Dr. Jason Jay
Senior Lecturer, MIT Sloan School of Management
Director, Sustainability Initiative at MIT Sloan
jjay@mit.edu
Rana Plaza, Bangladesh
Planetary Boundaries

- Biosphere integrity
- Genetic diversity
- Functional diversity
- Land-system change
- Freshwater use
- Phosphorus
- Nitrogen
- Ocean acidification
- Atmospheric aerosol loading
- Stratospheric ozone depletion
- Novel entities
- Climate change

Legend:
- Red: Beyond zone of uncertainty (high risk)
- Yellow: In zone of uncertainty (increasing risk)
- Green: Below boundary (safe)
- Gray: Boundary not yet quantified

Will Steffen et al. Science 2015;347:1259855 Published by AAAS
Figure 2 below plots these data within the framework of the doughnut. Focusing on the social foundation, it indicates how far humanity is falling below that foundation by depicting the deprivation gap for each dimension. In the case of food, for example, the dark shaded wedge represents the 87 per cent of the world’s population who have sufficient food. The gap between that wedge and the edge of the social foundation represents the 13 per cent of the world’s population (850m people) who are still undernourished.

Source: Oxfam, based on data in Table 1 above. Social dimensions with two indicators in Table 1 are represented by split wedges, showing both of the deprivation gaps.

Hidden within this global snapshot of deprivation are complex dynamics, both in terms of trends in progress, and in terms of inequalities between people. The past decade has brought significant progress in reducing some dimensions of deprivation. In developing countries, net primary school enrolment ratios rose by 9 per cent from 1999 to 2009, and the ratio of girls-to-boys enrolled rose from 0.92 to 0.96. Worldwide, deaths from malaria fell by 20 per cent, 2000–2009, and the number of people receiving antiretroviral therapy for HIV or AIDS increased 13-fold from 2004 to 2009. An estimated 1.1bn people in urban areas and 723m people in rural areas gained access to improved drinking water sources, 1990–2008.15

Despite these gains, there are many enduring inequalities of deprivation, by wealth, gender, ethnicity and location. Children from the poorest households, those living in rural areas, and those who are girls are still the most likely to be out of school. Out of the world’s 760m illiterate adults, two-thirds are women. And children living in rural areas of developing regions are twice as likely to be underweight as are their urban counterparts.16

The social foundation will only be achieved for all by tackling these enduring inequalities. If humanity is falling below every dimension of the social foundation, where do we stand in relation to the environmental ceiling? This is explored in the following section.

Source: Kate Raworth
Combining the social foundation with the environmental ceiling creates a doughnut-shaped area between these social and planetary boundaries. It is an illustrative depiction of a safe and just space for humanity (see Figure 4).

This framework brings out a new perspective on sustainable development. Human-rights advocates have long focused on the imperative of ensuring every person's claim to life's essentials, while ecological economists have highlighted the need to situate the economy within environmental limits. The framework brings the two approaches together in a simple, visual way, creating a closed system that is bounded by human rights on the inside and environmental sustainability on the outside. The resulting space – the doughnut – is where inclusive and sustainable economic development takes place.

It implies no limit on increasing human well-being; indeed, it is within this safe and just space that humanity has the best chance to thrive.

Quantifying both the planetary and social boundaries (Figures 2 and 3 above) turns the framework into a global-scale compass, giving an indication of the current state of human and planetary well-being in relation to the boundaries of sustainable development.
PROMISE: Sustainability at all levels

The **fundamental alignment** between healthy environments, healthy societies, healthy businesses/organizations, and thriving individuals.
Our community

95%
MIT Sloan grads in 2017 who had taken a sustainability elective

1/3
Of our students take 3 or more electives in sustainability while at MIT Sloan

47
MIT Masters students completed 6-course sustainability certificate in 2017

146
Projects completed with leading companies and organizations in S-Lab since 2007

#1
In sustainability among top-tier US business schools, in both NetImpact and Corporate Knights rankings

450
People who attended MIT Sustainability Summit 2017
**Vision**

**Energy**
- Drive widespread adoption of a 21st century electricity infrastructure

**Climate**
- Accelerate climate action plans toward achievement of NDCs

**Water**
- Widespread adoption of improved watershed governance

**Jobs**
- Improve jobs and lives of low wage workers while benefiting companies and customers

**Faculty Champion**
- O'Sullivan
- Sterman, Malone, Knittel
- Susskind, Levi
- Ton, Kochan

**Strategic MIT Alignments**
- MITei, CEEPR
- Climate CoLab, Joint Program
- DUSP, J-WAFS
- Good Jobs Initiative

**Strategic External Alignments**
- NRG, Exelon, etc.
- WRI, Climate Interactive, Ceres
- WRI, Ceres, Nestle, Colgate
- Patagonia, FLA

**Improve measurement quality to enable sustainable investing**
- **Faculty**: Rigobon
- **Allies**: SHIFT.tools, State Street, Sustainalytics, Bloomberg
Website → http://mitsloan.mit.edu/sustainability/
How do we change the conversation about sustainability?
The cultural context

Perceived traits of a "typical environmentalist."

1. Tree-hugger 17. Determined
2. Vegetarian 18. Stupid
3. Hippie 19. Intelligent
4. Liberal 20. Zealous
5. Unhygienic 21. Nontraditional
6. Militant 22. Outdoorsy
7. Eccentric 23. Forceful
8. Activist 24. Animal lover
9. Caring 25. Intolerant
10. Protester 26. Helpful
11. Overreactive 27. Democrat
12. Unfashionable 28. Annoying
13. Self-righteous 29. Crazy
14. Educated 30. Irrational
15. Drug user
16. Hairy

In 1964, the U.S. Congress enacted the Civil Rights Act, outlawing racial and gender discrimination (National Archives and Records Administration, 2014). More recently, in 2010, President Obama repealed the Don’t Ask, Don’t Tell policy, allowing openly gay Americans to serve in the military (The Library of Congress, 2011). These landmark events occurred only after activists spent many years actively challenging the status quo (House Committee on Armed Services, 1999; National Archives and Records Administration, 2011), illustrating that long periods of slow progress typically precede social change. Such slow progress is at odds with the perception that many individuals believe that important, socially desirable, and moral to address social justice concerns (Shwu et al., 2010). If individuals believe that social change is crucial and socially valued, they should generally be supportive of and responsive to the activists who advocate it. Yet although activism enthusiastically strive to address social justice concerns and are at times successful in promoting social change (e.g., Castro, Yu, & Mark, 2006), they often encounter substantial resistance from the public Nelson et al., 2008; Superroman & Cadi, 2002). Eventually, it may be difficult to dissuade with rational arguments, and activists may be metaphorically repressed, viewing them as militant and combative. Accordingly, individuals may avoid affiliating with activists and disregard their pre-change initiatives. We examine this directly.

To gain, researchers have attempted to understand resistance to social change by examining individuals’ perceptions of social issues and potential impacts on personal lives.

*Correspondence to Nadia Y. Bashir, Department of Sociology, York University, 800 North York Blvd., North York, ON M3J 1P3, Canada. E-mail: nadiabashir@yorku.ca

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The ironic impact of activists: Negative stereotypes reduce social change influence

NADIA Y. BASHIR1*, PENELOE LOCKWOOD1, ALISON L. CHASTEEN1, DANIEL NADOLNY1 AND INDIRA NOYES2
1Department of Psychology, University of Toronto, Canada 2Department of Sociology, University of Toronto, Canada

Abstract

Despite recognizing the need for social change in areas such as social equality and environmental protection, individuals often avoid supporting such change. Researchers have previously attempted to understand this resistance to social change by examining individuals’ perceptions of social issues and social change. We instead examined the possibility that individuals resist social change because they have negative stereotypes of activists, the agents of social change. Participants had negative stereotypes of activists (female and environmentalists), regardless of the domain of activism, viewing them as eccentric and militant. Furthermore, those stereotypes reduced participants’ willingness to affiliate with activists’ actions and, ultimately, to adopt the behavior that the activists proposed. These results indicate that stereotypes and personal perception processes more generally play a role in creating resistance to social change. Copyright © 2013 John Wiley & Sons, Ltd.
The background conversation

Value 1
Healthy
Energy-efficient
Non-toxic
Biodegradable
Renewable
Fair Trade
Responsibly made
Organic

Value 2
Comfort
Power
Speed
Quality
Low-cost
Performance
ROI
What do conversations look like when we operate inside this mental model?
My Values  

×

“Compromise”

Your Values
In the midst of the tension, we can get a little weird.
Polarization

My Values  Your Values

SAVE THE PLANET
KILL YOURSELF

EARTH FIRST,
WE'LL MINE THE OTHER PLANETS LATER.
The background conversation

Values inside the choir
Healthy
Energy-efficient
Non-toxic
Biodegradable
Renewable
Fair Trade
Responsibly made
Organic

Values outside the choir
Comfort
Power
Speed
Quality
Low-cost
Performance
ROI
The background conversation

Impact-focused

Healthy
Energy-efficient
Non-toxic
Biodegradable
Renewable
Fair Trade
Responsibly made
Organic

Performance-focused

Comfort
Power
Speed
Quality
Low-cost
Performance
ROI
An alternative mental model

- Performance-focused
- Important
- Not Important

Impact-focused
An alternative mental model

- Performance-focused
- Impact-focused

"Compromise"
An alternative mental model

- Innovation
- Flourishing

- Performance-focused
- Impact-focused

- Important
- Not Important

- Tesla S
- Nike Flyknit
- LED bulb
Evolution of $1 invested in matched portfolios with high vs. low performance on material sustainability issues as defined by SASB.

Figure VI: Investment Performance

The figure shows the evolution of $1 invested in a portfolio of firms with high performance on the material sustainability issues versus competitor firms with low performance on material sustainability issues. Materiality of sustainability issues is industry-specific and it is defined by the Sustainability Accounting Standards Board. Source: Mo Khan, George Serafeim and Aaron Yoon. Corporate Sustainability: First Evidence on Materiality. HBS working paper, 2014.
Business Value Drivers for Sustainability

**Cost**
- Resource Efficiency
- Waste as Input
- Labor Productivity

**Risk**
- Legal
- Social/Reputational
- Economic/Operational

**Revenue**
- Market access
- Differentiation
- New market offerings
How can we drive revenue through sustainability-oriented innovation (SOI)?
Sustainability-Oriented Innovation

Failure mode: Telling customers what they should want

Failure mode: Addressing a pool of customers too small or under-resourced to scale and sustain system impact

Failure mode: Making attractive offerings that might look/sound sustainable but have negative externalities when scaled

SOI

Good for the system

Good for Business

Good for Customer

Systems thinking

Regulation-driven Innovation

Donor-supported Innovation

Market thinking

Design thinking

Consumerism-driven Innovation
### CHAMPION: What are your values, motivations, skills, capabilities, resources, and network?

| Personal / Relational | What is a sustainable BUSINESS MODEL? |
|-----------------------|--------------------------------------|
| Organizational        | PRIVATE PROBLEM: What do customers and investors want? What are their jobs to be done? How well do existing solutions fulfill their needs? |
| Market                | STAKEHOLDERS: Who are the stakeholders for your public problem? What policies support your work, and which ones get in your way? What are avenues for change? |
| Institutional         | PUBLIC PROBLEM: What problems do you most care about solving? Why? What is the goal state you envision? What is the current state? |
| Social Environmental  |                                      |

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Spoiler Alert team

Ricky Ashenfelter
Chief Executive Officer
Sustainability, food & ag, business development

Emily Malina
Chief Product Officer
Product marketing, sales, tech adoption

Marty Sirkin
Chief Technology Officer
30+ yrs. of experience, 3 successful startups

Born out of MIT in June 2015
Based in Boston, MA
Graduate of Top Startup Program
$2.5M Investment, Led by Acre Ventures
40% of food is wasted, 0 waste is possible

- GHG + Environmental impact
- Lower effective supply contributes to food insecurity
- Financial losses to food industry

Public Problem

40% of food is wasted, 0 waste is possible

- Spoilage and discard on farms
- Discarded food post-consumer
- Food waste in supply chain

Private Problem

- Food manufacturers and distributors spend $60 billion/year on uneaten food, could be 0

Effects (why this is important)

Strategy is what you are NOT doing
Food waste is an environmental, social, and financial problem.

**ENVIRONMENTAL**

- Approximately **30-40% of food is wasted** in the United States.
- If wasted food was a country, it would be the third largest producer of greenhouse gases (GHGs) in the world, after China and the United States.

**SOCIAL**

- Meanwhile, 48.1 million Americans lived in **food-insecure households** in 2014.
- Reducing food losses by only 15 percent would be **enough food to feed more than 25 million Americans** each year.

**FINANCIAL**

- **$218 billion is spent** to grow, process, transport, and dispose of food that is never eaten.
- Food & money is **lost at every step in the supply chain** — across farms, manufacturers, restaurants, and homes.
Surplus food happens, manage it better
A SOFTWARE PLATFORM HELPING FOOD BUSINESSES MANAGE UNSOLD INVENTORY.

Why Spoiler Alert?

Improve Your Bottom Line
Reduce waste management costs, claim tax benefits for charitable donations, and find new buyers of surplus food.

Empower Your People
Enable your employees to save time by taking food recovery and waste management into their own hands.

Help Your Community
Fight food insecurity and waste by getting surplus food to qualified nonprofits in your community.
Sustainability-Oriented Innovation

Failure mode: Telling customers what they should want

Failure mode: Addressing a pool of customers too small or under-resourced to scale and sustain system impact

Failure mode: Making attractive offerings that might look/sound sustainable but have negative externalities when scaled
Varieties of SOI

- **Production and Consumption System**
  (Education campaigns, E.g., “Sharing Economy”)

- **Policy and Market Design**
  (Standards & regulations, Taxes, Financial Infrastructure,
  E.g., California’s ZEV Regulation)

- **Delivery & Business Model**
  (E.g., Car sharing, Ride sharing)

- **System Infrastructure**
  (E.g., Charging stations, Public transportation)

- **Product**
  (E.g., Hybrid or electric engine)

- **Process**
  (E.g., Work practices like telecommuting)

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**SUSTAINABILITY INITIATIVE**

Adapted from Ashford & Hall (2011)
Varieties of SOI

- **Sustainability-Relevant Innovation (SRI)**
  - Emphasis on private problem
  - **Sustainability:** A positive ‘side-effect’

- **Sustainability-Informed Innovation (SII)**
  - **Sustainability:** One of the inputs

- **Sustainability-Driven Innovation (SDI)**
  - Emphasis on public problem
  - **Sustainability:** The core purpose

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**Emphasis on private problem**

*Zipcar*®

**Emphasis on public problem**

*Patagonia*®

*Sanergy*®
Accelerating sustainability-oriented entrepreneurship
A startup is a temporary organization designed to search for a repeatable and scalable business model  -Steve Blank
Tools to support the search process

Failure mode: Telling customers what they should want

Failure mode: Addressing a pool of customers too small or under-resourced to scale and sustain system impact

Failure mode: Making attractive offerings that might look/sound sustainable but have negative externalities when scaled
The Business Model Canvas

Key Partners
- Why are our key partners?
- Who are our key suppliers?
- Which other entities do we acquire from our partners?
- Which key activities do partners perform?

Key Activities
- What are the key activities in value propositions?
- How do we deliver value to customers?
- How do we deliver value to the customer?
- What bundle of products and services are we offering to each customer?
- What customer needs are we satisfying?

Value Propositions
- What value do we deliver to the customer?
- What changes in customer behavior do we expect to enable?
- Who are the major customers?
- What do our customers value?

Customer Relationships
- What type of relationship does each customer want?
- How are we communicating with each customer?
- How are we integrating with each customer?
- What are the major customer segments?

Customer Segments
- For whom are we selling?
- Who are our most important customers?

Key Resources
- What key resources do our value propositions require?
- What is the key resource model?
- How do we generate revenue?

Channels
- Through which channels do we reach our customers?
- How are we reaching them?
- How are we integrating with our customers?
- What is the channel model?

Cost Structure
- What are the most important costs in our business model?
- What are the key cost drivers?
- How do we deliver value?

Social Cost
- What are the negative social externalities of the business model?
- What are the negative social externalities of the business model?
- How do we measure impacts on society?

Revenue Streams
- For what value are customers willing to pay?
- What are the key revenue drivers?
- How do we generate revenue?

Social Benefit
- What are the positive social externalities of the business model?
- What are the key social benefits?
- How do we measure impacts on society?
Startup Impact Benchmark

What in the business model differs compared to the status quo solution?

Who benefits/suffers from the changes to the status quo solution?

Which stakeholder needs do you address and how?

How can you measure and quantify these changes?

Understand, validate & improve impact logic and increase impact

Impact Identification

Impact Substantiation

Sustainability Initiative

www.startupimpactbenchmark.org
Social Impact Benchmark: Quantifying the identified impact

**Phase 1 – Impact identification**

- Status quo
- Business model differences
  - Affected stakeholder 1 → Change for the stakeholder
  - Affected stakeholder 2 → Change for the stakeholder
  - Affected stakeholder 3 → Change for the stakeholder

**Phase 2 – Impact substantiation**

- Input → Output → Outcome → Impact
  - Input → Output → Outcome → Impact
  - Input → Output → Outcome → Impact
Evaluating sustainability

SUSTAINABILITY Potential for Systemic Impact

Impacts on Subsystem & System
- Economic
- Environmental
- Social

Impacts on Product-Service System
- Usage-System
- Culture

Governance
Organizational Sustainability
- Team
- Stakeholders
- Ethics & Integrity
Sustainability Initiative Leadership Team

Prof. Jason Jay, PhD '10
Director
Sr. Lecturer
jjay@mit.edu

Bethany Patten, EMBA '13
Associate Director
Strategy & Engagement
bpatten@mit.edu

Prof. John Sterman, PhD '82
Faculty Director
Jay W. Forrester Professor of Mgmt
Director, MIT System Dynamics Group
jsterman@mit.edu

Website → http://mitsloan.mit.edu/sustainability/