Class 02 | Lecture
What is Social Good?

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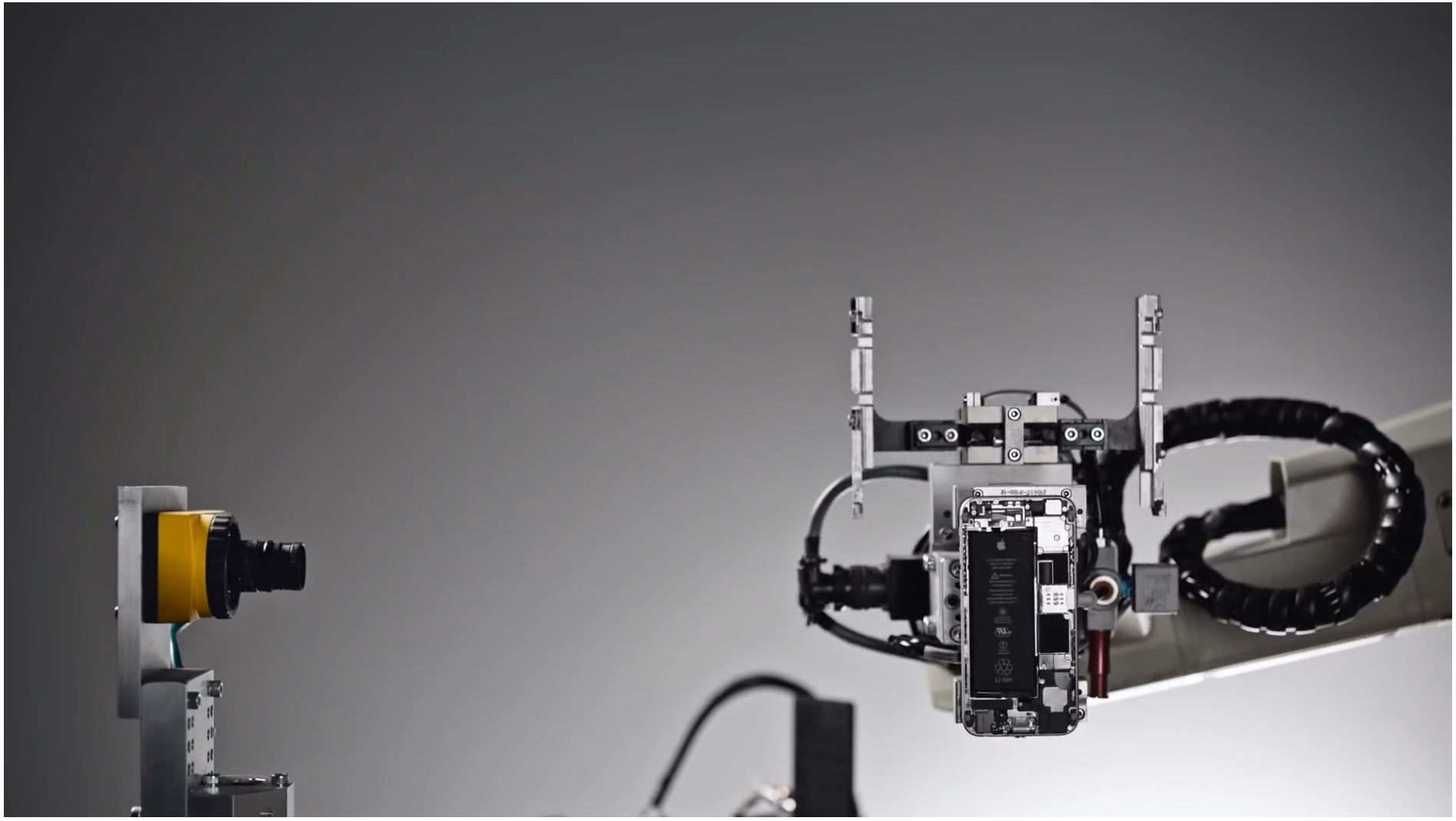
Robot of the Day



https://www.youtube.com/watch?v=AYshVbcEmUc

What is Social Good?

- Social Good Exemplified
  - A Gentle Definition, Clean Air, Smart Phones
- A Conceptual Framework
  - From Literature to Business
- Sustantainble Development Goals
  - United Nations, US, China, SET ArDeSoRo
- Measuring Impact
  - Modeling, A Simple Model

Examples of Social Good

- Something that benefits the largest number of people in the largest possible way.

Clean Air

Clean Water

Literacy

Healthcare

- Also known as "*common good*," social good can trace its history to Ancient Greek philosophers and implies ***a positive impact on individuals or society in general***.
- It also provides the basis for charity or philanthropic work.

https://www.investopedia.com/terms/s/social_good.asp

Examples of Social Good

- **Something** that benefits **the largest number of people** in **the largest possible way**.

- Something **designed** as a Product or Service for the mass
- Provide benefits for the people as **a positive change**
- **Technology innovation** to enforce possible ways of **impact**

A broad concept that fits almost everything designed

Clean Air as Social Good

- Something that benefits the largest number of people in the largest possible way.

- Air exists in nature already …
- Why air becomes *not-so-clean*?
- How does *dirty air* affect human lives?
- What can be done to clean the air?
- How to deliver clean air to the mass?
- Would it cause other problems while providing clean air?

Clean Air

Smart Phones as Social Good?

- Something that benefits the largest number of people in the largest possible way.

- Phones are created to provide wireless communication
- Besides communication, any other benefits?
- Why making the phones smart?
- How to make smart phones accessible for the mass?
- Would it cause other problems with smart phones?

https://www.cambridgeblog.org/2018/03/origin-of-the-smartphone/

Smart Phones as Social Good?

PRESS RELEASE
July 21, 2020

Apple commits to be 100 percent carbon neutral for its supply chain and products by 2030

https://www.apple.com/newsroom/2020/07/apple-commits-to-be-100-percent-carbon-neutral-for-its-supply-chain-and-products-by-2030/

Already carbon neutral today for corporate emissions worldwide, the company plans to bring its entire carbon footprint to net zero 20 years sooner than IPCC targets

Apple's Climate Roadmap

- **Low carbon product design**
  - Apple will continue to increase the use of low carbon and recycled materials in its products, innovate in product recycling, and design products to be as energy efficient as possible.
- **Expanding energy efficiency**
  - Apple will identify new ways to lower energy use at its corporate facilities and help its supply chain make the same transition.
- **Renewable energy**
  - Apple will remain at 100 percent renewable energy for its operations — focusing on creating new projects and moving its entire supply chain to clean power.
- **Process and material innovations**
  - Apple will tackle emissions through technological improvements to processes and materials needed for its products.

Social Good Exemplified

Apple's disassembly robot, Daisy, is the most efficient way to reclaim more of the valuable materials stored in iPhone. Daisy can take apart up to 200 iPhone devices per hour, removing and sorting components, so that Apple can recover materials that traditional recyclers can't — and at a higher quality.

Social Good Exemplified

Apple's latest recycling innovation — a robot the company is calling "Dave" — disassembles the Taptic Engine from iPhone to better recover key materials such as rare earth magnets and tungsten while also enabling recovery of steel, the next step following its line of "Daisy" iPhone disassembly robots.

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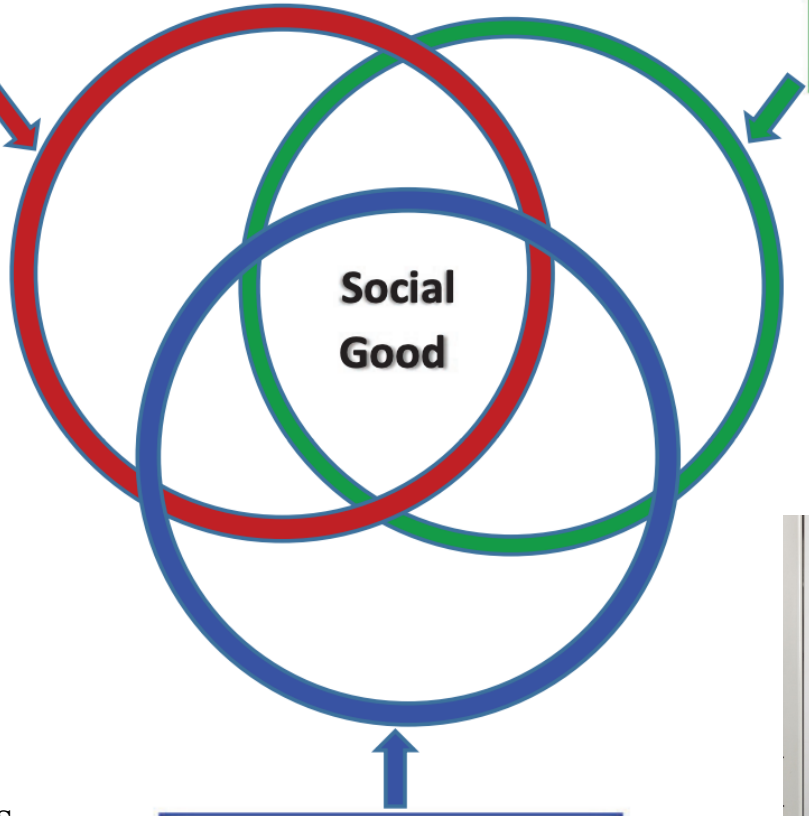
Conceptual Framework of Social Good

Social Good Domains

- Environmental justice & sustainability
- Social inclusion
- Peace, harmony & collaboration

The Need: Domain of application that affects a large number of people in specific ways



Systems of Change and Collaborations

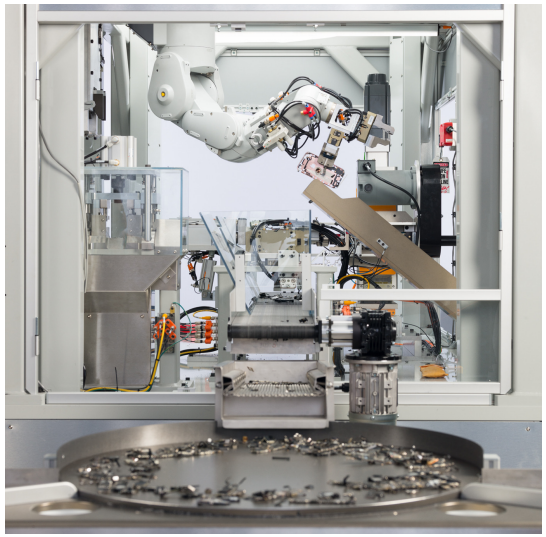
- Business
- Nonprofit and grassroots
- Social entrepreneurs

The Way: System of collaborations to deliver changes on a social scale

The Method: Innovations and technologies that delivers benefits for a positive change

Innovative Technologies and Approaches

- Design thinking
- Big data-driven models
- Using social media to create social change



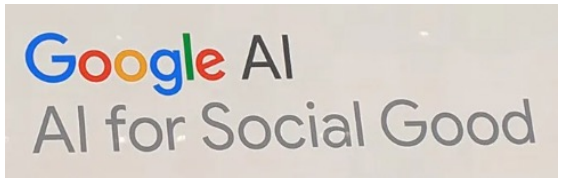
Daisy by Apple

10.1177/1049731517745600

Social Good vs. Business Incentives

- The capitalism-based definition of business states that companies exist only to provide the maximum possible return to shareholders.
  - This has often **not** run parallel to serving the common good in ways such as promoting clean air and water or financial independence for all citizens.

As corporations focus more on corporate ***sustainability efforts and social responsibility*** in recognition of a de facto social contract with the public, their ***business models*** may expand to ***include*** more work to promote ***social good*** in their day-to-day strategies and operations.



Apple commits to be 100 percent carbon neutral for its supply chain and products by 2030

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17 Sustantainble Development Goals

https://sdgs.un.org/goals

- The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.

17 Goals	169 Targets	230 Indicators
EXAMPLE **Goal 1:** End poverty in all its forms everywhere 	**EXAMPLE** **Target 1.4:** By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	**EXAMPLE** **Indicator 1.4.1** Proportion of population living in households with access to basic services **EXAMPLE** **Indicator 1.4.2** Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure

IRIS+

Origins of the SDGs

- The SDGs are the continuation of 8 goals adopted by the UN in 2000 called the Millennium Development Goals (MDGs)
  - A number of world leaders were involved in the creation of these goals
  - The MDGs were set to be achieved by 2015
- The SDGs were created through a mass effort to identify the problems that global citizens believed to be important
  - Door-to-door surveys
  - My World Online Survey
  - The UN Rio+20 Conference
    - An open working group of 70+ countries

Five Themes of SDGs

https://www.globalconnect.socsci.uci.edu/files/webppts/projectofchange/01%20UN%20Sustainable%20Development%20Goals.pdf

Highlights of China's Domestic Progress

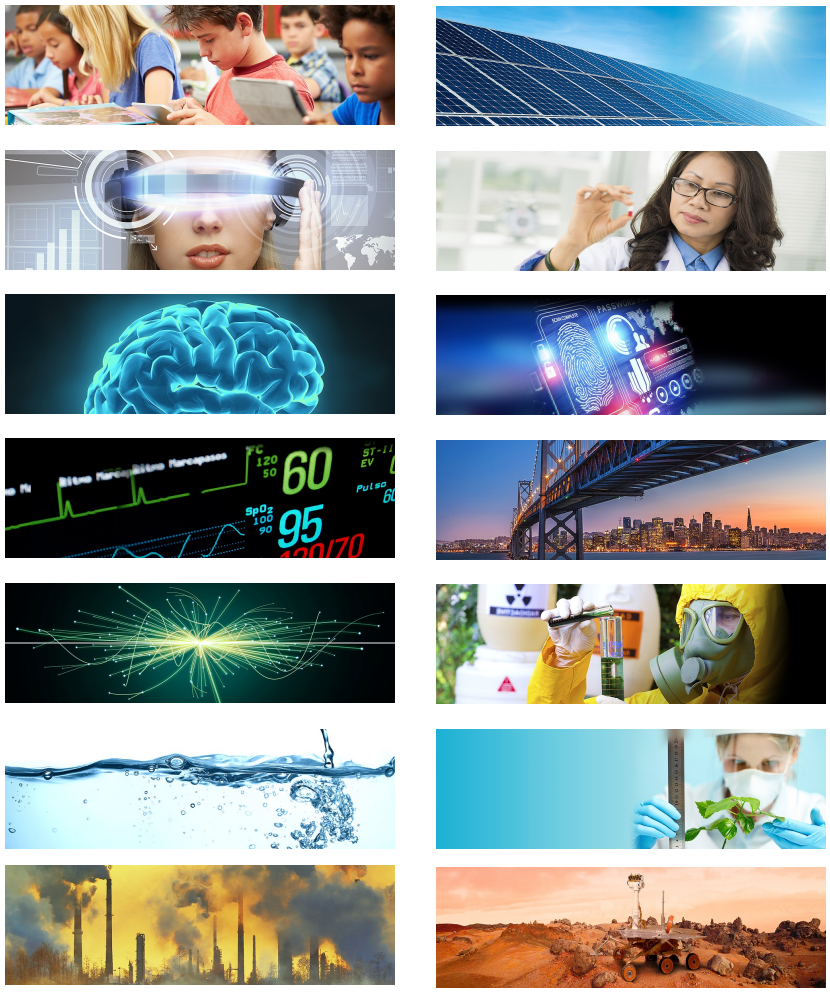
- **SDG 6**: access to safe drinking water provided to almost all rural population; innocent treatment of rate of urban garbage reaching 95%; urban sewage treatment rate 92.4%; water quality and efficiency further improved.
- **SDG 7**: formulation of Energy Production and Consumption Revolution Strategy (2016-2030), highly aligned with energy-related SDGs; capability increased in securing energy supply and access to electricity provided to the entire population; energy structure and efficiency steadily improved;
- **SDG 11**: greatly improving government-subsidized housing projects and conditions. By end 2016, 11.26 million families had moved into public rental houses and 2.69 million families enjoyed rental subsidies.
- **SDG 12**: a "dual control" system adopted to control the aggregate consumption volume and intensity of energy and water consumption; further reduction on food waste and production losses; improvement in the management of chemicals and waste, and in green development public awareness and procurement.
- **SDG 15**: establishment of wetland protection system, restoration of degraded farmland into forests and grassland; prohibition of commercial logging of natural forests.

https://sustainabledevelopment.un.org/content/documents/26674Zhou_EGM_presentation_0123.pdf

NAE Grand Challenges for Engineering

- SUSTAINABILITY
  - Make Solar Energy Economical
  - Provide Energy from Fusion
  - Develop Carbon Sequestration Methods
  - Manage the Nitrogen Cycle
- HEALTH
  - Provide Access to Clean Water
  - Advance Health Informatics
  - Engineer Better Medicines
  - Reverse-Engineer the Brain
- SECURITY
  - Prevent Nuclear Terror
  - Secure Cyberspace
- JOY OF LIVING
  - Restore and Improve Urban Infrastructure
  - Enhance Virtual Reality
  - Advance Personalized Learning
  - Engineer the Tools of Scientific Discovery

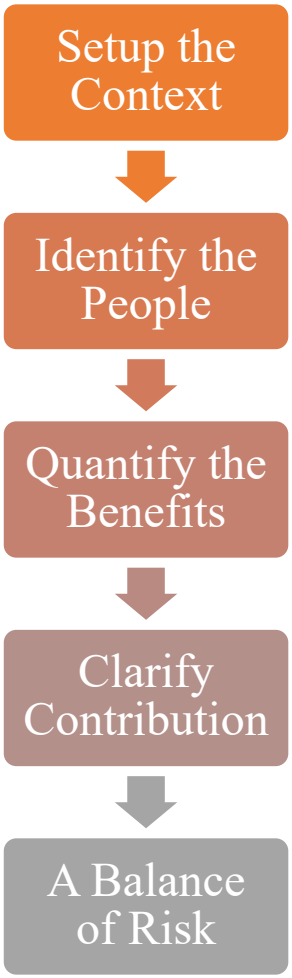
A Different Perspective on Social Good



https://www.nae.edu/20782/grand-challenges-project

Five Dimensions of Impact

- **WHAT**: Understanding the outcomes the enterprise is contributing to and how important the outcomes are to stakeholders.
- **WHO**: Understanding which stakeholders are experiencing the effect and how underserved they were prior to the enterprise's effect.
- **HOW MUCH**: Understanding how many stakeholders experienced the outcome, what degree of change they experienced, and how long they experienced the outcome for.
- **CONTRIBUTION**: Assessing whether an enterprise's and/or investor's efforts resulted in outcomes that were likely better than what would have occurred otherwise.
- **RISK**: Assessing the likelihood that impact will be different than expected.



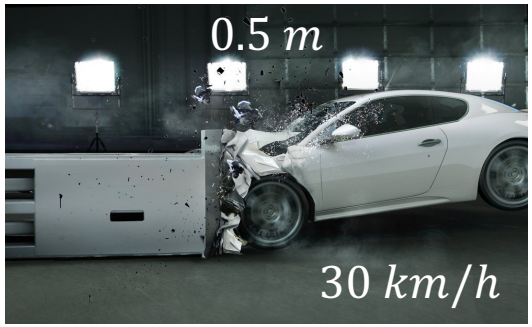
https://iris.thegiin.org/standards/

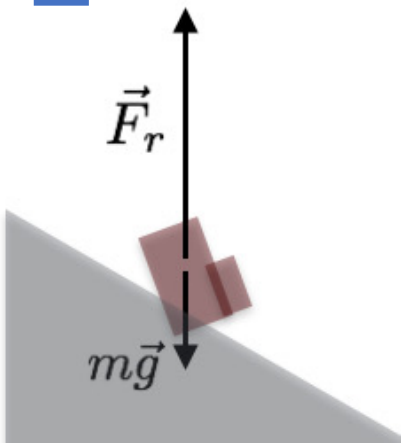
Impact Force Measurement Example

- Impact as a sudden conversion between energy and work

$$Kinetic\ Energy = \frac{1}{2}mv^2 \quad Potential\ Energy = mgh$$

$$Energy = Work \leftarrow Work = F_{avg}d$$





$$F_{avg} = \frac{mv^2}{2d} = \frac{mgh}{d} = \frac{m\Delta v}{\Delta t}$$

$$F_{avg} = \frac{mv^2}{2d} = \frac{2000\ kg \times (8.35\ m/s)^2}{2 \times 0.5\ m} = 139.445\ kN$$

$$F_{avg} = \frac{mgh}{d} = \frac{1\ kg \times 9.8 m/s^2 \times 1m}{0.05\ m} = 196\ N$$

A sudden change can be measured in *distance* or *time*

A Simple Model to Measure Impact

- Identify the Problem and People within a Social Context
- Given a Solution aiming at addressing the Social Good
- Roughly assess the potential impact in *a simple way*

- An Engineering approach to measure impact of social good
  - Positively related to # of People
  - Positively related to **Δ** of Benefits
  - Negatively related to the efforts taken to delivery

$$F_{avg} = \frac{mv^2}{2d} = \frac{mgh}{d} = \frac{m\Delta v}{\Delta t}$$

$$Impact\ Estimation = \frac{\#\ of\ People \times \Delta\ of\ Benefits}{Time\ Taken\ (t)\ or\ Unit\ Cost\ (\$)}$$

Thank you~

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