

Recycling & Waste Reduction

A Review of Policies and Behavioural Interventions



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Research Aims

South Asia is experiencing one of the fastest growth in global waste. The World Bank estimated that 3.88 billion tonnes of global waste would be generated annually by 2050 (73% increase from 2020 and more than double of population growth). Waste indicates inefficiencies and misallocations of resources (Atiq & Steffen, 2012). Waste is also a third largest source of anthropogenic methane emissions. Increased waste volumes adversely affect climate and resource sustainability, requiring an urgent response to innovate waste processes and change behaviours towards recycling and reducing waste.

This research aims to explore prevailing waste strategies in three different cities that seek to reduce waste volumes and promote recycling. Through a discussion using behavioural analysis of individuals and households' responses and perceptions towards waste, it is hoped that significant factors and drivers of interventions could be identified and thereby help to develop recommendations to be suitably applied to the local context.

Research Methodology

This research uses a qualitative review of waste policies in the cities of San Francisco, Seoul and Singapore. Through document analysis of current waste practices and existing behavioural frameworks that discusses decisions relating to waste and recycling, recommended approaches for future local implementation are being proposed.

Research Questions

1. What are the waste practices in these cities that have increased recycling and reduced waste
2. What are the behavioural enablers and innovations that incentivises these actions?
3. What dis-incentivises these efforts?
4. How can Singapore learn from the best practices?

Image source: The World Bank

Discussions: Behavioural Frameworks

Nudge Theory

Based on studies by Mont, Lechner & Heiskanen (2014), there are four types of policy instruments that constitute behavioural interventions through 'nudging' - i) simplification and framing of information, ii) changes to physical environment, iii) changes to default policy and iv) use of social norms.

Nudges influence individual choices and are often done through methods that do not involve monetary incentives.

Ajzen's Theory of Planned Behavior

Intentions and resulting behaviours can be understood from i. attitudes towards the behaviour, ii. subjective norms and iii. perceived control. In addition, the stronger the intention, the more likely the outcome (Ajzen, 1991).

In the case of recycling and trash reduction, the strength of intentions could come from incentives such as monetary rewards. The intention can also be influenced by social norms such as greater environmental values.

Schwartz and Howard's Norm Activation Model

Based on Schwartz and Howard's norm activation model, behaviours are also reflected through a person's underlying values or beliefs and displayed where situations are conducive to the activation of these values and norms (Ebreo, Vining & Christancho, 2003).

This is consistent with studies by Oke, McDonald, Korobilis-Magas, Osobajo & Awuzie (2021) that the awareness of consequences influences consumers' personal norms and responsibility.

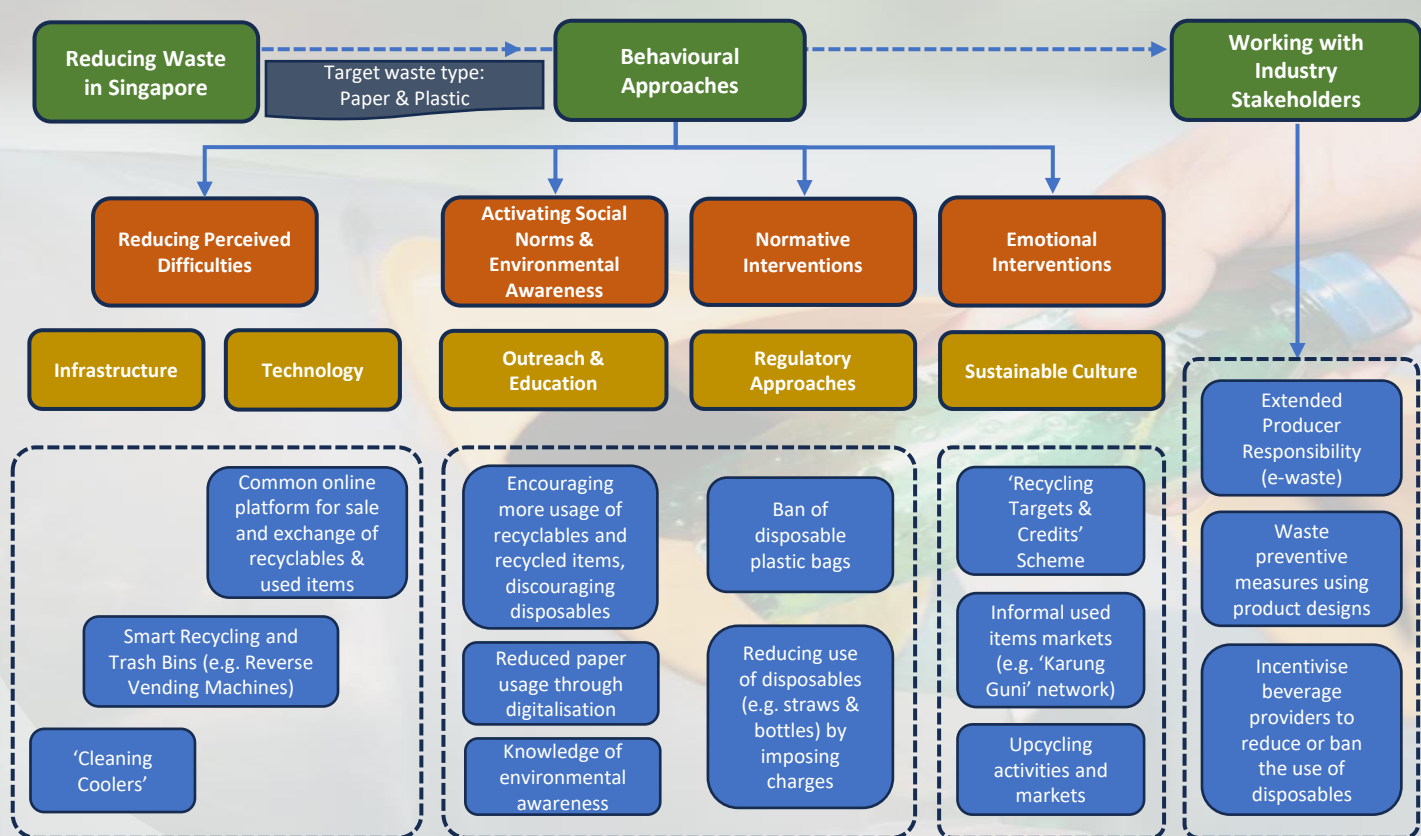
Focus Processing Theory

Consumers are believed to be led to actions through external incentives which increase commitment and extend outreach of initiatives.

According to the Separation-focus and Contribution-focus theory by Li, Yang, Sun & Wang (2021), financial incentives induces a focus on separating with belongings which have negative effect on recycling emotion-involved items, and non-financial incentives led consumers to focus on positive environmental contributions.

Individual choices and governance decisions about waste can determine how much waste is produced and how waste is managed to extend its value in the commodity chain. Behavioural interventions have been widely used recently as low-cost and effective approaches. It was also found that education, environmental changes and interventions through outreach campaigns have better effects while incentives and commitment seem to derive weaker effects (Xia, et. al, 2023).

Recommendations



Findings: Cities Case Studies

	Policies incentivising recycling & waste reduction	Technology & Innovation	Sustainable consumption & resource recovery
San Francisco	<ul style="list-style-type: none"> Prohibition of Styrofoam & Polystyrene foam usage in food services Ban of Plastic bags in 2009 and Plastic disposable water bottles in 2014 Increases in landfill levies 	<ul style="list-style-type: none"> AI-powered Waste Sorting 	<ul style="list-style-type: none"> Zero Waste Goal towards full-life cycle and reductionism Mandatory Recycling and Composting Mandatory Recycling of Construction Debris Ordinance for Environmentally Preferable Purchasing for Commodities
Seoul	<ul style="list-style-type: none"> Volume-based Waste Fees Gradual ban of single-use disposables Plastic reduction plan with industry stakeholders 	<ul style="list-style-type: none"> Smart RFID bins Information management & e-bidding platform for recyclables Reverse-vending machines 	<ul style="list-style-type: none"> Informal junk operators Seoul Upcycling Plaza Green Marketplace project
Singapore	<ul style="list-style-type: none"> Chargeable disposable Plastic bags and food containers Beverage Container Return Scheme 	<ul style="list-style-type: none"> Reverse-vending machines 	<ul style="list-style-type: none"> Extended Producer Responsibility for e-waste producers

Further research in this area could investigate the differences of financial incentives versus behavioural nudges in achieving waste reduction and increasing recycling efforts. In addition, there could be further exploration into the areas of waste minimization such as actively incorporating culture of sustainability and minimalism consumption.

