catalyst

CASE STUDY

CATALYST:

TRANSFORMING WASTE MANAGEMENT

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The Constant Production of Disposable Plastic

In 2019, the world produced 381 million tonnes of plastic waste and is predicted to double by 2034[1]. Research concludes that 40% of plastics produced are for packaging purposes[2], which are often single-use plastics that currently cannot be recycled.

Disposable plastics are created using petroleum, which isn't biodegradable, and will release toxic chemicals into the soil as they breakdown over many years[3]. This leads to humans, animals and the environment intaking or ingesting these toxic chemicals. However, throwaway plastics continue to be produced.

Single-use plastics are convenient and cost-efective for large companies packaging and transporting products. For example, the plastic bottle allows transportation and sales of exact volumes of liquid in a container that is lightweight, indestructible and air-tight comparing to traditional glass bottles[4]. For consumers, this packaging is easy, simple and can be easily disposed. However, the environmental consequences are disastrous.

Inadequate Waste Management

Plastic pollution has had a visible negative impact in the oceans and in developing countries. The Great Pacifc Garbage Patch is 1.6 million square kilometres and weighs an estimated 80,000 tonnes[5]. This large mass of plastic in the ocean is an accumulation of fshing nets, plastic bottles and containers from primarily Asia and North America. This problem being left in our oceans is also handed over to developing counties for disposal without providing them with the correct supplies and infrastructure for adequate disposable procedures[6].

The key methods of disposal for plastics are landfll, incineration and recycling. In the UK, the recycling aspect often involves exporting the waste to other countries in order to ensure recycling occurs[7]. This practice is problematic as it requires burning fossil fuels to transport the plastics and introduces large volumes of waste into other countries.

The exportation of rubbish, plastics and unwanted items globally has led to an unsustainable process for the disposal of items. In 2018, China banned the import of mixed recyclables[8], which saw waste either redirected to other less-regulated countries or remaining in exporters' regions that cannot be processed adequately. For the UK, exported plastic packaging was redirected to Malaysia, Turkey, Poland, Indonesia and the Netherlands[9] in response to China's ban and incineration of plastics increased. However, neither of these methods of disposal are sustainable.

It is clear that current waste management and recycling

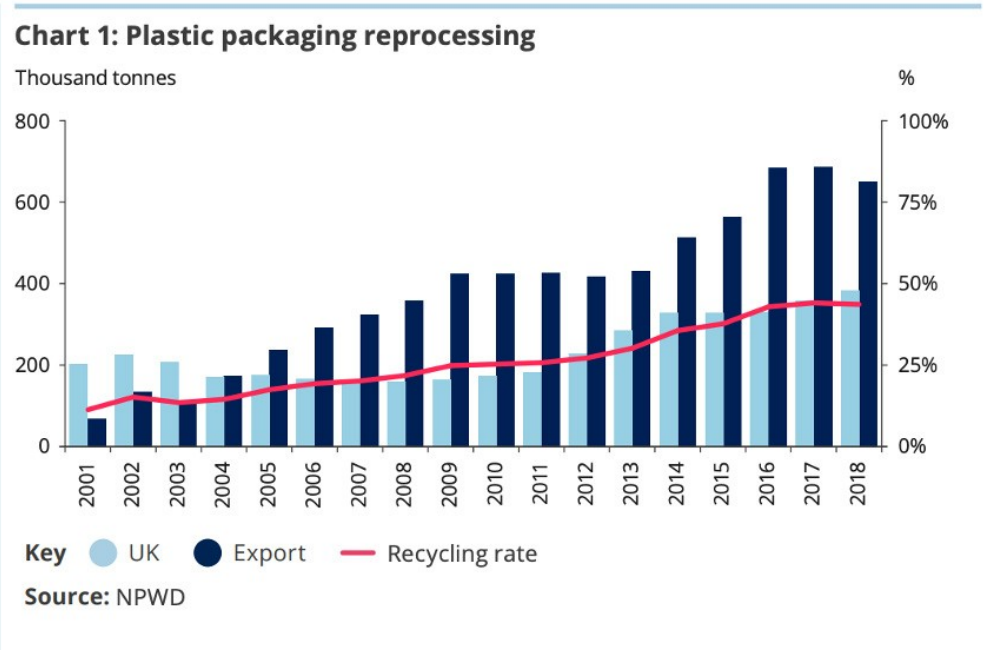

Fig 1. Plastic Packaging Reprocessing completed in the UK by the country, for export and for recycling each year from 2011-2018[10]

eforts for single-use plastics remain inadequate. There needs to be a transformation in “infrastructure and collective willpower”[2] to manage the problem efectively.

Blockchain Technology

Blockchain challenges traditional database tracking solutions by providing a platform that increases accountability and greater transparency. The technology can increase efciency in the waste management process as it enables recycling plants, companies using plastic packaging and governmental organisations to more efectively encourage and manage a circular economy.

Catalyst is a Distributed Ledger Technology (DLT) platform that was specifcally created to streamline processes to reduce administrative tasks and focus on environmental goals. For the recycling industry, Catalyst provides the necessary tool to support and maintain a circular economy.

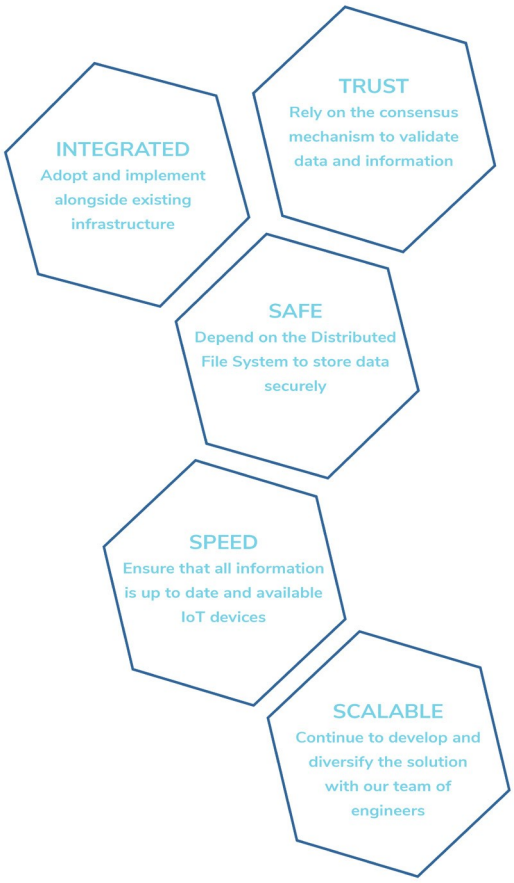

Fig 2. Advantages of Catalyst Network that can help with revolutionising the waste management

By implementing a multi-party platform using Catalyst, a circular economy for single-use plastics and other recycled waste can be created for their tokenisation and correct disposal. A multi-party platform can help coordinate and manage parties with the same goals to streamline and transform recycling practices to become accountable, automated and efective.

Red Skies products and services help companies, organisations and individuals maintain and align themselves with environmental goals using simple blockchain-based solutions that can have a withstanding impact.

Digitisation – Most recycling centres have their own databases to manage their import and export products. However, these individual records do not help monitor the overall recycling efort. By using Catalyst, data can be shared securely and recorded chronologically by multiple parties to monitor and achieve goals.

Tokenisation – Items that are recycled are often lost in the waste management cycle as they are untraced individually or as part of a group. With blockchain, physical items can be tracked from location to location by creating unique tokens that are linked to the physical items. This can ensure that items are recycled and managed efectively.

Verification – The waste management process does not currently record the waste transfer from one party to another. Consequently, most parties that deal with waste must undertake responsibility for the disposal of waste, even after it has left their possession[11]. Blockchain can challenge this method and ensure that all parties are recycled according to guidelines.

Accountability – In the UK, all parties (i.e. companies or organisations) remain liable for irresponsible waste disposal[11]. Catalyst can increase accountability using unique digital signatures that link to specifc individuals or organisations. Thereby, holding negligent parties accountable for irresponsible waste management.

The disposable nature of plastic has increasingly become a worrying problem globally. Plastic waste disposal has been identifed as a no “one-size-fts-all” problem and

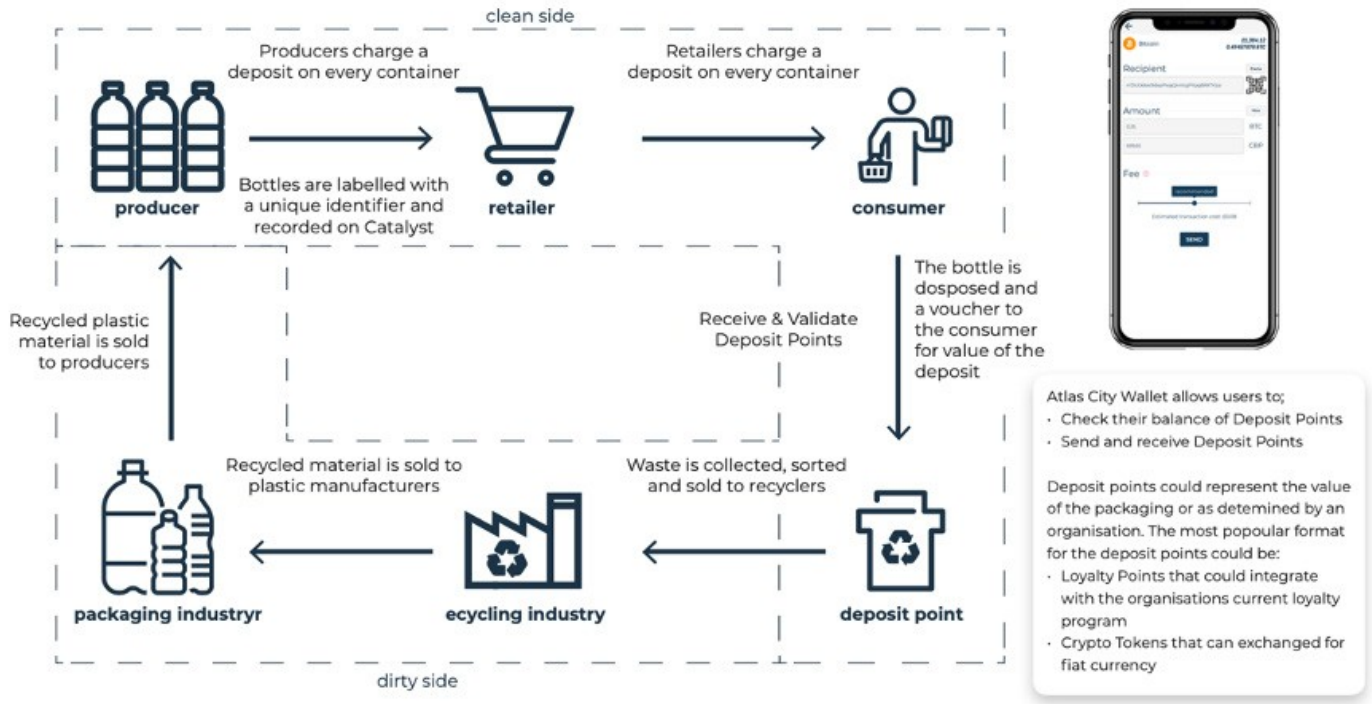

Fig 3. Catalyst provides the track and trace functionality for physical assets that can increase transparency and accountability. In addition, the Red Skies Wallet can aid the convenience of this solution for individuals and recycling companies to have immediate up-to-date information.

the WEF has stated that it requires a "multi-pronged, circular economy-based response"[12]. With this in mind, innovative technology must be leveraged to foster and support this kind of solution.

Application for Plastic Recycling

In the UK, 7.7 billion bottles are used annually[13] and only 52% are proactively recycled[14]. In response to this problem, a Deposit Return Schemes (DRS) ofers an incentive to individuals and businesses to recycle more. DRS often work by requiring an individual to pay a little more for the item to incentivise them to receive some reward (i.e. money or cryptocurrency or loyalty points).

For Individuals

Each bottle or plastic packaging is manufactured with a dot code attached to it alongside the barcode (fg 1). The unique dot code is immutably recorded on the ledger. Once production is complete, then the bottle moves throughout the supply chain until it reaches the consumer's hand. After consumption, the bottle is disposed. The individual user must scan the dot code on the bottle and the code on the smart bin before placing the bottle into the smart bin. The consumer is then rewarded via the Red Skies Wallet upon appropriate disposal.

For Organisations

Containers of plastic recycling can be weighed to estimate the volume of plastic being received from an organisation. Each container can be marked with a unique dot code to link the waste having come from a specifc organisation. Upon arrival at the recycling plant, the recycling can be verifed as meeting requirements before a reward is given to the organisation via the Red Skies wallet.

Transforming Waste Management Techniques

The UN Climate Change Summit in 2019 concluded with nine areas to focus on to combat climate change, including industry transformation and raising ambitions[15]. This aligns with creating and managing a circular economy, whether locally or nationally.

Waste management has continued to sufer with insufcient temporary solutions that do not overhaul the process or provide a long-term solution aligning with global environmental goals. Currently, large companies are pledging to change their manufacturing or production process[16] but are not working together for long-term change to happen.

Catalyst ofers a platform in which many parties can collaborate and come together to change recycling habits and transform the waste management process.

Scalable

Catalyst was built to grow as a platform and has mechanisms to allow growth without future bloating or latency issues. Therefore, it is well suited to promoting a circular economy for plastics and beyond. The platform can be used to track any waste product with the help of dot codes and tokenisation of physical assets. This means that the solution can be expanded to encourage recycling of glass, metals, hazardous waste and other materials.

The large volume of data is secure by using Catalyst. Distributed Ledger Technology means that data is inherently distributed, but Catalyst ofers a decentralised architecture that prevents the data from being hacked or altered internally. The platform ofers a trustless network for multiple parties to collaborate efciently.

Effortless Automation

The challenge of a new system is often marred by having to get used to the new software but blockchain technologies can run automated in the background and provide up-to-date information when required. Catalyst ofers an interoperable nature with already established databases and software. In addition, Catalyst uses a consensus mechanism to ensure all the data uploaded is valid by pre-authorised parties. Thereby, providing the peace of mind that your data is in fact valid.

Catalyst ensures that data from users recycling items can keep track of their rewards with the integration of the Red Skies Wallet, as well as providing recycling companies with data about the smart bins and the volume being recycled.

Previous systems would require individuals to continuously to update the information, but Catalyst provides a seamless transfer of information from user to the distributed ledger. Waste management operations can therefore focus on recycling and ensuring appropriate disposal rather than management of waste from place to another.

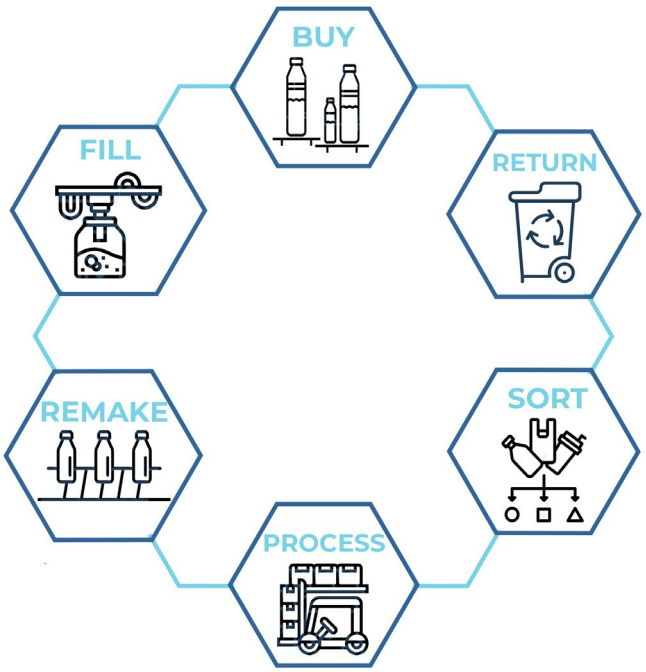

Fig 4. Circular Economy for Plastic Packaging

Collaboration with IoT

As companies continue to adopt new technologies, this comes with integrating IoT devices into processes. IoT devices provide mobility and convenience for people remote or on-site. The use of the Red Skies wallet means that information can be accessed while at recycling centres and for users to receive their reward immediately.

It was estimated that 2.07 billion individuals will use a mobile wallet to make a transaction in 2019[17]. Integrating a mobile wallet will help increase adoption and encourage users to gain rewards for their good recycling behaviours. The use of a digital wallet enables the solution to reach a wider audience and increase the percentage of the population to become part of a circular economy.

The Red Skies Wallet is conveniently downloaded onto the consumer's smart phone using the iOS App Store or PlayStore. The wallet is highly benefcial for crypto-investors and established cryptocurrency users, which are predicted to grow in the next 10 years[18] as it is compatible with all ERC-20 tokens.

Conclusion

The situation of COVID19 has highlighted the damaging efects of our daily habits on the environment. From the NASA image alone, we have noticed the reduction in air pollution over cities (fg 5). It is clear that our actions are impactful and how much our behaviour needs to change to protect our planet and its future.

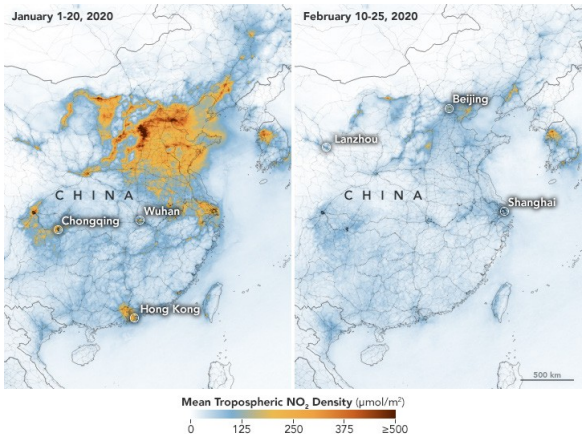

Fig 5. NASA Image of Air Pollution over North-Eastern China from January 2020 to February 2020[19]

Global leaders have mentioned relentlessly that we must change their recycling behaviours to combat climate change. Emerging fashion brands have proven that a circular economy can work (i.e. Elvis and Kresse, Re;code and ECOALF) and shown that consumers are keen to get involved with environmental conscious brands and projects.

The implementation of a large-scale circular economy can be efciently and efectively supported by blockchain technology. While the aspect of decentralisation encourages multi-party collaboration within a trustless network, the technology's immutable nature makes it ideal for projects that require constant monitoring to maintain trajectory.

For companies and individuals, the solution requires quick implementation and efortless adoption. Catalyst ofers compatibility into current software and systems for seamless implementation into organisations and individuals' hardware. The use of the Red Skies Wallet makes the solution accessible wherever you are and convenient to use for companies across many locations.

The innovative nature of a circular economy will help businesses to automate and simplify their waste management process, which will ultimately reduce their workload, as well as improve their environmental impact.

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We’re here to help you and your organisation along your blockchain journey.

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