

Sustainability: Impact of Sustainability Upsurge on Polyolefin Demand

February 26th, 2019



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- ▶ Overview
- ▶ Sustainability and its Stakeholders
- ▶ Risks and Opportunities
- ▶ Conclusion

► Overview

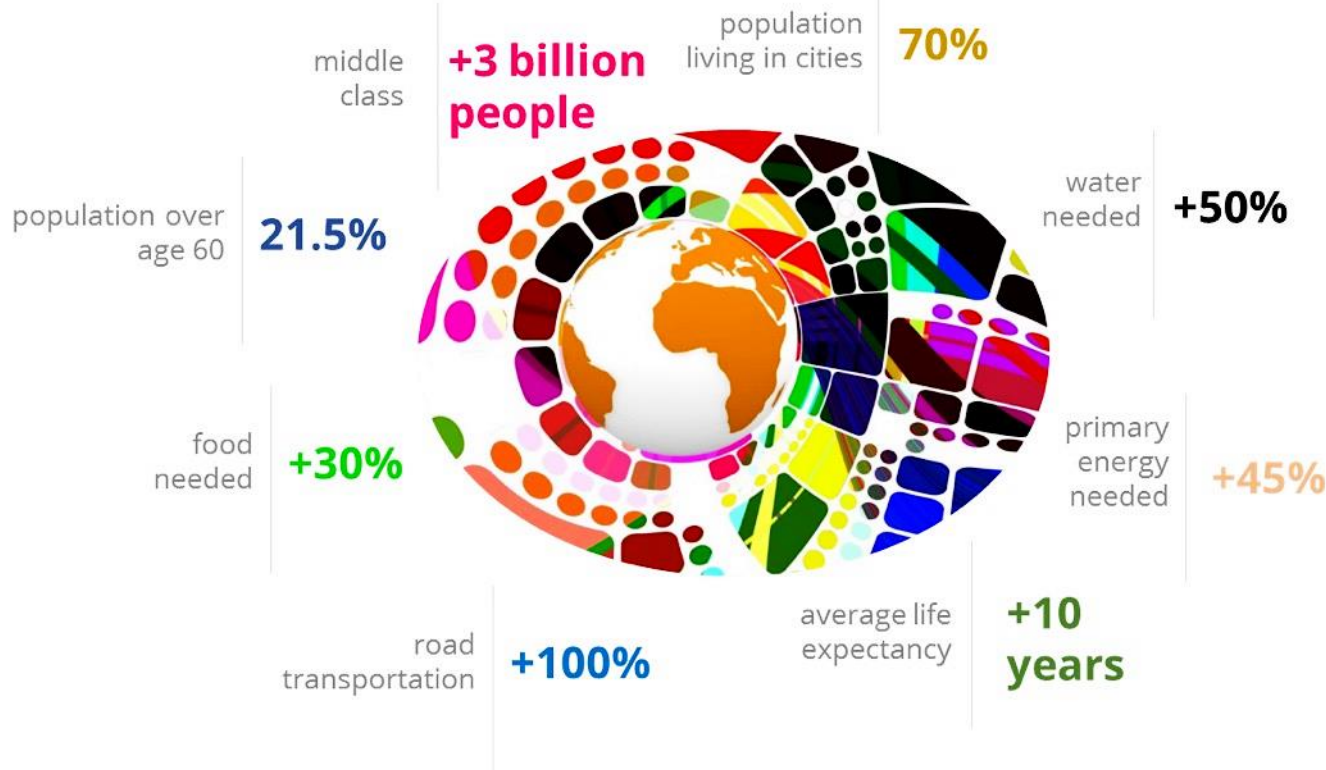
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► Conclusion

Global Megatrends

Forecasted Changes Through or As Of 2050



Megatrends are long-term, transformational processes on a global scale with a broad scope and dramatic impact.

Plastics play a major role in supporting “quality of life”.

Global Risks: 10 Year Comparison

Top 5 Global Risks in Terms of Likelihood

Top 5 Global Risks in Terms of Impact

2008

Breakdown of critical information infrastructure

Chronic disease in developed countries

Oil price shock

China economic hard landing

Asset price collapse

2018

Extreme Weather Events

Cyberattacks

Major Natural Disasters

Failure of climate-change mitigation and adaptation

Massive Incident of Data Fraud/Theft

2008

Asset price collapse

Retrenchment from globalization

Interstate & civil wars

Pandemics

Oil price shock

2018

Weapons of mass destruction

Extreme Weather Events

Water crisis

Major Natural Disasters

Failure of Climate Change Mitigation and Adaption

Economic

Environmental

Geopolitical

Societal

Technological

Source: World Economic Forum
2008-2018, Global Risks Report

**Sustainability is a mainstream issue...
driving attention, investment and growth
on a global scale**



**Sustainability action is no longer an idealistic trend in business...
Political beliefs aside it is now essential for business survival**

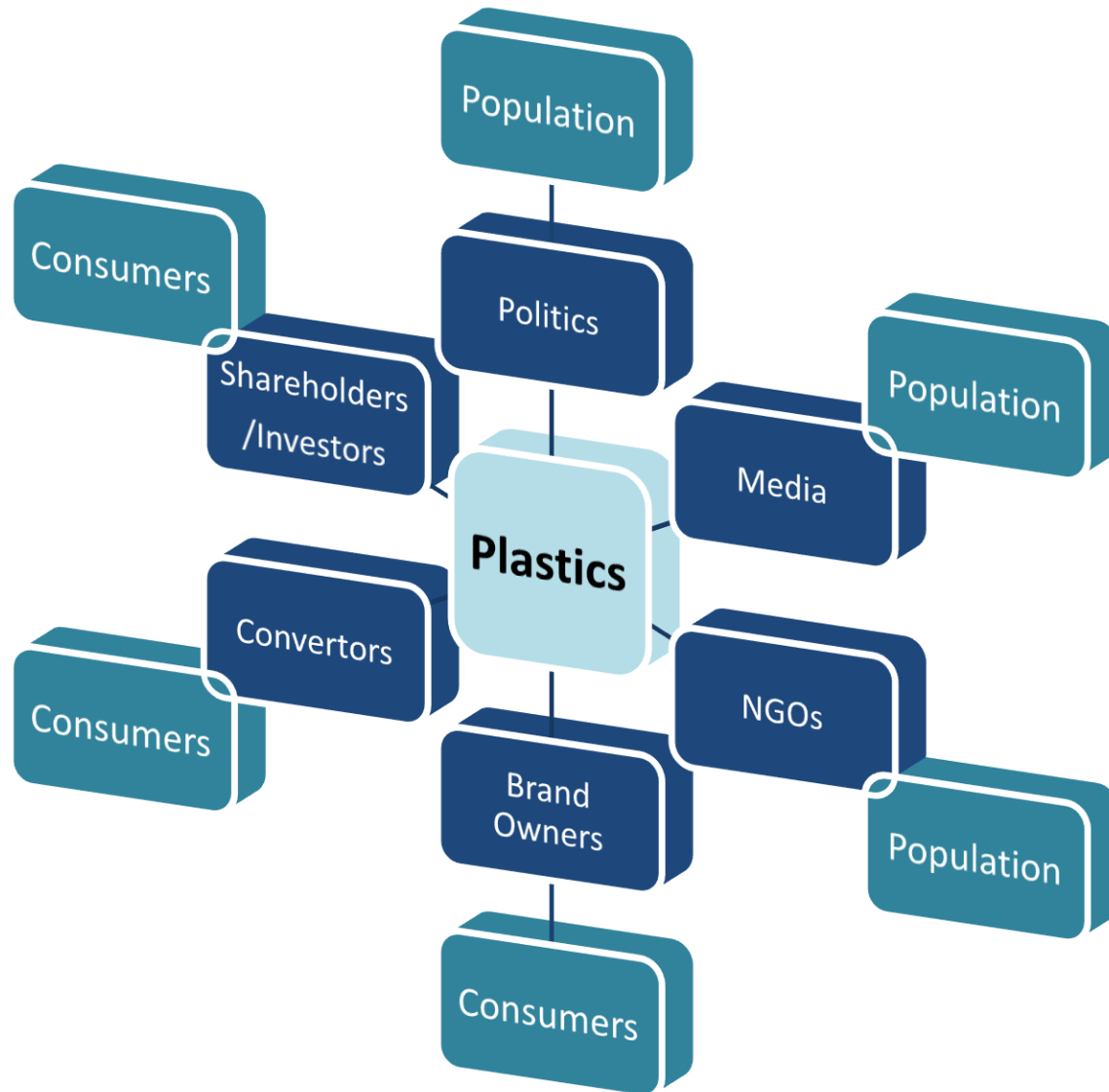
▶ Overview

▶ Sustainability and its Stakeholders

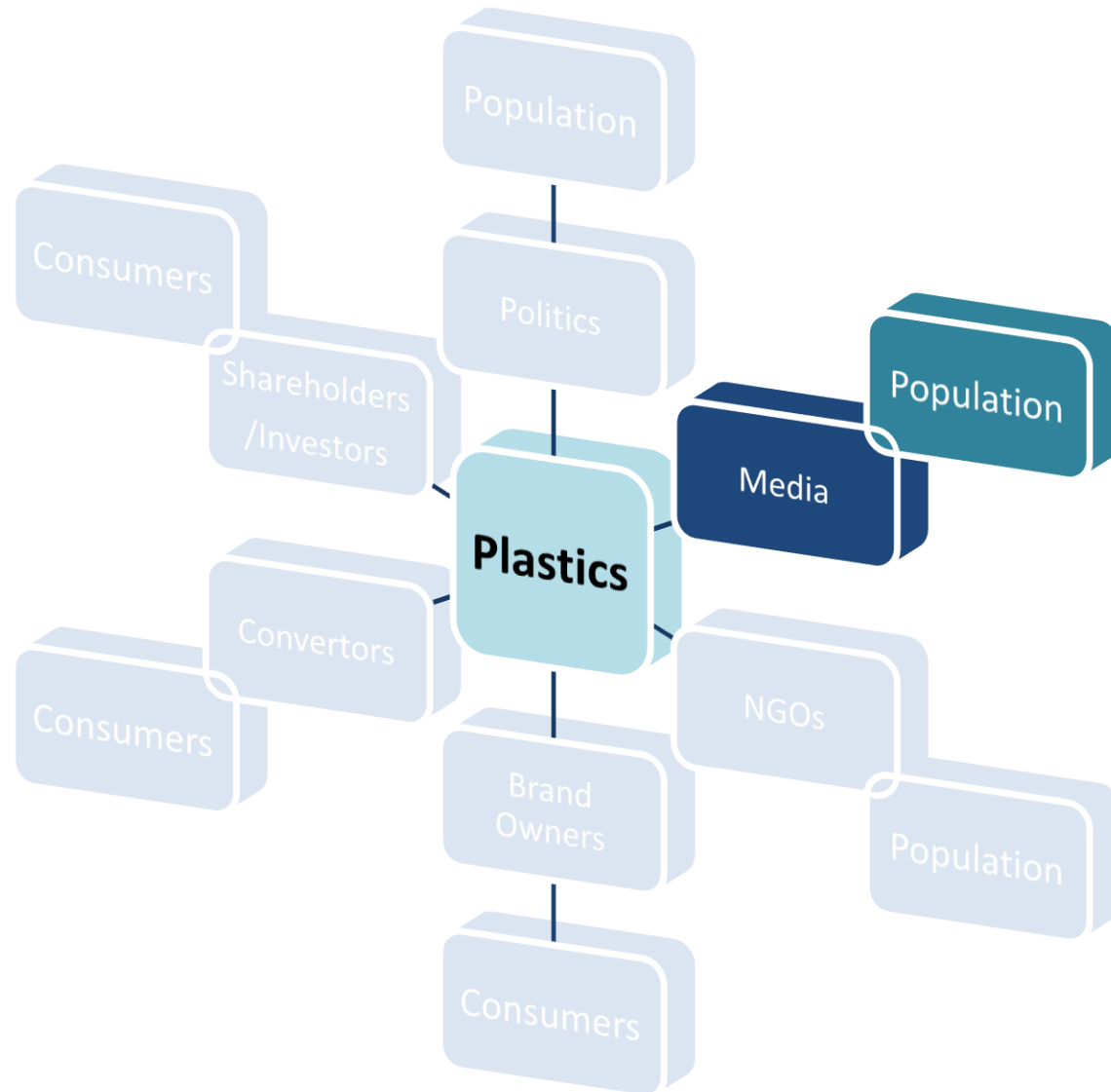
▶ Risks and Opportunities

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Stakeholders Map in our Industry (Simplified)



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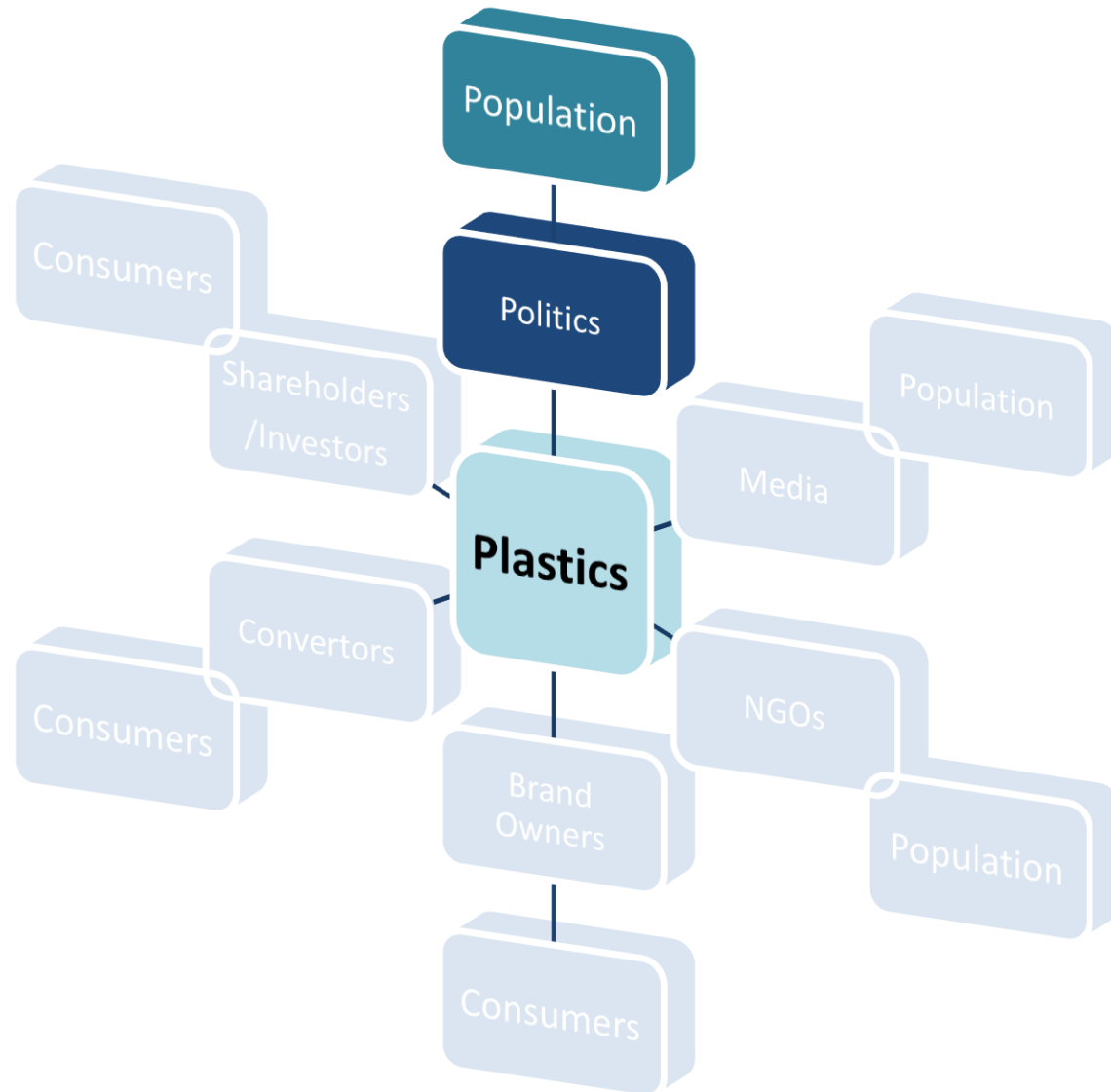
Impact on Media - Plastics on our Oceans



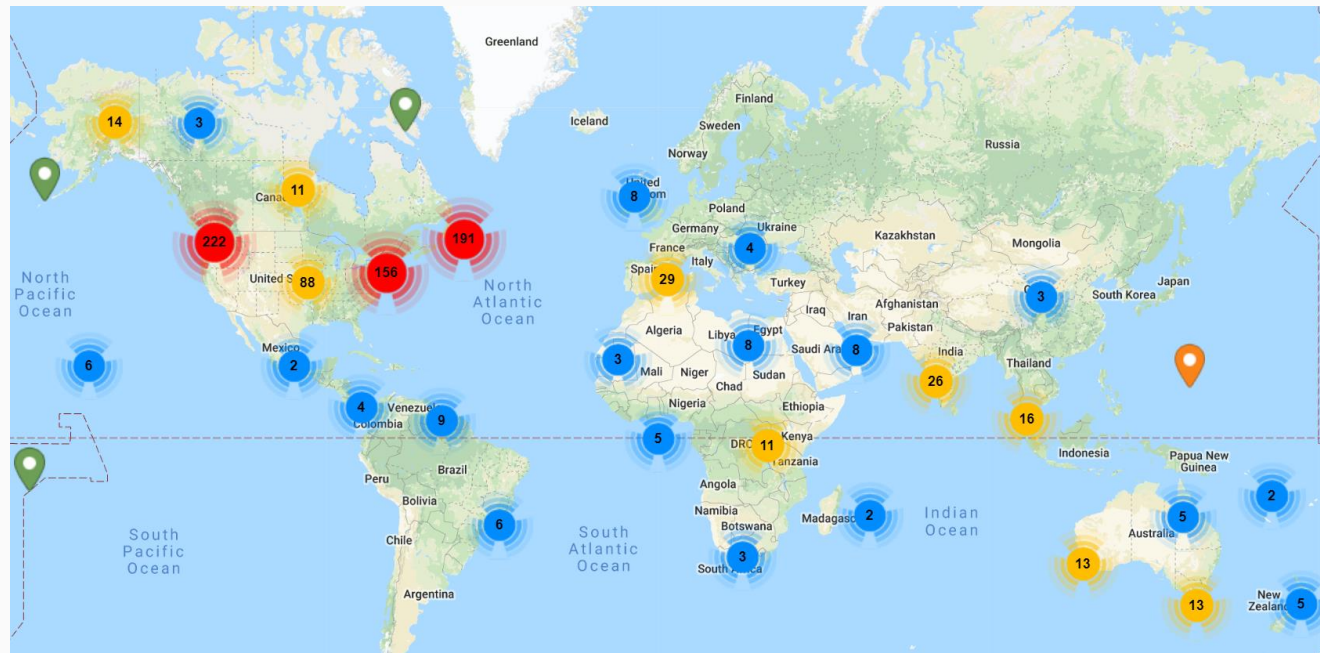
June's National Geographic magazine cover resonated across the world.

- Plastic debris (plastics leakage) in our oceans has emerged as a new global challenge
- Highly driven by growing economies in emerging regions
- Impact on plastics demand growth is nominal

Stakeholders Map in our Industry (Simplified)



Impact on Regulation and Legislation – Bans



Current locations where plastic bags were banned (green) or where fees are implemented (blue)
<http://www.factorydirectpromos.com/plastic-bag-bans>

As of mid-2018
over 850
cities/states in
more than 60
countries have
enacted
legislation to
either ban or
charge a fee for
using plastic
bags.

Plastic Bans/Fee to use: Plastic Straws

Starbucks plans to phase out plastic straws by 2020.

McDonald's recently announced it will ban plastic straws at its U.K. and Ireland restaurants.

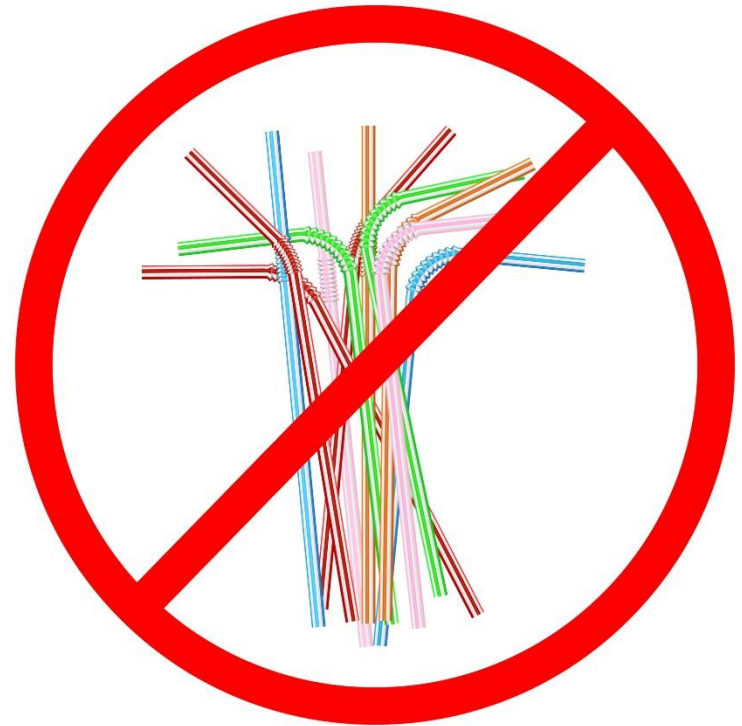
Bon Appétit Management, a food service company with 1,000 U.S. locations, announced last May it will phase out plastic straws.

Alaska Airlines and American Airlines have pledged to phase out plastic straws and stirrers.

Both Hyatt and Marriott International have announced initiatives to eliminate plastic straws worldwide.

Disney announced it would eliminate single-use plastic straws and stirrers at all their locations by mid-2019.

Royal Caribbean will stop providing plastic straws on its 50 cruise ships by the end of 2018.



Increasing public awareness is driving Brand Owners to take the lead on plastic straw bans

Sustainability: Plastic Bans

France's tough stance on banning single use plastics.

Common "T-Shirt" Bag
Ban Effective
July '16

Fruit/Veg &
Meat/Fish
Bag Ban
Effective
January '17

Cosmetics
Containing
Solid Plastic
Particles Ban
Effective
January '18

Single Use
Plastic
Plates, Cups
& Cutlery
Ban Effective
2020

July 2016

France banned all plastic bags smaller than 10 liters and less than 50 microns thick (t-shirt bags).

January 2017

France expanded the bag ban to include fruit/veg and meat/fish bags and authorize domestically compostable bags made in full or in part from bio-sourced materials.

January 2018

No cosmetic products placed on the French market contains solid plastic particules capable of generating marine waste.

By 2020

Effective 2020 France plans to ban all single-use plastic plates, cups and cutlery that isn't made of biologically sourced materials and can be composted in a domestic composter.

Impact on Regulation and Legislation – Taxes


UK to tax packaging wit

https://www.plasticstoday.com/packaging/uk-tax-packaging-less-30-recycled-material/45189261959729

UK to tax packaging with less than 30% recycled material

by: PlasticsToday Staff in Packaging, Sustainability, Recycling, Materials on October 30, 2018


f in t e



Chancellor Philip Hammond said yesterday that the UK government would introduce a new tax penalizing plastic packaging containing less than 30% recycled plastic. He did not specify the amount of the tax nor a timetable of its implementation when he presented his budget in the House of Commons on Oct. 29.

In a response on behalf of the British Plastics Federation, Director General Philip Law stated that the plastics industry shares the government's ambition of being a good steward of the environment for future generations, but getting that right needs to involve manufacturers, retailers, recyclers and the public at large, he stressed.


"The plastics industry wants to see more recycled content in its products and has already set out a vision to minimize plastic entering the sea and to ensure that no plastic packaging goes to landfill by 2030," noted Law. He promised to "engage with the government constructively in the weeks and months ahead," but urged caution in requiring a specific level of recycled content in packaging products, "as we must ensure the UK has the recycling infrastructure to meet demand."

**Sponsored Content Brought to you by PLASTEC Minneapolis**
The Midwest's Only Plastics Trade Show


PLASTEC Minneapolis is the hub to injection molding, materials and additives, product design, automation, and more. Source new products explore breakthrough technology, and hear innovators reveal their latest discoveries and developments.

Environmental activists were unimpressed by Hammond's proposed tax, arguing in essence that it was too little, too late. They were especially disappointed that he rejected the so-called latte levy, which would add 25 pence to the price of a coffee served in a single-use cup to encourage reusable alternatives.

"A tax on virgin plastic packaging would be a welcome step. But if we're going to stem the huge tide of


**POLYMER PROCESSING SOLUTIONS FOR PACKAGING.**

davis-standard.com


**PLASTEC Minneapolis begins this week**

Back for its third year in Minneapolis, PLASTEC showcases advances in materials and additives, injection molding, rapid prototyping, automation and more. The show is part of the Midwest's largest advanced design and manufacturing event, presenting a full spectrum of products and services supporting the region's booming medical sector and beyond.

Recommended Reading

**Business titans commit to elimination of plastic packaging waste by 2025**

Solutions for the




Impact on Regulation and Legislation – Taxes



UK to tax packaging with less than 30% recycled material



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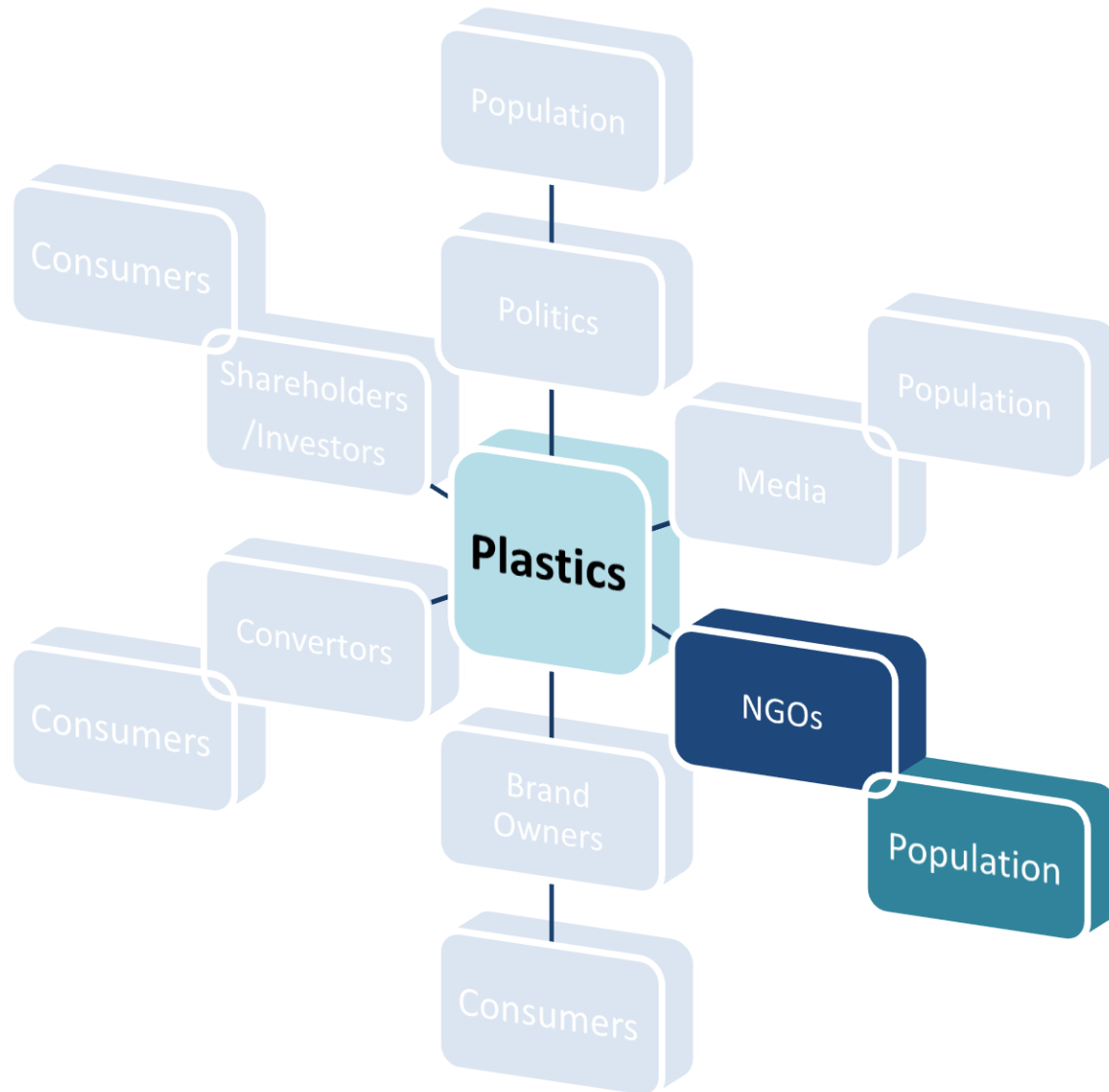
Solutions
for the

Recommended Reading

Business titans commit to elimination of plastic packaging waste by 2025



Stakeholders Map in our Industry (Simplified)





CIRCULAR ECONOMY

TARGETS*

PLASTIC PACKAGING

70% Reuse/Recycle

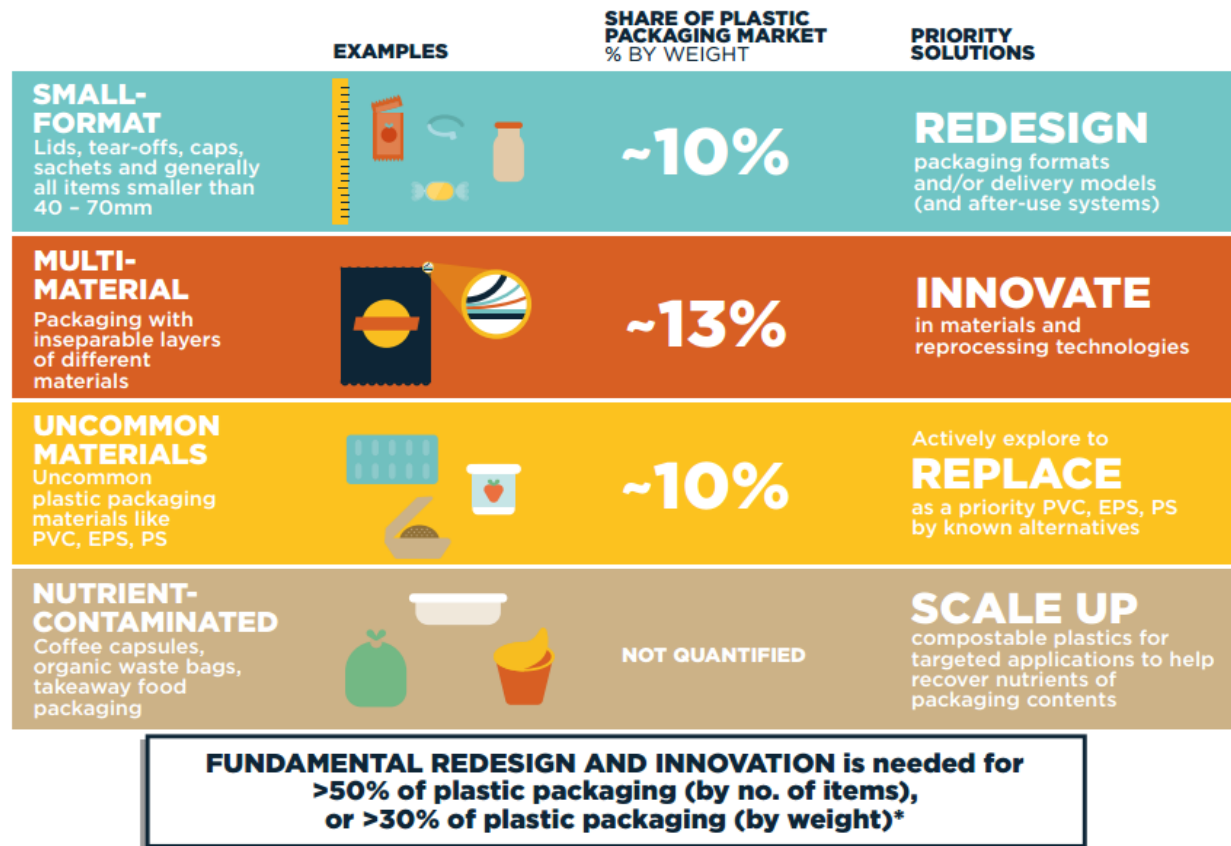
30% Redesign/Innovate

New mindset is driving the de-coupling of economic growth from the use of natural resources.

While the circular economy concept has been around since the 1960's, it's re-introduction by the Ellen MacArthur Foundation has quickly gained momentum and has been widely embraced as a key lever in bridging the emissions gap required to limit global warming (climate change).

Sustainability: Circular Economy

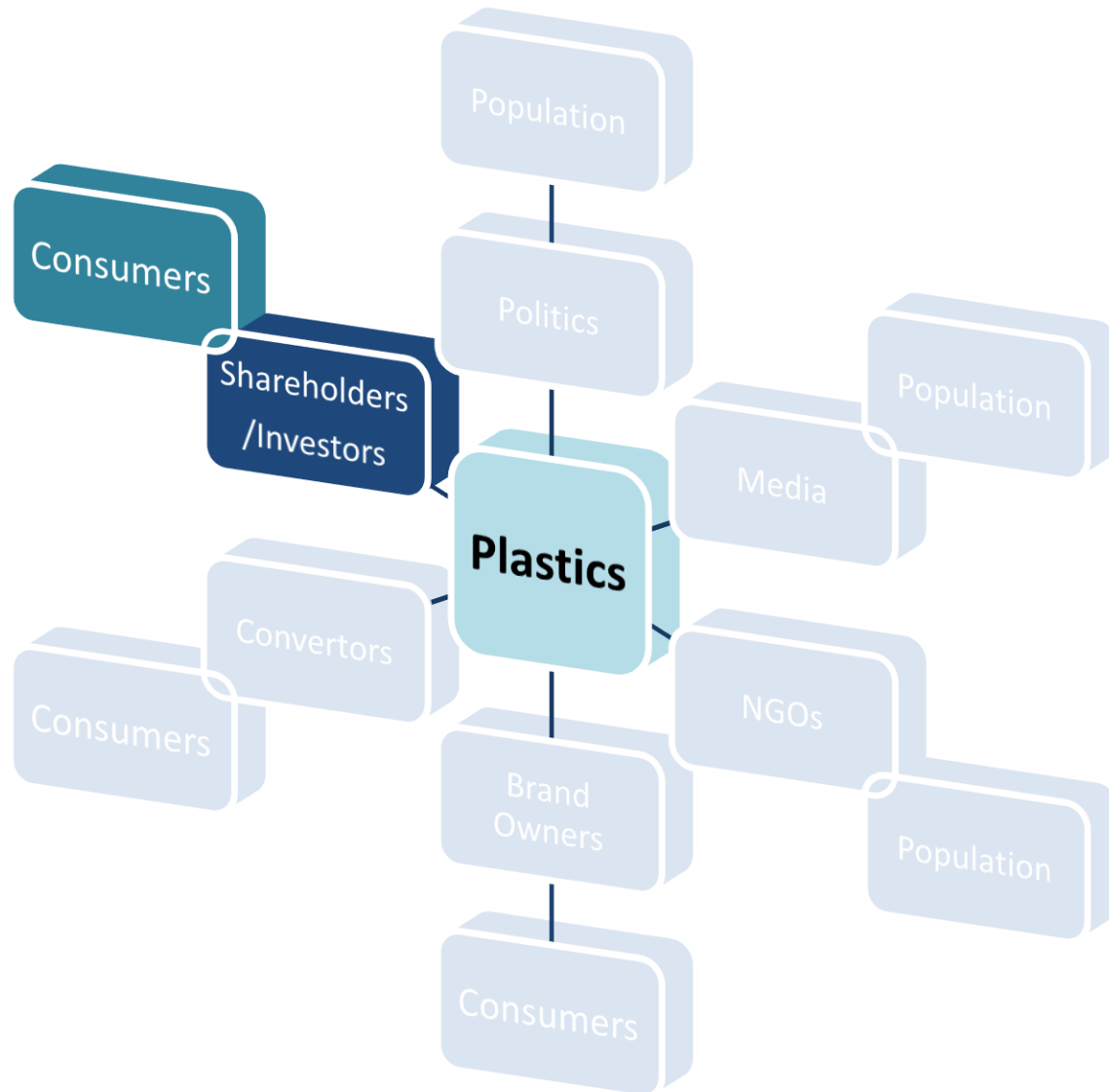
A number of plastic packaging segments are targeted for fundamental redesign and innovation in the “New Plastics Economy”.



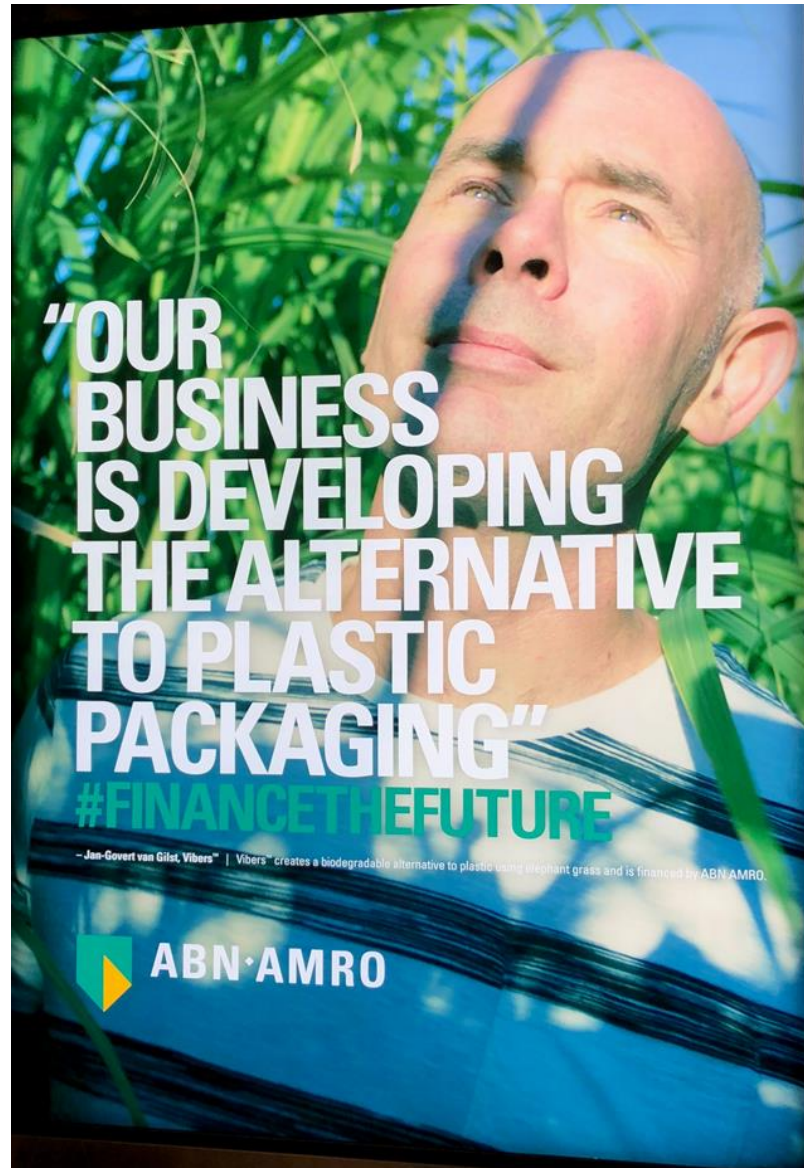
*Total is not the sum of separate categories due to overlap

Source: World Economic Forum and Ellen MacArthur Foundation

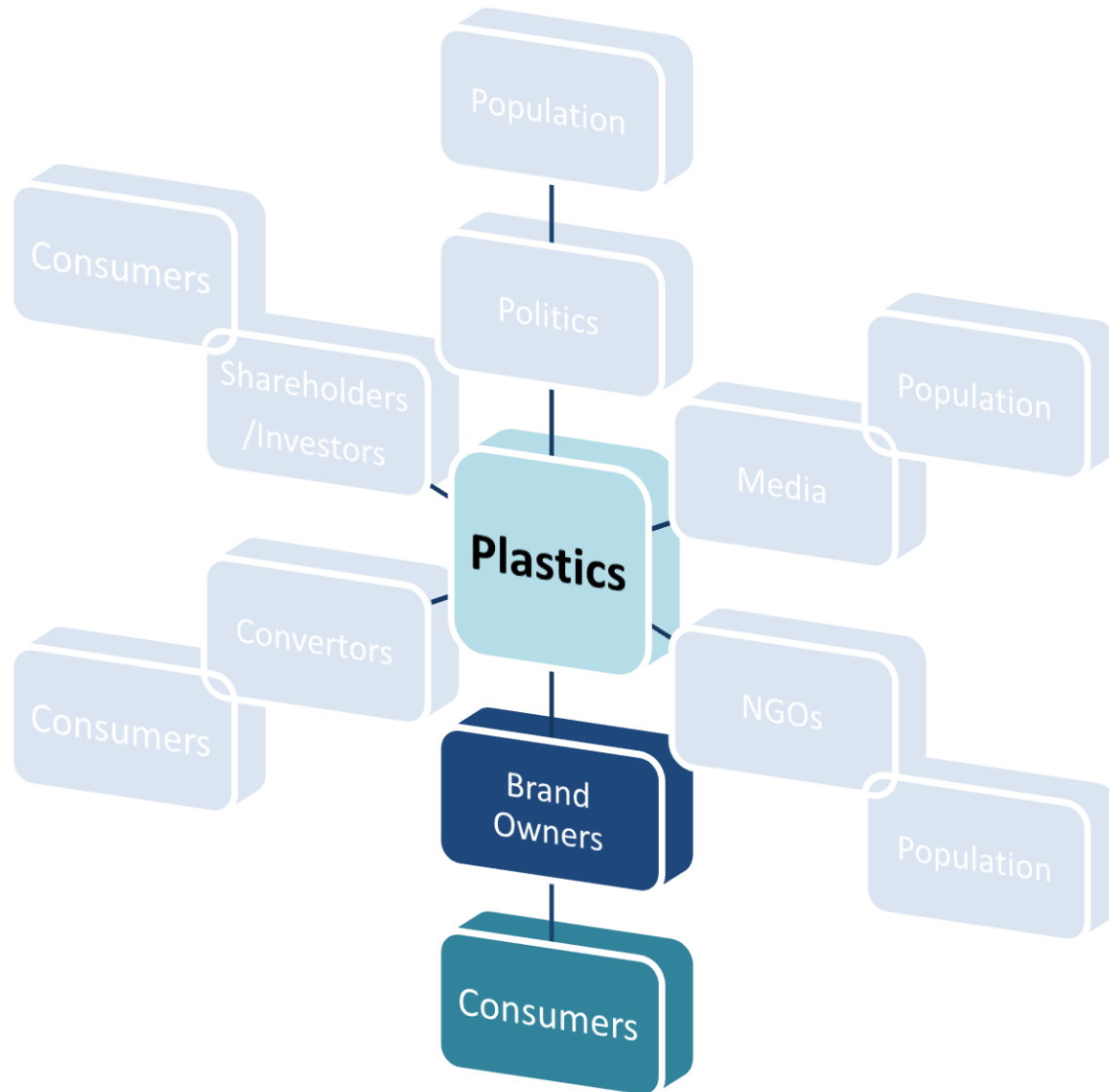
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Investors Moving from Plastics?



Stakeholders Map in our Industry (Simplified)



Sustainability: Brands

Company	Rev (2017)	Plastic use	Sustainability Targets
Colgate-Palmolive	\$15.4 billion	613,000 tonnes (all packaging including fiber)	<ul style="list-style-type: none"> • 50% recycled content across all packaging materials by 2020, including paper packaging; • 25% recycled content for plastics by 2025; • Package recyclability company-wide by 2025.
Procter & Gamble	\$66.8 billion	Not disclosed	<ul style="list-style-type: none"> • Reduce packaging by 20% per unit of production by 2020 • Double our use of recycled resin in plastic packaging by 2020 • 100% recyclable or reusable packaging by 2030 (90% by 2020) • 100% of paper packaging either recycle content or 3rd party certified virgin fiber
Unilever	\$62.6 billion	610,000 tonnes (31% of Unilever's packaging is made of plastics)	<ul style="list-style-type: none"> • 100% of plastic packaging to be reusable, recyclable, or compostable by 2025; • 25% recycled content in all plastic packaging by 2025; • All plastic packaging to be fully reusable, recyclable or compostable by 2025; • Reduce the weight of packaging by one-third by 2020; • Halve the waste associated with the disposal of products by 2020; • Increasing recycling and recovery rates by 15% by 2020 in its top 14 countries; • By 2020 total waste sent for disposal from manufacturing will be at or below 2008 levels despite significantly higher volumes.

Sources: Colgate-Palmolive, Townsend Solutions, Greenpeace



Adidas has announced its commitment to use only recycled plastics in its products by 2024.

By 2019, the company estimates that its line of apparels for the spring and summer of next year will be made up of 41 percent recycled polyester.

Last year Adidas and Parley for the Oceans sold more than a 1 million sneakers made with recycled ocean plastic.

Upcycling: Creative Value Addition

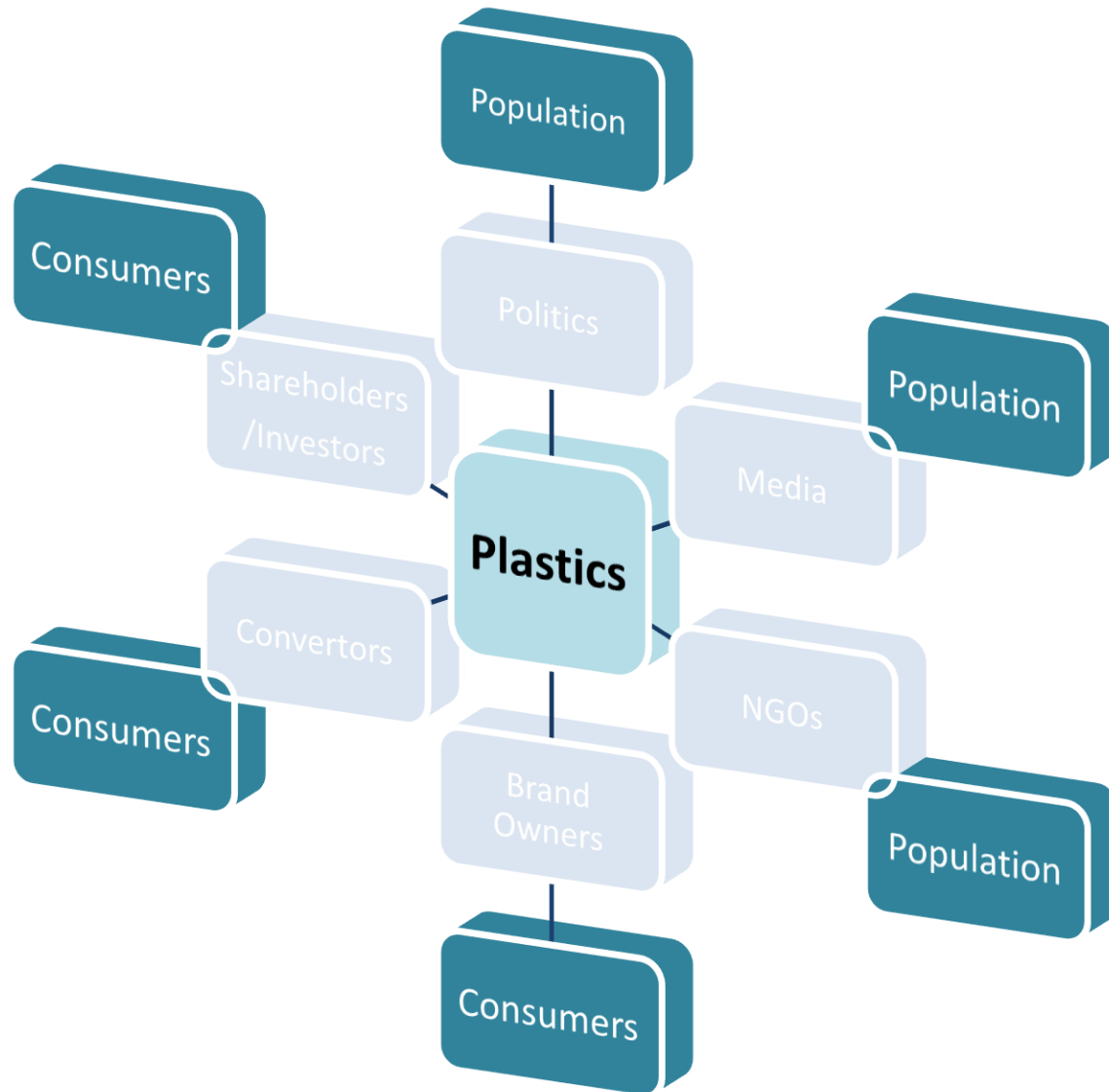
Upcycling, or Creative Reuse, is the transformation of used objects or materials to materials or products of a higher quality or that are better for the environment.



Courtesy of dezeen

- Nike upcycles post-consumer waste into simple polypropylene shoe packaging.
- Not only is the packaging for the NikeLab Air Max 1 Royal made from recycled materials, but it can also be used as a backpack.

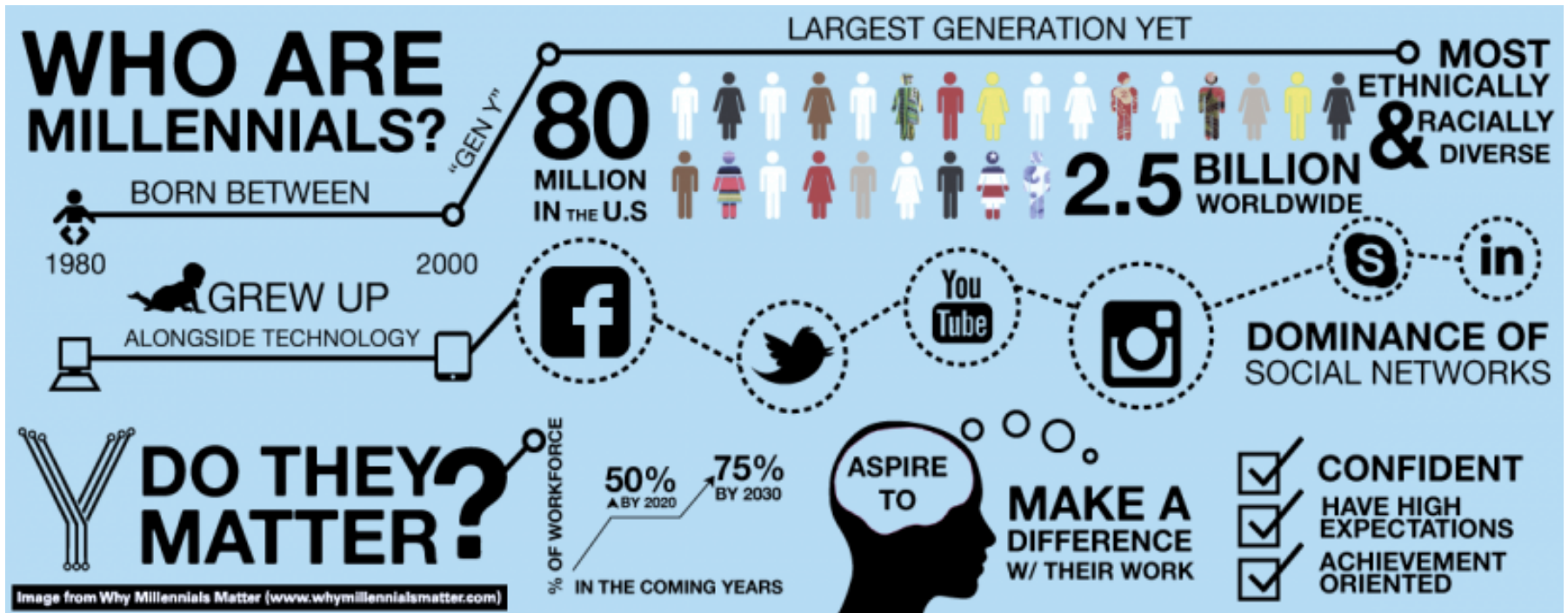
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Consumers



Who the consumers are: Millennials



Courtesy of Millennialsmatter.org

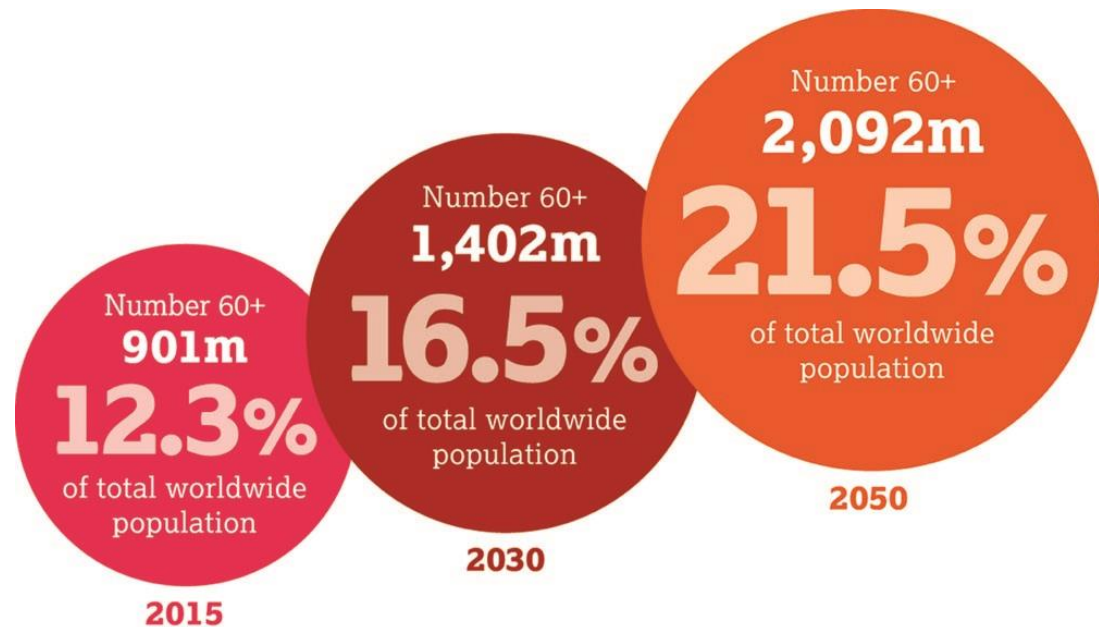
- Millennials, now generally **between the ages of 18 and 37.**
- Preferences and behaviors of are already **driving paradigm shifts across sectors.**
- Millennials will generate almost **50% of total US income in less than a decade.**
- Almost 90% of millennials 25 – 34 **use smartphones.**
- The **grab-n-go generation** for food and convenience shopping.

Who the consumers are: Older

Advances in medicine and healthier lifestyle choices are enabling people to live for longer while remaining active. In 2000, 810 million people were aged 60 or over. In 2050 that number will rise to 2 billion... that's almost 22% of the world population.

In less than a decade, people 65 and over will start to outnumber children 5 and under for the first time in human history. This increase in the numbers of retired people will fuel developments and demand for goods and services linked to older people. This is a tremendous opportunity for healthcare markets in particular, where traditional growth has come largely from material substitution.

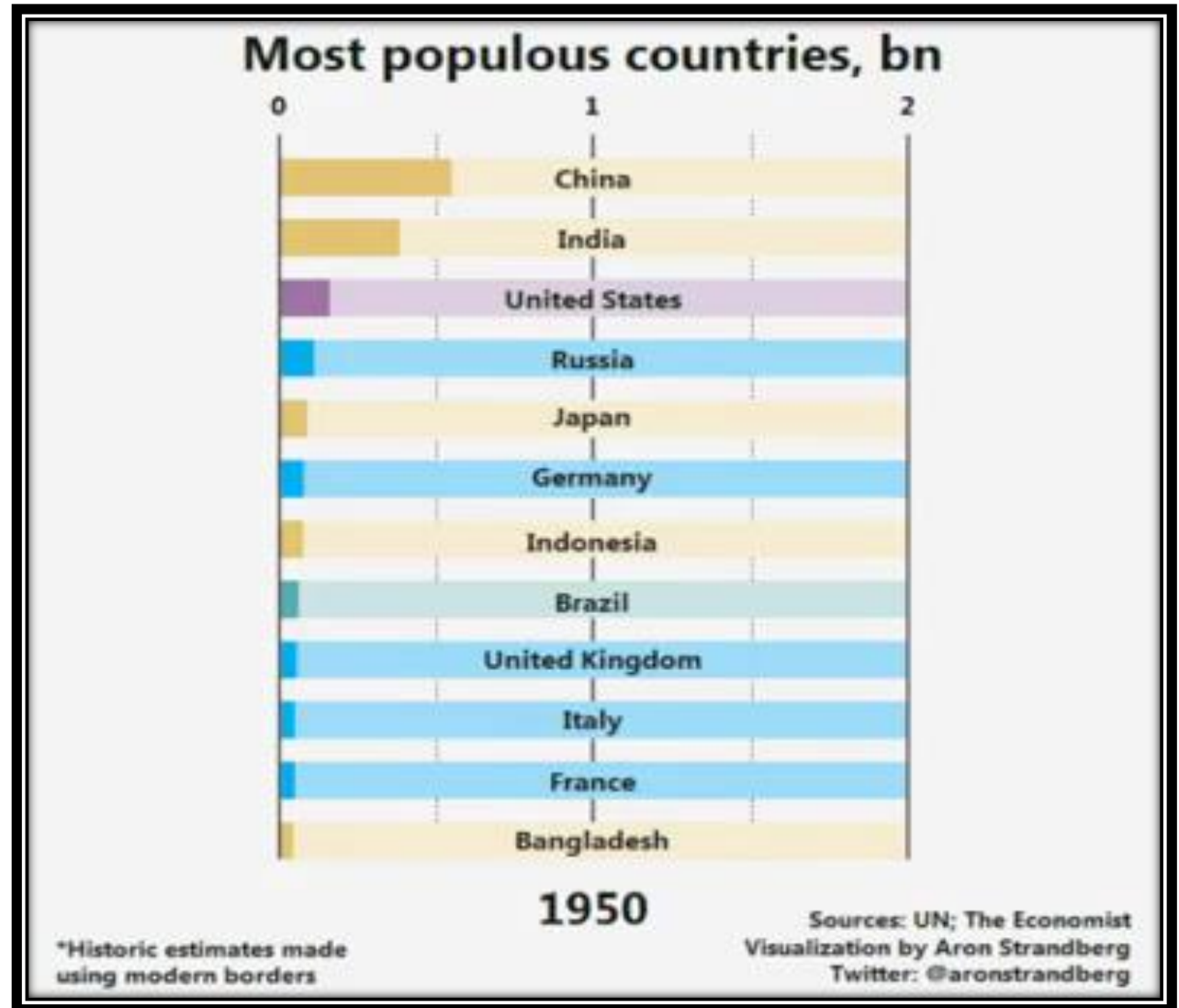
In addition to rising incomes in rapid-growth markets, the seniors of tomorrow are more physically, professionally and economically engaged.



Where the consumers are: Population

Watch as **India** surpasses **China** in **2022** becoming the world's most populous country, **Nigeria** grabs the third rank over the **United States** by 2049, and **Pakistan** becomes fifth by 2057

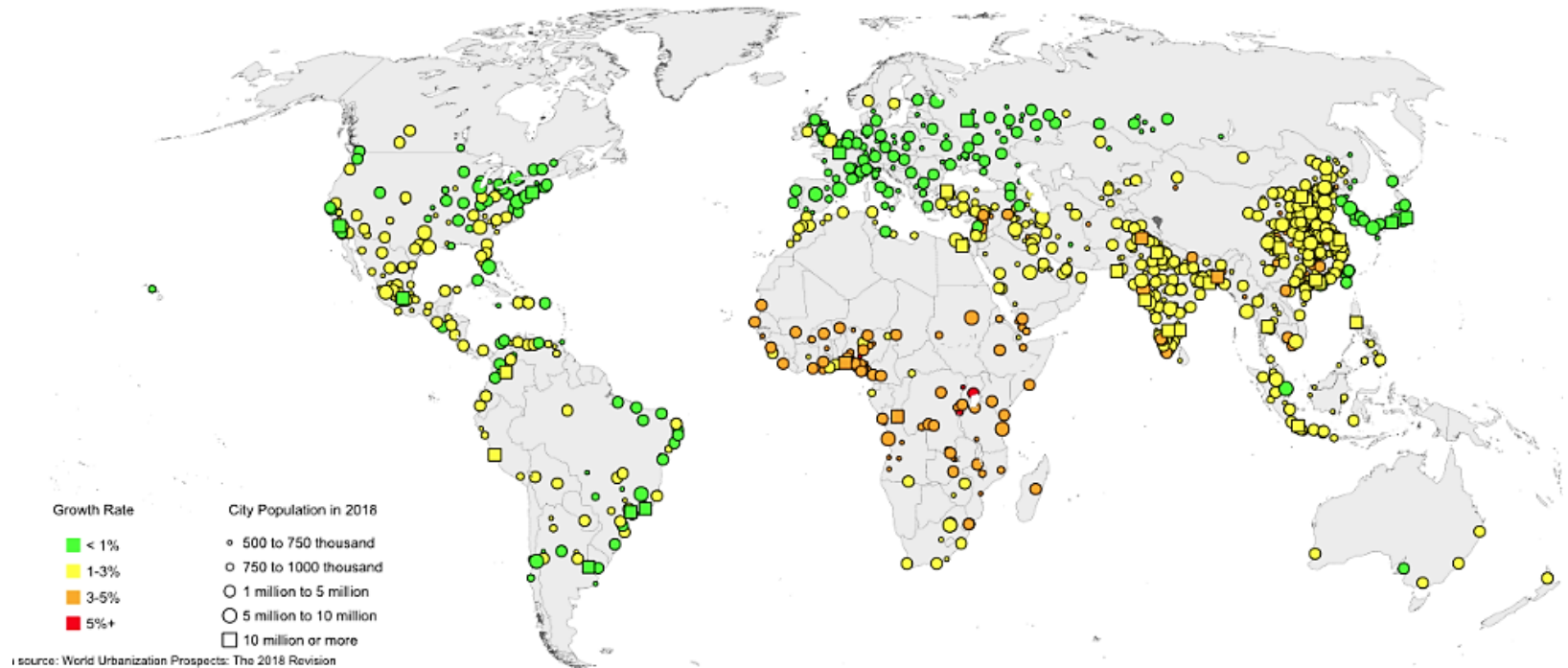
During the one-child policy, life expectancy in China improved from 67 to 75 and fertility rate decreased from 2.8 to 1.7 resulting in an increase in older citizens, and a decrease in population



Where the consumers are: Urban Agglomerations

The trend towards urbanization is accelerating quickly, with the majority occurring in developing regions.

2018-2030



- Cities are looking at **effective infrastructure investment** and sound planning to be competitive and resilient.
- At the same time, **entrepreneurship is rising**, driving the need for more supportive and complex ecosystems.

Urbanization: Population Shift

Key Plastic Markets Impacted

Agriculture (film, geomembrane, etc.);

Automotive (paneling, parts, tires, seats, coverings);

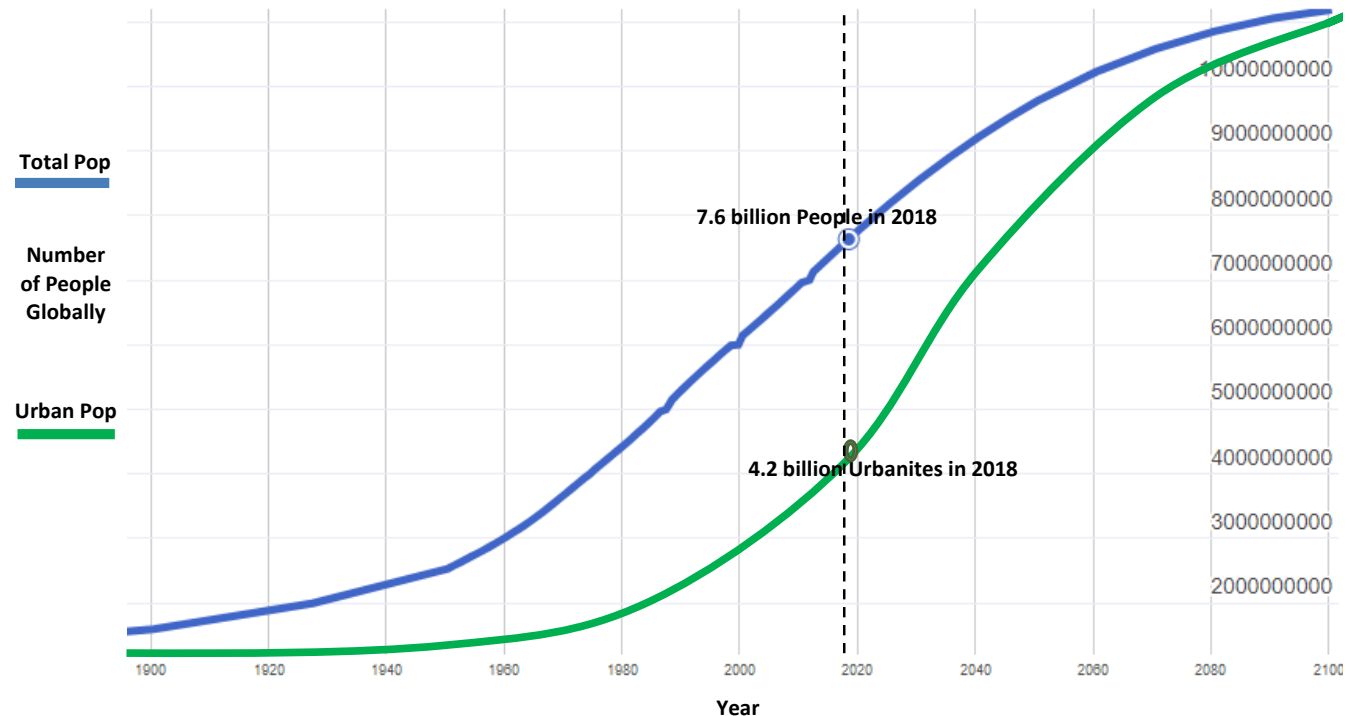
Building & Construction (pipe, windows, flooring, siding, etc.);

Electrical & Electronic (power transmission, cabling, etc.);

Retail & Grocery (as people move to cities, become more urban, they use more packaged products less bulk).

Year	Population	Urban Pop	Urban Pop %
1900	1.6 billion	0.2 billion	13 %
1951	2.6 billion	0.8 billion	30 %
1985	4.9 billion	2.0 billion	41 %
2018	7.6 billion	4.2 billion	55 %

Global Pop CAGR since 1951 is 1.61%, but for Urban Pop its 2.51%



What the consumers buy: Millennials

- Support brands that strive for a **higher purpose** as well as delivering quality & freshness.
- More mindful of **sustainability** and environmentally conscious.
- Contribute to the rising number of single-person households, driving growth for **resealable packaging**. (flexible pouches, space-saving, convenient).
- Want **on-the-go formats**, like spout pouches for drinking (health-conscious) yogurts, which are convenient for single usage and provide excellent protection against moisture, oxygen and light.
- **Branding & Packaging** portrays instant gratification, personal connections, visual, minimalism, analog...



Courtesy of Packworld

How the consumers buy: On-Line

Packaging for the on-line shopping supply chain

On-line shopping is THE disruptor for traditional retail based supply chains. With home delivery becoming more and more popular, packaging needs to be optimized to consider (new) transport and storage conditions

- Speed and convenience are king
- Both ship-from, and ship-to options are expanding at a breakneck pace
 - Additional distribution centers to get closer to customers
 - Store-level fulfillment operations
 - Pop-up delivery services, vans, personal vehicles
 - Products spend less time in secure palletized format
 - Opportunities for shifts in orientation and drops significantly increased
- In-store pickup is growing in popularity. Also known as “Webrooming” aka “ROPO” (research online and purchase offline), the process of researching products online and then visiting a store to make a purchase is especially popular with millennials and is already being embraced by many big-box retailers.
- Subscription based relationships between brands & consumers



How can a package and a closure affect the purchasing decision in this new environment?

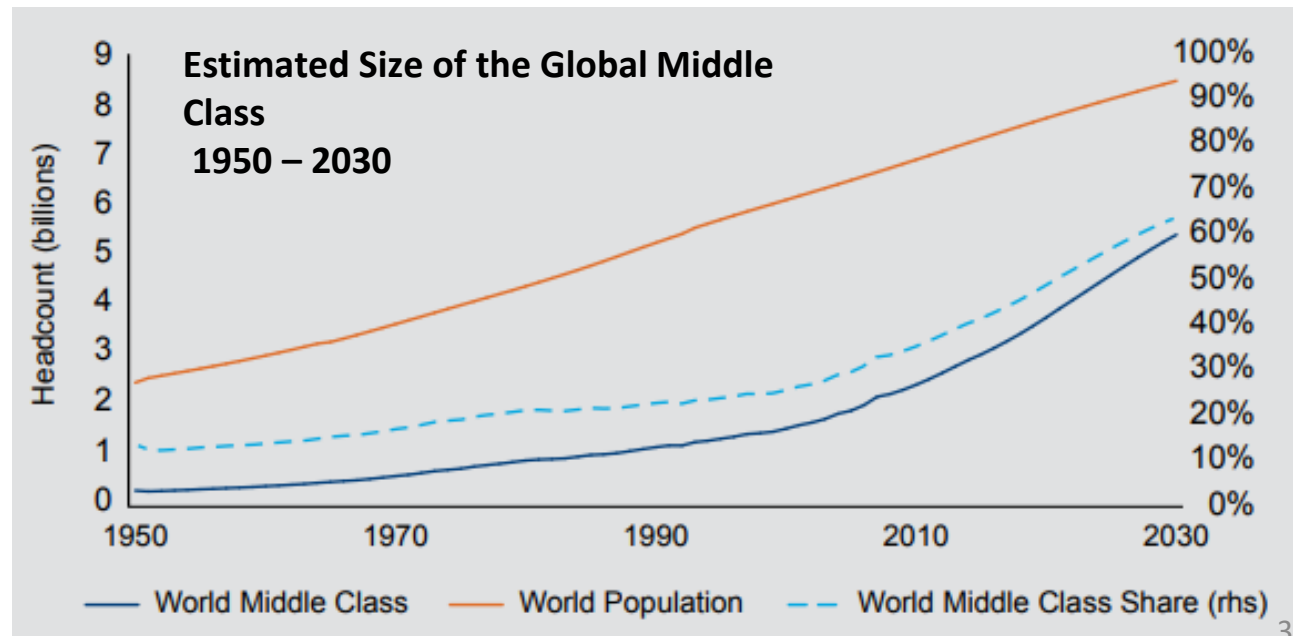


Why the consumers buy: Growing Middle Class

- ▶ Middle-class consumption of consumer goods accounts for over 1/3rd of the global economy
- ▶ Roughly 150 million people join the ranks of the middle class annually – most are from Asia

By 2030, Asia will represent almost two-thirds of the global middle class population.

Growth in PPP (purchasing power parity) thru 2030 will be dominated by India, Indonesia, Vietnam & China.



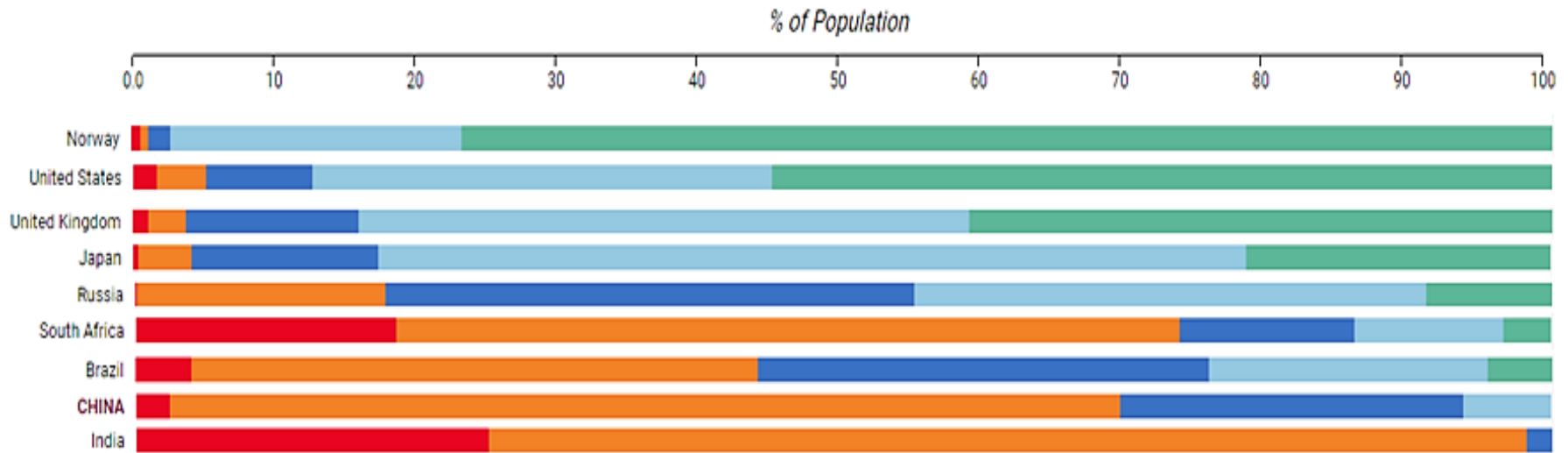
Source: Global Economy and Development at Brookings

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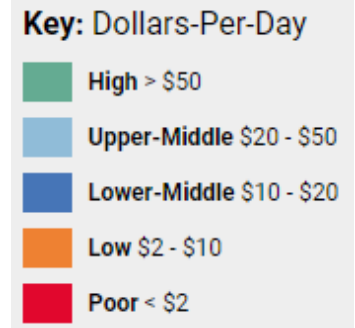
Changing Demographics: Growing Middle Class

Breaking Down the Middle Class

The share of each country's total population has been divided into five income bands. These bands are defined by dollar-per-day spending amounts expressed in purchasing power parity terms. The middle-class is defined by persons spending between \$10 and \$50 per day.



According to the Center for Strategic & International Studies (CSIS), India's middle class is less than 5% of its total population, Japan and Russia's middle class is over 70% of its population, and the US and China's middle class is about 40% and 30% respectively. This leaves the UK and Brazil towards the higher percentage end, and Norway and South Africa towards the lower percentage end.



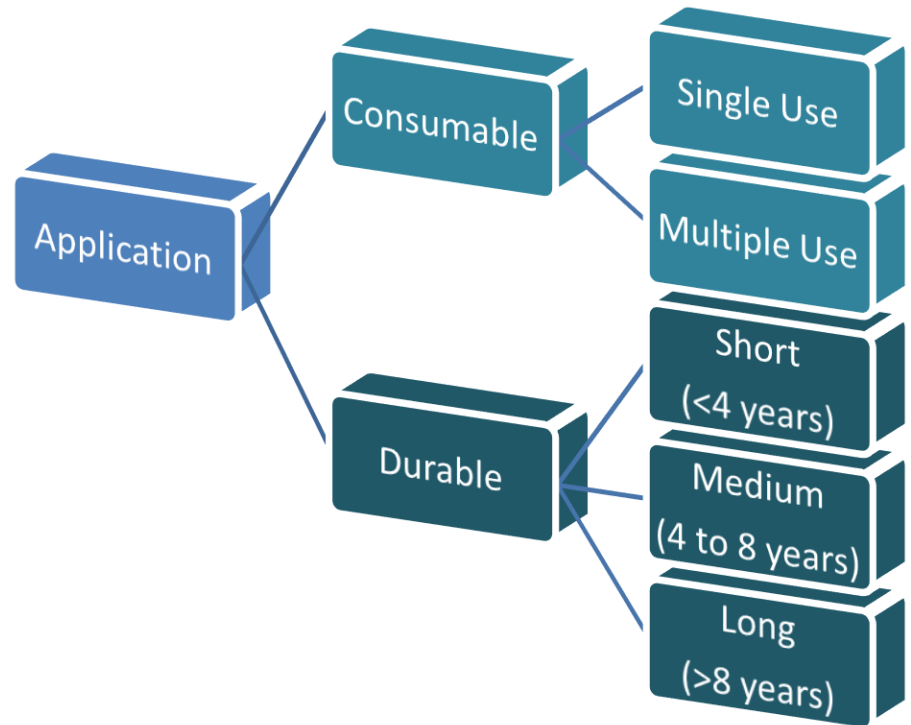
Courtesy of chinapower.csis.org

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What is the size of the risk for plastics?

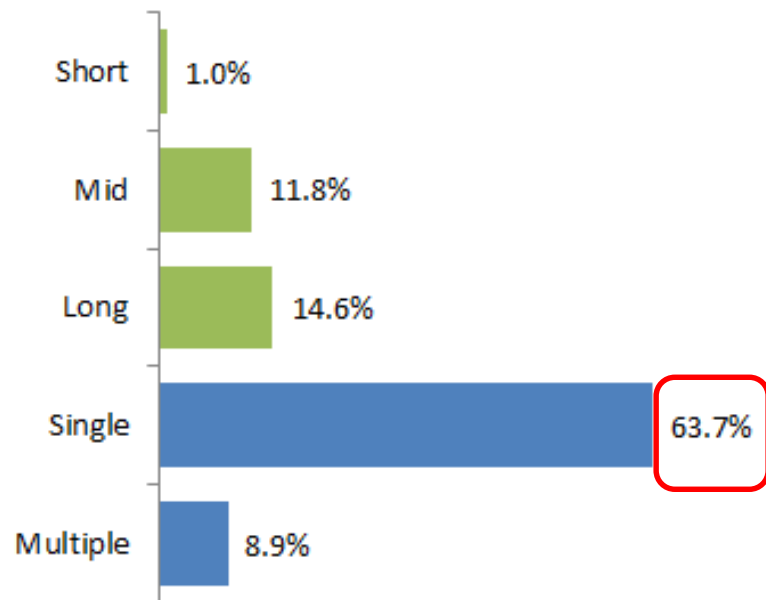
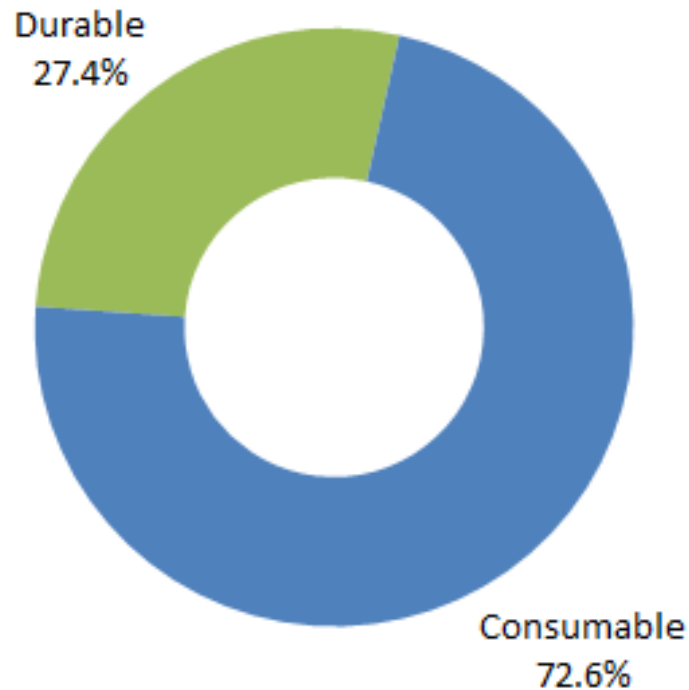
Townsend methodology divides the plastics market in two categories: **Consumable**, a product that is intended to be used up relatively quickly and **Durable**, goods not for immediate consumption and able to be kept for a certain period of time.

Later, each group is split into other categories according to the **length** that it takes to use the product and the type of **use** we have, application by application.



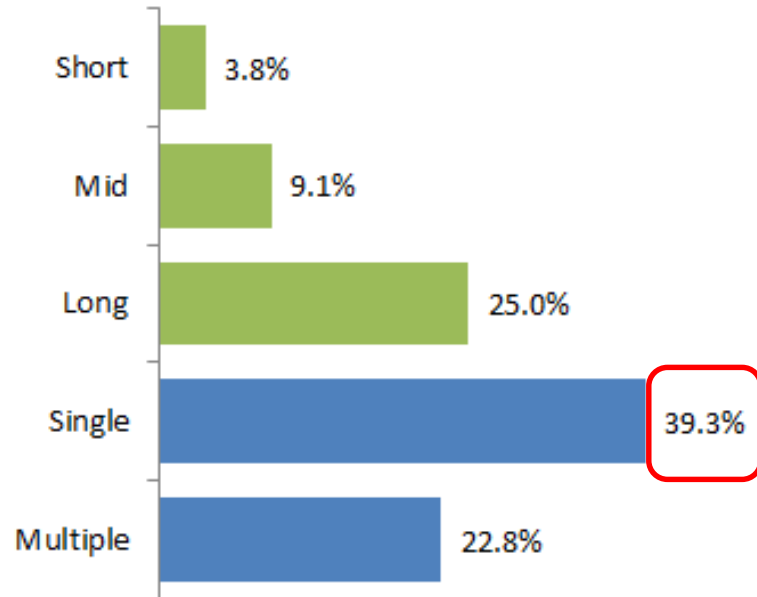
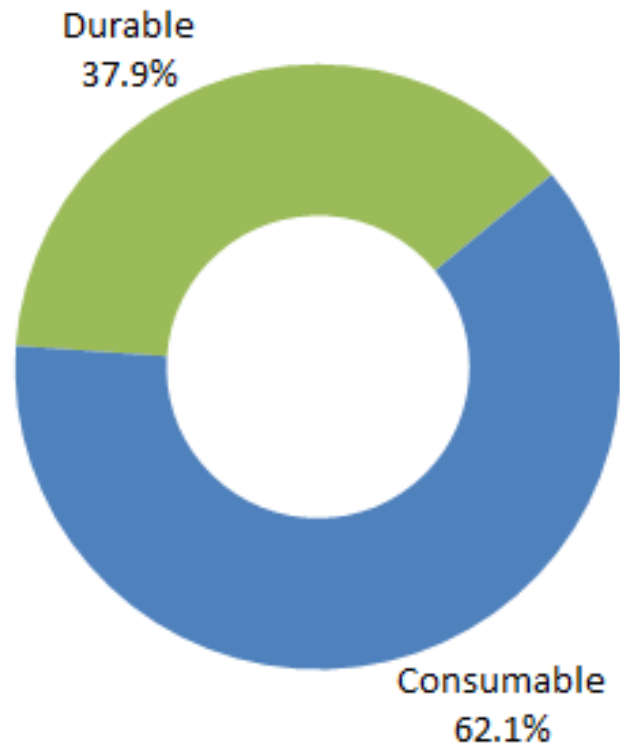
For Polyethylene, Impact of Potential Regulations

Global



For Polypropylene, Impact of Potential Regulations

Global



Activity

active

- Initiatives
- Investments
- Innovations
- Technology
- Regulations
- Opinion Climate



Plastics Recycling: Initiatives

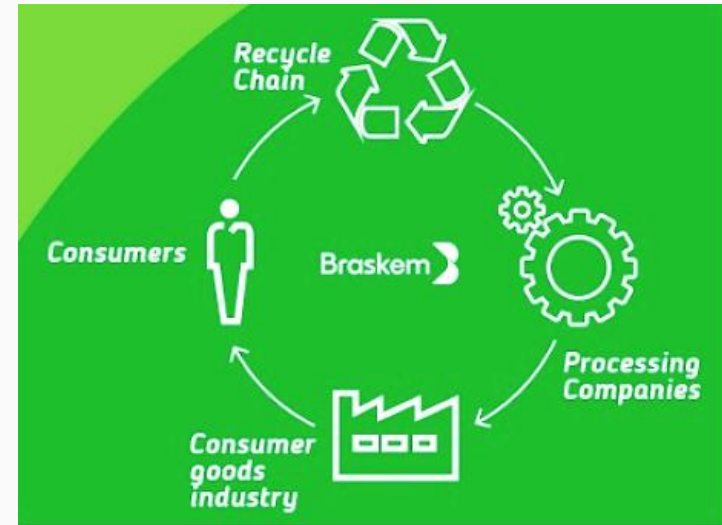


- The Recycling Partnership helped generate **\$29 million in total infrastructure investment** since 2014.
- The goal is to reach \$33 million by the end of 2018.
- The Recycling Partnership is a national nonprofit working hand in hand with communities and companies to improve recycling for the environment, the economy, and families.
- The Recycling Partnership is made possible by corporate backers that spur matching government grants for local projects.

Plastics Recycling: Wecycle



The Wecycle platform aims to develop initiatives for businesses to utilize plastic waste through partnerships, and develop products, solutions and processes involving all links in the plastic recycling chain.



Courtesy of Braskem

- Through the Wecycle platform, Braskem is a partner of companies for the development of products, solutions and processes that are related to the plastic recycling chain.
- From project design to the selection of partners, the Wecycle platform adds reliability and quality to all stages of the recycling cycle and to the production of the new packaging.

Industry M&A: Integration Upstream and Downstream



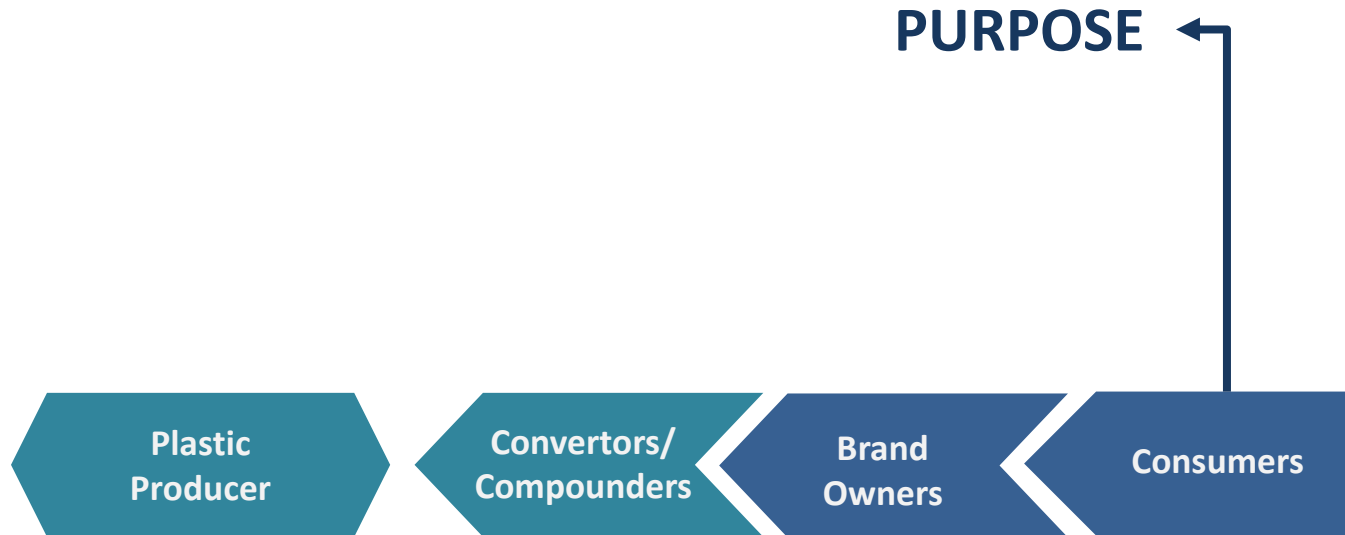
- LyondellBasell announced Nov. 27, 2017 that it will be a 50 / 50 partner with SUEZ in Quality Circular Polymers (QCP), a plastics recycling company in the Netherlands.
- Starting in 2018 the Sittard-Geleen facility will be capable of converting consumer waste into 35,000 tons of high quality polypropylene (PP) and high-density polyethylene (HDPE) per annum. They currently convert 25,000 tons pa, and plan to convert 50,000 tons pa before 2020.
- This is the first time plastics & chemicals and resource management join to realize the circular economy vision.



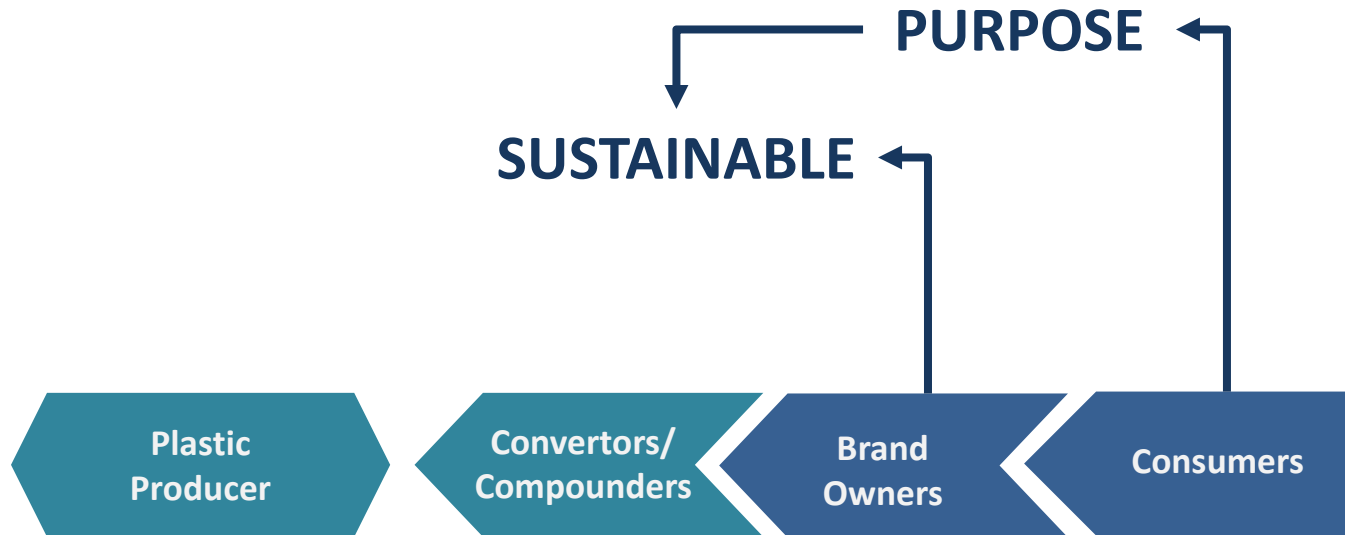
- In July 2016 Borealis finalized the acquisition of sister companies mtm plastics and mtm compact, technology leaders in the recycling of mixed post-consumer plastic waste and among Europe's largest producers of post-consumer polyolefin recyclates.
- Borealis is marketing this acquisition as an opportunity to deepen their engagement in plastics recycling, driven by their commitment to the principals of circular economy.

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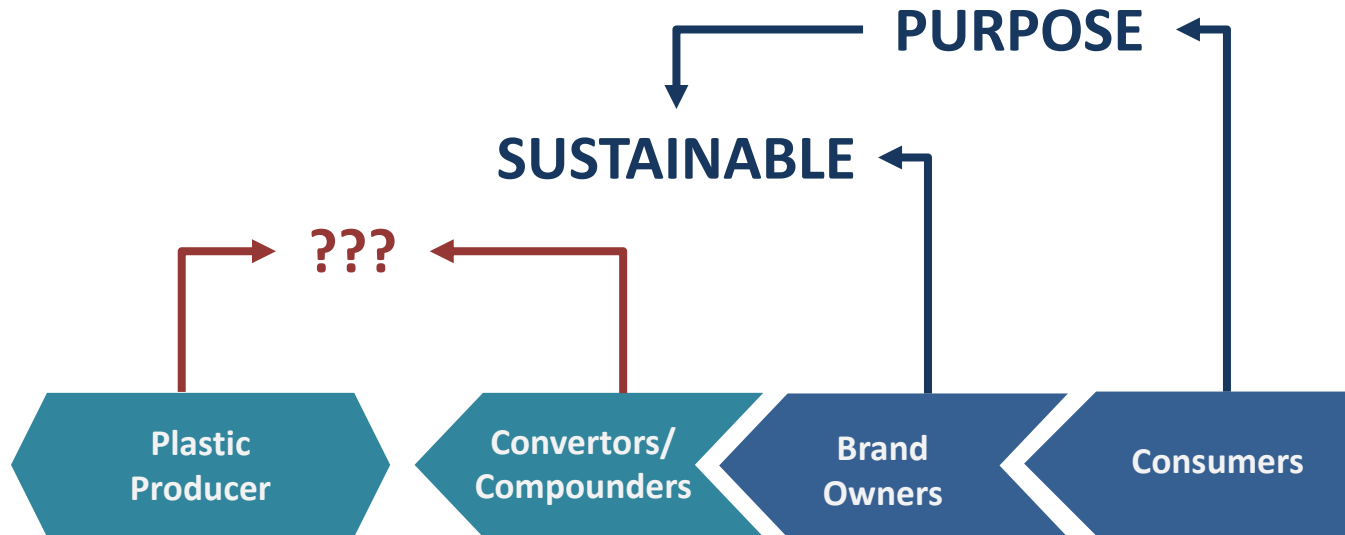
Industry Drivers



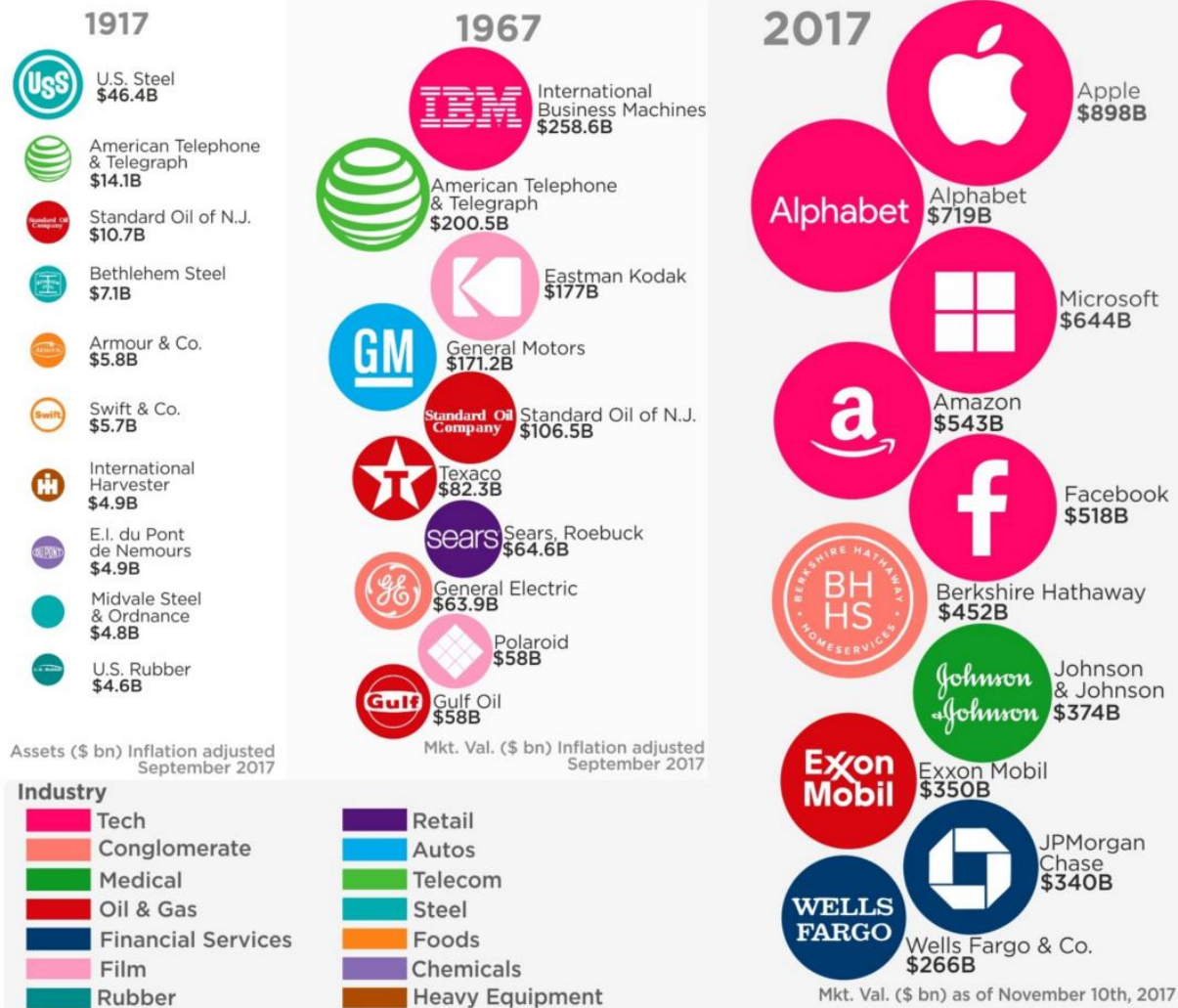
Industry Drivers



Industry Drivers



Final Thoughts



Source and Article:
<https://howmuch.net/articles/100-years-of-americas-top-10-companies>
<https://forbes.com>

howmuch.net

A 4x4 grid of 16 vinyl records. Each record has a different colored label. The top-left record has a white label with the text 'Q&A'. The center record (row 2, column 2) has a white label with the text 'Thank You!'.

Q&A

Thank
You!

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