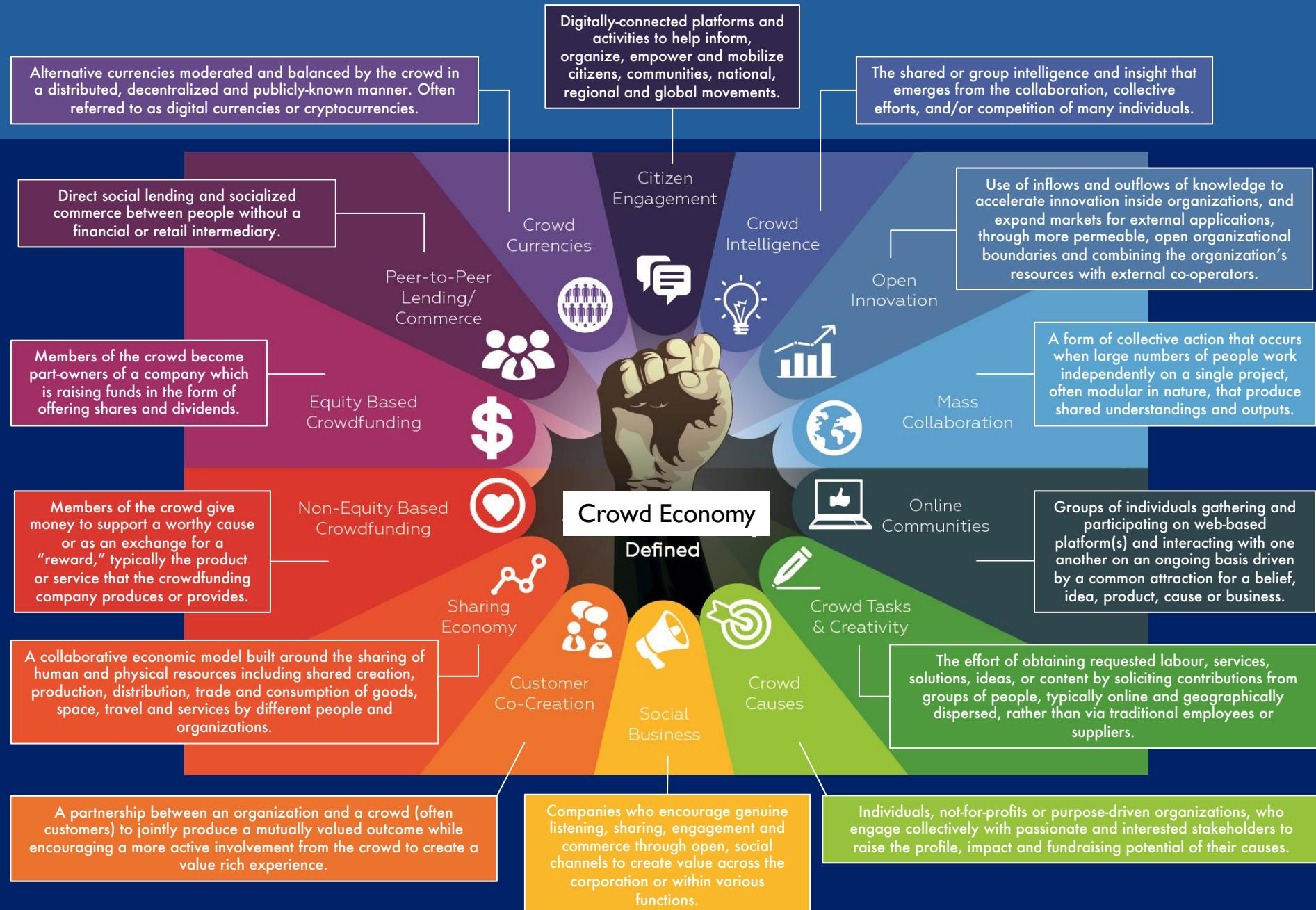


[https://iemweb.biz.uiowa.edu/graphs/graph\\_PRES20\\_VS.cfm](https://iemweb.biz.uiowa.edu/graphs/graph_PRES20_VS.cfm)

# Part II: The crowd economy



<https://crowdsourcingweek.com/14-parts-of-the-crowd-economy-landscape/>



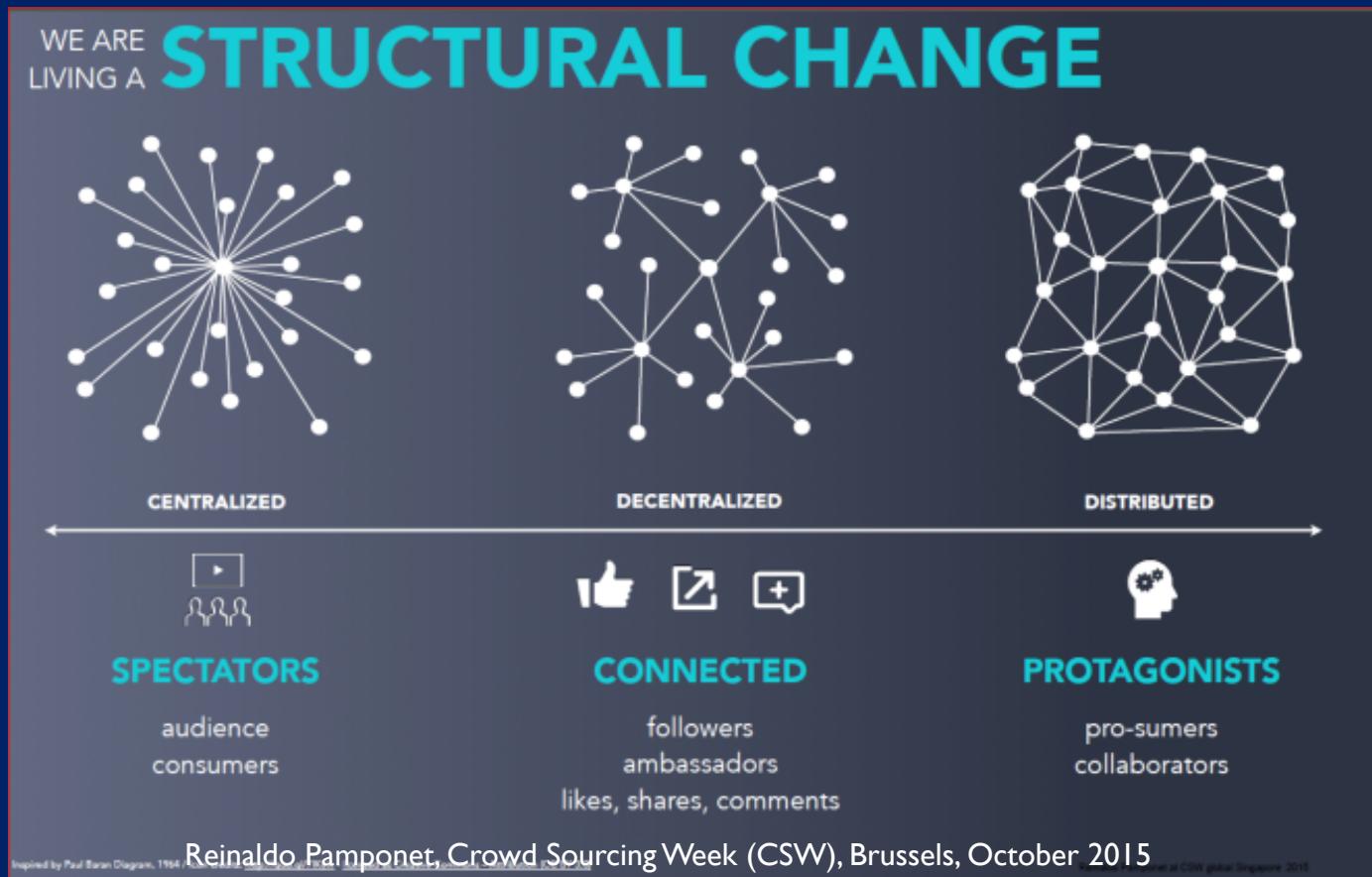
# Web 2.0: evolution of the “social” web

- Web 1.0 (1990s)
  - Content creators are few; most users consume content.
    - Personal web pages common, with static pages hosted on ISP-run web servers / free hosting servers.
    - Interaction often only through “Guestbooks” where visitors can leave comments
- Web 2.0 (early 2000s onwards)
  - Active user contribution / participation:
    - User generated content (YouTube, Wikipedia) blogging (word press)
    - Applications software (apps: cloud SaaS)
    - Dynamic programming languages (Python Ruby, Perl)
    - Social networks (Facebook)
    - Rich user experience, dynamic content, scalability



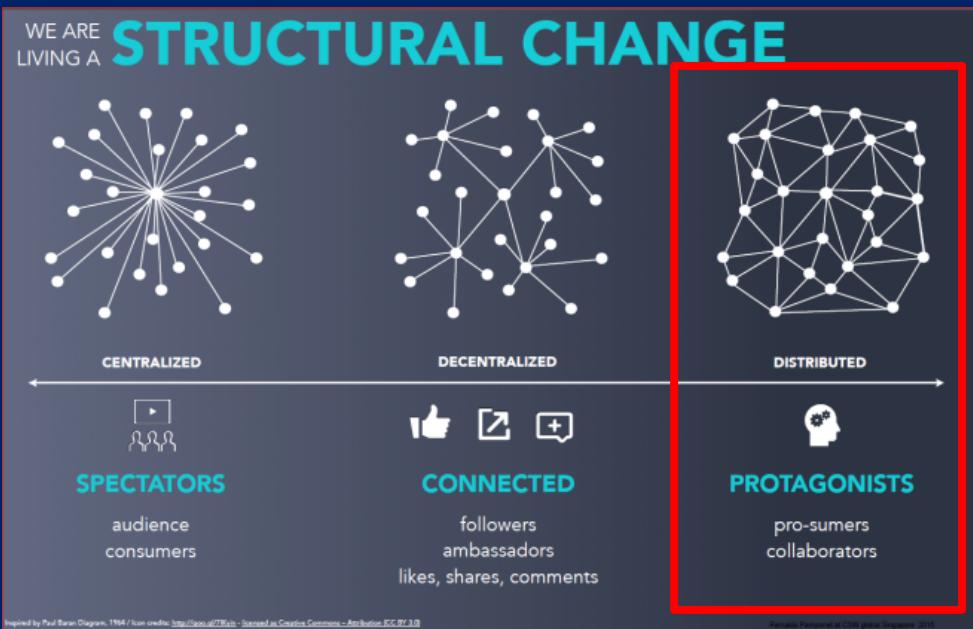
Original by Markus Angermeier. Vectorised and linked version by Luca Cremonini - Based on The huge cloud lens bubble map web2.0 web20map.png Vectorised and linked version from Web 2.0 Map Web\_2.0\_Map.svg, CC BY-SA 2.5, <https://commons.wikimedia.org/w/index.php?curid=1522976>

# The crowd economy: network structure evolution



With Web 2.0, there has been an evolution in the structure of online organizations

# The crowd economy: network structure



In the crowd economy, we become “**prosumers**”:

- Capable of **producing and consuming** a product. For example, a user can add to a Wikipedia article (act as a producer), or can simply browse Wikipedia for information (act as a consumer)
- Participation of users (e.g., on Twitter, Facebook, etc.) blurs the line between producer and consumer

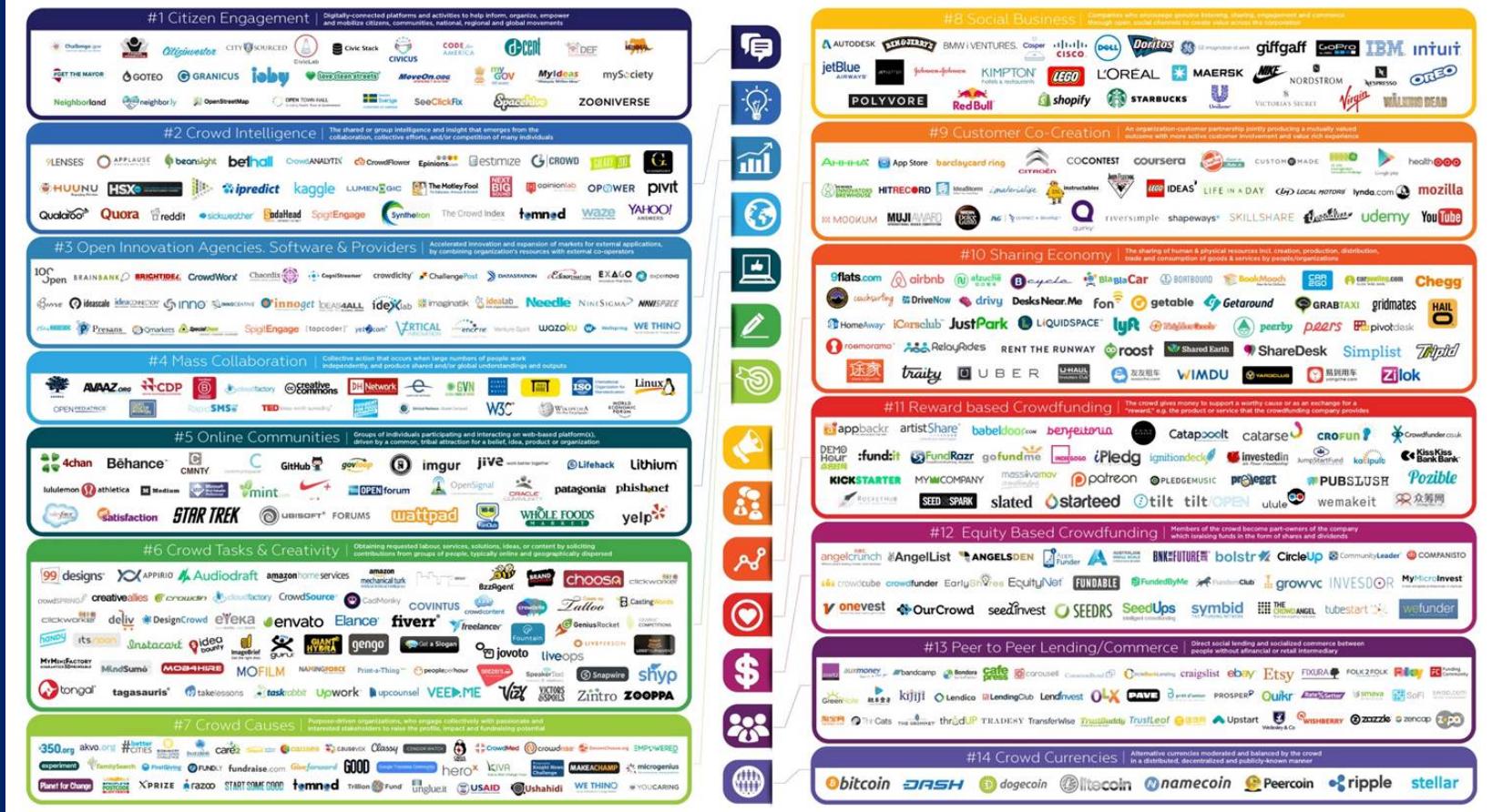
“From **centralised**, then **decentralised**, to a **networked designed organisation** is what fuels the crowd economy. The crowd evolves from **spectators** to **connected**, and finally to **protagonists**. The new companies like Airb’n’b ,Uber, etc., access resources through this model. Exponential growth and crowd distributed activities become possible.”

(Joanne Celens, CEO Synthetron (Crowd Opinions and Feedback. - “Social Brainstorming”).

<http://www.synthetron.com/crowdsourcing-is-changing-possibilities/>

## The crowd economy: Top 450 companies (2015)

# The Top 450+ Platforms & Practitioners of the Crowd Economy



Sean Moffitt, Crowd Sourcing Week (CSW), Brussels, October 2015

# **crowdsourcing**

# **crowdfunding**

## The Top 450+ Platforms & Practitioners of the Crowd Economy

### **Citizen engagement:**

e.g., Zooniverse, Cancer Research UK

### **Crowd intelligence:**

e.g., iPredict (prediction market)

### **Mass collaborations:**

e.g., Wikipedia, Linux

### **Crowd tasks and creativity:**

e.g., Mechanical Turk, reCAPTCHA

### **Donation-based:**

e.g., Fundly

### **Reward-based:**

e.g., Kickstarter

### **Equity-based:**

e.g., Seedrs

### **(Debt-based) P2P lending:**

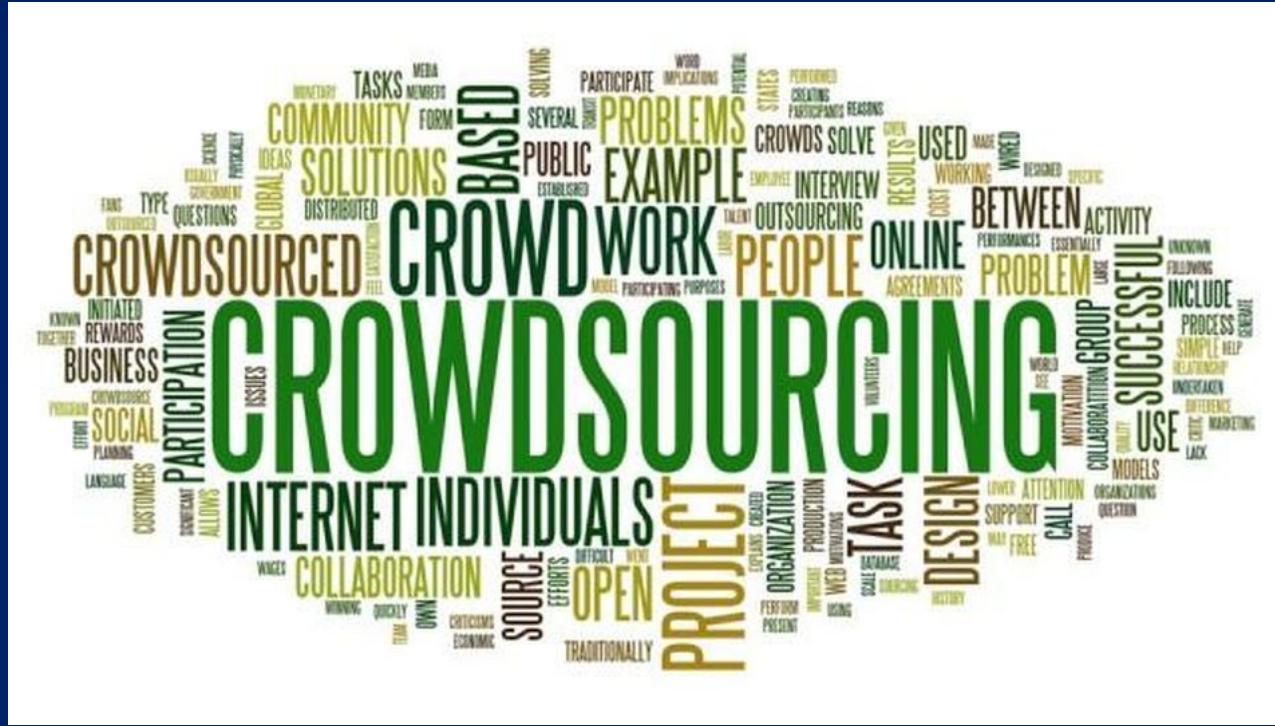
e.g., Zopa, LendingClub

### **Crowd currencies:**

(Cryptocurrencies), e.g., Bitcoin

Covered in lectures 17-18

## Part 2(a): Crowdsourcing



- Enlisting crowds of humans to help you solve a problem
  - Crowd creation and collaboration

# Crowdsourcing

- Enlist a crowd to solve a problem defined by the system owners
- Can collaboratively build some artifact;
  - E.g., Wikipedia; Open Source computing
- Or can execute part of a large task
  - E.g., Amazon Turk, Galaxy Zoo
- Or can contribute to some evaluation
  - E.g., Reviewing at Amazon (crowdsourcing of quality data)
- Crowdsourcing can be implicit (i.e., *hidden from you*)
  - E.g., Google Ad experiments (in an earlier lecture we saw how Google moved adverts around the page to observe the effect it had on consumer behaviour)
- Crowdsourcing is particularly helpful (indeed, it can be *vital*) for tasks that are currently too difficult for a computer to perform

# Amazon's Mechanical Turk

New carbon capture plant turns emissions into baking soda      Amazon Mechanical Turk      Market Info

**Sign In**

**amazonmechanical turk** Artificial Artificial Intelligence

Your Account    HITs    Qualifications    475,052 HITs available now

All HITs | HITs Available To You | HITs Assigned To You

Find    HITs    containing    that pay at least \$ 0.00    for which you are qualified    require Master Qualification    GO

**Timer: 00:00:00 of 5 minutes**

Want to work on this HIT?    Want to see other HITs?

**Accept HIT**    **Skip HIT**

**Total Earned:** Unavailable    **Total HITs Submitted:** 0

Find Images of these Real Estate Agents  
Requester: Kristin Howe    Reward: \$0.04 per HIT    HITs Available: 130786    Duration: 5 minutes  
Qualifications Required: Masters has been granted

**Office Website:** <http://www.brushrealty.com>

**Office Name/Location:** Brush Real Estate Services Inc in Escondido, CA

**Real Estate Agent:** Kevin DeCew

1. Enter the IMAGE URL for the given real estate agent:

2. If you could not find an image for Kevin DeCew, give the reason why below. (Note: Only answer this question if you cannot find an image for the given real estate agent.)

This agent was not found on the given website.

No image existed of this agent on the given website.

Other:

Want to work on this HIT?    Want to see other HITs?

**Accept HIT**    **Skip HIT**

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# Amazon's Mechanical Turk

**Office Website:** <http://www.brushrealty.com>

**Office Name/Location:** Brush Real Estate Services Inc in Escondido, CA

**Real Estate Agent:** Kevin DeCew

1. Enter the IMAGE URL for the given real estate agent:

2. If you could not find an image for Kevin DeCew, give the reason why below. (**Note:** Only answer if you did not find an image.)

This agent was not found on the given website.

No image existed of this agent on the given website.

Other:

Total HITs Submitted: 0

Reward: \$0.04 per HIT    HITs Available: 130786    Duration: 5 minutes

## Task:

- Find image of estate agent named **Kevin DeCew** on website **BrushRealty.com**
- Upload URL if found

## Pay:

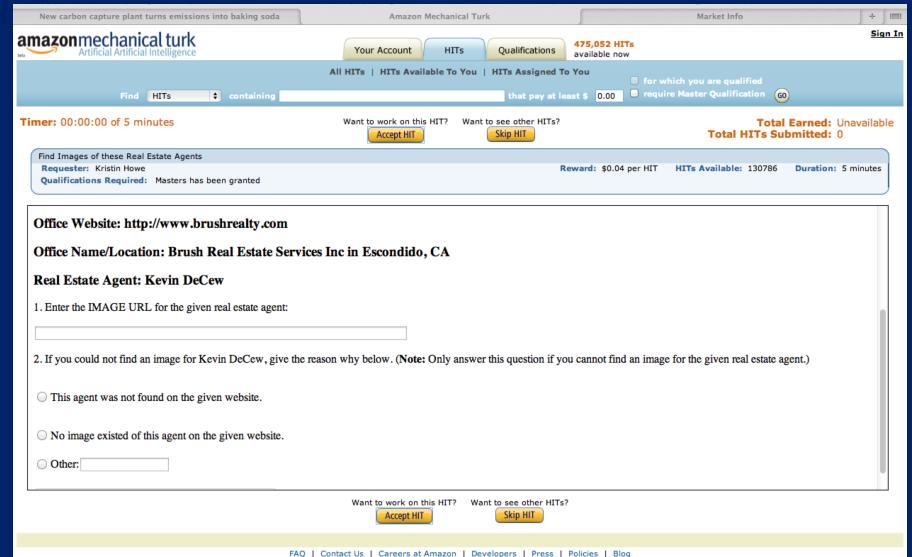
- 4 cents per hit

## Time to complete:

- 5 mins

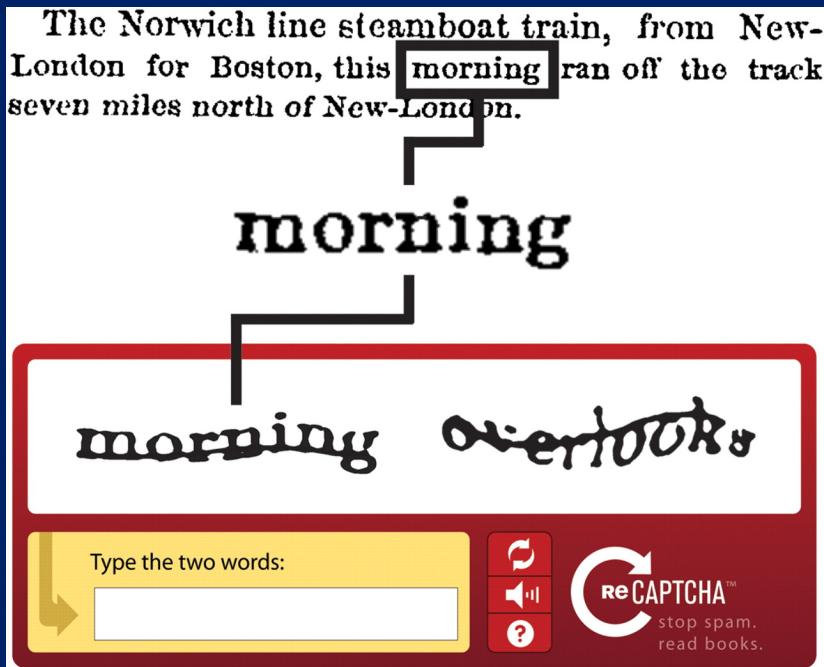
# Mechanical Turk

- A crowd-based labour market
  - “Employers” offer small tasks to complete in return for a (usually small) amount of pay.
- Useful for tasks that are difficult/costly for a computer
- Haro et al. (2018) showed average “wages” are very low:
  - Only 4% of Mechanical Turk workers earn more than the UK / USA minimum wage
  - Mean wage: \$1.77 / hour

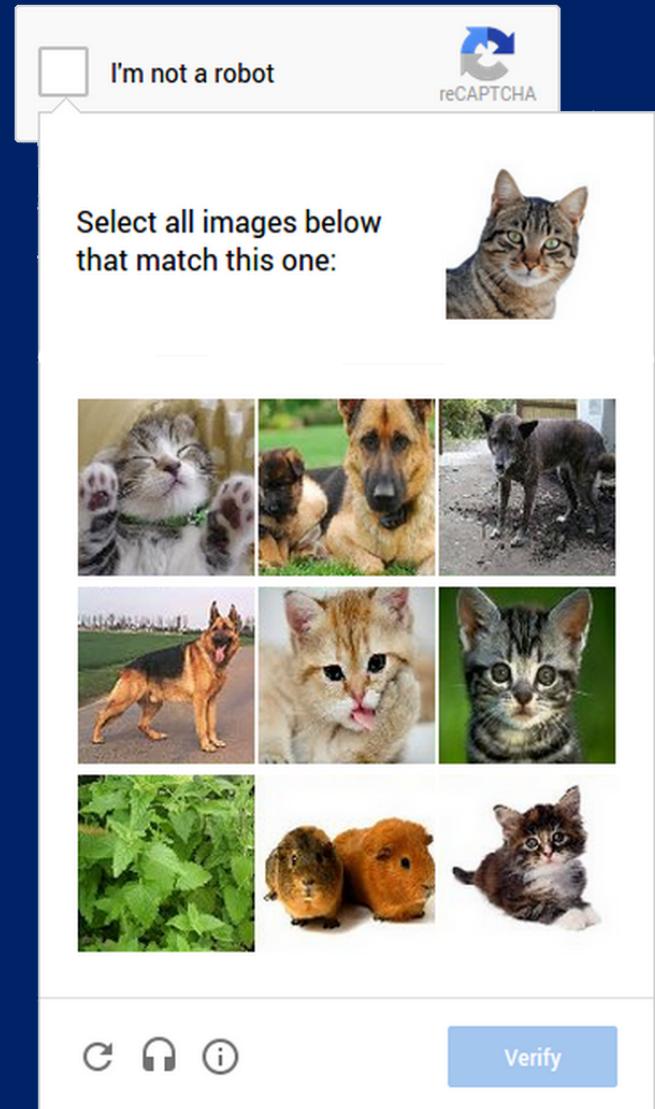


Haro et al (2018) A Data-Driven Analysis of Workers' Earnings on Amazon Mechanical Turk Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems Paper No. 449 <https://dl.acm.org/citation.cfm?id=3174023>

# reCAPTCHA



- Application to **verify** that a user is a **human**
  - At the same time, it is assisting in the **digitization** of books
  - Or helping to **label images** for supervised machine learning
- Originally Carnegie Mellon University, acquired by **Google** in 2009



# Crowdsourcing: How to recruit & retain contributors?

- Pay them (e.g., Mechanical Turk)
- Crowd Source as a **side effect** of something they want to do, or have to do anyway (e.g., Google adverts / reCAPTCHA)
- Recruit **volunteers** (more on this next...)
  
- If recruiting volunteers, they must be well motivated to work for free:
  - Intrinsic motivation for doing a task that interests them or they believe is worth doing
  - Fun.
  - Recognition and virtual reward for contribution.
  - Competition with others

# Crowdsourcing: Citizen Engagement / Citizen Science



- Crowdsource volunteers to address grand challenges

# Zooniverse: people-powered research

## PlanetHunters

<https://www.zooniverse.org>



- Looking for planets (using NASA's huge dataset)
- Go online, get some brief training
- When a planet goes in front of a star the light will dip
- Why not use machine learning?
  - There are currently no tagged datasets for supervised learning
  - The aim is to crowdsource the public to classify images. These can later be used as a training corpus for machine learning (so eventually the process can be automated)

# Cancer Research UK: Citizen Science

The screenshot shows the Cancer Research UK website's "Citizen Science" page. At the top, the logo "CANCER RESEARCH UK" is displayed next to a colorful circular graphic. The tagline "Together we will beat cancer" is centered above a search bar and a pink "Donate" button. Below the header, a navigation menu includes "Home", "About cancer", "Get involved" (which is highlighted in pink), "Our research", "Funding for researchers", "Shop", and "About us". A breadcrumb trail at the bottom left shows the path: "Home > Get Involved > Citizen Science > The projects". The main content area features a large heading "The projects" and a thumbnail image of a 3D puzzle game interface. The thumbnail shows three interconnected levels of a puzzle landscape with various objects and text overlays like "LAND IMPROVED", "Citizen Science at Cancer Research - Our...", "Watch later", "Share", and "FULLY UPGRADED". To the right of the thumbnail, a box titled "Our projects" contains text about the five citizen science projects, mentioning over 500,000 global volunteers supporting research into four cancer types. It also encourages reading about the projects below.

Watch the video [1 min 37s]

<https://www.cancerresearchuk.org/get-involved/citizen-science/the-projects>

# Cancer Research UK: The Projects

- Gamification of classification / data analysis challenges related to cancer research
- Series of games (web apps) released from 2012 onwards, each improving performance on the last
- Latest project: Trailblazer
  - Web-app designed to continuously improve citizen scientists' ability to spot cancer cells in tissue samples.
  - Players shown images of tissue cores and asked to mark areas of cancerous cells after going through a tutorial.
  - 90% accuracy compared with scientists' classifications

## Part 2(b): Crowdfunding



- Raising money (for business ventures and other projects) from crowds of people directly, without needing the involvement of traditional financial organisations such as banks

# Reward-Based Crowdfunding

KICKSTARTER

Raise money directly from the public, without needing to go to a loan organization or venture capital firm



Bristol, United Kingdom Change city

See all

A thumbnail for a campaign titled 'All New Adventures of Morph from Aardman Animations' by Peter Lord. It features an orange cartoon character holding a sign that says 'BRING BACK MORPH'.

A thumbnail for a campaign titled 'FizzJelly: A Cellular Connected Arduino Compatible Platform' by Mobile Minds. It shows a white device with various ports and sensors.

A thumbnail for a campaign titled 'ITAH S/S 2015 Final Collection' by Hati South. It features a woman wearing a white headband and pink sunglasses.

A thumbnail for a campaign titled 'Vanessa Hartley's debut album "Passivity"' by Vanessa Hartley. It shows a woman sitting outdoors near a waterfront.

\$4,708,796,065 total dollars pledged to Kickstarter projects

175,259 Successfully funded projects

- Money paid at end of pledging period
- Goods given at the end (i.e., the **reward** is the product you invested in), e.g.,
  - Oculus Rift (VR headset); Pebble watch
- Pre-commitment of buyers allows money to be raised to fund development.

- There is often a ‘menu pricing’ of premium options (a form of versioning)
- Psychology encourages participation too:
  - A sense of ‘being part of’ a project.
  - A charitable action

# Crowdfunded Projects by Capital Raised (Feb 2017)

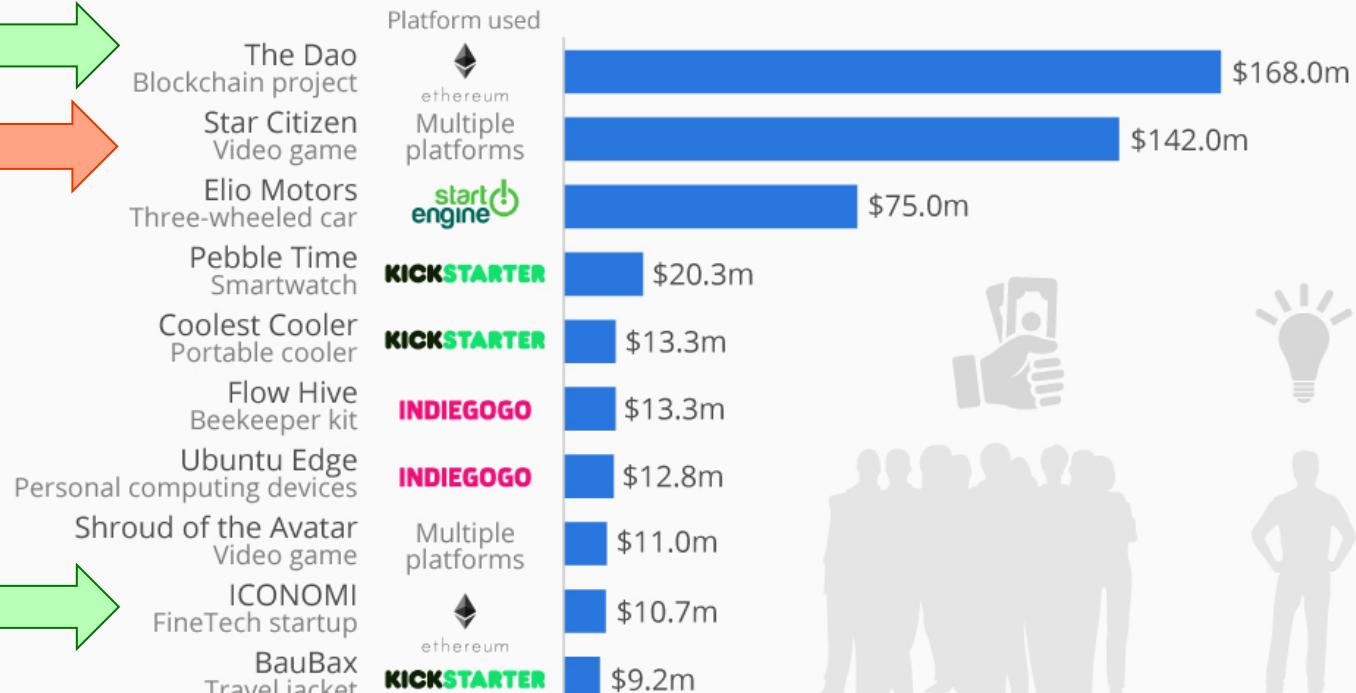
The DAO. Described more in “Blockchain 2” lecture

**Star Citizen** video game (under development). By Dec. 2019, funding over \$250m, with 2.4m backers.

**ICONOMI**. Cryptocurrency investment and trading platform (FinTech Startup)

## Funded by the Crowd

Capital raised in particularly successful crowdfunding campaigns



as of February 2017

Sources: Statista Digital Market Outlook, Crunchbase, Indiegogo, Kickstarter, Wired.com



statista

# Equity-Based Crowdfunding



**Equity crowdfunding:** the 'crowd' invest in an early-stage unlisted company (i.e., pre-IPO) in exchange for **shares** in that company.

- A shareholder has partial ownership of a company and stands to profit should the company do well. Because equity crowdfunding involves investment into a commercial enterprise, it is often subject to securities and financial regulation.

**Seedrs:** Largest equity crowdfunding platform in the UK, with over £500 million in total investments raised. First to receive regulatory approval (from FCA) in May 2012.

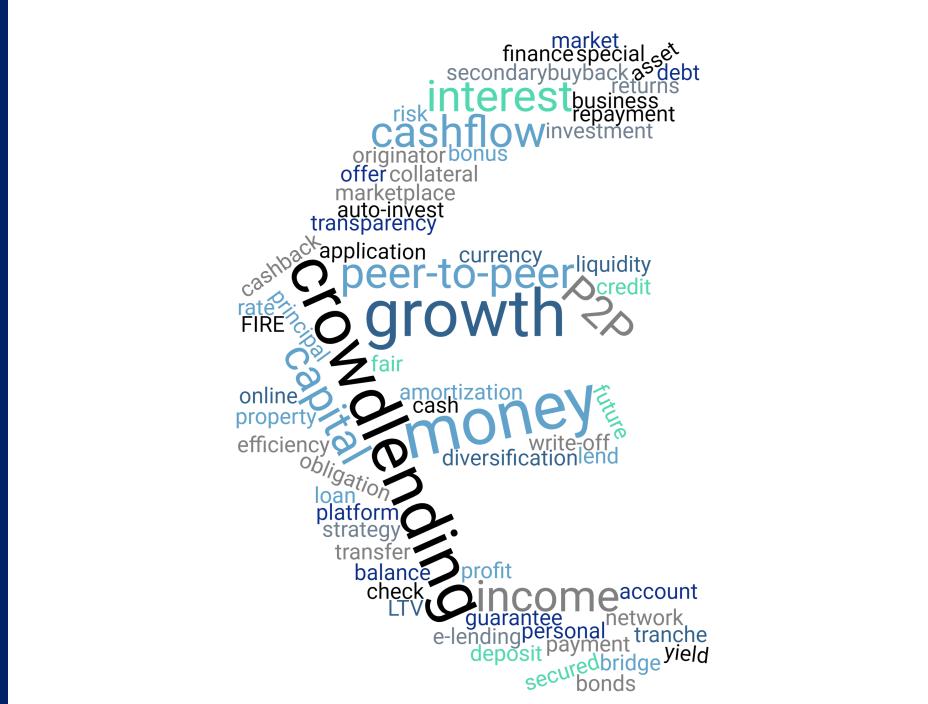
- **Fees:** Successful campaigns pay 6% fee on funds raised, and 0.5% processing fee.
- **Famous alumni:** Revolut (challenger bank) - April 2018 became a UK Unicorn
- **Includes a secondary market:** Allows investors an opportunity to access liquidity by trading equity before IPO

**Largest equity crowdfunding investment:** £74 million for BrewDog brewery, home of Punk IPA. Company now valued at \$1.5 bn. Campaign “equity for punks”

**EQUITY FOR PUNKS**



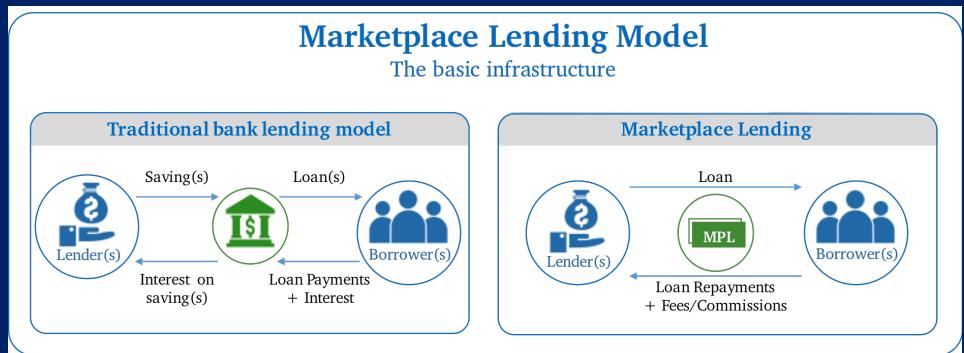
# Part 2(c): Peer-2-Peer Lending



- Remove the need for high-margin intermediaries (banks and loan companies) by matching borrowers with lenders directly.

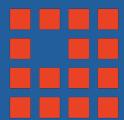
# P2P Lending

- Peer-2-peer (P2P) finance offers an alternative to traditional banking
- Rather than have a bank (or other financial institution) as an intermediary, borrowers and lenders are matched directly through a P2P lending platform
  - **Borrowers** tend to be either individuals looking to take out a personal loan (to buy a car, consolidate debts, etc.), or small businesses.
  - **Lenders** are people with some money, looking to seek a return (i.e., *investors*)
- The P2P platform sits between borrowers and lenders, providing a marketplace for people with capital to lend to people needing it.



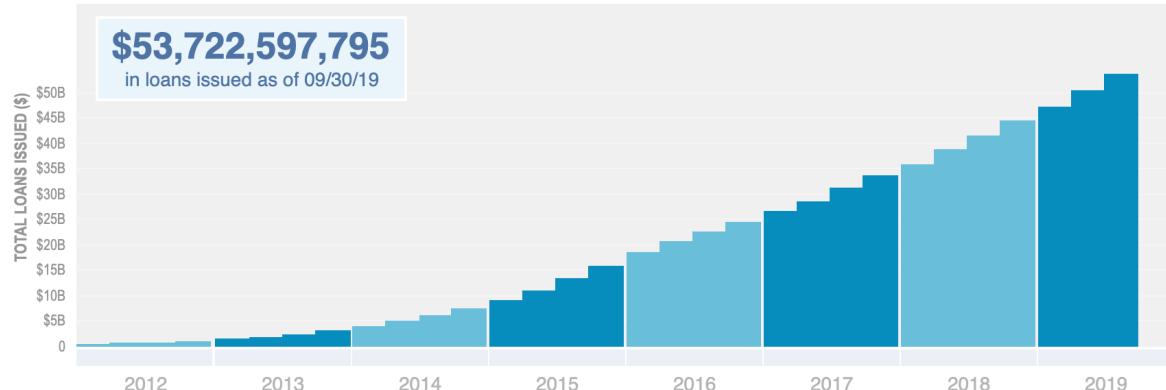
P2P platforms are *FinTech*. They work on low margins (compared to traditional banking and finance) so can offer:

- loan interest for **borrowers** that is much lower than a bank interest rates
- returns for **lenders** that are much higher than savings interest in a bank



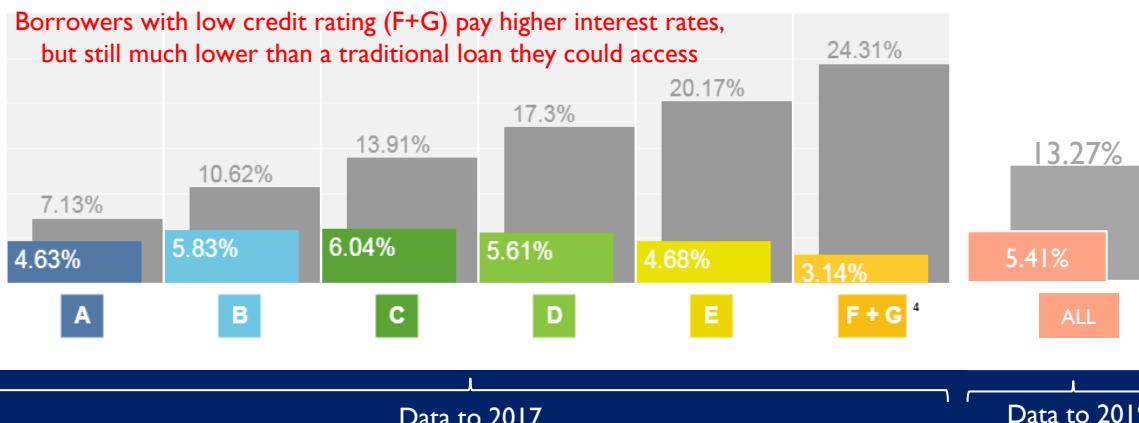
# LendingClub

## TOTAL LOAN ISSUANCE



## HISTORICAL RETURNS BY GRADE

Adjusted Net Annualized Return      Average Interest Rate



Avg. Interest Rate: Weighted average interest rate on issued loans

Adj. Net Annualized Return: Adjusted Net Annualized Return ("Adjusted NAR") is a cumulative, annualized measure of the return on all of the money invested in loans over the life of those loans, with an adjustment for estimated future losses.<sup>1</sup>

## FinTech startup, 2006 (USA)

- IPO Dec 2014
- Market Cap: \$1.1 billion

Offers unsecured:

- personal loans* (\$1,000 - \$40,000)
- small business loans* (up to \$0.5m)

By 2019:

- Total borrowing: > \$50 billion
- Total customers: > 3 million

## Fees

- 1% on all borrower payments

## Borrowers

- Ranked by grade A-G, based on credit rating (risk)
- Average interest rates (2019):
  - A: 7.22 % (2019)
  - F/G: 26.09 % (2019)

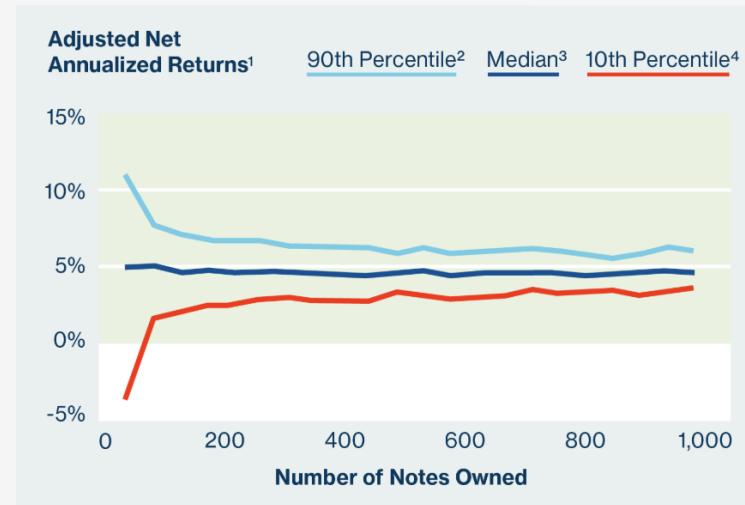
## Investors (Lenders)

- Average returns: 5.41%

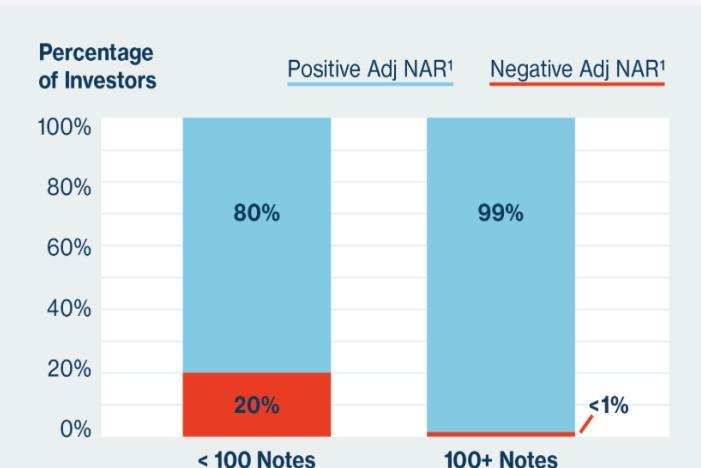
# Portfolio Diversification

These charts illustrate how diversification-spreading an investment equally across hundreds or even thousands of Notes-can drive more solid returns. LendingClub investors with more diversified accounts have generally experienced less volatility and more solid returns than investors with more concentrated holdings. Diversification increases when you purchase additional Notes related to different borrower loans.

Diversification Can Reduce Volatility of Returns



Owning 100+ Notes Reduces Risk in Your Returns



To reduce risk (volatility of returns, and the chance of negative returns from defaulting loans), spread investments out over a wide portfolio. If investments are spread over more than 100 loans, the chance of negative returns are less than 1%.

# P2P Lending: Pros and Cons

ZOPA

Funding Circle

RateSetter

LendingClub

		BORROWERS	LENDERS
PROS	<ul style="list-style-type: none"><li>Lower interest rates than banks</li><li>Fast, simple online application process</li><li>More options available via multiple originators and platforms</li><li>Less bureaucracy and no hidden fees</li><li>Unsecured loans readily available</li></ul>		<ul style="list-style-type: none"><li>Higher returns and no fees</li><li>Diversification – spread capital across multiple loans</li><li>Choice and visibility – variety of loan types, currencies and geographies</li><li>Accounts easy to open and manage</li><li>Low minimum investment amounts</li><li>Predictable, regular cash flows</li></ul>
CONS	<ul style="list-style-type: none"><li>Less privacy</li><li>Borrowers with poor credit scores still face high rates</li><li>Even if accepted, no guarantee loan will be filled</li></ul>		<ul style="list-style-type: none"><li>Not all platforms offer tax-friendly account options (e.g. IFISA in UK)</li><li>Potential for cash drag</li><li>Higher risk than a standard savings account and no government protection</li><li>Platforms vary in maturity and may be unproven</li><li>Not all platforms have secondary markets therefore money may be tied in for duration of loan</li></ul>

- P2P lending has lots of benefits for borrowers & lenders but **there are some risks**
- In the UK, P2P is now regulated by the FCA, but investments are not covered by the FSCS (so not as safe as money in the bank). **It is possible to lose your money.**
- Risks can be reduced for lenders by **diversifying** portfolio across multiple P2P platforms, across multiple credit-risk classes, across multiple geographical regions, etc.
- **P2P lending is now a mature industry:** Global P2P lending market is valued at around \$15 billion in 2018, and expected to grow to \$44 billion by 2024

# Summary: Harnessing the power of crowds

- There is great value in the **power of crowds**...
  - We can harness the intelligence of crowds to make collective predictions, by creating financial *prediction markets* where predictions are traded
  - Can be more accurate than other forms of predictions / opinions / polls, as users have to pay-to-play, which encourages objectivity rather than wishful thinking
- Web 2.0 has enabled web users to evolve from passive consumers into active *prosumers*, enabling a new *crowd economy* to flourish...
  - Create new products and solve (grand) challenges that machines can't (yet) solve by enlisting the power of crowds through *crowdsourcing*, but how to engage users?
  - Make it fun, pay them, crowdsource for a good cause
  - Cancer research UK is using crowdsourcing to battle cancer and save lives
  - Traditional banking is being disrupted through *crowdfunding* and *P2P lending*
  - \$4.7 bn cumulative total raised on Kickstarter alone
  - £9.7 bn cumulative total lending on P2P platforms in UK alone

# Example Questions

Aug/Sep 2019

**A.7:** A prediction market is trading two binary options: *Snow* and *No-Snow*. Option *Snow* will pay out £1 if it snows on MVB building on Christmas day 2019, and £0 otherwise; *No-Snow* will pay out £1 if it does not snow on MVB building on Christmas day 2019, and £0 otherwise. If the current price for *Snow* is £0.63 and the price for *No-Snow* is £0.32, what should you do? What do you expect to happen to the prices, and why?

[4 marks]

**A.8:** What is the difference between *crowdsourcing* and *crowdfunding*? Give an example technology or application for each.

[2 marks]