The Incubation Network

2021 Market Insights Report
Plastics Data Challenge

Introduction

The Data Dilemma

The mission to eliminate ocean plastic by building a circular economy will only be accomplished by reducing plastic use, collecting used plastic as close to the source of use as possible, and connecting it to increasing market demand for post-consumer recycled (PCR) plastic. Building the infrastructure, processes and markets for plastic circularity requires a fundamental understanding of what types of and how much plastic is being used; where it is entering the wastestream; and transparent accounting and exchange of information about the economic value of the materials and labor that is critical to the collection and sorting steps of the recycling process.

However, data from the plastic waste management sector across South and Southeast Asia is missing, inconsistent, or unreliable, in part due to the reliance on informal collection and sorting activities.

This results in an inability to effectively track, monitor, forecast, or optimize material flows, with repercussions that act as barriers to the development of circularity - including a lack of supportive policies, actionable targets for waste reduction, municipal infrastructure, and adequate investment capital.

At the same time, continual advances in, and access to, technology solutions, including artificial intelligence, blockchain and mobile applications, are being harnessed in other sectors that are trying to solve complex socioeconomic and environmental issues, like agriculture, public health and microfinance. If applied to waste management and recycling, these solutions could hold tremendous promise for preventing plastic waste from entering our oceans.

Closing the gap
A collaborative effort

While the issue of ocean plastic is a global one, the majority of it flows from five countries in Asia. As a result, this region is the focus of a range of programs trying to close the data gap, as well as voluntary and mandatory initiatives that are creating opportunities for entrepreneurs and companies that are developing data-driven solutions. Some examples include: India's **Extended Producer Responsibility (EPR) policy**, which has opened up a space for solutions that can support producers with compliance; the **Alliance to End Plastic Waste** and IBM partnership to create the **Plastics Recovery Insight and Steering Model** (PRISM), a data platform to help track global plastic waste in the environment; and the World Bank's **Indonesia Sustainable Oceans Project,** which is supporting a number of research projects to increase the availability of data on plastic pollution.

This report aims to add to this collective understanding by providing an overview of business models that can improve access to quality data on plastics and plastic waste as well as a discussion of some of the challenges and opportunities facing them. The insights were gathered from the 2020 Plastics Data Challenge, **The Incubation Network's** first Global Innovation Challenge. The Plastics Data Challenge is a pilot readiness program aimed at supporting the development of innovative solutions to overcoming the data gap in the waste management

sector to prevent the flow of plastics into the ocean. With input from stakeholders across the plastics value chain, the challenge sought innovative solutions and working prototypes to overcome data gaps in three areas:

01 **Plastic waste management,** including understanding and forecasting plastic waste generation and material flows across South and Southeast Asia;

02 **Plastics recycling supply chain optimization,** including improving the connectivity, visibility, transparency and efficiency of supply chain actors across the region; and

03 **Plastic waste leakage identification and prevention,** including remote monitoring and tracking to identify leakage hotspots.

More than 90 innovators from 39 countries applied to the Plastics Data Challenge, providing a diverse representation of potential solutions. Half of these ventures were from Asia, reflecting the breadth of the opportunities and challenges that exist in South and Southeast Asia as well as the multitude of potential sources and uses of data across this region.
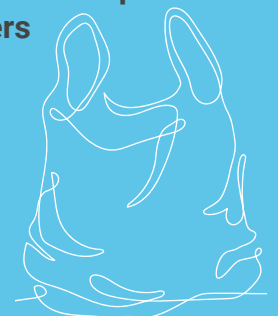
2020

Plastics Data Challenge

92+
entrepreneurs

50%
of innovations from Asia

100+
advisors, mentors, coaches and capital providers

39
countries

10
semi-finalists developed and implemented innovative pilots for data-driven solutions

Mapping promising data-driven solutions

At a high level, we identified one major distinction among data solutions: those for which data is the primary product or solution, which we refer to as pure play data models; and those for which data is an enhancement to primarily physical operations in the recycling value chain, which we refer to as data-enabled models. We describe these categories in more detail in this section, as well as the business models within each, and provide examples from the Plastics Data Challenge and broader community of entrepreneurs that The Incubation Network has worked with in recent years.

Solutions

Pure play data models

Data as the primary product or solution

Data-enabled models

Data is an enhancement to primarily physical operations in the recycling value chain

TOPOLYTICS™

plastx

Siklus

clearbot

SUPER LESS PLASTIC

NEPRA
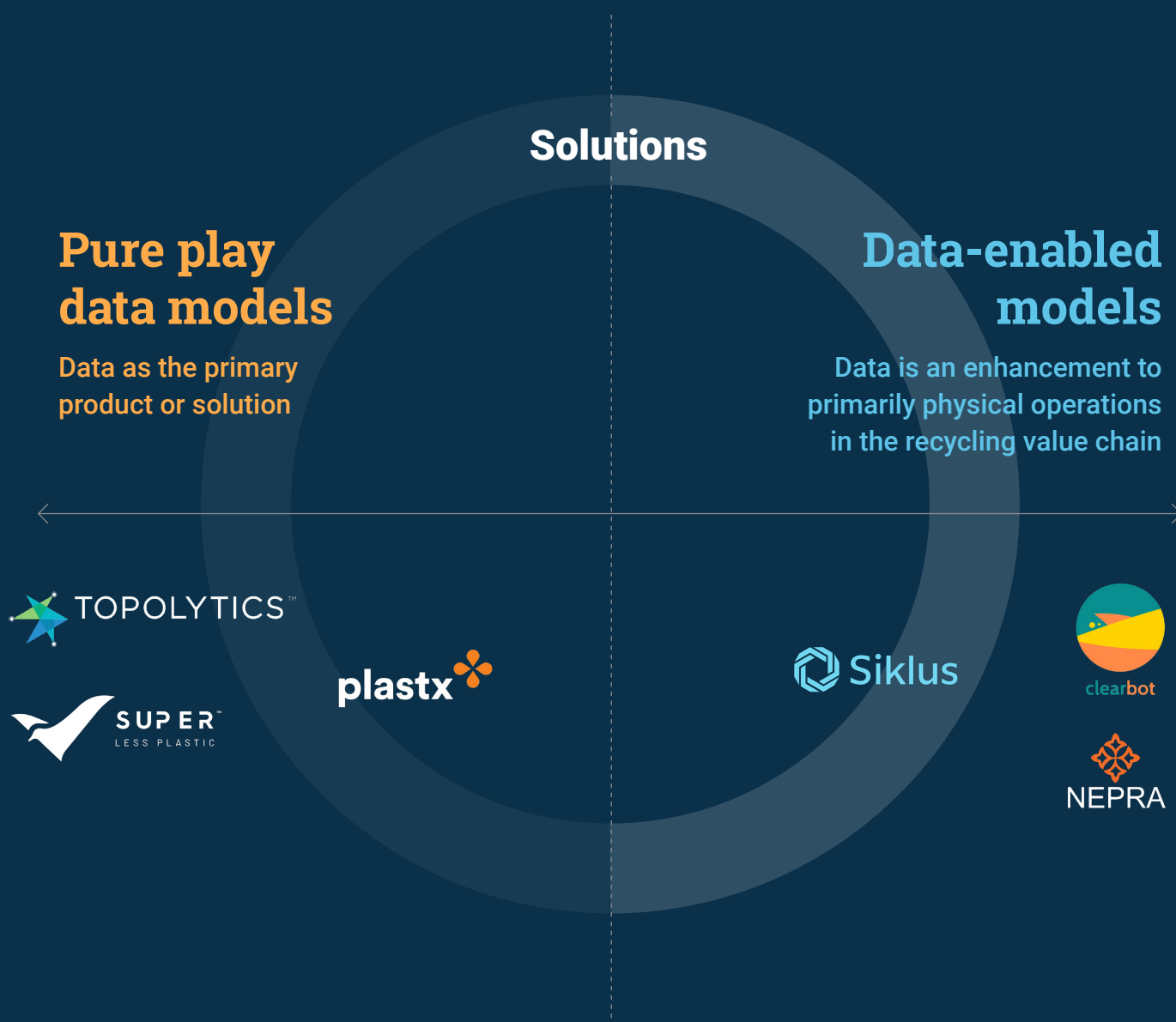
Pure Play Data Models

Pure play data models are applications of technology that use or generate data from different points in the recycling value chain.

For these businesses, data is generated without actually touching or interacting with the physical processes or infrastructure for recycling. In some cases, the data is the product. These are, essentially, digital businesses, with "Data as a Service" (DaaS) as the potential business model.

01

Data Mapping and Analytics

A range of technologies such as aerial drones and satellites, internet-connected devices and mobile applications can be used to digitize the remote, autonomous collection of data on post-consumer plastic, including the sources, types and locations of plastic in the post-consumer wastestream. Data can then be analyzed and mapped more accurately, and presented more powerfully in maps to support data-driven decision making; for example, targeting interventions to address plastic waste reduction and collection, or informing plans for the development of waste management infrastructure. Business models depend upon clients' willingness to pay for sophisticated analytics related to plastic waste and ability to gain efficiencies at scale.

CASE STUDY

TOPOLYTICS™

Topolytics collects, aggregates, and cleans waste data from many different sources to inform better decision-making by waste producers, recyclers, governments, and investors. The company uses machine learning, analytics and mapping to generate a high-quality granular view on the generation, movement and fate of the world's waste. Topolytics has developed a waste data analytics platform called WasteMap® that is used by waste producers, waste processors, investors and regulators to generate better environmental and commercial outcomes for the material.

02

Plastic Accounting and Footprinting

Plastic accounting and footprinting models help upstream producers and users of plastic to benchmark their single-use plastic use and the environmental impact of that use. These solutions leverage data inputs about a producer's or consumer's actual plastic use to model the footprint and impact of that plastic use; the accounting and footprinting is produced through data models. These services can provide a baseline, as well as ongoing monitoring support for companies that are setting concrete goals for plastic reduction or other environmental impact. However, this model depends on the willingness of producers and users of plastic to share their data. Greater participation is being seen in markets where EPR policies have been, or are being, introduced.
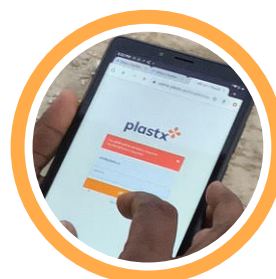
CASE STUDY

Plastics Data Challenge semi-finalist **SUPER™** is an American-based non-profit startup that helps businesses calculate their single-use plastic footprint, reduce it and become certified. It provides businesses with rich and granular data that includes not only a detailed analysis of their footprint but also outlines an actionable pathway and the ROI for switching to alternatives. In addition, its data-driven procurement platform connects supply and demand for vetted alternatives to single-use plastics.

03

Digital Traceability and Marketplaces

Using digital tools to track the flow of materials through the value chain represents the opportunity to leapfrog manual tracking processes that are inefficient, error-prone and difficult to aggregate. Technologies like QR codes and blockchain can build secure records of how materials flow through the value chain, as well as more detailed information about the materials themselves, with data provided and stored in a decentralized way. The ability to record secure transactions easily is essential to building and sustaining the economic relationships between actors in a circular value chain, who may not always be in geographic proximity. If players are incentivized to participate, these models may act as virtual brokers for material, earning revenue per transaction, or be supported by large buyers or sellers via subscription or service fees.

CASE STUDY

A subset of digital traceability solutions is marketplaces. Australian startup The Plastics Circle launched **PlastX** as a two-sided marketplace for recycled plastics, integrating informal plastic collectors and enabling them to connect to processors as well as brand owners with specific demand for PCR plastic. This connection addresses the issue of mismanagement of the plastics wastestream that results in an inability to meet the growing demand for PCR plastic from multinational brand owners. Brand owners place orders for PCR plastic, specifying the type, color, condition and location of what they are looking for, as well as the price they are willing to pay. Through its app, PlastX alerts collectors, who choose the jobs they want to do and the quantity they can collect.

Data-Enabled Models

On the other side of the spectrum from the pure play data models are data-enabled models. These are data-driven solutions that integrate with and add value to different physical operations and processes in the recycling lifecycle, from consumer to collections to processing.

Here, data is an enhancement to, or byproduct of, an existing model for reducing plastic waste and increasing reuse of post-consumer plastic.

01

Mobile Applications to Support Consumer Behavior Change

The surge in use of mobile telephones throughout South and Southeast Asia provides a powerful, and relatively inexpensive way for integrating the individuals and households that are the upstream generators of plastic waste into the supply chain for recycled plastic. Mobile phones and applications can be used in creative ways to enable reduced plastic use and incentivize recycling, while also generating valuable data on consumer preferences and consumption patterns at the point of sale or consumption.

CASE STUDY

Siklus

Plastics Data Challenge finalist **Siklus**, which operates in Indonesia, is a refill service for household goods like detergent and shampoo. Customers place orders through a mobile app, and bring their own plastic bottles to fill. The refills are provided by mobile vendors who travel by tricycle and meet consumers close to their homes. The refill service is a source of livelihood for the vendor, while the sales activity generates a rich data set on consumer buying patterns, including product preferences, frequency of refills, and location of customers, which can in turn be monetized for brand owners that want to understand consumer behavior.

02

Artificial Intelligence and Machine Learning for Waste Recovery

Artificial Intelligence (AI) and machine learning are in use in advanced recycling centers in the United States and Europe to make operations more efficient, accurate and profitable, but there are applications of AI and machine learning outside of recycling facilities that can make the initial collection and sorting of plastic more accurate, safe and efficient. These solutions harness the falling costs of the necessary hardware and software, as well as the growing pool of shared data that can make the machine learning algorithms for classifying plastic waste more accurate.

CASE STUDY
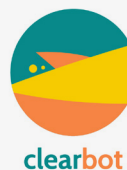
Hong Kong-based Plastics Data Challenge finalist **ClearBot** uses a combination of hardware and software to collect, classify and measure plastic waste from waterways. Its swarm of autonomous, solar-powered robots use AI-Vision to detect and sort plastic waste in waterways. The robots themselves are more efficient than existing alternatives like boats with nets, and can recognize more than 60 different types of waste. The recognition process, powered by machine learning, has the ability to improve in accuracy as more plastic - and data - is collected. There is potential to generate revenue through corporate plastic offsets and individual and corporate donations, as well as through contracts for services and data provided to governments.

03

Data for Optimizing Recycling Operations

Another category of data solutions is the internal applications developed by recycling plant operators to increase the efficiency of their own operations. In these cases, more than any of the other solutions we identify, data is an enhancement to an existing business and operations, providing insights that can inform refinements to the operating model. These refinements, in turn, lead to greater value and cost-savings in the handling of the wastestream and facilitate communication with partners along the value chain, investors and other stakeholders. The initial value proposition of the data is to the company itself, as well as to potential investors who want assurance that a company has the internal systems to optimize its operations.

CASE STUDY

Nepra is India's largest dry waste collection and sorting company. Nepra has built a common platform that integrates informal waste collectors, uses facial recognition software to facilitate payments to collectors, and facilitates sales of materials collected and then sorted at its material recovery facilities to recycled materials processors.

PHOTO CREDIT
Photographs of Nepra's team and facilities by Vision Strategy Storytelling for Circulate Capital

Challenges and opportunities
Creating a web of data solutions

Our analysis of the existing and nascent applications of technology to address the data gap in plastics recycling and circularity highlights that there is no single business model that can meet all challenges.
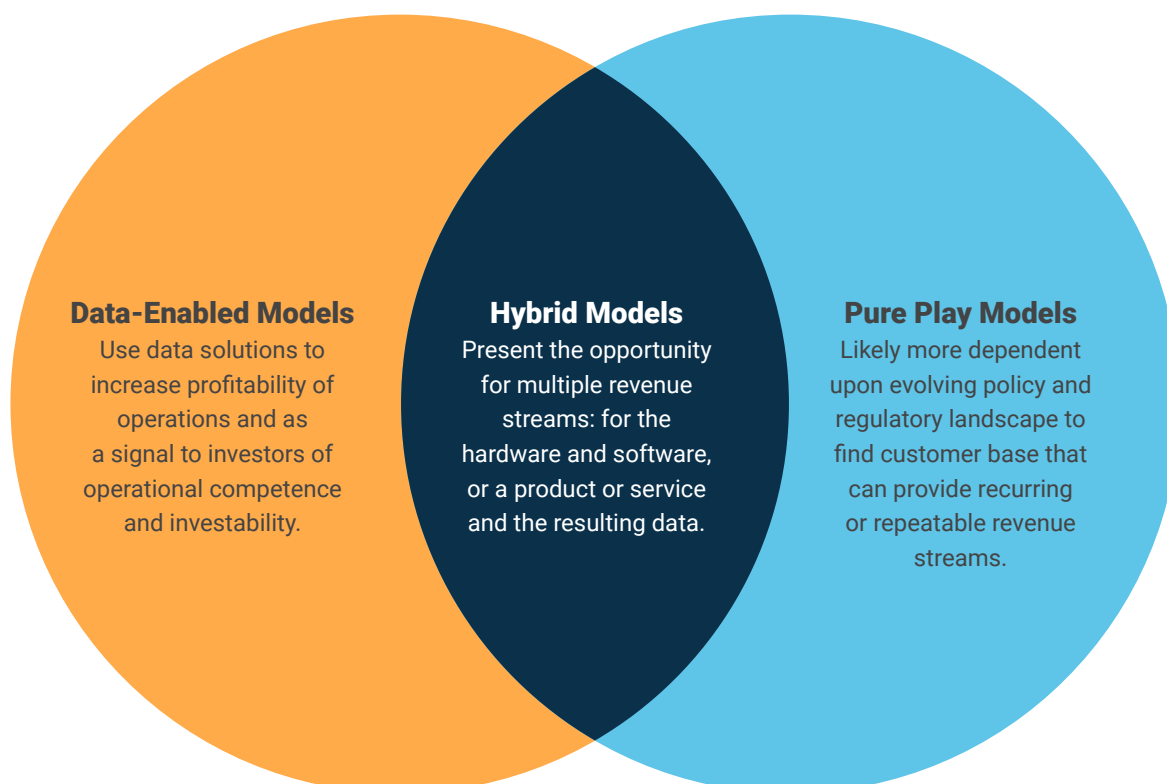
Rather, just as the solutions themselves are diverse in their technologies and applications, the value propositions and target customers are diverse and have varying degrees of willingness and capacity to pay for and use the data that these solutions generate. Given this variation, the solutions identified exist on a spectrum of investability and for each broad category of solution there are different considerations.

In short:

Data-enabled models can use their data solutions to increase profitability of their own operations and as a signal to investors of their business' operational competence and investability. There is the potential for future commercialization of these data solutions which may also be valuable or applicable to other actors who occupy a similar niche in the recycling value chain, if companies design with broader market needs in mind.

Pure play models are likely more dependent upon the evolving policy and regulatory landscape to find a customer base that can provide recurring or repeatable revenue streams. For example, in India, where EPR has been introduced, producers are required to play an

Revenue Streams

Data-Enabled Models
Use data solutions to increase profitability of operations and as a signal to investors of operational competence and investability.

Hybrid Models
Present the opportunity for multiple revenue streams: for the hardware and software, or a product or service and the resulting data.

Pure Play Models
Likely more dependent upon evolving policy and regulatory landscape to find customer base that can provide recurring or repeatable revenue streams.

active role in resourcing the recycling system under the EPR framework, thereby creating more opportunity for partnerships with pure play models that can help facilitate regulatory requirements. However, the success of models are highly dependent on how EPR policies will be implemented. In other countries or scenarios, there may not be any incentive for continual data services. Marketplace solutions avoid the reliance on regulatory environments but need to add value to both ends of the transaction.

There are some **hybrid models** that present the opportunity for multiple revenue streams: for the hardware and software (as in the ClearBot example), or a product or service and the resulting data (as in the Siklus example). An advantage for these models is in identifying areas of synergy across both the hardware and software to create efficiencies and further refine products or services using data from both elements. The challenge is in finding and managing two different customer bases, each with their own business model.

As these solutions are still in early stages, we believe there is still significant work to be done in identifying market fit as well as product viability, in order to increase investability. We also believe that the most powerful opportunities may be in the combination of different solutions. For example, plastics footprinting alone might not be an investable business model if there are not enough places or companies where there is a strong incentive to undertake the process, but an initial footprinting service combined with a digital marketplace or traceability tool that can show the lifecycle of a company's actual plastic use might be a more enduring product for a company.

"We believe that the most powerful opportunities may be in the combination of different solutions."

The way forward
Adapting to complexity

The Plastics Data Challenge demonstrated that the application of data solutions to waste management and recycling is an active space for innovation and entrepreneurs.

Data is foundational to scaling many solutions that are building a circular economy for plastics and therefore offers significant potential for impact. But data solutions will only realize their full potential if early-stage companies are able to adapt their business models to the complicated context of the sector and region.

For example, many data businesses will need to design solutions that work for the informal sector, where a great deal of the physical work of the recycling value chain takes place. Data businesses can play a role in helping informal actors formalize their operations, while also creating greater transparency and traceability. At the other end of the spectrum are the large institutions and global supply chain actors that want better data on the lifecycle of plastics in their supply chains, but who already have their own data systems and infrastructure. In order to be successful, start-ups must align with these existing systems or design their products to be interoperable.

Due to the fragmented waste landscape and sector economics, pure play data models are challenged to find customers who are willing to pay voluntarily; hybrid or data-enabled models have an easier runway to scale due to more diversified revenue streams. As new models emerge, there is potential for innovative partnerships and combinations of different solutions. Again, this highlights the significant work that remains to be done to help early-stage companies refine their business models and identify their market niche.

The potential for innovation is wide — but open collaboration, partnerships, blended capital and community commitment are needed for these solutions to be sustainable, scalable business models that can source sufficient reliable data to truly move the needle on plastic circularity.

As we work with new innovators across the recycling and waste management value chain through future Global Innovation Challenges and other accelerator programs, The Incubation Network will continue to capture new insights that may help data-driven ventures to build and scale their solutions more effectively. In 2021, The Incubation Network is supporting another cohort of entrepreneurs through the **Future of Flexibles Challenge** and we plan to publish further reports that provide a unique viewpoint on the implementation of inclusive and effective solutions on the ground across South and Southeast Asia.

Interested in more content?

If you would like to receive updates about future insights reports from **The Incubation Network,** please register here. We invite you to join us and be a part of a global network of diverse partners and communities that will work together to prevent ocean plastic pollution.

REGISTER HERE →
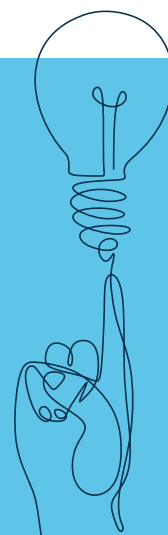
About

Plastics Data Challenge

The Plastics Data Challenge is the first global innovation challenge of **The Incubation Network**, a partnership between **The Circulate Initiative** and **SecondMuse.** Its mission is to build a diverse, collaborative global community around plastics data and increase awareness of the data gap in waste management and recycling in South and Southeast Asia, as well as identify solutions to address the challenge.

The 2020 Plastics Data Challenge took place over more than seven months, attracting 92 applicants from 39 countries and diverse backgrounds including academia, and the nonprofit and private sectors. More than half of the entries were from Asia, with about 10 percent of applicants from Indonesia. The companies represented were primarily early or seed stage ventures.

From the applicant pool, 10 semi-finalists were selected for participation in the program. Semi-finalists received financial support and were guided through a three-month pilot-readiness program focused on developing their company's pilot's market fit and design, resilience and risk awareness, as well as their connectivity to local and strategic partners through an assessment process, virtual innovation summit, and six-week mentorship program. Support was provided by a diverse network of more than 100 stakeholders from the public, private, academic and NGO sectors acting as advisors, mentors, coaches and capital providers. Three finalists, Clearbot, Kabadiwalla Connect and Siklus, were selected at the end of the pilot-readiness phase to receive additional financial and technical support.

For more information, visit: **incubationnetwork.com/plastics-data-challenge/**

About

The Incubation Network

The Incubation Network is an impact-driven initiative that sources, supports and scales holistic innovative solutions to combat plastic pollution through strengthening entrepreneurial ecosystems with a diverse network of key partners.

Part of a highly collaborative community of startups and entrepreneurs, investors, partners and programs, The Incubation Network works together with industry players to tackle key barriers to address plastic leakage and advance a circular economy. This includes sourcing and supporting, to scaling early stage or pre-investment solutions, and connecting compatible ecosystem players to reinforce the value chain in waste management and recycling.

Established in 2019, The Incubation Network is a partnership between non-profit organization, The Circulate Initiative and impact innovation company, SecondMuse.

The Incubation Network is open to interested collaborators, corporations, and mentors, looking to address plastic leakage and advance a circular economy in South & Southeast Asia.

For more information, visit: **incubationnetwork.com**

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