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Enhancing Waste Reduction, Reuse and Recycling by Behaviour Change

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Abstract

Behaviour centric approach to Waste Reduction is an important dimension in devising the future strategies as the success rate of future strategies entirely depend on how well these are perceived, how effectively these invoke desired behaviour required for the future strategies to function and how effectively these are able to convince that these are beneficial to the Planet. The behaviours can be changed through Awareness on Key Information that influences behaviour dramatically, Sustainable Product Design that appeals the consumer without compromising the aesthetic and quality aspects, Strategic Alliances and Partnerships that can inspirationally foster involvement, innovation through Digital Platforms that materializes the intended behaviour change, improving access to the Recycling locations and Regulatory Regime that supports framework for waste reduction.

Keywords

Alternative Materials

Behaviour

Cultural / Paradigm Shift

Design for Behavioural Change / Sustainable Product Design

Extended Producer Responsibility

Persuasive Techniques

Product Lifecycle Responsibility

Pull Factor Framework

Stakeholder Management

Strategic Alliances and Partnerships

Sustainability Labels

1 Background

Everyone in this world would agree that waste generation is increasing at an alarming rate. The world has entered a significant phase of economic shift wherein

a) The product life cycles have shortened due to obsolescence, product design and upgradation of configuration (e.g. mobile phones, computers, tablets, etc.),

b) Rapid urbanization leading to redevelopment of existing infrastructure and communities in metros and cities (e.g. demolition of old buildings),

c) Increase in economic activities leading to over-pressure on ecosystems on account of higher demands leading to additional waste management issues, e.g. due to uncontrolled and illegal mining, etc.

d) Stringent health and hygiene standards, leading to single use (use and throw) packaging in most consumer items (e.g. water bottle)

e) Rise in income of middle and higher middle income category people boosting the so-called “throwaway culture”.

f) Preference given equally by manufacturers and consumers to aesthetic appeal of the product leading to increased product packaging

g) Emergence of e-commerce business encompassing the lives to a significant extent leading to increase in single use packaging for delivery of articles, groceries, hot food, etc., resulting into quantum leap in waste generation

h) Increase in Emergency situations and Pandemics (such as COVID-19) leading to additional waste burden

With over 90% of waste openly dumped or burned in low-income countries [1], it is the poor and most vulnerable who are disproportionately affected. Poorly managed waste is contaminating the world’s oceans, clogging drains and causing flooding, transmitting diseases, increasing respiratory problems from burning, harming animals that consume waste unknowingly, and affecting economic development, such as tourism.

In 2016 alone, the world [1] generated 242 million tons of plastic waste – equivalent to about 24 trillion 500-millimeter, 10-gram plastic bottles, and that’s just 12% of the total waste generated each year. The global waste is projected to increase by 70% over the next 30 years – to a staggering 3.40 billion tons of waste generated annually.

A staggering 91 per cent of all plastic [2] is single-use. Since plastic became commonly used material almost six decades ago, it has cumulatively resulted in 8.3 billion metric tons of plastic pollution. The scariest part of this is that production of plastic is set to double over the next 20 years, despite increasing awareness of its detrimental impact on the environment. According to the United Nations Environment Program (UNEP), each year, an estimated eight million tons of plastic end up in the ocean – equivalent to a full garbage truck dumped into the sea every minute. Therefore, a novel approach for intercepting single-use plastic and removing it from the

natural environment will be needed to ensure that it is placed back into the circular system.

Upper-middle and high-income countries provide nearly universal waste collection, and more than one-third of waste in high-income countries is recovered through recycling and composting. The low-income countries [1] collect about 48% of waste in cities, but only 26% in rural areas, and only 4% is recycled. Overall, 13.5% of global waste is recycled and 5.5% is composted.

Notwithstanding, such **sustainable waste management** requires a significant cost. In low-income countries, it comprises as high as 20% of municipal budgets. However, research suggests that it does make **economic sense** to invest in sustainable waste management. Uncollected waste and poorly disposed waste have significant health and environmental impacts. The cost of addressing these impacts is many times higher than the cost of developing and operating simple yet adequate waste management systems. The real solution to this problem, therefore, lies in the fact that how effectively all the associated stakeholders are able to convince and propagate this understanding amongst the masses to make it a **continual and sustainable movement**.

2 Introduction

There is only one Planet Earth, yet by 2050, the world will be consuming as if there were three planets [3]. As apparent from the statistics in the preceding section, a progressive, yet irreversible transition to a sustainable economic system (i.e., Sustainable consumption and production) is an indispensable part of the future strategies to

- accelerate the transition towards a **regenerative growth model** that gives back to the planet more than it takes,
- advance towards keeping its resource consumption within planetary boundaries to reduce its consumption footprint and
- significantly enhance the circular material use rate in the coming decade

It is therefore important that **resource consumption and circular material use** are scaled up into the mainstream for achieving climate neutrality by 2050 and decoupling economic growth from resource use, while ensuring inclusiveness of all masses.

Therefore, as the resource consumption and circular material use are at the **core** of every developmental decision taken by each entity across the globe, it is **critically important** that how **best** we can influence the people on this focus area to **drive the shift needed**.

3 Paradigm Shift

The human tendency, over a period of time, has changed to such an extent that we do not use **Resources** wisely, turning them into **Waste** and then invest heavily in infrastructure, equipment, energy, manpower, etc. to convert the Waste back to Resources. This, in no way, is sustainable consumption and production behaviour.

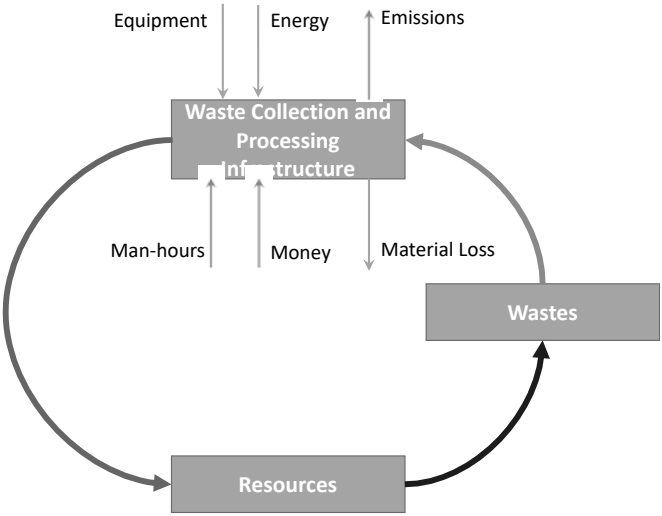

Figure 1 Waste Processing Cycle

Therefore, the planet is desperately calling for a **Paradigm Shift**, in first place, why to generate waste, and secondly, if generated how effectively it can be reduced, reused and recycled.

Addressing the root cause of this crisis, we need to first **Redefine** the existing model for **Economic Growth**, to be based not on **Consumption**, but by assigning a greater weightage on **Environment and Sustainability**.

Secondly, **human behaviour** towards the waste needs to be **radically changed**, which demands a **Cultural Shift** in our perspective towards accepting our wastes and the way they are generated and tackled. Technology can undoubtedly prevent certain quantum of waste generation from product use but not necessarily making a particular community, area or town **Waste Free.**

The cultural shift is not as simple as it looks as changing human behaviour is a herculean task. The greater challenge lies in garnering the attention of human beings from every walk of life, whom are unique by virtue of their culture, traditions and belief systems, their education, and their nature, attitude and behaviour, to the common goal of waste reduction.

The behaviour springs from and significantly influenced by awareness on underlying issues stemming from undesired or usual ignorant behaviour. Moreover, the behaviour can be significantly altered when there is a benefit attached to it, e.g., rewards on depositing recyclable waste, when innovatively highlighted, loud and clear.

It is also believed that **harmonizing the "Waste Segregation and Collection Systems & Protocols"** across the municipalities, cities, states and nation will aid in shaping up behaviour of people towards waste minimization by the way of better clarity, improved cognitive perception and gradual but consistent habituation.

In parallel, the Regulators also need to step-up roll out of **Smart Strategies** along with the **Regulation** that enhances synergies for transition into the circular economy as well as inspires the masses influencing their behaviour translating the best practices into the habits.

4 Finding a Fitting Solution

What lesson does the pandemic COVID-19 teach us? Primarily, the human behaviour (social distancing, wearing masks and washing hands frequently) was key to prevent the infection from further spreading. We also witnessed that this human behaviour was regulated through the penalties and fines on violation and there has also been plenty of innovative ways articulated to sustain the routine business.

Similarly, the effective and sustainable management of wastes relies on three pillars, namely, Innovation, Behavioural, and Regulatory. Let us get deeper into each of these pillars.

Figure 2 Pillars of Waste Management

4.1 INNOVATION:

The only way to discover the limits of the possible is to go beyond them into the impossible. Therefore, innovation continually evolves the way of conducting any activity.

I. **Redefining the Hierarchy of Waste Management**: The first step to begin our journey on embarking to this **Cultural Shift** is to revisit this governing criterion or the guiding principle on which the future strategies shall be built.

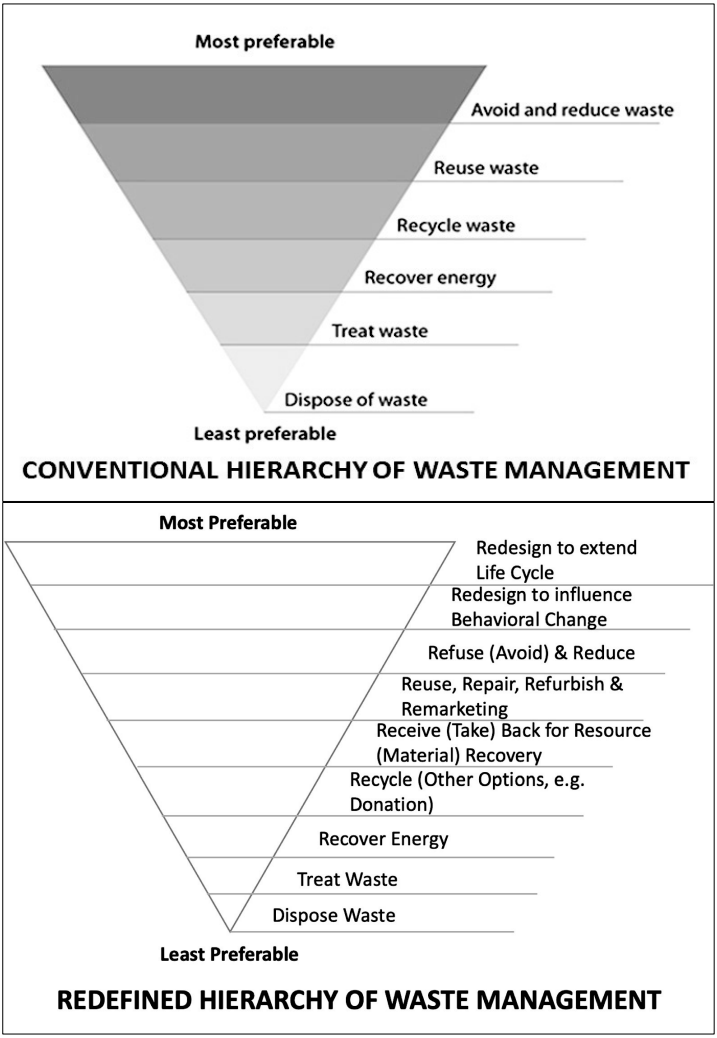

Figure 3 Re-Inventing the Hierarchy of Waste Management

- **Redesigning** not only includes all options that extends the life-cycle of wastes but more importantly, influence behavioural change, both intentionally and unintentionally.
- **Repair, Refurbish & Remarketing** included the options that enables remarketing of a repaired and refurbished product.

- **Receive, Take Back or Sell Back** includes the options that enables resource / component recovery, etc.
- **Recycle by Donation**: The functional items, meant for discarding, can be donated to such organizations which avails them to our underprivileged fraternity.

Finally, the target for Destruction and Disposal of wastes should be zero.

II. Calling for **Sustainable Product Design** as driver for creating a Circular Economy

- Eliminating or substituting the hazardous constituent in the product design
- Promote product designs that is modular, with separable components to allow replacement of damaged or faulty parts with new spare-parts, repair and reuse friendly, DIY repair features, etc. to restrict use and throw.
- Increasing recycled content in products without compromising quality, performance and safety
- Establish Standards and Regulations on Sustainable Product Design – Ensuring durability, long life span and avoiding premature obsolescence
- Incentivize sustainable product designs
- Use United Nations (UN) and similar Global Vehicles to make it popular through channels like United Nations Environment Program (UNEP), World Environment Day, WWF, Earth Hour, etc.

III. Promote the novel concept of **Design for Behavioural Change** to influence human behaviour: The design should seek approaches, like **persuasive techniques**, **user-centric designs**, etc. that seek to change human behaviour in terms of his/her cognition or attitude or in sense of his/her socially responsible actions.

IV. Incentivizing product-as-a-service where producers keep the ownership of the product or the responsibility for its performance throughout its lifecycle – a concept of **Product Life Cycle Responsibility**.

V. **Strategic Alliances and Partnerships** can create a symbiotic and synergetic impact wherein two specialized entities collaborate to provide solution to a multi-dimensional problem

- The Alliance to End Plastic Waste and China Petroleum and Chemical Industry Federation partnered to jointly tackle plastic waste in China.

- Massachusetts-based [4] **Preserve**, known for its reusable picnic ware and personal care products like shavers and toothbrushes made from recycled plastics, partnered with the **5 Gyres Institute** and **Renew Oceans** to launch a line of products made from recycled ocean plastic called POPi (Preserve Ocean Plastic Initiative). The POPi shavers and toothbrushes help remove plastic waste from shorelines and rivers to prevent it from entering the oceans and harming marine life.

- Connect sustainability lovers - those who deliver and those who admire: In USA [5], BBMG and Sustainable Brands joined with a group of global brand leaders including Procter & Gamble Company, Estée Lauder Companies, Happy Family Organics, Keurig Dr Pepper, Target, Johnson & Johnson Consumer Health, National Geographic, Heineken USA and Veocel conducted consumer research that revealed human need for premium, high-value product attributes with environmental and socially conscious design of goods, services and actions so consumers can shop consciously without feeling like there's a trade-off. This led to development of **Pull Factor Framework**, shown is figure below, a new way to build brands that create a pull factor by blending sustainability, human need and brand factor.

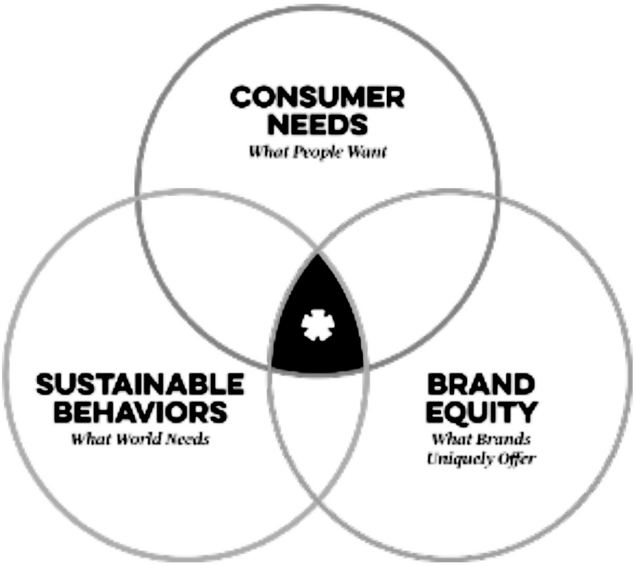

Figure 4 Pull Factor Framework

VI. Promote **Alternative Materials** for Packaging

- E-commerce industry being hugely packaging intensive; reusable delivery boxes can have a big impact on waste generation.
- Bio-based plastics, where the use of bio-based feedstock results in genuine environmental benefits, could be better alternative to conventional plastic packaging.
- Use of biodegradable or compostable plastics can be beneficial to the environment e.g., biodegradable and compostable material called **Flaxstic** [6] was used to create the first Pela case in 2011 for the iPhone 4.

VII. **Design New Communities** for greater waste sorting at a central location within the community for enhanced recycling, e.g., integrated resource recovery centre (IRRC) [7] that reduces community waste footprint

- improve access to the recycling point, e.g., used clothes donation boxes installed in each community at strategic locations [8].

Figure 5 *Used Clothes and Shoes Bank*