



# Catalysing Partnerships in Plastics

Exploring the potential for collaboration between mobile network operators and plastics organisations

June 2022



## GSMA ClimateTech Programme

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with almost 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

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The GSMA ClimateTech programme unlocks the power of digital technology in low- and middle-income countries to enable their transition towards a low-carbon and climate resilient future. We do this with the collective support of the mobile industry, as well as public and private actors. Through our research and in-market expertise, we catalyse strong partnerships, facilitating innovative digital solutions that address key challenges. Our work spans climate mitigation, adaptation and resilience strategies in low- and middle-income countries, across the globe. The programme is supported by the UK Foreign, Commonwealth & Development Office (FCDO).



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# Executive summary

The mismanagement of plastic waste is a global challenge that must be urgently addressed if we are to achieve the Sustainable Development Goals (SDGs) or meet the targets set out in the 2015 Paris Agreement. Plastic pollution continues to be driven by increased plastic packaging in low- and middle-income countries (LMICs) in Africa and Asia, where formal waste collection systems are often underdeveloped or non-existent.

However, promising circular economy solutions are emerging and there is growing interest in using digital technology to improve the efficiency and effectiveness of them. Digital technologies have an important role to play by improving citizen engagement in recycling, driving operational efficiencies and increasing transparency in the plastics supply chain.

In 2021, GSMA published the landscaping study “[Digital Dividends in Plastics Recycling](#)” exploring the specific benefits that plastics organisations in LMICs could reap from using digital tools and services, or partnering with technology organisations. The report encouraged mobile network operators (MNOs) and other technology organisations to explore how they could benefit from supporting plastic organisations, and to work with the GSMA to identify opportunities for collaboration.

This report builds on the Digital Dividends landscape research to explore mutually beneficial opportunities for plastic organisations and MNOs in selected markets. While there is a recognition from the sector that change needs to happen, the research found limited examples of MNOs actively participating in this space, underlining the fact that the MNO-PSE partnership model is still nascent and rife with opportunity.

There is scope for further testing and experimentation in this space to pilot services and products that best meets the needs of both MNOs and PSEs. MNOs recognised the importance of being ahead of regulation when thinking about their own waste streams but the business case for plastics recycling needs to be clear for action to happen. As such, this report illustrates the specific advantages that such partnerships could offer both MNOs and PSEs across the “triple bottom line” of People, Planet and Profit.





# Introduction

## Plastic waste is an urgent global problem

Plastic has become so integral to the ease, comfort and efficiency of our lives that it is hard to imagine a world without it. It is synonymous with both the freedom and aspirations of modern convenience culture and consumerism. With a burgeoning global middle class, the scale of consumption and the associated plastic waste have become an urgent issue.

The United Nations estimates that 300 million tonnes of plastic waste are produced each year – equivalent to nearly the weight of the entire human population – and that this figure is likely to double by 2030.<sup>1</sup> Yet, globally, less than 10 per cent of plastic is recycled, and some reports estimate that at least 75 per cent of all the plastic ever produced has become waste.<sup>2</sup> That is the equivalent of more than 50 million jumbo jets.

With the vast majority of plastic waste destined for landfills, the impact of the world's current plastic footprint will take its toll on the environment for generations to come – leaking into and polluting oceans, land and food systems.

While this will ultimately affect every country in the world, the most immediate impacts are felt disproportionately in low- and middle-income countries (LMICs) where less developed systems for waste collection, sorting and recycling/repurposing are compounded by low consumer awareness of waste, high reliance on cheaper but harder-to-recycle plastics and large quantities of plastic waste exported from higher-income countries.

Electronic waste, or e-waste, such as mobile phones, SIM cards and broadcasting equipment, also pose a serious threat to the environment. As the use of mobile technology grows, so does the threat of e-waste, making it the fastest growing waste stream in the world.

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1. UNEP. (2021). *From Pollution to Solution: A Global Assessment of Marine Litter and Plastic Pollution*.  
2. Geyer, R., Jambeck, J.R. and Lavender Law, K. (2017). "Production, use, and fate of all plastics ever made". *Science Advances*, Vol. 3, Issue 7.

## Recycling plastics is a timely opportunity to turn waste into wealth

With increasing global anxiety that the climate crisis is causing irreversible and unprecedented damage to ecosystems, there is a need to make quick and innovative changes to the paradigms and structures of our societies that are no longer fit for purpose. One such approach is rethinking how plastic is recycled.

The Ellen MacArthur Foundation estimates that about 95 per cent of the value of plastic packaging is lost to the global economy annually if it is not recycled after its first use.<sup>3</sup> That equates to between \$80 billion and \$120 billion per year that could be captured in the global economy if plastic was recycled even once – a sizeable and significant economic opportunity even if only a fraction of this value was realised.

As the international market for recycled resins grows and national governments move to hold the private sector to account for their waste streams via extended producer responsibility (EPR) regulations,<sup>4</sup> early innovators will seek opportunities to secure stable waste streams and increase the volume, efficiency and types of plastics that can be recycled and repurposed into higher-value (rather than lower-value) products.

Given the relative immaturity of the plastics recycling sector around the world, particularly in LMICs, there is great potential for businesses with clarity and vision to retrieve, recycle and realise value both from the waste they produce and the waste of other plastics producers.

## Partnerships between mobile network operators and plastics social enterprises can unlock opportunities across the plastics value chain

The 2021 GSMA report, “[Digital Dividends in Plastics Recycling](#)”, explored synergies between the plastics recycling sector and mobile network operators (MNOs) and began to articulate ways that partnerships between MNOs and plastics social enterprises (PSEs) could strengthen the plastics value chain. This included the “shared value” model outlined in Figure 1.

This report builds on that work. Our research was designed to understand how partnerships between MNOs and PSEs can best be supported to address the plastic waste problem in LMICs. Discussions with a range of stakeholders, including founders of PSEs and senior leaders of MNOs, helped to create a holistic picture of the challenges and potential opportunities.

For a broader analysis, we also relied on interviews conducted as part of other GSMA studies.

We spoke with:

- Two MNOs – one from Kenya and one from the Philippines;
- Six PSEs – two each from India, Kenya and the Philippines; and
- One MNO and one PSE from the Philippines.

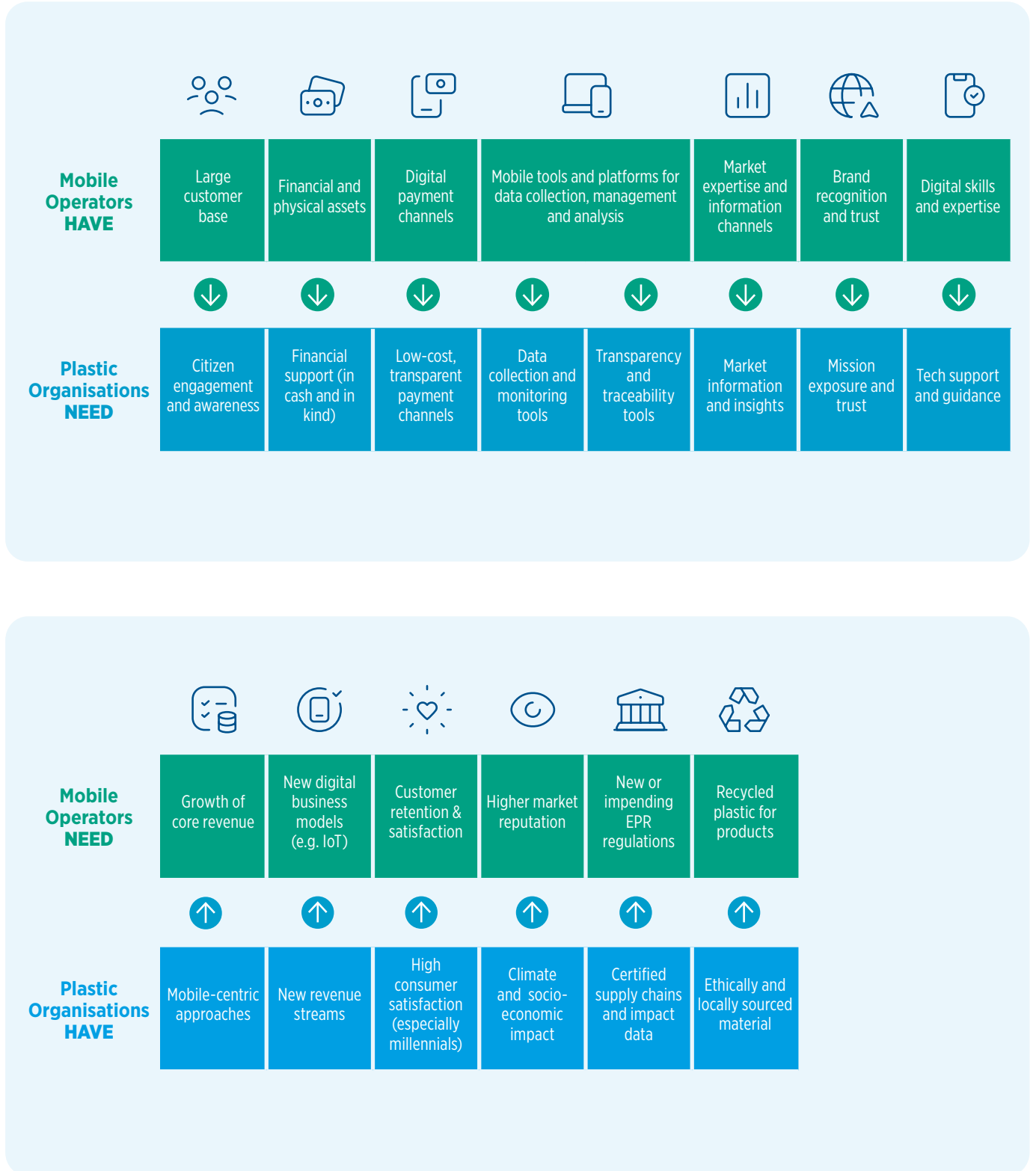
This report explores the challenges and opportunities across the plastics value chain and identifies areas of shared value and mutual benefit for MNOs and PSEs in this circular economy.

3. Ellen MacArthur Foundation. “[Plastics and the Circular Economy](#)”.

4. Extended producer responsibility (EPR) is a policy approach by which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products.

Figure 1

### Synergies between plastics organisations and MNOs





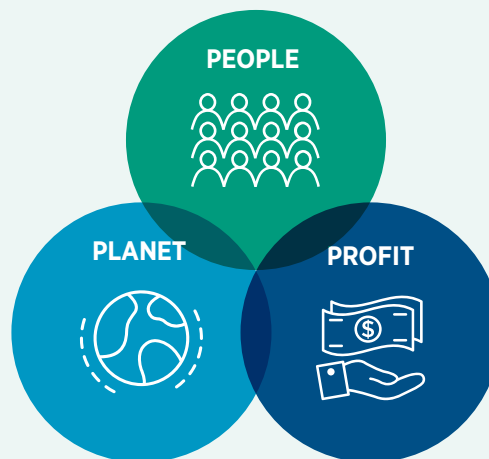
## Partnerships with PSEs offer MNOs a triple bottom line opportunity

This study found that few MNOs are involved in any major initiatives in plastics separation and recycling, especially those with an existing or future commercial purpose. MNOs are often unaware of the potential of plastics organisations to scale and become sustainable, as well as their digital needs and current and future contribution to carbon reduction.

However, interviews highlighted that the paradigm around waste and business is changing. While the bottom line remains an MNO's priority, business growth in and of itself is no longer enough to meet the demands of the modern consumer. In an age of

purpose- and authenticity-led advertising, consumers and governments are demanding more accountability from businesses for their sustainability and social impact, and MNOs are seeking the balance between commercial and social drivers.

The leaders of MNOs we spoke with recognised this shifting landscape and the need to be ahead of regulation with their own waste streams and to make the business case for plastics recycling clear. Indeed, creating partnerships with PSEs has offered MNOs a “triple bottom line” opportunity to serve people, the planet and profit.



### **People: Demonstrate integrity, enhance brand image and drive customer retention by solving sustainability challenges**

Working with a PSE can improve brand reputation and customer loyalty by offering clear ways to go beyond “greenwashing” and invest in robust initiatives that make the world a better place for people and help to solve one of the most pressing sustainability challenges of our age: plastic waste.



### **Planet: Anticipate EPR regulations and meet business needs by addressing plastic waste in the supply chain**

A partnership with a PSE offers an MNO the opportunity to address plastic waste issues across their own supply chain and capture some of the waste of other plastics producers, as well. This enables MNOs to meet regulatory or EPR requirements, reduce their own waste footprint and reduce the amount of waste that is improperly managed and left to pollute ecosystems.



### **Profit: Future-proof the business by extending and diversifying revenue streams**

With longer-term investment and support, PSEs represent a real business opportunity for MNOs, enabling them to diversify revenue streams, recapture some of the lost value of plastic waste and extend existing or develop new mobile money mechanisms or apps.



## Case study: An MNO and PSE collaborate to tackle waste management in Côte d'Ivoire

Coliba is a web, mobile and SMS platform that connects households and businesses with waste pickers in Côte d'Ivoire. MTN is the largest MNO in Africa.

In 2017, Coliba joined MTN's Y'ello Startup, an incubator programme that supports early-stage,

local tech entrepreneurs and identifies future business partners for MTN. Coliba and MTN later collaborated through a commercial and co-branding partnership. Households that recycle plastic bottles through Coliba's mobile app were granted MTN data credits, allowing them to access the internet on their mobile phones.



*“The benefits of this partnership with Coliba is on three levels. First, it's a business opportunity, because the idea is to be able to help Coliba with their development. Secondly, there are socio-economic issues, and thirdly, environmental issues.”*

**– Guillaume N'gouan, Deputy General Manager, MTN Business**



# Challenges and opportunities in solving the plastic waste problem in LMICs

The key to unlocking the latent value within the plastics value chain is to help PSEs on their journey to scale. As a relatively new sector, it is characterised by both the challenges and possibilities of doing things differently. However, while the challenges are significant, they are by no means insurmountable. Businesses with clarity and vision that can recognise the opportunity will be ahead of the step change in production and recycling practices around the world, and be well positioned to capture the inherent value of a plastics circular economy.

## Challenges of achieving a plastics circular economy

As defined by the Ellen MacArthur Foundation, a circular economy is restorative and regenerative by design.<sup>5</sup> This means materials flow relatively consistently and continuously around a closed-loop system. In the case of plastic, the challenge is keeping the value of plastics in the economy while at the same time minimising leakage into the natural environment through landfills and incineration. While theoretically straightforward, circular economy frameworks are difficult to achieve in practice (see Figure 2 for the challenges related to the plastics sector). This is because they require:

- Financial, infrastructure and production mechanisms to be rethought, restructured and redeployed.
- Proper and efficient functioning across all stages of the circular economy to close the loop. If one part of the value chain fails to meet its required targets, there is a direct knock-on effect on the entire circular economy. For example, if not enough plastic waste is collected, plastics producers cannot recycle enough plastic resin to make recycled plastic goods.
- Agreement, alignment and incentives between multiple stakeholders and partners whose objectives do not always neatly align.

5. <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

Figure 2

### Challenges of achieving a plastics circular economy



6. [https://unhabitat.org/sites/default/files/2021/02/2010\\_collection-msw-developing-countries\\_un-habitat.pdf](https://unhabitat.org/sites/default/files/2021/02/2010_collection-msw-developing-countries_un-habitat.pdf)  
 7. Digital Dividends in Plastic Recycling, GSMA, April 2021

“[Digital Dividends in Plastics Recycling](#)” highlighted that plastic waste management can be viewed as a market system with potential to create value at each stage of the value chain through fair and decent employment, sustainable revenue generation and climate and environmental benefits.

PSEs are playing a key role in solving the plastic waste problem in LMICs, using innovative plastics waste management to enable a circular economy, from connecting informal waste collectors with waste

segregators or processors, to behaviour change initiatives that improve consumer waste behaviours and innovations in plastics upcycling processes. Through these efforts, PSEs have developed profitable and sustainable business models and partnerships across one or more areas of the plastics value chain.

## PSEs offer MNOs a strategic partnership opportunity by solving the ‘wicked problem’ of plastic waste

In many LMICs, circular economy solutions are nascent, but innovative PSEs are demonstrating the opportunities and value of managing plastic waste more effectively. While MNOs cannot be expected to support PSEs on their journey to scale alone, they are natural business partners in a sector that relies heavily on mobile and digital innovation to formalise and drive efficiencies in informal waste collection in LMICs. Key areas of impact for MNOs include:



- **Growth of core revenue** – Working with a PSE offers MNOs greater penetration and consumption of their services by new customers, particularly in engaging harder-to-reach groups.
- **New digital business models (eg IoT)** – For MNOs in LMICs, digital payments and broader financial services provide an opportunity to diversify beyond connectivity, offset stagnating core revenues and grow their presence in the digital ecosystem.
- **Customer retention and satisfaction** – There is growing pressure from socially conscious consumers for corporations to be taking action to deliver ethical and sustainable business practices. MNOs can benefit from the association of working with an established PSE who is recognised for making impact in this space.
- **Higher market reputation** – Taking bold steps to address the plastic problem can set an MNO brand apart, positioning them as a market leader in this space, as well as establishing longer-term sustainable organisation practices.
- **New or impending EPR regulations** – Extended Producer Responsibility policies are increasingly targeting both plastics and e-waste, and shifting responsibility for their collection and disposal back to the private sector. A partnership with a PSE offers an MNO the opportunity to address plastic waste issues across their own supply chain and meet regulatory or EPR requirements.
- **Recycled plastics for products** – Working with a PSE can help MNOs increase their use of socially responsible recycled plastics in their manufacturing processes.



# The innovations that PSEs have developed – or could develop through a partnership – offer multiple and varied opportunities for MNOs.

Some of the examples listed below are supported by TRANSFORM, a joint initiative between Unilever, the UK’s Foreign, Commonwealth & Development Office (FCDO) and EY which works to pilot and support business models designed to address the plastics problem. This includes both Take Ni Mala and Trashcon, organisations which have benefited from the support of the TRANSFORM initiative.

Table 1

## Opportunities for MNOs throughout the plastics circular economy

Stage	PSE innovations	PSE examples (See the <a href="#">annex</a> for full case studies)	Opportunities for MNOs
<b>Disposal</b> 	<p>Plastics organisations are using mobile apps and community awareness-raising events to change behaviours around waste disposal.</p>	<p><b>BEST:</b> holds community engagement events where they incentivise proper waste disposal by offering “environmental points” that can be redeemed in local stores.</p>	<p>Mobile money payments, apps and interactive content can help PSEs <b>raise awareness of waste disposal, helping them address the volume of plastics in their value chain and encouraging engagement with their services.</b></p> <p>A partnership would provide an MNO with:</p> <ul style="list-style-type: none"> <li>• A route into mobile money payments for unengaged populations;</li> <li>• An expanded mobile money system by embedding incentives;</li> <li>• Development of branded or monetised apps or interactive content;</li> <li>• Joint access to harder-to-reach rural or semi-rural communities through brand-building activities; and</li> <li>• A climate-positive brand image.</li> </ul>
<b>Collection</b> 	<p>PSEs are helping to make waste collection more efficient by formalising the informal sector and securing larger volumes of waste via partnerships with plastics producers.</p>	<p><b>Taka Ni Mali:</b> have prototyped a mobile app that households can use to “hail” waste pickers who then come to their house and take plastic waste to collection sites. The challenge they seek to address is how to expand into areas where households tend not to have access to smartphones.</p> <p><b>Hapinoy and Reconx:</b> are working with informal “Sari-Sari” shops as collection points for plastics that are recycled into fuel. They incentivise waste collectors and consumers to use these collection points.</p> <p><b>Recircle:</b> connects households, businesses and institutions to informal waste collectors to help manage their waste collection and promote recycling. They have also gamified recycling to encourage this behaviour among consumers.</p>	<p>Mobile-enabled solutions can drive operational efficiency in waste collection by connecting households or businesses to waste pickers who then take waste to collection points. Securing more stable and greater volumes of plastic waste helps the PSE become more attractive to investors and increases opportunities for scale.</p> <p>A partnership would provide an MNO with:</p> <ul style="list-style-type: none"> <li>• Higher use of mobile money payments to waste pickers and encourage the formalisation of informal employment in waste collection;</li> <li>• Location data and GPS tracking of waste can ensure higher volumes of waste and increase profits;</li> <li>• Valuable data on waste behaviours, increased visibility of their potential carbon footprint and carbon capture of recycling activities; and</li> <li>• The ability to retrieve and reprocess their own waste.</li> </ul>

Stage	PSE innovations	PSE examples (See the <a href="#">annex</a> for full case studies)	Opportunities for MNOs
<b>Segregation and aggregation</b> 	PSEs are automating plastics segregation and aggregation processes by developing or purchasing machinery or technology.	<b>TrashCon:</b> developed a waste aggregation tool called Trashbot that takes waste from the streets and sorts it into biodegradables such as food waste, and non-biodegradables such as plastics and metals.	AI and IoT can improve collection and recycling activities, such as bin monitoring and weighing and the automation of plastics segregation. Mobile and digital tech can also connect PSEs to an international market for recycled plastic resins. A partnership would provide an MNO with: <ul style="list-style-type: none"> <li>• Increased profits from plastics recycling;</li> <li>• Greater transparency and auditability of plastic resin to service the international market and improve profitability; and</li> <li>• Mobile payments between different actors in the plastics marketplace.</li> </ul>
<b>Reprocessing</b> 	PSEs are innovating: <ul style="list-style-type: none"> <li>• The types and ease with which plastics can be recycled (e.g. flexible plastics);</li> <li>• Ways to upcycle rather than downcycle plastics; and</li> <li>• The uses of recycled plastic resins.</li> </ul>	<b>TrashCon:</b> has built a recycling machine that can turn hard-to-recycle flexible plastic into “WoW” boards, which are similar to particle board and can be used to make furniture or as a building material. This technology has global applications. For example, 61% of plastic waste in the Philippines is flexible plastic. <sup>8</sup> <b>T3:</b> is turning PET into yarn that can be sold on the international market for sustainable materials for the fashion industry.	Digital innovations and support with R&D will help PSEs capitalise on their innovative approach to plastics recycling and recapture the value of plastic in the market. A partnership would provide an MNO with: <ul style="list-style-type: none"> <li>• A plastics value chain that could meet their waste needs (e.g. SIM cards, telecoms materials, e-waste);</li> <li>• Higher quality upcycled plastic goods that can be sold on the international market and bring new revenue streams;</li> <li>• Data to create a transparent and traceable marketplace for recycled plastics and secure international buyers of recycled resin; and</li> <li>• Brand-building activities by using recycled plastic in their own supply chain or retrieving waste put out into the local market.</li> </ul>

## PSEs have many challenges to address before they can demonstrate a sustainable business case

Despite the potential and business case for supporting PSEs on their journey to scale, as a new industry PSEs often struggle to attract investment. This is because there are several challenges in building more scalable and sustainable solutions, from the upfront cost burden

of waste collection and reprocessing infrastructure to fluctuation in the value of plastics and the stability of plastic waste. Some of these are general challenges for a new business while others are specific to the plastics sector (see Table 2).

8. Market Study for the Philippines: Plastics Circularity Opportunities and Barriers, World Bank Group, <https://openknowledge.worldbank.org/handle/10986/35295>

Table 2

## Sector-specific challenges facing PSEs

Challenges for PSE	What PSEs need
<p><b>Creating a more stable and efficient business model</b></p> <p>The business of turning waste into wealth is predicated on the ability to create efficiencies across the plastics value chain by formalising the informal sector and securing steady, stable streams of the right type of plastic waste. Margins on plastics are very low and business models have little flexibility built in.</p> <p>Mobile-enabled digital solutions are the key to capturing the potential across the plastics value chain and play a key role in optimising waste collection routes, connecting waste pickers to waste and incentivising engagement with the model via mobile money payments. However, many of the mobile-enabled solutions require a smartphone and Wi-Fi access, which are not universal in LMICs.</p>	<ul style="list-style-type: none"> <li>• Technical support for data-driven efficiencies that reduce operating costs, optimise routes and secure steady, stable streams of plastic waste;</li> <li>• Cheaper access to mobile money payments or incentive points to encourage waste pickers to join their organisation;</li> <li>• Technical support to determine how to use USSD, text or free Wi-Fi hotspots to connect waste collectors to waste streams, rather than relying on smartphones;</li> <li>• Access to organisations that have the resources and technical expertise in logistics and operations to help upskill PSEs in the management of their supply chain; and</li> <li>• Partnerships with known brands to encourage people to participate in waste collection and disposal.</li> </ul>
<p><b>Resilience to fluctuations in market prices</b></p> <p>The profitability of plastics recycling depends heavily on the price of oil, and therefore fluctuates. PSEs that diversify the range of material they recycle are more resilient to market fluctuations and can meet a wider variety of businesses' recycling needs. However, this also means that PSEs will experience horizontal rather than vertical growth, which can overwhelm new businesses, particularly if they need to build in new sorting and reprocessing functions.</p>	<ul style="list-style-type: none"> <li>• Support or partnerships that aid diversification in other, more stable waste streams;</li> <li>• To create economies of scale in terms of the volume of plastic waste collected;</li> <li>• Established partnerships with organisations to retrieve larger volumes of waste; and</li> <li>• Logistical and operational efficiencies that drive down other costs.</li> </ul>
<p><b>Access to a transparent and trustworthy marketplace for plastic resins</b></p> <p>As demand for recycled plastic resins grows, businesses purchasing recycled plastics or investing in plastics retrieval and reprocessing via EPR will seek to ensure that plastic is being properly managed and reprocessed. They will want to know the carbon-capture impact of their investment or purchasing decisions and ensure that plastics are ethically and locally sourced. Particularly for harder-to-process waste such as e-waste, they will also want to ensure that safety standards are paramount. Organisations will need to formalise data collection, safety standards and protocols and ensure traceability across the system to "prove" the quality and social/planetary impact of their end products.</p>	<ul style="list-style-type: none"> <li>• Greater traceability and transparency across waste streams to create a marketplace for waste that validates the local and ethical nature of the recycled plastic;</li> <li>• IoT and AI innovations to help improve traceability and transparency of the marketplace;</li> <li>• Reduced or subsidised mobile money transaction fees; and</li> <li>• Technical support for data collection methods to provide evidence of their carbon-capture impact.</li> </ul>
<p><b>Help change the paradigm of waste so that all actors are invested in the need to recycle</b></p> <p>As PSEs grow, they rely on raising awareness of consumers, businesses and local governments to gain buy-in, secure investment and collect a steadier stream of plastic waste to reprocess. This often means they must explore and learn about consumer insights, behavioural science and marketing. Mobile-enabled apps or campaigns play a key role in shifting consumer behaviours, but PSEs do not always have the reach or brand recognition to encourage engagement and behaviour change.</p>	<ul style="list-style-type: none"> <li>• Access to data or consumer insights about waste behaviours (or support to conduct research) that could help build effective consumer behaviour change campaigns;</li> <li>• Local community engagement to offer behavioural incentives and create physical collection points;</li> <li>• Access to a large customer base to raise awareness of the service;</li> <li>• Mobile money or digital payment services for subscription models or incentive points; and</li> <li>• Space within established businesses or retailers to launch consumer awareness-raising campaigns.</li> </ul>



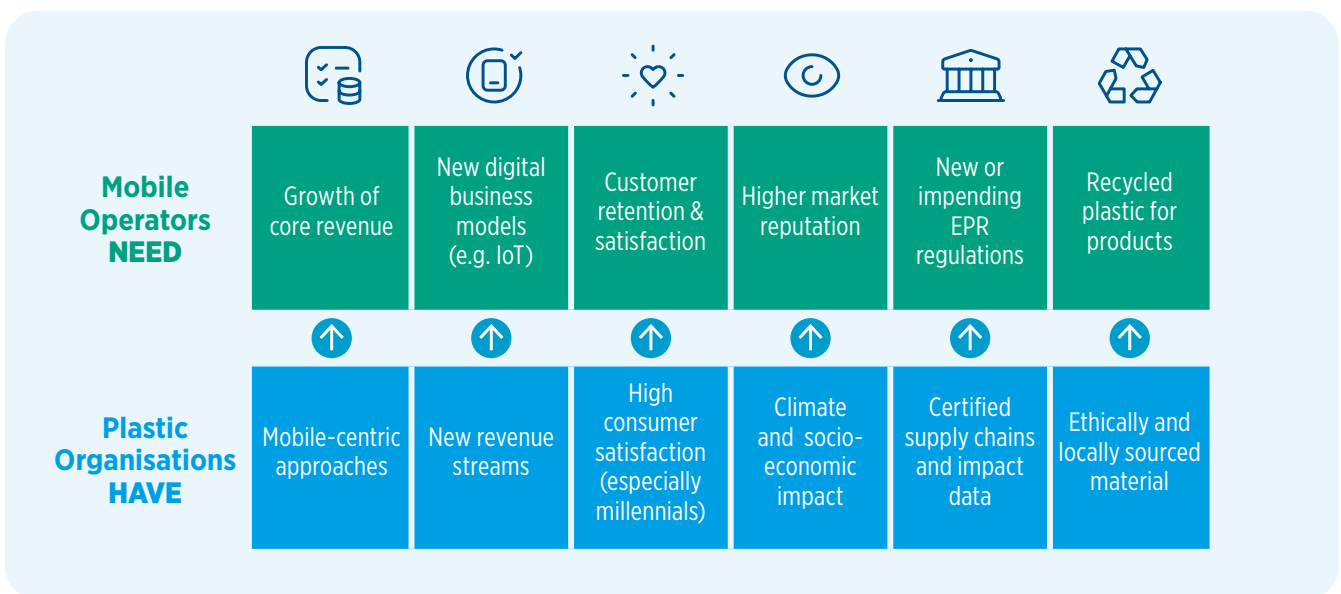
## MNOs can help PSEs increase their reach and impact

Interviews with PSEs highlighted the various challenges and needs they faced on their journey to scale. They recognised the immense potential of a partnership with an MNO as a business opportunity. During each interview, some of the potential synergies between MNOs and PSEs identified in the “Digital

Dividends in Plastic Recycling” report (in Figure 2) were raised. These areas were discussed with both PSEs and MNOs to determine which are most appealing, where needs might align and which would be most beneficial on a PSE’s journey to scale.

Figure 2

### Synergies between MNOs and PSEs



While PSEs were clear that MNOs could play a key role in supporting their efforts, some contributions were seen as more relevant than others. These offerings had clear benefits for the PSE, were areas in which MNOs were best suited to provide support and where

there was clear potential for shared value (i.e. a business opportunity not a handout). PSEs pointed to the following areas they felt a partnership would offer the most impact.

### MNOs can help PSEs improve citizen engagement and awareness.

Awareness and citizen engagement is critical for PSEs because tackling the plastic waste problem requires behaviour change at the consumer and institutional level. MNOs’ large customer base can drive engagement with PSE services and consumer

behaviour change. The PSEs we interviewed considered this not only an excellent opportunity to improve their own marketing, but also to engage in joint marketing with MNOs.



## MNOs' in-kind and technical support can improve efficiency.

MNOs have financial and physical assets that can have clear benefits for a PSE as they scale their organisation. PSEs were interested in this support, but strongly expressed the need for these to be strategic investments where a “win-win” can still be achieved, as opposed to an investment that is purely charitable. This came with a preference for in-kind support over financial support.

In-kind support for digital services was especially interesting to PSEs. For example, MNOs' digital payment channels are important tools that all PSEs used in their business models (as shown in Table 1 and detailed in the annex). Offering lower costs can enable PSEs to scale while potentially passing on some savings to end users.



*“The partnership must help their bottom line, we need to find a win-win that hits the sweet spot.”*

– **Philippines-based PSE**



### Case study: An MNO helps a PSE scale mobile payments in the Philippines

**Hapinoy**, a social enterprise based in the Philippines, partnered with an MNO to scale the use of mobile payments in Sari-Sari shops. The MNO approached Hapinoy directly to drive mobile payments in this specific market. There is an ongoing opportunity for an MNO to improve

core revenue as Hapinoy grows mobile payments in new markets engaged in the plastics value chain. For example, through their mobile app, which allows consumers to track their plastics recycling and receive mobile payments.

MNOs also have digital skills and expertise that can help PSEs as they develop their technology stack. Many PSEs are seeking to grow their in-house technology and expertise, so this support would need to focus on growing their internal capabilities rather

than long-term reliance on the MNO for these services. There was some hesitancy about whether an MNO is best placed to offer these services compared to other technology companies, but PSEs would welcome the support.

## MNOs have digital tools and platforms for data collection, management and analysis that can help PSEs with data collection and improve transparency and traceability in their operations.

PSEs expressed that although this type of support was relevant, they had not considered seeking it from an MNO. They questioned the extent to which an MNO focuses on data collection, management and analysis,

and whether they would be able and willing to offer this type of support to a PSE. This could be an area to explore further with MNOs and to clarify what they can offer to a PSE so that both sides reap the benefits.

## Case study: Helping MNOs understand informal markets

**Recircle** is a PSE that operates across India, providing waste collection and processing services to both consumers and businesses. Recircle uses mobile payments and data and analytics to make their operating model more

efficient, as well as gamification to promote recycling behaviours. There are opportunities for an MNO to support these mobile technologies to drive their core revenue and gain better insights into informal markets.

## MNOs' market expertise and information channels could be shared with PSEs.

PSEs struggled to comprehend the value of market insights and data for their core business model. PSEs generally questioned the relevance of this data and, again, whether an MNO's expertise would be aligned to their needs. One PSE expressed this could be a

useful way to measure the success of their work and the impact of their behaviour change efforts. However, in general, there was low understanding of the role of MNOs' insights and how this could drive business activities.

## MNOs' immense brand recognition is a huge draw to PSEs as they try to engage more consumers and drive uptake of recycling.

MNOs have brand recognition and consumer trust, which can also help PSEs gain exposure and trust and increase engagement with their services. This is particularly important for consumer awareness-raising activities as people are more likely to listen to a brand

that they know and respect. This can help with both a PSE's own marketing as well as joint marketing. While MNOs have broad consumer recognition and trust, PSEs have trust within informal markets.

“

*“Everyone knows these companies, that is an amazing opportunity for us.”*

- India-based PSE

”

“

*“It's all about access. They can help people see we are trustworthy, a good brand to get involved in, and if they get some Wi-Fi or data off the back of engagement then it's even better.”*

- Philippines-based PSE

”



# The opportunity for shared-value partnerships

The scale of solving the plastic waste problem is so immense that no single organisation can do it alone. PSEs need and require partnerships from an array of stakeholders to have the support they require to scale and sustain their activities and to innovate. There is an opportunity for all parties to benefit from the commercial and environmental impacts of plastics recycling. This shared value model identifies and pursues “win-wins” to build and develop partnerships.

## The triple bottom line of people, planet and profit is an opportunity to create shared value

This research and the existing evidence base have revealed three key areas with the greatest opportunity to create successful, shared-value partnerships between MNOs and PSEs.

**People: MNOs want to drive brand recognition and loyalty while PSEs need to reach a wider audience.**

MNOs are becoming more sustainable companies, both through investor and consumer pressure and a desire to do more for people and the planet. Sustainability is often embedded in key performance indicators (KPIs) and there is a genuine desire to understand how to maintain the bottom line while also helping to address the environmental challenges the world faces. In an age of purpose-led branding, MNOs are also under pressure to demonstrate that their efforts are making a genuine difference.

PSEs employ and help to formalise work for low-income and low-educated individuals and improve their working conditions and incomes. This work reduces waste on the streets of communities and creates cleaner and healthier environments. All these outcomes can align with the sustainability goals of MNOs to cut direct and indirect waste and reduce greenhouse gas (GHG) emissions.

By working together, MNOs can drive brand recognition and loyalty by showcasing what they are doing to support sustainability initiatives, while PSEs can reach a wider audience, raise awareness of the need to recycle and encourage more engagement with their services.

PSEs and MNOs can share their customer bases, both of which have brand value. In a long-term partnership, there is an even greater return on investment. There is an opportunity to employ sustainability narratives in MNO marketing and enter markets together that would

benefit both parties. PSEs are trusted and have a strong relationship with the communities where they work, including informal markets, which may be potential new markets for an MNO. These efforts can help PSEs to scale and, in turn, strengthen the business case for MNO participation and drive core revenue as the use of mobile technology increases. MNOs also bring their credibility and well-known brand to make joint marketing with PSEs especially effective.

**Planet: EPR regulations are driving MNOs' need to find organisations to retrieve and recycle their waste while PSEs need investment to optimise their business model.**

With looming EPR regulations, MNOs around the world are attempting to assess their impact and determine how to deal with the waste they produce. The threat of increased government pressure for the private sector to take account of its waste streams is a key driver, which also includes considerable and sustained pressure from investors and customers. As such, PSEs offer an opportunity for MNOs to understand the potential carbon capture associated with retrieving waste and meet the requirements of EPR regulations.

EPR regulations also compel businesses to take more responsibility for the waste they produce. MNOs produce some plastics for internal operations, such as packaging and water bottles in office buildings. They also produce some plastics in telecoms and consumer products, such as SIM cards, packaging and marketing materials.

PSEs help to create a circular economy for plastics in which they are continuously recycled or upcycled, reducing the volume of waste ending up in landfills and oceans or to be incinerated. They offer MNOs the opportunity to address the waste they produce. However, most MNO waste is e-waste, which is currently the fastest growing waste stream in the world.<sup>9</sup> This means there is potential misalignment with the types of waste PSEs process, and could be an opportunity for MNOs and PSEs to explore recycling e-waste to meet MNOs' EPR needs and create a new revenue stream for PSEs. This could be achieved when working with a third-party to address the mismatch in types of plastic being recycled – such as a plastic producer who could help close the circle.

Meanwhile, PSEs need financial and in-kind investment to optimise their business model and expand infrastructure as they scale. Rather than grant funding, they would benefit from long-term business partnerships, particularly technical and in-kind support that can drive operational efficiencies.

**Profit: PSEs can drive MNO revenue by digitising informal markets while MNOs can help PSEs scale and become profitable.**

While MNOs are seeking ways to adopt more sustainable products and operating practices, ideally, a partnership would offer an investment opportunity and not just an impact story. Through their use of mobile technology, PSEs provide a unique opportunity for MNOs to not only have a positive impact but also increase their core revenue.



*“A commercial model will be the most viable and most beneficial for a partnership.”*

**- Kenya-based MNO**



PSEs are using digital innovations and mobile technology to help solve the plastic waste challenge in LMICs and enable their organisations to scale. They are using tools such as location tracking, SMS, emails, mobile payments and others to improve citizen awareness, operational efficiencies and transparency and traceability for their business.

As PSEs scale, their use of mobile technology increases, along with opportunities to expand the reach of MNOs into new and relatively untapped communities in LMICs (e.g. waste pickers and Sari-Sari shops). There are various challenges in working with these communities, including a lack of smartphones, low levels of disposable income and low literacy levels. PSEs understand these challenges and are building tools that work for these communities, such as local access points or hotspots, SMS or email to engage and activate people and mobile payment services to pay for goods and services. MNOs can offer technical expertise and guidance, particularly in developing digital or mobile-based innovations for hard-to-reach audiences. This is critical for PSEs to scale in LMICs where infrastructure challenges and low smartphone penetration outside urban centres need to be overcome. Once they have scaled, PSEs can represent a business opportunity in their own right and offer a new revenue stream for MNOs.

9. Statista. (2021). “Projected electronic waste generation from 2019 to 2030 (in million metric tons)”.



# Catalysing partnerships between PSEs and MNOs

As the previous sections have highlighted, while there are limited partnerships currently in practice, there is significant scope for mutually beneficial collaborations between PSEs and MNOs. Key factors that could facilitate these partnerships are highlighted below.

## The key factors that could contribute to a successful partnership

If the PSE...	If the MNO...
<ul style="list-style-type: none"><li>• Is established;</li><li>• Commercially viable and/or has existing funding from a third party;</li><li>• Can provide evidence of impact (has strong monitoring and evaluation processes in place);</li><li>• Has the opportunity to scale; and</li><li>• Offers MNOs entry to new markets/ customers.</li></ul>	<ul style="list-style-type: none"><li>• Is focused on innovation or has an innovation arm beyond corporate social responsibility (CSR);</li><li>• Operates in a market where EPR is more demanding; and</li><li>• Thinks plastics recycling offers a strong branding proposition that will resonate with audiences.</li></ul>

## How MNOs can support the development of partnerships with PSEs

- **See the potential beyond e-waste.** While e-waste is a pressing concern, there are many business opportunities with PSEs even if they only recycle certain types of plastic. It is important to look at different ways that PSEs deploy mobile and digital solutions and identify areas where an MNO might be able to monetise a service.
- **Align shared goals and work to achieve them.** Identifying shared value and win-wins will enable organisations with different structures and motivations to work effectively and collaboratively to achieve shared goals. For example, mobile money is a key area where there could be potential beyond CSR.
- **Play the long game.** PSEs will solve many sustainability and business challenges in the future, but developing a circular economy model that is sustainable and profitable requires long-term focus and resources. Organisations that achieve it will be able to market the business model and make the most of the global opportunities to improve plastics recycling.
- **Leverage reputation to unlock broader opportunities.** MNOs have established brand image and networks with major players in the countries where they operate. Using these networks to help PSEs unlock broader opportunities in the economy and value chain is key, as plastic waste cannot be solved by a single organisation.
- **Explore opportunities via third parties.** Where values do not neatly align, consider bringing in third parties that might have a business need to work with a PSE (i.e. a manufacturer responsible for high levels of waste in a country, such as Coca-Cola, Unilever or Nestle).
- **Encourage PSEs to work with other PSEs and share lessons:** There is tremendous potential for PSEs to learn from each other's successes and failures. Working together to bridge infrastructure gaps or pool resources has potential to create interesting partnerships that could help to optimise business models and ensure mutual success.





## How PSEs can strengthen their offering for MNOs

To develop a partnership with an MNO, a PSE needs to clarify how they can support the MNO's triple bottom line. In general, a PSE will need to demonstrate their track record as an impactful business with a clear path to scale. At the same time, it is important for an MNO to see the PSE as a long-term partner.

The following criteria are important for PSEs to follow when approaching MNOs:

- **Provide robust evidence of social and environmental impact.** PSEs should make a clear case for how their business can support the MNO's specific CSR and EPR needs. This can include demonstrating the capability to monitor and evaluate the social and environmental impact of actions taken by MNOs to address plastic waste. It would be especially beneficial for a PSE to demonstrate willingness and/or capability to expand their model to include other types of waste, such as e-waste, and the capacity to manage MNO-related plastic waste. Many PSEs have weak monitoring and evaluation systems – a key area to improve to strengthen the evidence of their impact.
- **Demonstrate the potential scale of mobile technology.** PSEs should provide evidence of how mobile technology is integral to their business and their ability to scale. They should demonstrate how this technology will continue to develop and grow as the business scales. Evidence of which consumer markets are currently digitised or have potential to be digitised through the efforts of the PSE, such as enabling mobile payments to be adopted by informal shops used as waste collection points, will be helpful as part of the business case. PSEs have a deep understanding of new and informal markets, including data and insights into where these services have worked, as well as the trust of communities, while MNOs have data and technical expertise. With clear and targeted goals, there is potential to create innovative digital solutions.
- **Spark curiosity through research and development.** There may be research and development topics that MNOs and PSEs could explore jointly, such as recycling for emergent plastic wastes.





# Annex: Case studies of plastics social enterprises



## Case study 1: TrashCon, India

### Context:

Indian cities are some of the most densely populated in the world, and in 2017 they generated approximately 9.47 million tonnes of plastic waste. One of the main reasons is the scale of single-use packaging that is used and disposed of within moments of purchase.<sup>10</sup> Often, single-use plastics are almost impossible to collect, sort and recycle. Faced with this immense waste challenge, Trashcon set out to develop a system that could recycle flexible plastic waste.

### What they do:

TrashCon is a PSE based in Bangalore, India that has developed proprietary waste sorting and recycling technology to create value out of even the most “unrecyclable” plastics.

The waste on the streets of India is made up of mixed waste that is extremely difficult to segregate by hand. Manual segregation also poses health hazards for those involved. TrashCon developed “Trashbot”, which takes waste from streets and sorts it into biodegradables, such as food waste, and non-biodegradables such as plastics and metals. The plastics are then recycled into sheets called WoW boards, which can be used to build furniture or roads or for refuse-derived fuel (RDF).

### Digital innovations:

TrashCon is developing a digital system to monitor and track the waste as it moves from the informal waste sector to their facilities and to the buyer

of their WoW products, ensuring value is not lost at any point in the process. They also plan to use digital payments to enable smoother transactions for everyone involved.

### Impact:

TrashCon has a widespread impact on people and the planet. TrashCon removes waste from city streets and creates cleaner local environments in India while enabling a circular economy that prevents waste from ending up in landfills, remaining on streets or being incinerated and causing further environmental damage. They also remove the need for manual waste segregation, which can have detrimental health impacts.

### Partnerships and opportunity for MNOs:

Much of TrashCon’s growth has been the result of a close partnership with TRANSFORM, a joint initiative between Unilever, the UK Foreign, Commonwealth & Development Office (FCDO) and EY. Transform has supported them with financial and in-kind investments that have allowed them to enter new markets and grow from processing two tonnes of waste per day to 200 tonnes per day.

Trashcon is digitising the informal waste collection sector in India, a feat that has taken years of working closely with this market to understand its needs, from both an operational and behavioural perspective. An MNO could support TrashCon by providing lower rates for digital payments, allowing them to scale the use of mobile payments in this informal and newly digitised market.

10. Pandey, S. and Manuja, S. (2 December 2020). “[Plastic Waste Management: Turning Challenges into Opportunities](#)”. The Energy and Resources Institute (TERI).



## Case study 2: Hapinoy and Reconx, Philippines

### Context:

In 2018, Greenpeace designated the Philippines as the third-worst plastics polluter of the world's oceans. This is due in part to the country's densely populated urban areas and relatively high levels of poverty. For large segments of the population, implementing extensive recycling systems across an archipelago of 7,000 islands is not a priority. To scale recycling systems in the Philippines, there must be more focus on generating wealth and jobs from the collection and recycling of plastics.

### What they do:

Hapinoy and Reconx are social enterprises that became partners to tackle the plastic waste challenge in the Philippines more effectively.

Hapinoy is a hybrid business that works with informal Sari-Sari shops, providing them with training and capacity building, as well as facilitating partnerships, to help them grow their businesses. ReconX is a CleanTech enterprise that converts plastic waste into usable fuel. These companies created a partnership to collect and process plastic waste more effectively, using Sari-Sari shops as collection points that then send the waste to ReconX for processing.

### Digital innovations:

Hapinoy and Reconx developed a digital technology that allows individuals to track their "waste points" and provides mobile payments to individuals who bring plastic wastes to the shops. This also enables consumers to track their impact by monitoring the number of kilograms of plastic they have recycled.

### Impact:

Together, these companies are helping to build a circular economy of plastic waste, removing waste from communities that may end up in landfills or the ocean and converting it into fuel that can be used in place of fossil fuels. They are also enabling behaviour change at the consumer level, which can lead to long-term shifts in recycling behaviours. They are also incentivising waste pickers and other individuals to collect plastics, which provides a steady source of income.

### Partnerships and opportunity for MNOs:

Hapinoy has a partnership with an MNO to help them scale the use of mobile payments in Sari-Sari shops. The MNO approached Hapinoy directly to drive mobile payments in this specific market. This partnership has not yet involved the waste collection efforts of Hapinoy and Reconx. This leaves an opportunity for an MNO to increase core revenue as Hapinoy/Reconx drive mobile payments in new markets engaged in the plastics value chain, such as through their mobile app, which allows consumers to track their plastics recycling and receive mobile payments.



## Case study 3: Recircle, India

### Context:

India has a population of more than 1.4 billion people and, despite being one of the fastest growing economies in the world, there are high levels of poverty and wealth inequality. Currently, plastic waste collection and recycling systems are scattered and inconsistent and are predominantly made up of informal waste collectors. A key challenge is formalising this system and its workers by generating value in a more circular economic system.

### What they do:

Recircle is a PSE that operates across India, providing waste collection and processing services to both consumers and businesses. Recircle connects households, businesses and institutions with waste collectors who bring waste to centres to be recycled into raw materials and used to create new products.

Recircle is addressing challenges across the ecosystem to enable long-term sustainable development. Waste collectors in India have little trust in formal infrastructure, or often the lack thereof, and consumers are often unaware of the need to recycle or how they can do so. Recircle focuses on educating the public and institutions about better recycling and waste collection behaviours.

### Digital innovations:

Recircle uses data and analytics to create more transparency and accountability across the value chain. They have also gamified waste segregation and collection to promote recycling behaviours. They intend to integrate new features in their digital platform, such as mobile money payments.

### Impact:

Recircle enables the collection and recycling of plastics; promotes behaviour change and capacity building for consumers and informal waste collectors; drives policy and institutional participation in the circular economy; and the development of infrastructure. This not only reduces plastic waste in landfills and oceans in the short term, but also promotes the long-term changes required to enable a circular economy of plastics.

### Partnerships and opportunity for MNOs:

Recircle heavily leverages partnerships in their business to drive change in recycling across the ecosystem. They partner with businesses and residential complexes to support their waste and plastics collection. They also work closely with institutions and the government to support the development of policies and initiatives that support environmental efforts.

Recircle uses mobile payments and data and analytics to make their operating model more efficient, as well as gamification to promote recycling behaviours. There are opportunities for an MNO to support these mobile technologies to increase their core revenue and gain better insights into informal markets.



## Case study 4: BEST, Philippines

### Context:

When Greenpeace designated the Philippines the third-worst plastics polluter of the world's oceans in 2018, it sparked a national conversation about plastic waste. However, much of the population is poor and live in rural areas or islands disconnected from the infrastructure of the mainland. With competing priorities around affordability, the drive to recycle and segregate plastics is low, and people tend to purchase lower cost, harder-to-recycle sachets.

### What they do:

Basic Environmental Systems and Technologies Inc., or BEST, is a technology-driven PSE and has the rare advantage of being a stable, consolidated business in a very immature sector. As such, they have the experience and networks to move into plastics recycling across seven different areas of the Philippines and, over time, developed their own sorting and recycling facilities.

Partnerships are central to how BEST operates. Working with local traders, they have built an environmental points cashback programme that incentivises consumers to segregate and either drop their waste off at a collection point or have it picked up. Their model relies on consumer behaviour change, community development and awareness raising around the benefit and need to recycle. While their services have been very popular in urban areas, expanding into rural and less affluent areas has presented different types of challenges, often related to digital accessibility and the complex logistics of waste management across an archipelago.

### Digital innovations:

BEST has placed mobile-enabled behaviour change at the forefront of their business model. They currently have 20,000 "eco-warriors" signed up to their mobile waste collection service who separate their waste and either bring it to a collection point or use the online platform to "hail" a waste collector to collect it for them. They are now seeking support to find cheaper ways for people to access their online services, as smartphone penetration is limited in some areas where they want to expand.

### Impact:

As a stable and established PSE, BEST has built networks of recycling systems in urban areas that are not only reducing pollution in local communities, but also changing behaviours and raising awareness about the issue of recycling.

### Partnerships and opportunity for MNOs:

From BEST's perspective, a partnerships with an MNO would be an opportunity to penetrate markets that are currently less accessible due to logistical and digital challenges. Funding would help them to host consumer awareness raising or educational events that would be jointly marketed, and provide ways to use USSD text blasts to reach those who do not have smartphones. They would also hope to receive in-kind technical support from MNOs to improve their mobile/digital capabilities and marketing expertise.

In terms of what they could offer an MNO, BEST is in a strong position as a profitable and established PSE to offer new revenue streams and access to their already large customer base. They are also clearly aware of the value of data and metrics to large organisations and know that they can "sell" this as a package to partners.



## Case study 5: T3, Kenya

### Context:

T3 described plastic waste in Kenya as a “thorn in our side”. Only five per cent of plastic waste in Kenya is currently recycled, compared to 31 per cent in the EU. This is despite a relatively strong appetite of both the public and government to become a more sustainable and circular economy. A lack of infrastructure that would enable a formal recycling system has meant that collecting and processing volumes of plastic at a consistent and profitable scale has been problematic.

### What they do:

T3 – or Trash, Thread, Textile – is a family-owned PSE that operates in Kenya. They use innovative recycling techniques to convert PET plastics into threads that are comparable to virgin polyesters and can be reused in the textile and fashion industries.

T3 collects PET plastics through a socially conscious three-tiered collection system. They pay a more generous rate to informal waste collectors and more competitive rates to registered waste collectors and large commercial businesses. Through this system, they aim to ensure a fair wage for informal waste collectors, while also incentivising plastics collection and recycling. In developing this system, they have come to recognise that building an extensive recycling system in Kenya will require collaboration and partnerships across a wide range of public institutions and commercial industries.

T3 is still in the developmental stage. They are perfecting the three-tier collection system and their unique recycling process before they scale into other recyclable waste streams. Ultimately, they aim to operate as a profitable business across a range of recyclables.

### Digital innovations:

T3 believes that an efficient recycling system is a digitised and modern. They currently use the M-Pesa mobile payment system across their value chain to increase traceability and encourage the formalisation of informal waste collectors. They are also interested in the role that digital incentivisation can play in encouraging plastic waste collection and raising awareness of plastic waste management in Kenya.

### Impact:

T3 are developing a fair and equitable system that redistributes wealth to the most vulnerable in the value chain. They are giving value to plastic waste to incentivise its collection and create awareness of pollution.

### Partnerships and opportunity for MNOs:

T3 sees the main opportunities of a partnership as digitising and modernising their business model and exploring additional uses of mobile payment systems along their value chain. They also believe that an MNO could help them to create a digital incentive system to further encourage plastics collection.



## Case study 6: Taka Ni Mali, Kenya

### Context:

The growth of urban centres and the ongoing industrialisation of the Kenyan economy has led to an increase in informal settlements and, ultimately, more complex waste streams. There is a lack of awareness of the problems of plastic waste mismanagement and existing collection systems are predominantly informal and inconsistent. A key challenge is organising and formalising informal waste collection across the country.

### What they do:

Taka ni Mali, which is Swahili for Waste is Wealth, is an environmentally focused PSE operating in Kenya. It is funded by the TRANSFORM initiative. Founded by Mary Ngechu, an esteemed businesswoman, Taka ni Mali was designed to give value to waste to incentivise conversion and recycling using a circular economy model. They collect and then sort plastic waste at their Community Waste Management and Entrepreneurship Hubs (CWMEH) and connect buyers of sorted plastic waste with collectors, creating a circular value chain.

To facilitate this value chain, they have created a wider ecosystem that involves collaboration and partnerships with county government and other PSEs. Their work focuses on empowering communities through job creation in the waste management sector and formalising informal waste collectors through organisation and training programmes provided by the CWMEHs.

### Digital innovations:

Taka ni Mali collectors use a mobile app to direct them to households, businesses and dumpsites that have recyclable waste for collection. This app streamlines and targets collectors to locations that have waste ready for collection, making the process far more efficient. They are beginning to explore innovative methods of data management that would allow them to further improve this system.

### Impact:

Not only does Taka ni Mali address environmental issues through their waste collection and sorting, but they are also keenly focused on improving the livelihoods of communities that suffer most from plastic waste mismanagement in Kenya.

### Partnerships and opportunity for MNOs:

Taka ni Mali is actively looking for partners that can plug into their ecosystem and further encourage plastics recycling while improving the lives of Kenyan communities. They are particularly interested in how an MNO could enable them to access USSD technology to better geomap their data and develop a more accurate and responsive online service.

Their offering to MNOs is the commercial opportunity their business represents. Not only would MNOs gain the trust of communities by supporting local wealth and job creation, but the opportunity to scale their business through Taka ni Mali's innovative mobile app also represents a profitable commercial opportunity.

[gsma.com](http://gsma.com)



For more information visit the GSMA website at  
[www.gsma.com/mobilefordevelopment/climatetech/](http://www.gsma.com/mobilefordevelopment/climatetech/)



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