Aligning Incentives: A Market-Oriented Strategy for Plastic Waste Compliance in the Paint Industry
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I. INTRODUCTION

Having the opportunity to analyze the Plastic Waste Management Rules (PWMR) with respect to the paint industry and suggest policy changes to the Ministry of Environment, Forest and Climate Change to make compliance more efficient. Few of these solutions were recategorization of rigid plastics, having more realistic recycling targets, and including EPR (Extended Producer Responsibility) under corporate social responsibility.

"The Domain of Life is violated due to the fact that recyclability rate in the paint industry is 18%, where even the recycled plastic loses its rigidity and cannot be recycled. Logically, hence, if households utilize the paint containers for 5-6 years before disposal, then the environmental cost is lower than if it is recycled."

Though changes to the PWMR were proposed, the policy did not incorporate consumers effectively. The fact that there is an informal market where trading of these plastic buckets exists means that one should understand how, or whether, they can be incorporated within the ambit of PWMR. Theoretically speaking, if the consumers have a higher inelasticity of demand for the paint bucket, then there should be some mechanism that places the burden on them, if they want to keep the bucket, instead of sending them for recycling. Furthermore, the assignment also made it evident that the leakages of paint buckets that exist in the market is precisely due to this demand, and further understanding the demand and supply in informal markets are vital if it is to be incorporated into PWMR. Here, the assumption is not whether recycling is better than households using the bucket, but the fact that if the government wants to reach a target of 50% recyclability in 2024-25, how will the consumers that keep the buckets be motivated to return it back for recycling? It is evident that despite the PWMR coming under 'Extended Producer Responsibility', there should be some governmental regulation on consumers as well, which makes this report very essential to PWMR. Though the conclusive statement (above), there is no quantitative evidence to back it up-finding which is the aim of this report.

II. METHODOLOGY

In order to understand how Greater Kailash's consumers of paint buckets can be incorporated into PWRM it was vital to understand how many paint buckets enter Greater Kailash and consecutively, how many exit Greater Kailash for recycling? Considering there is no mandate for municipalities, companies or the local kabadiwalas to maintain these numbers, primary data was collected by surveying households, industries and municipalities. Because consumers interact with mechanisms of the market and state, it was vital to also include paint industries and government bodies into the research. 50 households and shops (that purchased paint a month ago) in a 3 kilometers radius from National Law School India University's campus were surveyed (Questionnaire attached as Appendix 1). Here, the shopkeepers who sold paint were also spoken to about the chain of paint delivery, and understand their perspective on what happens to paint buckets post-use. Furthermore, 'Delhi Development Authority' in the Greater Kailash area was interviewed to understand the recyclable capability of Greater Kailash, and the policies of the municipality of this area with respect to waste management. Lastly, informal conversations with

construction workers, architects and waste collectors around Greater Kailash was also done to understand consumer recyclability behavior post-using paint buckets. Understandings, and documents from corporate internships at paint industries have been used to substantiate arguments in the analysis.

III. PROBLEM ANALYSIS

From the responses given by the shopkeepers of Greater Kailash, on an average about 230 buckets of paint are sold in Greater Kailash per month owing to the growing urbanization and concrete plots in the residential areas. Companies claim that about 12% of buckets come back for recycling, so if that principle is directly applied to Greater Kailash, then about 28 buckets out of the 230 buckets of paint should be sent back for recycling. Unfortunately, out of the 50 households and shops that purchased paint, none of them were sent back for recycling. There were primarily 4 reasons given for this- lack of knowledge about where to recycle (24%), buckets were sold to shopkeepers or informal workers around Greater Kailash (60%), and buckets were sold to kabadiwalas for 8 rupees (14%), or were used within the household (8%). The addition of these numbers is more than 100% because few households gave more than one reason for not sending the buckets for recycling. Through these numbers it is evident that despite PWMR being initiated by the Indian government, if the whole responsibility is placed on the companies for re-collection, then the costs will be too high due to the existence of formal markets that absorb the buckets post use. Assignment submitted in module 1 had presented evidence that the estimated cost of paint would increase by 150% in case the companies are to re-collect every paint container that they release in the market. Instead, if consumers can be motivated to send containers back for recycling, or if appropriate cost is put on them to continue using the paint container post use, then more environmentally conscious decisions will be taken in Greater Kailash.

Upon interactions with the Delhi Development Authority, it was evident that there was no specific knowledge that the representatives had about rigid plastics. They were aware about PWMR but their applicability of it was relatively limited. They had placed the burden on the waste collectors to segregate the waste and appropriately send them for recycling. There was no data they had collected about plastics being collected in Greater Kailash- so it became very difficult to estimate how much rigid plastics- or specifically paint buckets end up in the landfills post use. When questions about technologies or mechanisms of safe disposal of rigid plastic were asked, it was mentioned that there are not too many buckets that are sent for recycling so there are no strategies of recycling incorporated by the municipality. Instead, the rigid plastics once collected are sent to private waste management companies like Saahas Zero, or state managed Bruhat Delhi Mahanagara Palike (BBMP).

With the household statistics provided, backed by understanding from the shop owners and government bodies few problem questions emerge:

- The households that want to send paint containers for recycling, where do they send it considering the municipality of the area is not itself aware about rigid plastic recycling?
- If on an average 230 buckets are sold- how heavy are the leakages such that numerous containers are going unaccounted for?
- If consumers are directly incentivized to send buckets for recycling, how will it affect the businesses of kabadiwalas?
- Can the supply demand market of households selling off the buckets to informal workers or shopkeepers around Greater Kailash be regulated or better understood?

IV. SUPPLY-DEMAND OF INFORMAL MARKET FOR PAINT CONTAINERS

Households that decide to keep the buckets cannot be directly fined. Moreover, it is very difficult to identify who are these households that are self-using the buckets. And so, it is difficult to regulate them or encourage those households for recycling. One can argue that them using the paint containers as house pots, or mopping pots is recycling. However, in this assignment we are assuming recycling to be as per the PWMR mandate. Hence, because these buckets get excluded from the “rigid plastic waste” statistics, one should take them as direct leakages that cannot be regulated. Instead, 60% + 14% of the paint buckets

that are sold to shopkeepers, informal workers, or kabadiwalas, can be regulated and solutions to incorporate them into recycling targets should be sought. This instead highlights the importance of understanding the factors that determine the supply of these buckets by households in the market- and whether they can be regulated?

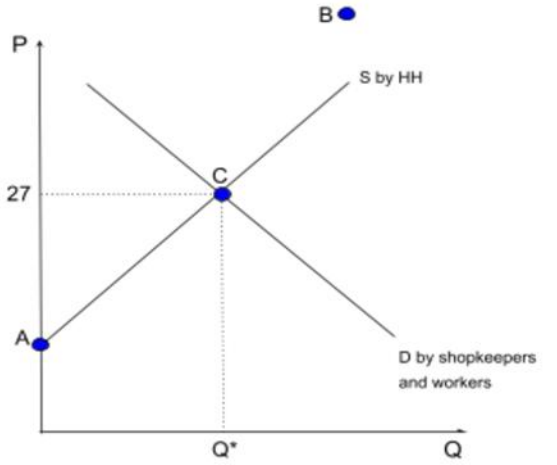

Image 1: Demand and Supply of Paint Containers in Greater Kailash

The graph indicated three types of household behaviors. Firstly, there are households that ask the painters using the paint to dispose of the containers post use- they don't engage in the market by taking a price for the container instead just give it off for free. However, majority households (64%) indicated that they would prefer getting some price for the bucket whereas few economically richer households were indifferent by the price and so have been placed at Point A in the graph. Secondly, some households feel that they are saving the environment by retaining the bucket and hence not wasting it. One household spoke about how they found paint buckets aesthetic for pottering and so wouldn't want to sell them. This household has been indicated by Point C on the graph. Lastly, the households that sell off the buckets in the informal market have an average expectation of rupees 27 per paint bucket and have been indicated by Point B in the graph. However, on dealing with kabadiwalas, there is an established market price of just 8 rupees which showcases the dynamisms of the Greater Kailash market for paint containers.

Image 2: Informal Market of Rigid Plastic Containers in Greater Kailash

V. SOLUTIONS

1. Deposit Refund Scheme is a surcharge on a product when purchased and a rebate when it is returned. This solution follows the assumption that if all buckets are merely collected back by the company, then they will employ necessary mechanisms to recycle it. Under this scheme, suppose now a paint bucket costs 100 rupees, then the company should charge 100+surcharge instead. Here when a customer returns the container post use, will get the surcharge back. The biggest question here is how much surcharge is to be charged? If the surcharge is less than the informal market price of 27, then we see that already informal markets are working well and the policy will fail. Instead, the surcharge should be more than 27. Secondly, this solution is also effective for those 8% households that do not return the paint buckets post use- the opportunity cost of not returning the paint bucket is that they don't get the surcharge back. It is vital to keep in mind that the surcharge should be high- otherwise if the transport cost is higher than a household will find it easier to go to the informal market than to go back to the shop and return it. So, ease is also a very vital factor while implementing the solution. It is unrealistic to give a number for surcharge without more extensive research because research done on 50 households cannot be used to suggest a pan India or even a pan Delhi surcharge amount. Lastly, some might assume that having a formalized system of deposit refund scheme will destroy the market for selling it to kabadiwalas which are buying back at a very low charge. However, they exist because of ease of access (many go to households and collect waste) and they exist despite informal existence. So, the surcharge needs to be well thought of before implementation.

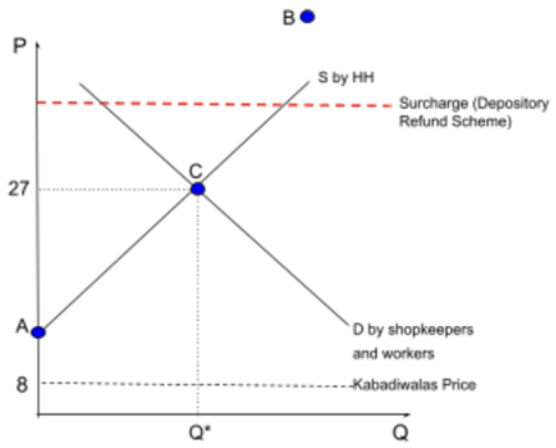

Image 3: Depository refund scheme impact on Informal market

2. Hedonic Pricing Strategy- In economics, hedonic pricing strategy is a revealed preference method for estimating the monetary value of the characteristic of a good. Primary survey revealed that Greater Kailash does not have a well-integrated system of individuals realizing the importance of recycling plastics due to which there was a market formed for selling and buying for paint containers without much thought about the impact it might be creating on the environment. Instead, similar research should be conducted in various other districts of Delhi to understand what is the level of environmental consciousness relating to PWMR that people have. Based on more symmetric information, companies should have better pricing strategies that place a bigger burden of compliance on consumers directly wanting PWMR to be strictly followed in Delhi. This can be done by having market mechanisms like- having QR scans on paint containers that show how recycling is done, which will make people come forward to give back containers. Their cost is not measured in monetary terms but in opportunity cost terms.

3. "Lao paint bucket, le Jao sundar bucket"- Though the Delhi Development Authority does not have direct strategies for recycling themselves, in order to promote PWMR, they should be included as a part of the policy. Here, the municipalities of local areas should have advertisements that households can get paint buckets and take better household buckets from them. The idea is that the municipality should have technologies procured- or partner with organizations that have the technology- to recycle paint containers into normal buckets. Research suggests that once paint buckets are recycled, they lose their rigidity and cannot be used on an industrial level again, but can be used for household uses. So, isn't it better that if we want to increase visibility of the leakages, we encourage the households to get them exchanged? Here again, ease of exchange should be high or leakages will continue existing.

VI. IMPLICATIONS FOR BUSINESSES OPERATING IN THE INDIAN PAINT INDUSTRY

The findings of this report have significant implications for firms operating within India's paint industry, particularly in the context of compliance with the Plastic Waste Management Rules (PWMR) and the broader transition toward a circular economy.

1. Shift from Cost Burden to Shared Responsibility Currently, Extended Producer Responsibility (EPR) places disproportionate responsibility on manufacturers for post-consumer waste collection and recycling. This study highlights that a large portion of paint buckets leak into informal markets due to consumer preferences. As a result, businesses must move toward shared responsibility models, where consumers, retailers, and informal waste collectors are actively integrated into compliance frameworks. This reduces the financial burden on firms and improves collection efficiency.

2. Need for Consumer-Centric Business Models: The existence of a strong informal resale market indicates that paint buckets have residual economic value. Businesses must recognize this and design strategies accordingly:

- Introducing deposit-refund mechanisms to incentivize returns
- Embedding behavioral nudges (QR codes, awareness campaigns)

Offering exchange or buy-back programs: Such strategies can improve return rates while aligning with sustainability goals.

3. Pricing Strategy and Product Design Innovation: The application of hedonic pricing suggests that consumers value certain attributes of paint buckets (durability, reusability). This creates an opportunity

for firms to: Redesign packaging for multiple lifecycle use Introduce modular or return-friendly packaging Strategically price products to reflect recycling incentives or penalties This could lead to a transition from linear to circular product design.

4. Integration with Informal Sector: Rather than displacing kabadiwalas and informal traders, firms should aim to formalize and integrate these stakeholders into their supply chains. This could involve: Partnerships for collection and aggregation. Providing financial incentives or commissions. Digitizing transactions for traceability. Such integration ensures that existing efficient collection networks are leveraged rather than disrupted.

5. Operational and Compliance Strategy Adjustments Businesses will need to invest in: Reverse logistics systems Data tracking for plastic recovery Partnerships with recyclers and municipalities While this may increase short-term operational complexity, it will reduce long-term compliance risks and costs associated with stricter environmental regulations.

6. Competitive Advantage through Sustainability Firms that proactively adopt market-based and consumer-inclusive recycling strategies can: Strengthen brand positioning as environmentally responsible Gain regulatory goodwill Appeal to increasingly sustainability-conscious consumers in the long run, sustainability compliance can shift from being a regulatory obligation to a source of competitive differentiation.

VII. CONCLUSION

The primary aim of this essay was to question the assumption of PWMR being placed strictly under extended "producers" responsibility. We saw that the buckets are of high value to consumers and hence they should be incorporated in the recycling process without which leakages will continue in the market. The solutions that have been provided are specific to the Greater Kailash region. This remains to be the reports biggest criticism as well- can research in one area be generalized to a bigger area without further research? Perhaps using statistical models and data analysis this question can be further answered. However, we have seen that the PWMR is short sighted in its approach. It is instead suggested that shopkeepers, kabadiwalas, municipalities are also given responsibilities to encourage households to return the rigid plastic containers used by them. If this is done, then plastic will be collected effectively, more R&D will be done to get even better technologies for its recycling, and the environment will be better off.

Appendix 1

1) Households:
a) Do you retain plastic buckets once they are over?
b) If you retain, what are they used for?
c) How many years do you retain it for?
d) What do you do if you do not want to retain the bucket?
e) Have you considered sending the container for recycling post use? Why or why not?
f) Have you ever sold a paint bucket post use? What was the price you charged for it?
g) Would you like to make money by selling a paint bucket post-use? How much?

2) Industry:
a) What is the type of rigid plastics used by the paint industry? What is the recyclability of rigid plastics used by the paint industry?
b) On an average, how much rigid plastic waste does the paint industry generate per annum?
c) What % of containers come back (post-use) for recycling?
d) What are the costs incurred per unit to package? What is the cost per unit to recycle rigid plastic packaging?
e) What are the costs incurred by the paint industry to recycle rigid plastic packaging?
f) What is the estimated cost of recycling/recollection on per unit cost of paint?
g) What is the technology you use to recycle the containers? What is its efficiency?
h) Is there a better technology to improve recycling efficiency? If yes, what are the procurement issues?
i) How big is the informal market which collects rigid plastic waste after its use for the purpose it was originally intended for?

3) Municipalities:
a) What % of rigid plastic ends up in the landfills?
b) What technology does the municipality use for recycling hard plastic?

c) Does India have the technical capacity such that rigid plastic can be recreated?
d) What are the global standards / global best practices, regarding plastic waste management or rigid plastics?

REFERENCES

[1] Ministry of Environment, Forest and Climate Change (MoEFCC). (2016, amended 2022). Plastic Waste Management Rules (PWMR), India. Government of India.
[2] Central Pollution Control Board (CPCB). (2022). Guidelines on Extended Producer Responsibility (EPR) for Plastic Packaging. Government of India.
[3] OECD. (2016). Extended Producer Responsibility: Updated Guidance for Efficient Waste Management. Organisation for Economic Co-operation and Development.
[4] Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. World Bank.
[5] Ellen MacArthur Foundation. (2019). Global Commitment: Progress Report on Plastic Waste and Circular Economy.
[6] Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, Use, and Fate of All Plastics Ever Made. Science Advances, 3(7).
[7] Deloitte. (2021). Plastics Recycling and Circular Economy in India: Challenges and Opportunities.
[8] PwC India. (2022). EPR Implementation and Business Implications in the Indian Plastics Industry.
[9] Saahas Zero Waste. (2020). Decentralized Waste Management Practices in Urban India.
[10] Interviews and Primary Data:
Household and shopkeeper surveys conducted in Greater Kailash (2026)
[11] Informal discussions with waste collectors, construction workers, and architects
[12] Interview with officials from Delhi Development Authority (DDA)