



# Understanding Human Preference in Promoting Sustainable Development

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# Outline

1. Environment, Resource, and Sustainability – why is market NOT enough?
2. Understanding Sustainable Business – what is green and why do people care about green?
3. Transition into Sustainability – what are the strategies?



# Externality

- Each firm must maximize profit by choosing output  $q$

$$\pi = Pq - C(q) \rightarrow p = C'$$

- But, what if production causes damage  $D(q)$  to others?

- The firm “should” maximize

$$Pq - C(q) - D(q) \rightarrow p = C' + D'$$

- This damage is called **externality**
- If externality is prevalent, prices are wrong
  - Paper product
- Consumption externality is similar
  - Gasoline



# The Conventional Economic Wisdom

- Damages—the costs of pollution imposed on others such as:
  - Health costs including risk of death
  - Aesthetic costs such as poor visibility
  - Ecological costs such as extinction of species
  - Direct costs such as acid rain damaging paint
- Control costs include:
  - End of pipe treatment costs
  - Process changes in manufacturing methods
  - Input changes
  - Lost sales from reduced output
- Intergenerational externality



# The Conventional Economic Wisdom

- Voluntary pollution controls?
  - Generally doesn't work due to market competition
- Pollution standards
  - Effective but highly inefficient (firms are different)
- Pollution taxes
  - Economists' favorite solution that has good theoretical properties!
- Marketable permits
  - Similar to pollution tax but politically more complicated
- Lawsuits
  - Effective in an ideal environment but usually associates with huge transaction cost



# Resource and Energy Economics

## Renewable Resources:

- Fisheries, wildlife and other ecological resources, agriculture hydro power, solar energy

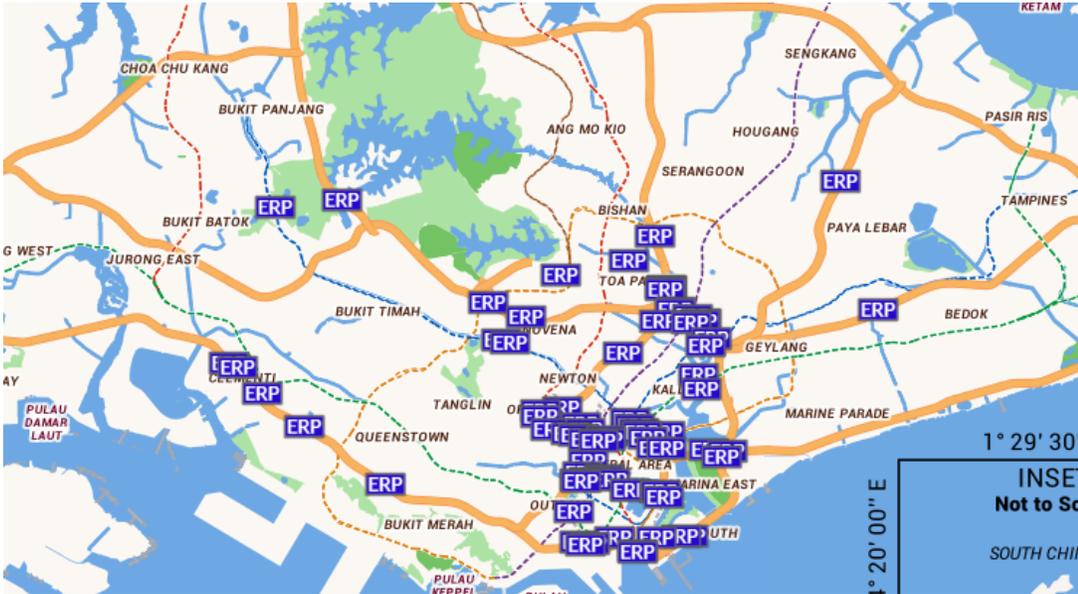


## Non-renewable Resources

- Coal, oil, natural gas, uranium, hard rock minerals like copper



# ERP



Source: Land Transport Authority

- You pay a fee when driving through an ERP gantry during operational hours
- ERP charges are reviewed regularly to keep traffic moving at an optimal speed
- There are different ERP operating hours on the eve of major public holidays

# Carbon Tax

- Singapore is the first country in Southeast Asia to introduce a carbon price
  - S\$5 per tonne of greenhouse gas emissions
  - Introduced in 2019 through the Carbon Pricing Act (CPA)
- There are no exemptions for covered facilities, to maintain a transparent, fair, and consistent price signal across the economy
  - Emission report
  - Monitoring plan (only applicable to taxable facilities)
  - Third-party verification of Emissions Report (only applicable to taxable facilities)

Source: Ministry of Sustainability and the Environment



# Sustainable Business—Firms

- Terms used in green marketing had no clear meaning
  - Safe, Earth Friendly, Non-toxic, Organic, Natural
  - Some paintbrushes were **green** because they used plastic and were nature friendly by saving trees
  - Other paintbrushes with wooden handles were **green** because they avoided chemicals used in plastic
- Green marketing back-fired (greenwashing)
- Many brand leading firms now avoid environmental claims
  - Levi and Strauss quietly started adding 2% organic cotton but hid the fact
  - Starbucks is increasingly using fairtrade coffee in its products



# Sustainable Business—Firms

## CLIMATE

We're on track to meet our science-based targets for reducing GHG emissions in our owned-and-operated facilities and our global supply chain, and meeting our renewable electricity targets – all by 2025.

## CONSUMPTION

In 2020, **83%** of our cotton – our most used raw material – came from more sustainable sources, and we expanded our efforts toward a circular economy.

## COMMUNITY

By the end of 2020, LS&Co. suppliers had active Worker Well-being offerings at **118** sites where more than **195,400** employees worked, fostering improvements in engagement, satisfaction and absenteeism.

*In 2020 Starbucks committed to a resource-positive future, formalizing environmental goals to cut its carbon, water, and waste footprints by half.*

*As a progression against those goals, the company commits to Carbon Neutral Green Coffee and to conserve water usage in green coffee processing by 50%, both by 2030.*



Source: [stories.starbucks.com](https://stories.starbucks.com)



# Sustainable Business—Consumers

- Knowing what is green is incredibly complex for consumers
- How to tell whether a pair of jeans is green?
  - Incredibly complex analysis including mining (metals used in zippers and buttons), agriculture (cotton), manufacturing including energy used, and shipping of the product
- Expensive and no way to include all the information on the product label
- Do consumers care even if they know the information?



# Social Preference

- Imagine that you have received S\$10 and are asked to split it between a classmate and yourself. Your classmate can only accept your decision. What is your proposal?
- Imagine that you have received S\$10 and are asked to split it between a classmate and yourself. Your classmate can choose to either accept or reject your proposal
  - If he/she accepts, you will split according to your proposal
  - If he/she rejects, you will both receive S\$0
- What would you propose? How will you determine whether to accept or reject a proposal?



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# Social Preference

- A precise definition of social preference has not been settled upon
- In most cases, “social preference” is loosely defined as **a concern for the payoffs allocated to other relevant reference agents in addition to the concern for one’s own payoff**
- People have preferences for efficiency (Charness and Rabin, 2002)
- People have preferences for fairness (Fehr and Schmidt, 1999)
  - Equality is often mentioned
- Reciprocity
  - Kindness repaid with kindness, spite with spite



# Beyond Economics

- Most consumers do NOT strictly follow economic rules in making their consumption decisions
- What strategy would you use to pick a husband / wife if:
  - You had as long as you liked to search?
  - You are on TV and have just met three candidates, and have ten seconds (one minute) to choose a husband (wife) or you lose 10 million dollars so you can ask no questions (one question) in the remaining time)?
- Obviously you would use different strategies



# Beyond Economics

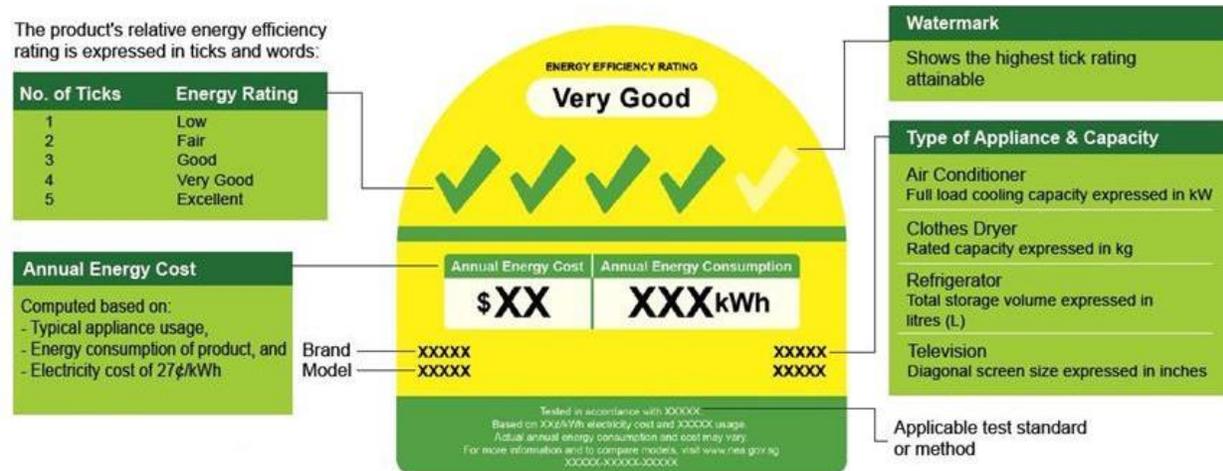
- The **weighted adding strategy** (linear utility) examines alternatives and is compensatory
  - Consumers pick the alternative which has the greatest sum of attributes times weights (values). It is accurate but high in cognitive effort--the standard
- The **lexicographic strategy** implies the consumer uses the most important single attribute and chooses based on that alone
- **Satisficing** implies the consumer evaluates alternatives sequentially in order and rejects any that fail to meet minimum thresholds for any attribute and then go on to the next alternative, choosing the first that meets the minimum threshold for all attributes
- **Elimination-by-aspects** combines the lexicographic and satisficing strategies by eliminating any alternatives that fail to make a cutoff for the most important attribute, repeated for second most important, etc., until only one alternative is left



# MELS and MEPS

- Consumers can easily figure out how much they save (both financially and environmentally)

- Government has been gradually tightening the standard



- MELS implemented on 1 Jan 2008
- Revised energy rating system for MELS implemented on 1 Sep 2014

- MEPS implemented on 1 Sep 2011 (old 2-tick level)
- Tightened MEPS implemented on 1 Sep 2013 (old 3-tick level)
- MEPS raised on 1 Dec 2017 for refrigerators with freezer and an adjusted volume of up to 300L (raised by 5%), and for all other refrigerator categories (raised by 13%)
- MEPS for all refrigerators raised to 2-tick level on 1 Jan 2022

Source: National Environment Agency

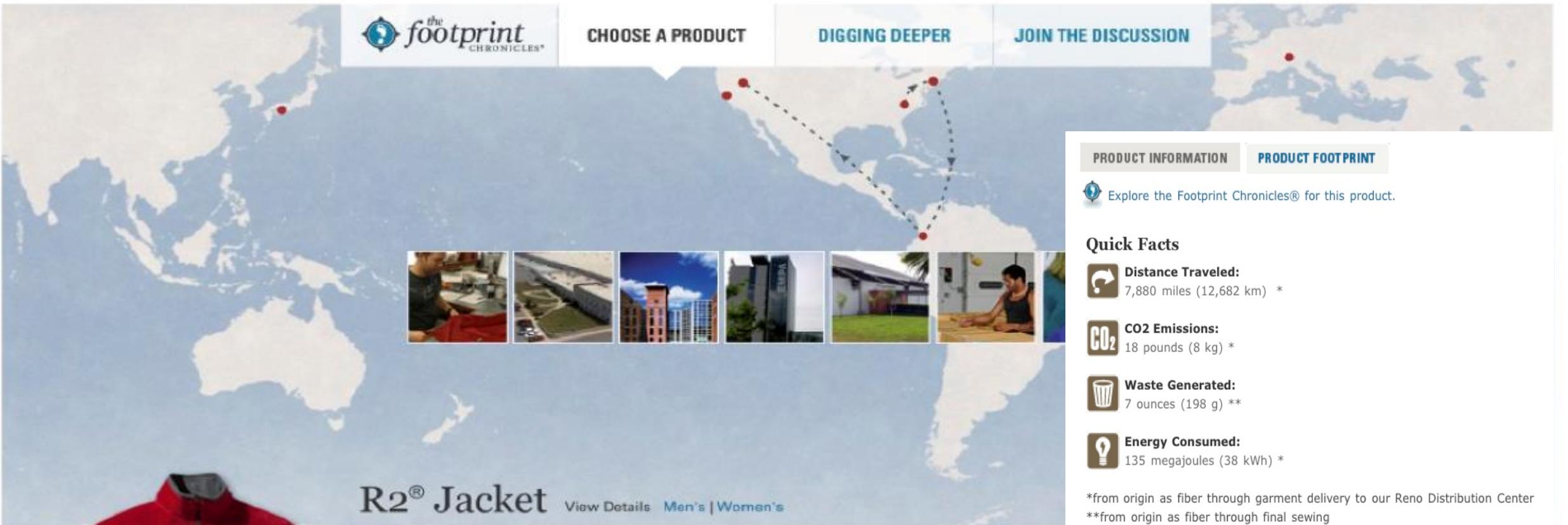
# A Case Study: Patagonia



***“Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis.”***

- Common Threads Recycling Program:
  - Launched in 2005, offering the option for customers to return their worn out products, started with one now extended to all fleece and cotton products, some polyester and nylon products
  - Will fix any defect in any product with a still-useful life for free

Source: [www.patagonia.com](http://www.patagonia.com)



PRODUCT INFORMATION    **PRODUCT FOOTPRINT**

Explore the Footprint Chronicles® for this product.

**Quick Facts**

-  **Distance Traveled:**  
7,880 miles (12,682 km) \*
-  **CO2 Emissions:**  
18 pounds (8 kg) \*
-  **Waste Generated:**  
7 ounces (198 g) \*\*
-  **Energy Consumed:**  
135 megajoules (38 kWh) \*

\*from origin as fiber through garment delivery to our Reno Distribution Center  
\*\*from origin as fiber through final sewing

**R2® Jacket**    [View Details](#)    [Men's](#) | [Women's](#)



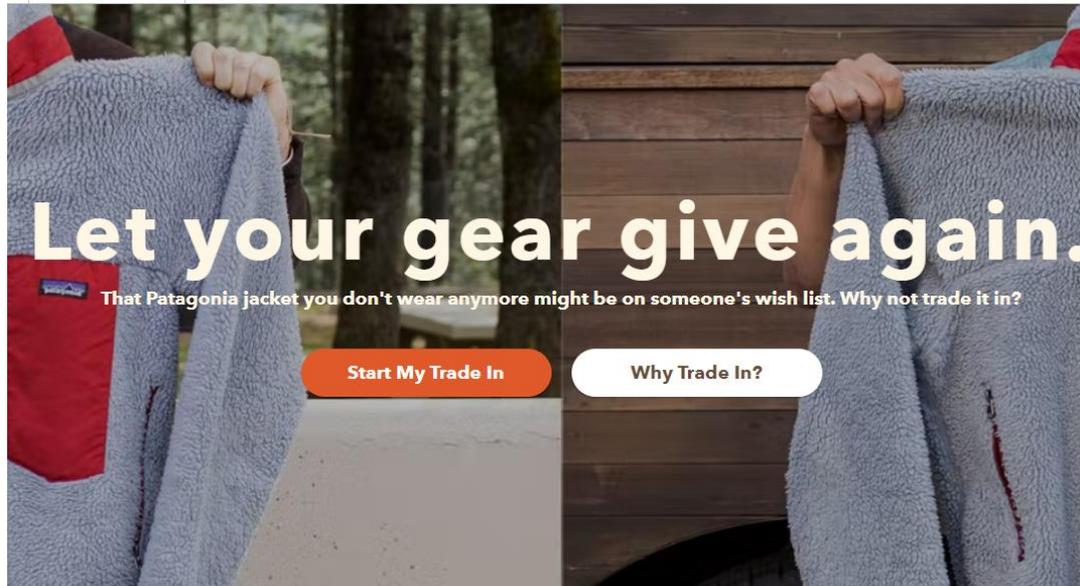
**The Good**  
Regulator® R2® is an excellent technical fabric whose directional fleece biomimics the performance of fur, combining high thermal efficiency with synthetic virtues – quick dry time, moisture evaporation and easy care. It is made with over 60 percent recycled content, and is recyclable through our Common Threads Recycling Program.

**The Bad**  
The downside of fabric with great breathability: it lets the wind go through unless you throw on a shell. Also, polyester is oil-based and, though over 60 percent recycled content is a breakthrough, we have a bit further to go.

**What We Think**  
We're trying to improve R2® fabric's stellar performance and keep bumping up recycled content. Despite our progress – we increased recycled content 20 percent this season – we need to keep working.

# A Case Study: Patagonia

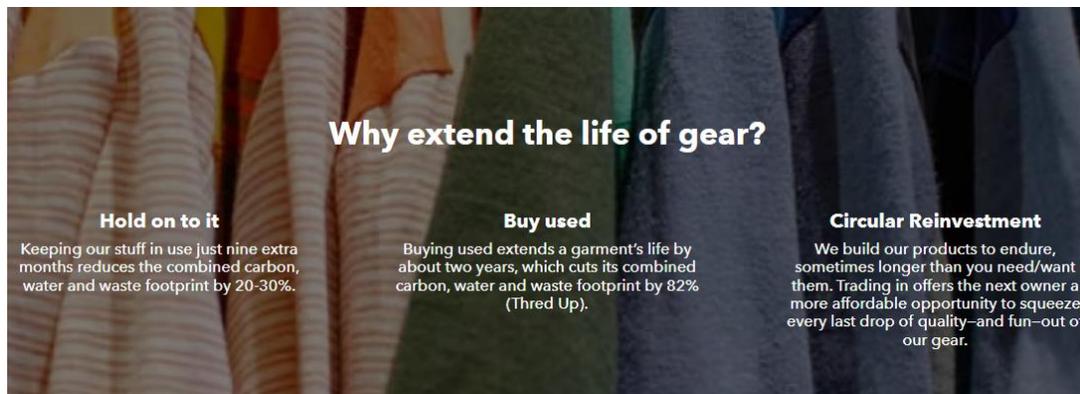
- Reminding consumers **not** to buy new items



**Let your gear give again.**

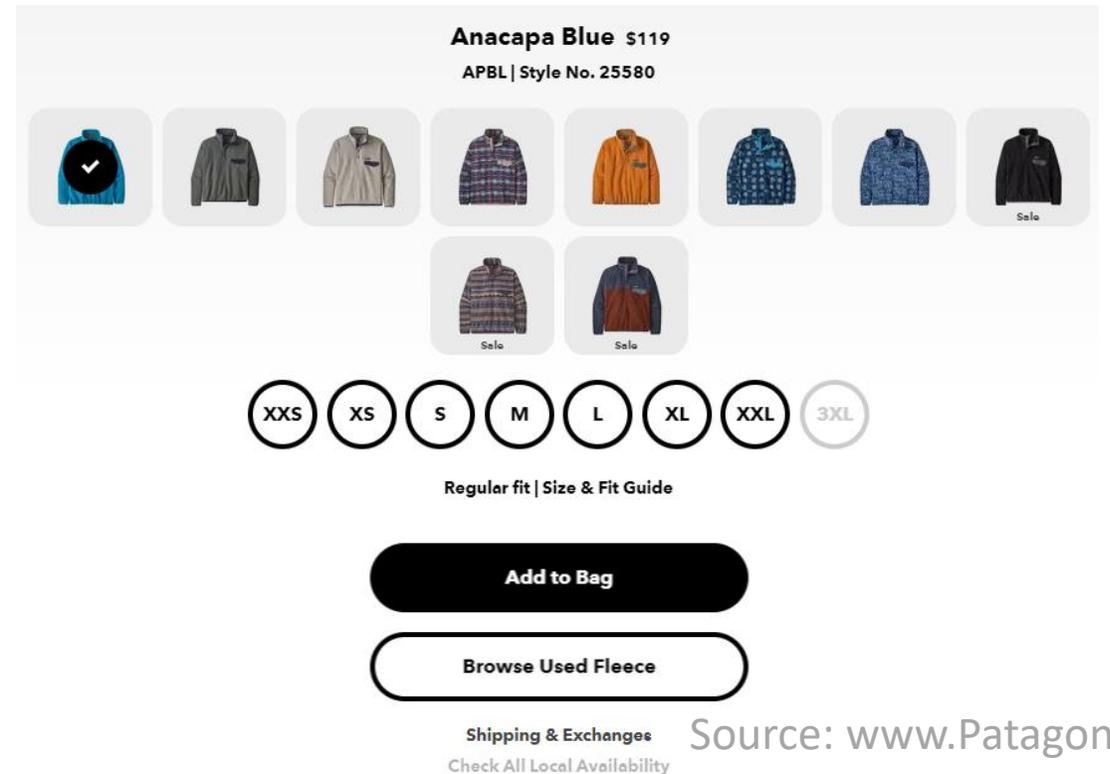
That Patagonia jacket you don't wear anymore might be on someone's wish list. Why not trade it in?

[Start My Trade In](#) [Why Trade In?](#)



### Why extend the life of gear?

<b>Hold on to it</b> Keeping our stuff in use just nine extra months reduces the combined carbon, water and waste footprint by 20-30%.	<b>Buy used</b> Buying used extends a garment's life by about two years, which cuts its combined carbon, water and waste footprint by 82% (Thred Up).	<b>Circular Reinvestment</b> We build our products to endure, sometimes longer than you need/want them. Trading in offers the next owner a more affordable opportunity to squeeze every last drop of quality—and fun—out of our gear.
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**Anacapa Blue** \$119  
APBL | Style No. 25580

Size selection: XXS, XS, S, M, L, XL, XXL, 3XL (Regular fit | Size & Fit Guide)

[Add to Bag](#) [Browse Used Fleece](#)

Shipping & Exchanges | [Check All Local Availability](#)

Source: [www.Patagonia.com](http://www.Patagonia.com)



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# Social Preference and Green Products

- Costs: firms may incur additional costs to differentiate their products from others.  $G$  is how green the product is;  $r_i$  is the input quantity;  $g_i$  is how green each input is

$$G = f(A)[g_1r_1 + g_2r_2 + \dots + g_nr_n]$$
$$Q = Q(r_1, r_2 \dots r_n)$$

- Demand: consumers do care about **green** (social preference)
  - demand curve will become less than perfectly elastic  $P(Q, G)$
  - demand curve is likely to be shifted out (consumers are willing to pay more)
- Profit: should the firm maximize profit?

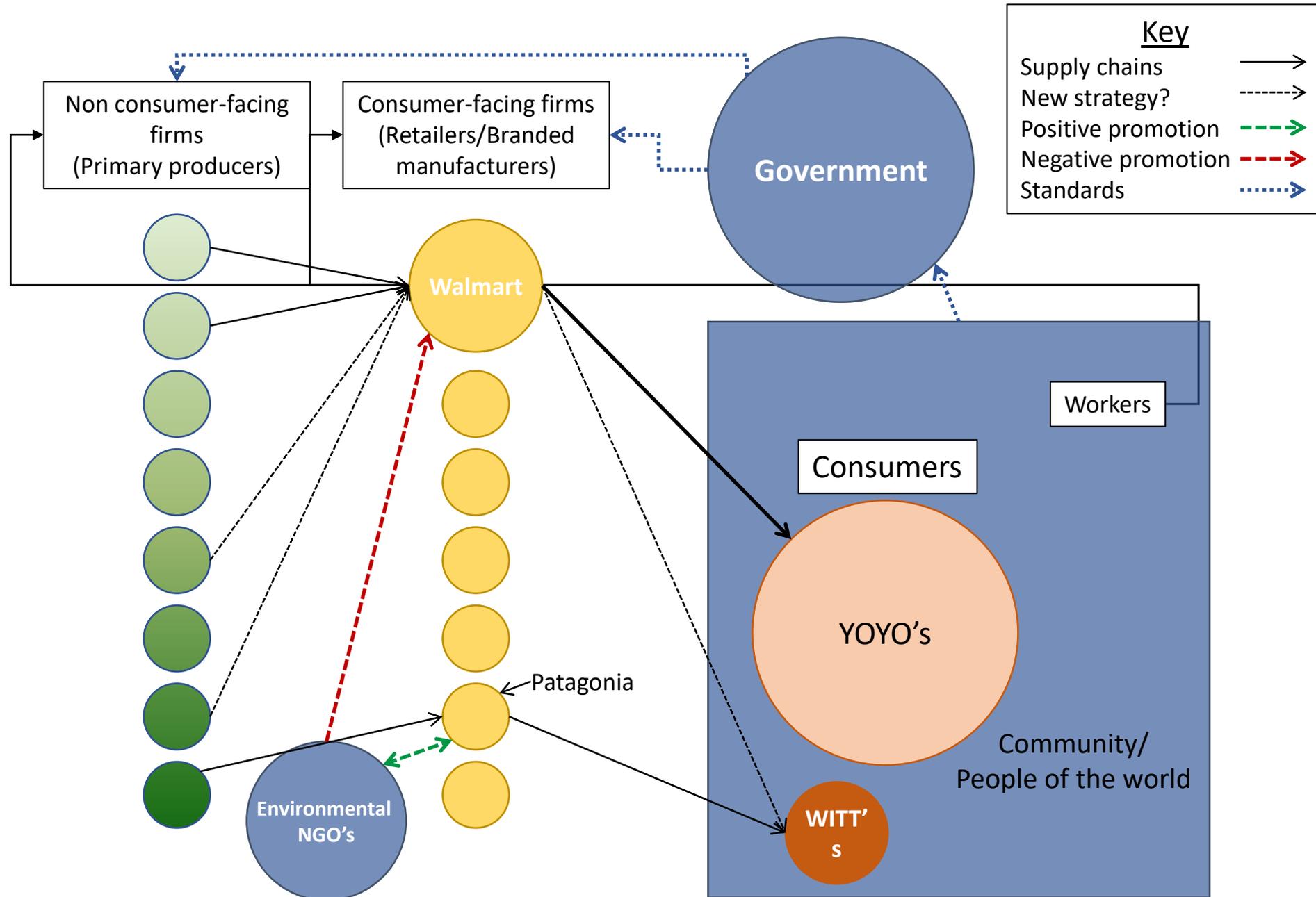
$$\pi = P(Q, G)Q - A - [c_1(g_1)r_1 + c_2(g_2)r_2 + \dots + c_n(g_n)r_n]$$

# Social Preference and Green Products

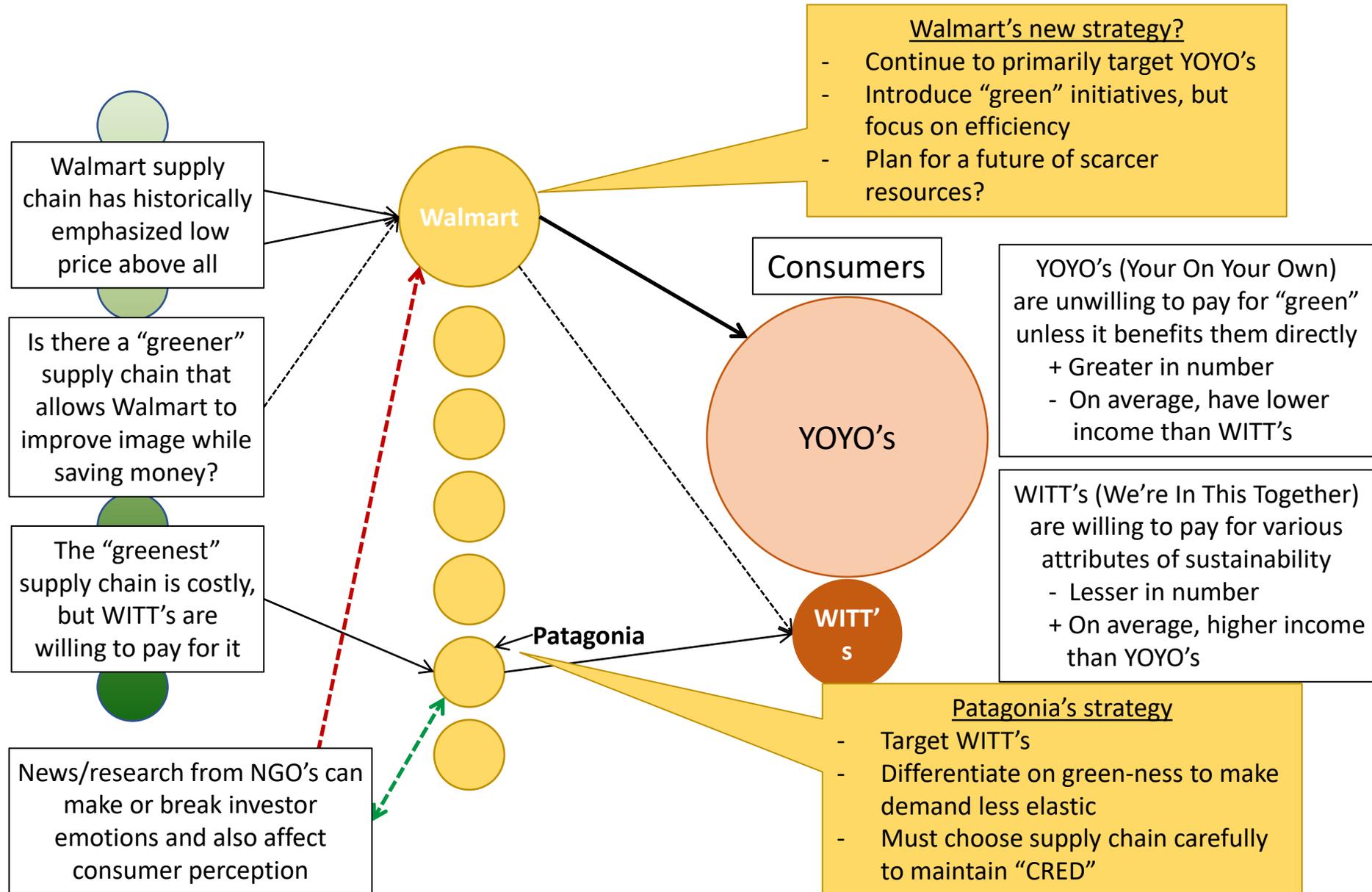
- In theory publicly held firms should maximize profits
- A privately held firm might maximize utility,  $U(\textit{Profit}, G)$ , so  $G$  gets extra weight in decision making
- From first-order-conditions
  - For  $r_i$ :  $c_i = P(1 - G)Q'_i + P_G f_{g_i}$
  - For  $g_i$ :  $c'_i = f P_G$
  - For  $A$ :  $1 = P_G [g_1 r_1 + g_2 r_2 + \dots + g_n r_n] f'$
- Firms may bring in green input but may only do so if it is profitable
- The high-dimensional search is hard!
- This requires government / industry coordination



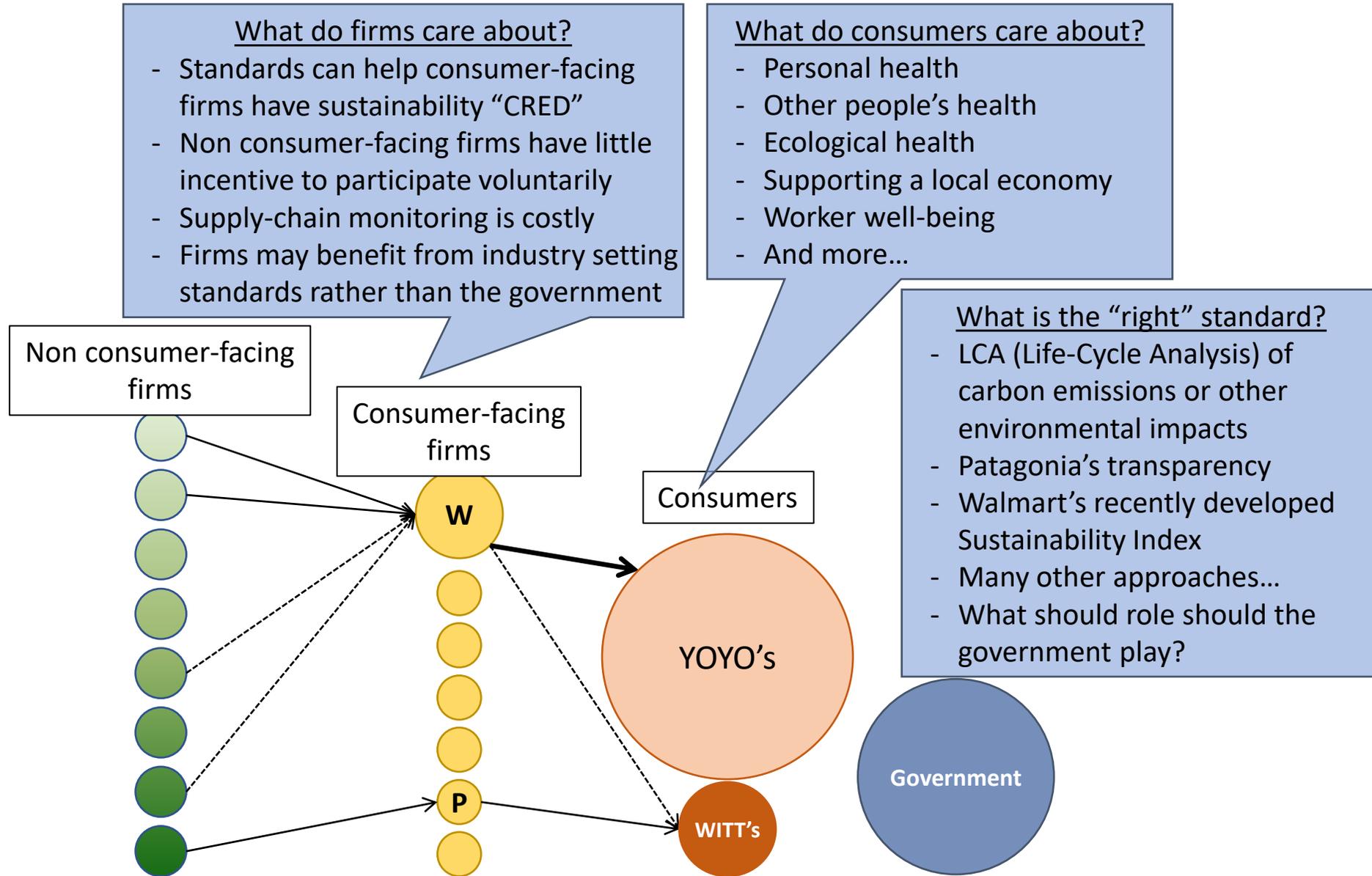
# A Framework for Sustainable Business



# Patagonia vs. Walmart: Two different strategies of consumer-facing firms



Standards can improve information asymmetries but designing a meaningful standard is challenging



# Basic and Intermediate Firms Should Focus on Sustainable Cost Savings Unless Selling to Green Retailers

- Sustainability efforts that are costly to the bottom line have limited value such as avoiding bad PR that might lower stock prices in the short run
  - Exception: a firm is supplying a sustainable retailer that will pay more for sustainable inputs and labor practices
  - Exception: a firm that is privately owned or has market power and a board that desires to be sustainable
- Sustainable cost savings come by redirecting managerial cognitive effort from other profit enhancing activities
  - Cognitive effort is constrained as are all of the firm's resources
- Work with regulatory authorities like NEA to find innovative solutions that enhance the bottom line and sustainability
- Greenwashing is likely to backfire
- Watch the money!



# Firms That Sell Directly to Consumers Can Sell Sustainability for a Premium

- The premium is the result of product differentiation (e.g., Patagonia)
  - A firm faces a less than perfectly elastic demand curve so can raise prices without losing a large share of the market
- The market is mostly WITTs (not YOYOs) that make up about 17% of the population but have higher incomes
- Firms selling to the mass competitive market on price are limited to sustainable cost saving strategies (e.g., Walmart), so no premium
- Greenwashing remains a major issue for any sustainable business
  - Environmental and labor organizations and NGOs are watchdogs that can cause serious problems so some firms “hide” initial sustainability efforts to avoid bad PR (e.g., Levi Strauss and organic cotton)
- Watch the money!



# Green Transition in Singapore

- “...we expect to see a “greening” of traditional sectors of our economy, like aviation, energy, and tourism.”
- “Moving quickly will position Singapore to build on our competitive advantages to capture these opportunities.”
- “In the financial services sector, for example, green finance is one of the fastest growing segments.”
- “For those who wish to drive, we want their vehicles to be cleaner. Hence, we had announced our intention to phase out internal combustion engine vehicles by 2040.”

Source: Ministry of Finance – Budget 2022



# Final Remarks

- Do we need firms to have social preference?
  - Not necessarily if going green is profitable
- Do we need all consumers to have social preference?
  - No. Only need enough demand for green products
- What is the government's role in sustainable development?
  - A coordinator that helps economic agents to shift to a better equilibrium
- What are some successful sustainable business strategies?
  - CRED: credibility, relevance, effective messaging, and differentiation

