

Wisdom of Crowds

Ifeoma Adaji

Learning objectives

- Explain the concept of wisdom of crowds – smart crowds
- List and explain the 4 characteristics of smart crowds
 - Diversity
 - Independence
 - Decentralization
 - Aggregation

Smart crowds

- Under the right circumstances, groups can be intelligent
- Often smarter than the smartest people in them
- Groups do not need to be dominated by exceptionally intelligent people in order to be smart
- Even if most people within a group are not especially well informed or rational, it can still reach a collectively wise decision
- Our collective intelligence is often **excellent**
- Groups do better than individuals, larger groups do better than smaller ones

Smart crowds: examples

- In 1906 Francis Galton attended the annual West England fat stock and poultry exhibition
 - Estimate the size of an ox
- In 1920 sociologist Hazel Knight started a series of experiments with her students:
 - Estimate the temperature in the room
 - Estimate the number of beans in a jar
 - Ranking 10 similar items by size...
- Who wants to be a millionaire
- The Challenger disaster and the stock market



4 characteristics of smart crowds

- **Diversity of opinion** (each person should have some private information)
- **Independence** (people's opinions are not influenced by those of others)
- **Decentralization** (people are able to specialize and draw on local knowledge)
- **Aggregation** (a mechanism exists for turning private judgments into a collective decision)
- Each person's guess/prediction has 2 components: information and error, Subtract the error and you are left with information.
- For a group to be smart, there has to be some information
 - E.g. one won't ask a group of children to buy and sell stock in the wake of the Challenger accident

Diversity

4 characteristics
of smart crowds

- Through the history of most technologies, the early stages were characterized with a huge number of alternatives
 - Cars
 - Personal computers
 - Browsers, Web search engines
 - PDAs / cell phones...
 - Social media
- Through a collective search process, some designs win over others
 - The winners are “smarter” (cheaper, more universal, better, prettier...)
 - The search process is more like a biological phenomenon –like ant colony intelligence, or survival of the fittest in evolution, than a deliberative process.
- Lack of diversity in deliberative processes also leads to failures
- Diversity adds new/differing perspectives
- A diverse group is better at problem solving

Diversity

4 characteristics
of smart crowds

Positive case for diversity

- Expands a group's set of possible solutions
- Allows new ideas, new ways of doing things

Diversity

4 characteristics
of smart crowds

Issues arising

- Homogenous groups can be formed
 - Homogenous groups can be insulated from outside opinions
- Pressure of conformity
 - People change their opinions not because they believe a different perspective but because they want to conform to the group, they don't want to be challenged
 - Diversity should make it easier for people to say what they think

Independence

4 characteristics
of smart crowds

- Independence doesn't mean isolation
- Means relative freedom from the influence of others
- If we are independent, our opinions are our own
- Decision is likely better when people are independent
- Individual errors won't affect group's decision
- Making decisions dependently can introduce bias
- Independence brings diverse perspectives

Independence

4 characteristics
of smart crowds

- Can be hard because we are social beings
 - We look onto others in social settings (social proof)
- Solomon Asch's experiment.
 - "What's up in the sky?"
- When things are uncertain, best thing to do is follow along
- Social proof can limit independent group thinking
- We "social proof" because
 - It is easier to follow along than be different
 - Not following our peers could lead to high risk if our decisions/choices are wrong – we believe it is safest to follow the herd

Independence

4 characteristics
of smart crowds

- Information cascades can also limit independent group thinking
- Happens when people in a group don't make decisions simultaneously but in sequence
- There is no peer-pressure, conformity, or mindless trend-following, people believe that what they choose is better
- Individuals stop paying attention to their own knowledge and look at the actions of others before them
- "If everyone has the likelihood of making the right choice and everyone before me made the same choice, then I should do what everyone else has done"
- Ratings online; not wanting to give a negative rating because everyone else gave a positive rating
- If the first decision/rank/prediction is wrong, it cascades to everyone else.
 - The group's decision becomes flawed
- Happens in reviews, ratings etc.

Independence

4 characteristics
of smart crowds

- Good cascades
 - “Follow the crowd and you will find the buffet” – We can’t always know everything
 - Imitation of profitable behaviour is usually profitable for the imitator too
 - Gives an array of options and information
 - Farmers imitate their neighbors who started growing better crops from new seeds
- Bad cascades: result from people switching off their private information/reasoning...
- Yet they are a mechanism for aggregating information, just like a voting system or a market

Decentralization

4 characteristics
of smart crowds

Example:

- The US security agencies (CIA created in 1947 to centralize all intelligence... but FBI, NSA remained, all formed by independent, self-interested agents)
- Efficient in gathering information, but couldn't prevent Pearl Harbor, the bombing of the WTC in 1993, the US Embassy in Kenya, and 9/11
- The politicians' reaction has always (1946, 2001) been to call for **centralization, opposite to** the trends in business, academy, science, technology

Decentralization

4 characteristics
of smart crowds

- Two main features of decentralized systems (DS):
 - Power does not fully reside in one central location
 - People coordinate with each other without someone being in charge
 - Many important decisions are made by individuals based on their own specific knowledge rather than by an omniscient or farseeing planner
- DS foster and are fed by specialization, tacit (context-based) knowledge
- DS allow for independent agents to coordinate their actions and solve difficult problems
- Increases scope and diversity of opinions and information in the system

Decentralization

4 characteristics
of smart crowds

- Problems of decentralized systems:
 - Relevant local information may never get propagated to where it will be useful
 - Valuable information never gets disseminated, making it less useful than it could be
- Solution is to have mechanisms that allow aggregating information
- Imagine autonomous individuals trying to solve a problem without any means of putting their solutions together
- **Aggregation** is important to the success of decentralized systems

Aggregation

4 characteristics
of smart crowds

- A decentralized system can only produce intelligent results if there is a means of aggregating the private information of everyone
- An aggregation mechanism is a form of centralization/summation, (ideally) of all the private information of the participants
 - Sifting through the information to figure out what is important
- Aggregation leads to organization
- Should provide incentives for revealing truthfully private information
- Should not inject extra bias in the system
- Mechanisms:
 - One person with foresight
 - Deliberation
 - Polls / votes

Summary

- Wisdom of crowds relies on the collective intelligence of a group instead of individual intelligence - smart crowds
- Has the advantage of more people bringing in their diverse, independent opinions
- Smart crowds have 4 characteristics:
 - **Diversity of opinion** (each person should have some private information)
 - **Independence** (people's opinions are not influenced by those of others)
 - **Decentralization** (people are able to specialize and draw on local knowledge)
 - **Aggregation** (a mechanism exists for turning private judgments into a collective decision)

References

- The wisdom of crowds. James Surowiecki
- Infotopia. How many minds produce knowledge. Cass Sunstein
- Lecture notes. Prof. Julita Vassileva