

Digital Circular Economy Models





Presents

Case Studies

on

**DIGITAL
CIRCULAR ECONOMY
MODELS**

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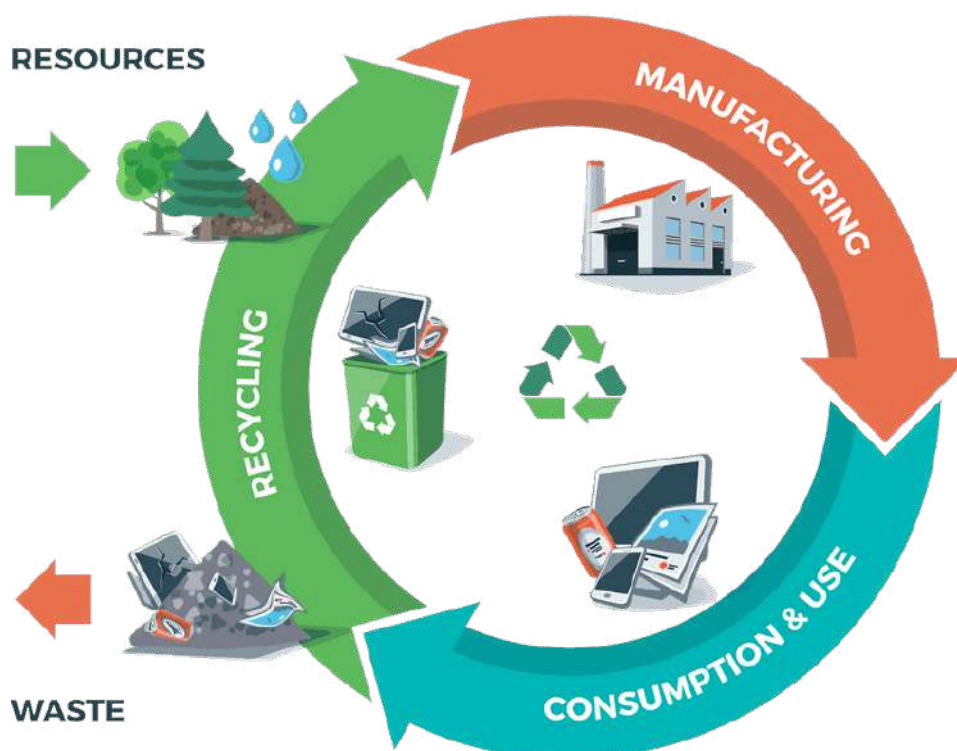
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Chapter-1

1. WHAT IS CIRCULAR ECONOMY?

The circular economy substitutes the old linear economy's take, make, use, and waste away strategy. Production models that are more than a decade old are just unsustainable. Organizations must now take a regenerative strategy. For decades, our growth has been fueled by the old, linear economy. However, the world's resources are limited. Climate change, biodiversity loss, waste, and pollution are just a few of the global difficulties we're facing today as a result of this. Global leaders are recognising the need for a new approach, one that makes better use of the limited resources available to us.



The three core principles of the circular economy are: to design out waste and pollution; to keep products and materials in use for as long as possible; to regenerate natural systems. Closing the loop in our usage of raw materials and energy is required for sustainable business. There is no such thing as waste in the ideal circular economy. The ultimate goal is to achieve economic growth that is unaffected by environmental factors. It promotes the use of renewable energy and resources, and it can be hastened by technological advancements.

SOURCE: EFQM LENS SERIES

Chapter-2

2. WHAT IS A CIRCULAR ECONOMY BUSINESS MODEL?

Business concepts based on the circular economy can help a company lower its environmental footprint. They're made to get the most value out of limited raw resources and goods by keeping them in use as long as feasible.

Different circular economy business models have an impact on different segments of the value chain, or the entire process of creating a product or service. They may be used wisely to generate growth, sustainability, and new revenue while also transforming customer relationships.

Each year, more than 100 billion tonnes of raw materials are converted into goods around the world, with only about 10% of it being recycled. Business models based on the circular economy help to reduce waste and the extraction of virgin resources.

There are five widely known business models, based on Circular Economy principles:

1	PRODUCT AS A SERVICE
	An organisation can provide benefits without selling product ownership by leveraging dematerialisation and resource productivity. The customer pays for the benefits of a product rather than its ownership when using a service.
2	PRODUCT LIFE EXTENSION
	Repairing, remanufacturing, remarketing, and updating a product extends and ensures its longevity and durability. Resource wisdom is exemplified by the use of technology in optimization.
3	RENEWABILITY
	By favouring renewable, recyclable, and biodegradable resources over toxic, polluting, and non-recyclable materials, an organisation can provide clean alternatives to toxic, polluting, and non-recyclable items. It necessitates the creation of modular products that can be disassembled, reused, and updated, allowing biological resources to be returned to nature.
4	SHARING PLATFORM
	Developing platforms for product distribution and sharing for access-based models (renting and leasing). Renting, borrowing, and swapping commodities between users can all be done using distribution platforms.
5	RESOURCE RECOVERY
	By recycling, reusing and recovering resources from materials, by-products and waste, an organisation can reduce its raw material costs, discover new products and revenue models and strengthen its self-sufficiency.

SOURCE: EFQM LENS SERIES

Chapter-3

3. CHALLENGES: IMPLEMENTATION OF CIRCULAR ECONOMY

The implementation of circular economy is a challenge. It exist due to various reasons, for eg. lack of awareness or indepth knowledge, lack of interest by top management, lack of information about the usefulness and benefits of circular economy and more. Few challenges are detailed below.

NON-AVAILABILITY OF INFORMATION

The quality of recyclable resources or used assets is frequently under doubt. There is a paucity of information. Because information about accessible amounts of recycled resources in the market is opaque, economies of scale are missed, and recyclable material become needlessly expensive.

INCREASED TRANSACTION AND SEARCH COSTS

Uncertainty about the quality of secondary materials makes it more difficult for users to locate and use this information. Due to a lack of knowledge, pricing processes become more complicated, and the cost of drafting contracts and assurances rises.

POTENTIAL CUSTOMERS AND DISTORTED PERCEPTION

Secondary materials are often thought to be of lower quality. There is a lack of understanding of secondary materials' general usability. Externalities (such as air and environmental pollution) in primary markets are not costed in as a result of the absence of knowledge, resulting in unwarranted price advantages for raw resources.

SOURCE: WUPPERTAL INSTITUT

LACK OF AWARENESS ABOUT CIRCULAR ECONOMY BENEFITS

Lack of awareness and knowledge on calculation of circular economy profits is one of the key challenge.

An increase in the availability of information could help to solve these issues.

Chapter-4

4. DIGITAL CIRCULARITY: A NEW ECONOMIC MODEL

The circular economy is the only viable long-term alternative to the classic linear 'take, make, dispose' approach. Its main goal is to divorce global economic growth from the consumption of scarce resources, and to find purpose and value in what is currently seen as "waste." In supply chains, circular business models lengthen product life, maximise asset utilisation, and create multiple value loops.

The enormous potential of circularity could be unlocked by digitalisation. **Information regarding resource usage across the whole product lifespan and value chain is critical to unlocking the huge benefits that the circular economy offers.**

The key to getting and utilizing this data is digitalisation. Digital solutions can give real-time information about an item's location, condition, and availability; improve material traceability; make items and services more accessible; and make operations more efficient. They can improve value retention in every design, manufacturing, and customer decision by doing so.

The circular economy and digitization, when combined, offer new ways of producing, consuming, and living. They provide humanity with an important opportunity when they work together.

SOURCE: CLIMATE KIC



Chapter5

5. CONDITIONS TO ENABLE DIGITAL PROGRESS

The four key drivers in the digital/circular space are Technology, Market Structure, Policy and Skills & Knowledge. These reveal tremendous opportunities, but also expose the systemic barriers which need to be addressed before we can fully benefit from the potential of innovative circular business models.

5.1. TECHNOLOGY

Digital solutions can revolutionise service and flexibility by allowing items and services to flow freely between producers and users at any time and in any location. A number of start-ups have adopted them as a basic component that provides two main benefits: they provide access to a far bigger client base, allowing for rapid expansion of an existing circular model; and they increase productivity, energy, and resource efficiency. The following main points about the technological aspects of digitalisation in the circular economy emerged from our interviews.

Application Of Software and Hardware Technologies

Several organisations sell their products/services through web-based platforms, or the platform is the product/service itself. They have opted on existing digital solutions in general. Some of them have taken the deliberate decision to employ existing solutions in order to focus time and resources on business development rather than technological development.

In some cases, however, it appears that start-ups are unaware of the capabilities of existing solutions, and as a result, they are missing out on opportunities to increase data collecting and scale up their current operations. There are additional facilitators and impediments to success, such as knowing how to use search engines and social frameworks to help create new markets and change people's minds.

Data is Essential

At the digital/circular interface, the ability to gather, evaluate, and use data supports a crucial part of value creation. The lack of data obstructs optimised flow and traceability. Partner companies from many nations and industries recognise the importance of data in realising the full potential of their digital solutions.

User habits (e.g., type and quantity of waste, type and quantity of food purchases) or product lifecycle data (e.g., origin, component lifecycle stage) are common data points. The

more knowledge a company has about this type of business, the easier it is to maximise the product's or service's use and lifespan, increasing the model's circularity.

Lack of Access to Data

Ownership and access have gotten more difficult as data has become a source of increased power. For circular economy start-ups, buying or collecting data can be time-consuming, resource-intensive, and costly, but a lack of supply can be a severe impediment to improved circular business models.

Lack of Data Standards

As collection and dissemination methods vary by institution, area, and country, data from public institutions (e.g. municipalities) is difficult to obtain and analyse.

The Challenge of Interoperability

Many digital solutions are created through closed innovation processes and are mostly used in isolated locations. This limits their circular application possibilities.

Start-ups emphasise the importance of being able to build partnerships with clients and partners, as well as integrating various web-based platforms quickly. It is a well known fact that is tough to synchronise with systems, which can impair partners' and suppliers' willingness to collaborate.

Innovation and Risk

The risks and expenses of integrating new software into an existing business IT system are increased when there is a lack of compatibility. Customers are apprehensive of becoming "trapped" with a product that will no longer be developed if innovative system builders go out of business, forcing them to invest in a whole new solution.

5.2. MARKETPLACE

Interest in circular products and services as well as a focus on resource efficiency and the sharing economy, is increasing at fast pace. Circularity necessitates the shift in traditional consumer behaviour, because the customer is involved in recirculating resources back into the market after they have been used.

Are People Ready to Buy Circular Products?

From product to service, from use and disposal to reuse, refurbishment, or recycling, the circular business model moves. Consumers may embrace the notion of the circular economy, but they may not be prepared to make the necessary changes to realise its full potential.

Innovation Overload

Several start-ups have stated that they have had to strike a balance between their own objectives and the realities of their consumers' adoption levels. This is the key for implementation and adoption of circular economy model, in markets.

Competing On Price, Quality and Convenience

Circular economy models can make a real impact, but such sustainable products and services must be competitive on price, quality and convenience. Circular economy model must also be scalable, so more consumers can easily adopt circular consumption and usage patterns.

5.3. POLICY

Every start-up and innovation project operates in a unique institutional, political, and regulatory environment, all of which have an impact on their potential to succeed. For example, a favourable political environment for circular models could improve capital flows and public awareness, whereas overly strict regulation could prevent businesses from experimenting with circular models.

Political Support Can Make or Break

Many start-ups and projects in countries and regions where the circular economy is on the political agenda have benefited from public and private funding opportunities.

New Regulation Is a Key Opportunity to Enhance Circularity

Ratification of a country's regulation that promotes circularity, such as circular economy policy, that encourage material looping, can play the key role.

5.4. SKILLS AND KNOWLEDGE

Digital/circular enterprises require the correct technology, market structures, and legislation, but they also require access to the right talents and resources.

The Right Combination of Knowledge and Skills

A lot of organisations have access to beneficial networks and skilled workers who can help them grow. Investors and funders can supply more than just money; they can also offer valuable advice and access to their own networks and partners.

Lack Of Financial Resources Limits Access to Key Employees

Highly qualified digital talent is in high demand, and hiring them might be expensive. Good legal minds who can assist innovative businesses in navigating restrictions are also costly. The problem isn't so much a shortage of qualified resources as it is a lack of easily available and economical ones.

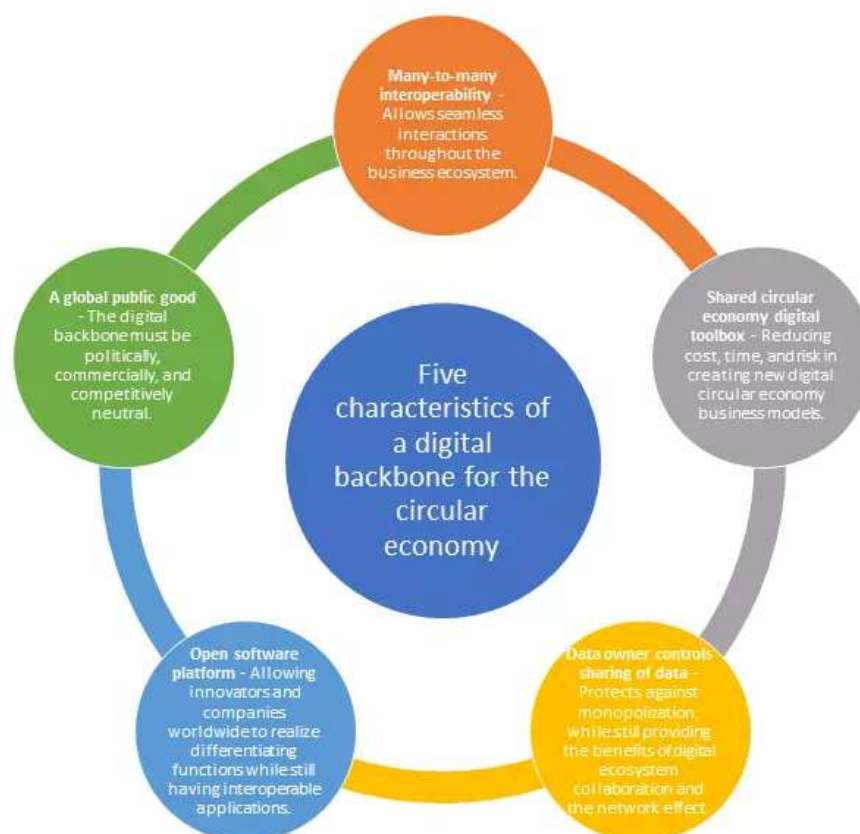
SOURCE: CLIMATE KIC

Chapter-6

6. DIGITISATION, THE BACKBONE OF CIRCULAR MODELS

Most circular economy initiatives are now small-scale undertakings that focus on physical materials and resources. However, in order to scale these solutions globally and across industries, we must establish consistent digital underpinnings – collectively known as a digital backbone – that will support appealing global circularity business models and speed the transition to circularity.

As per World Economic Forum - We will never be able to meet our climate targets in a timely manner without a coordinated and inclusive global digitization effort. Governments should create political, legislative, and economic frameworks that encourage the transition to successful circular economies.



In addition, a unified digital foundation must be established in order to meet the 2050 climate goals. This will have the same impact on the coming 30 years' trip to a circular economy as the internet did on society's digitization in the previous 30 years.

Without the internet as a basis, society's digitalization would have

proceeded much more slowly, with fewer appealing business ideas and a less impact on economic growth and poverty reduction. A circular economy will develop more slowly without a digital foundation, with fewer appealing circular business ideas and less impact on global climate goals, economic growth, and poverty alleviation.

SOURCE: WORLD ECONOMIC FORUM

Chapter-7

7. CASE STUDY

7.1. Metal Footprint

In 2018, *Sanshodhan: An E-Waste Exchange* designed a tech-based circularly economy model for the e-waste management sector.

Sanshodhan's innovative design used industry4.0 technologies to aggregate, recycle, and map metal resource recovery. This is named as METAL-PRINT™. METAL-PRINT™ showcase the metal consumption footprint and metal recovery footprint, of user corporate / conglomerate.

Innovation by Sanshodhan enable businesses to map their METAL-PRINT™ and achieve additional financial benefits. The design is useful for electronic and electrical (EEE) consumer companies and for the EEE producer companies, those mandated for extended producer responsibility (EPR) compliance.

This tech-based circular economy design is not restricted to e-waste, but applicable to plastic, automobile, and textile sectors too.

Currently, *Sanshodhan An E-Waste Exchange* is on the expert committee for circular economy at NITI Aayog, Government of India. Sanshodhan represented India at international forum such as the United Nations (UN-SPBF), served UNIDO, Europe & SAARC Countries and provides advisory services to the various business and governments.

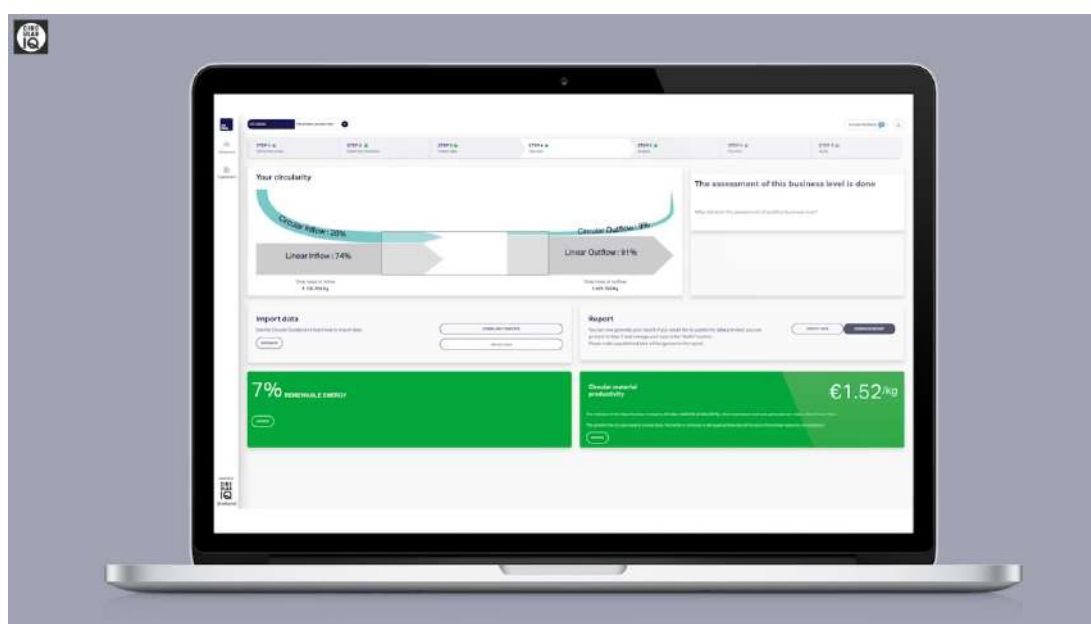
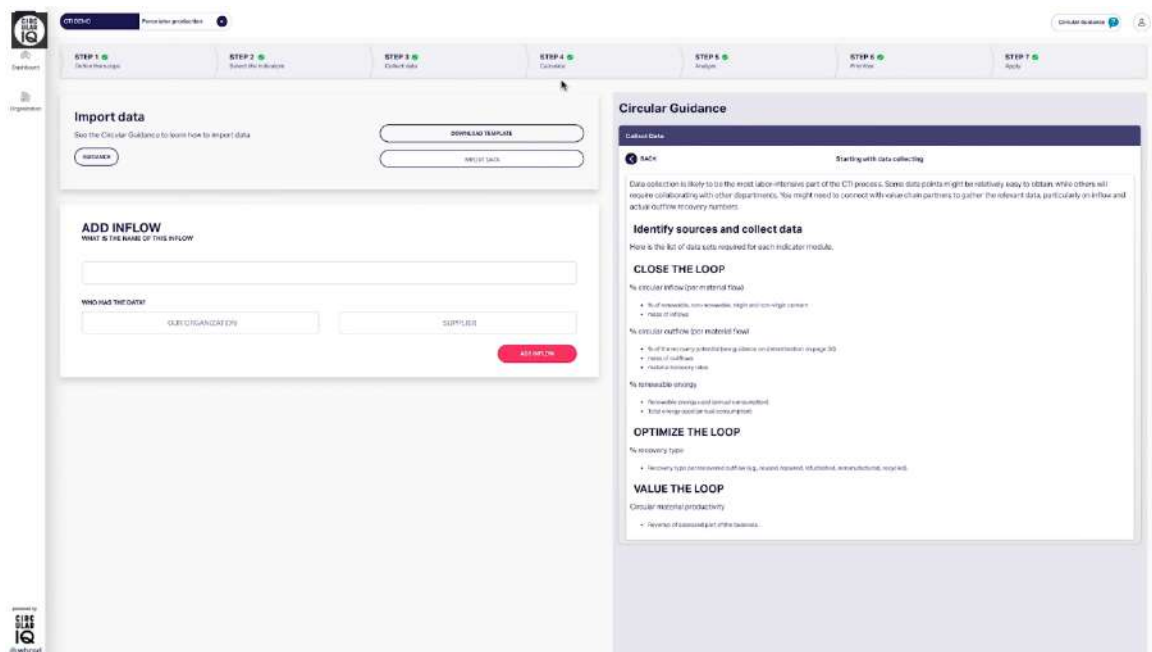
The company achieved global recognition as the winner of the Global SDG Challenge by Responsible Finance & Investment, United Kingdom and DDCAP Abu Dhabi. Their innovative circular economy model design - METAL-PRINT™, the digital circular economy model by Sanshodhan, was recognised as Highly Commended The Circularity 2019, by World Economic Forum, Davos in 2019.

7.2. Circular IQ Tool

Businesses can use ‘Circular IQ- Tool’ to assess the extent of circularity in their operations.

Businesses can identify the opportunities provided by circular business models using the metrics generated by the application. There has been a disconnect between industry standards and corporate needs, such as democratically engaging supplier chains.

With experience assisting businesses in improving their sustainability performance, the firm highlighted that, despite their best intentions, businesses often find it difficult to navigate, embrace, and accomplish the numerous sustainability standards and targets available.



Depletion of natural resources is a massive global issue. Only a small percentage of created garbage is recycled and raw material is recovered. According to estimates, waste creation is expected to rise by 70% by 2050. Businesses are directly impacted, with significant negative effects on profitability and resilience, as well as increased regulatory constraints on waste recovery, taxation, and restrictions. The product's /its components become garbage if no one knows what it's made of, or how to reuse or recycle it.

The CTI Tool from Circular IQ allows businesses to measure circularity, report on it, and identify improvement opportunities in a secure, transparent, and third-party-verifiable manner, assisting organisations in aligning circular goals with measurable metrics. The tool is the foundation of the solution, as it demonstrates the utilisation of secondary and/or renewable resources, recyclability, and practical reusability issues. Throughout the value chain, clear and actionable reports and dashboards assist organisations in making decisions and defining circularity targets.

ENVIRONMENTAL IMPACT

Businesses can use the CTI Tool to assess their value chains' environmental implications through a variety of lenses, including greenhouse gas emissions at the product or material level, waste tonnage, and water use. Industry leaders obtain complete transparency into their environmental impacts and set goals to improve circularity by comparing their results to the baselines.

SOCIAL IMPACT

Businesses can use the CTI Tool to examine the social consequences of their value chains, looking at things like forced labour, fair wages, and health and safety. All of the information obtained in the accounts can be validated by third parties and utilised to report on sustainability.

OTHER LONG TERM IMPACT

Platform provides various recommendations for businesses to operate efficiently. Use businesses are encouraged to transfer their procurement operations to ethical and accredited vendors, enhance the use of secondary resources, greening their supply chain and more.

SOURCE: CIRCULAR IQ

7.3. Asset Sharing Platform

FLOW2 is a framework for building online asset sharing marketplaces for businesses. This adaptable and scalable system helps businesses of all sizes to improve the efficiency of their assets, resources, services, people, and buildings.


FLOW2 was inspired by construction sites where excess materials were lying, unused. Competition, difficulties and a lack of information on demand and supply between enterprises, on the other hand, hampered any such interchange. By creating a "safe zone" for sharing within a closed circle, FLOW2 was able to overcome these challenges. From there, the service was expanded to include other industries such as business parks, retail chains, and healthcare districts, and it is still growing.


Our solutions and pricing

FREE SHARINGSCAN

- Earn or save by sharing assets
- Calculate in a few clicks what you can earn or save by asset sharing
- Insights in the possibilities and opportunities of asset sharing
- Your potential revenue and cost savings in one overview
- Your potential energy and CO₂ savings in one overview
- Insights in which assets, services and facilities could generate the best ROI
- Possibility to post your scanned assets to FLOW2 directly
- Custom made SharingScan possible (please contact us)

Start SharingScan





OWN SHARING MARKETPLACE

- Your own (internal) sharing marketplace, personalized and branded in your identity
- Unlimited organization accounts and users/employees
- Share within your own business, organization or network
- Publish unlimited amount of demand & supply online
- Demand & supply is only visible within your community
- Including access to app, analytics, SharingScan, planning, etc.
- Extra options: connection with your internal payment/administration system, communication and implementation support, QR-tool, web support, etc.
- No extra (transaction) fees
- Customized price, from €79 per month

(Unlimited amount of users)

Every company has devices, equipment, and materials that aren't always in use. While other firms and organisations continue to buy new products and materials, items remain for the most part of their life cycle. Overproduction, overconsumption, idle capacity, and spillage, all contribute to the depletion of natural resources, CO₂ emissions and the waste of materials.

Organizations can share, exchange, and sell underutilised assets using the FLOW2 marketplace platform. FLOW2 is a subscription-based internal service that may be tailored to the needs of specific businesses or communities looking to better manage their resources. FLOW2 allows businesses to gain a better understanding of their inventory and make more efficient use of resources, resulting in cost savings or even increased turnover.

Asset sharing is an important aspect of the transition to a circular economy. By addressing the issue of confidence in asset sharing, FLOOW2 encourages the formation of tiny circular sharing ecosystems and develops circular action among participating organisations.

As a result of these sharing models, fewer products are purchased, fewer materials are wasted, workers are more accurately allocated, and resources are used more efficiently overall. Collaboration can also help to spur innovation and the adoption of more circular economy practises.

ENVIRONMENTAL IMPACT

FLOOW2 lowers waste and enhances resource recycling and reuse by assisting businesses in finding uses for their byproducts or other unwanted resources. This corresponds to less virgin raw material usage, less primary energy consumption, and less fossil fuel-based raw material consumption.

SOCIAL IMPACT

FLOOW2 makes sustainable production more available to businesses, allowing for sustainable consumption to be accessed indirectly. Overall, sharing generates stronger, more resilient, and possibly even more equitable communities.

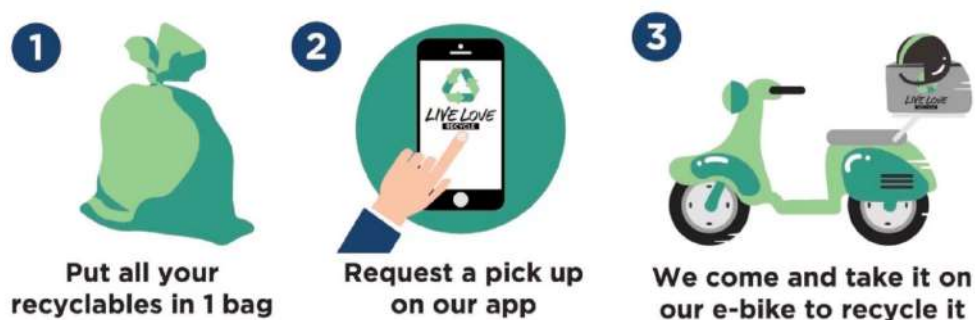
SOURCE: FLOOW2

7.4. Recycling Platform to Connect all Stakeholders of Recycling Process

LiveLoveRecycle simplifies and makes recycling more accessible to everyone. It connects consumers and businesses who have unwanted waste items with organisations that can recycle them. The software has become a staple of daily life in Beirut, with 20,000 users currently using it. In 2015, the garbage-recycling issue was recognised by LiveLoveRecycle. They developed the platform and it began its operations in 2018.

There is a lack of communication and contact between individuals who create garbage and others who want to repurpose the materials or goods. A lack of communication transparency is at the base of the problem.

LiveLoveRecycle is a crowdsourced recycling programme that makes recycling and communal garbage management easier, for example in areas where municipal rubbish pickup is not available. Users can also participate in garbage logistics using a crowdsourcing platform: anyone with a bike or automobile can deliver waste. As a result, LiveLoveRecycle lowers the costs of garbage logistics for organisations looking for reused products.



Our Impact



100 T

RECYCLABLES COLLECTED



4 111

HOUSEHOLDS IN BEIRUT



40 581

BAGS COLLECTED

ENVIRONMENTAL IMPACT

The platform helps to keep items in circulation for longer and limits the usage of virgin raw materials, reducing the negative consequences of resource extraction, such as biodiversity loss. Saving resources also reduces the negative environmental effects of garbage incineration and landfilling, such as pollution of the air, water, and soil.

SOCIAL IMPACT

As informed by LiveLoveRecycle, 436 people from disadvantaged communities now have work in waste collection due to Live Love Recycle. The application's assistance and recommendations raises awareness of sustainable behaviours, which leads to increased recycling activities. This has a good impact on community resilience as well as the health and well-being of local residents. It also encourages government officials to develop garbage recycling programmes.

SOURCE: LIVELOVERECYCLE

7.5. Food Sharing Application

OLIO is a digital platform that allows users to alert their neighbours about leftover food or ingredients, allowing communities to join together and avoid food waste. The scalable solution has a significant influence on the environment and social wellness, both on an individual and community level, by reducing food waste in households.

OLIO began when the founders were forced to throw food out despite their dislike of doing so. Food safety is a significant focal area for the solution, which is based on research, testing, and pilot initiatives.

About half of all food waste occurs at home in the developed countries. Residents may not know anyone to donate excess food to due to a lack of local community. With more mouths to feed every year, the stress on our food system will only increase, necessitating a shift to a more circular food economy.

Aside from peer-to-peer sharing, OLIO also allows trained volunteers (dubbed "Food Waste Heroes") to collect unsold food from local companies and distribute it for free to other OLIO users. Individual users will find OLIO to be a fun and easy method to reduce food waste and make a difference while also having a positive community experience. For enterprises, OLIO provides a cost-effective solution that allows them to achieve zero food waste in their facilities.

Although we've only just begun, OLIOers have already accomplished a lot. Together, we can end food waste!

4,996,742

OLIOers have joined the **Free Sharing App**

34,322,715

Portions of food have been shared 😊

100,784,397

Equivalent car miles saved

75,891

OLIO volunteer **Ambassadors** and **Food Waste Heroes!**

1,643

Radio, TV and **press pieces**

60

Countries OLIOers have successfully shared in

The users and advocates of OLIO promote the circular economy and consumer awareness. Consumer interests like as sharing, community resilience, and localism are reflected in the platform's ideals. OLIO's new alliances aid in the development of new hyperlocal circular food networks.

ENVIRONMENTAL IMPACT

As published by OLIO, so far 6.5 million portions of food have been shared worldwide via OLIO, which has reduced food waste sent to landfills. This is equivalent to taking over 30 million car kilometres off the road and saving over 1 billion litres of water in agricultural production. By optimising the use of resources in agriculture, the solution also contributes towards reducing the need for land occupied by agricultural activities.

SOCIAL IMPACT

As OLIO shared, they help eliminate hunger in local communities, and the solution's main social consequence is considerably enhanced consumer health and wellbeing. It also contributes to increased social cohesion, which improves community wellbeing. Because the food given through OLIO would otherwise be wasted, it is naturally sustainable, which implies it enhances access to sustainable consumption.

SOURCE: OLIO

7.6. B2B Matchmaking Platform to Reuse Materials

Excess Materials Exchange (EME) is a cross-sectoral matchmaking platform for materials and products that combines technology, human intelligence, and sophisticated tools to ensure traceability and transparency. In terms of environmental and socio-economic implications, the platform strives to locate the highest added-value pairings. EME started off as a resource passport. However, the founders realised after development that a passive marketplace would not be enough to locate high-value reuse choices. They began work on a "dating" platform for waste materials, which would leverage new digital technologies to connect excess material supply and demand with the highest-value reuse choices.

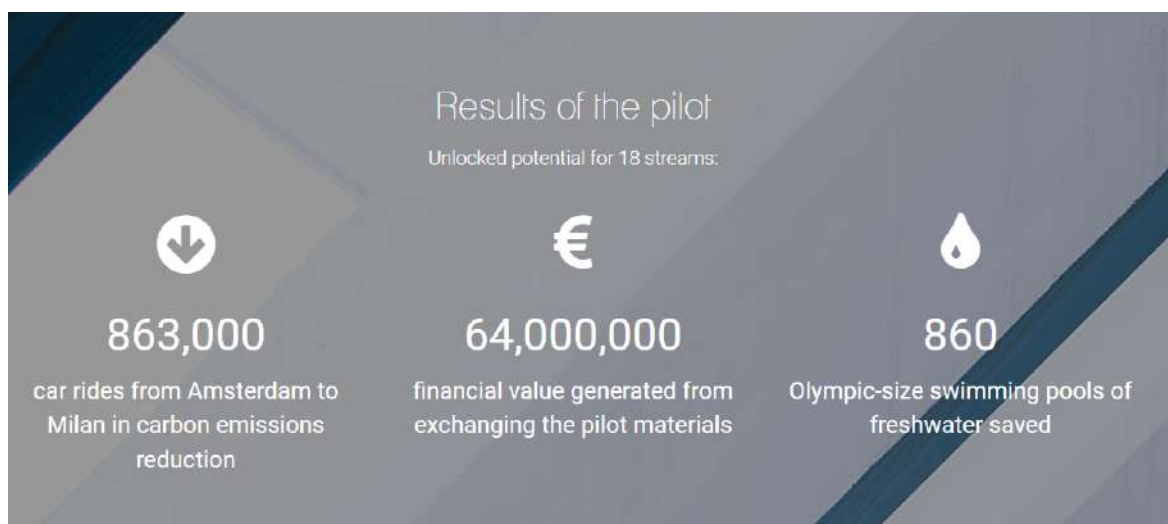
Lack of transparency, timeliness and availability of resources, quality and amount of resource flows, and inefficient internal resource cycles stymie the growth and scale of circular efforts. Organizations lack efficient cooperation capabilities that allow them to disperse excess resources and utilise waste flows from other organisations.

Artificial intelligence, Hyperledger blockchain, and smart contracts enable the matchmaking platform to help businesses across sectors locate high-value reuse options for resources and (waste) products. Resources passports aid in the matching process by restoring information on the materials' attributes like as composition, deconstruction, quality, and toxicity. Other benefits include the ability to track and trace material flows traded, as well as the assessment of the financial, environmental, and social implications of circular pairings. Companies that use the platform can lower or eliminate their material disposal costs while also increasing revenue from swapped materials, all while meeting their environmental goals.



ENVIRONMENTAL IMPACT

By boosting the use of secondary materials and reducing the number of materials sent to landfills or incineration, the platform minimises greenhouse gas emissions, energy use, and the use of virgin raw resources. In 2018, the company's large-scale trial, which included 17 products from eight global companies, estimated a 54 million euro decrease in environmental costs and a 64 million euro increase in financial value.



SOCIAL IMPACT

EME improves the health and well-being of local communities by reducing the amount of waste sent to landfills and incineration. Because EME promotes the growth of secondary material markets, it helps to strengthen economies, create jobs in maintenance, repair, and refurbishment, and improve working conditions in nations that extract primary materials. creation.

SOURCE: EXCESS MATERIALS EXCHANGE

7.7. Closed Loop Supply Chains Through Traceability

Through improved traceability, the **Circular platform** aids the growth of circularity in areas such as lithium-ion battery manufacturing. The technology can certify that recycled materials are used over virgin sources by allowing clients to follow raw materials along the value chain, all while assuring respect for human rights and tracking embedded carbon across the supply chain. Circular also assists firms in capturing and communicating information about their battery production's carbon footprint. Technologies like blockchain, machine learning, and the Internet of Things could be used to tackle known supply chain difficulties.

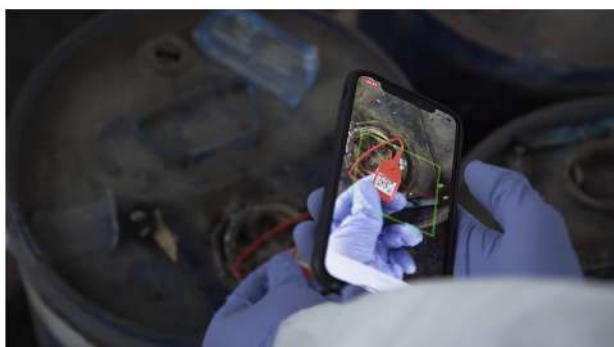
The transition to electric mobility is expected to be powered by lithium-ion batteries. Transparency in the supply chain and proper recycling of battery materials are critical to the energy transition's success. The social and environmental risks connected with obtaining the raw materials needed for lithium-ion batteries are becoming increasingly apparent to automakers and customers. As published by the **Circular**, it's created to be the technology backbone that addresses these risks by improving sustainability and ethical sourcing.

Traceability

Without knowing the provenance of goods or materials, it is difficult to ensure social and environmental standards are effectively applied across complex and global supply chains.

Our traceability products track the origin of raw materials and the actual flow of materials through the production processes and transformations they undergo within manufacturing and recycling supply chains. This granular, real-time data enables tracking of the scope 1, 2 and 3 emissions and associated ESG data, in order to demonstrate responsible sourcing, sustainability, and circularity.

We do this by creating a digital twin at source and tracking the digital identity of the materials journey as it changes state, to provide full visibility across traditionally opaque supply chains.



ENVIRONMENTAL IMPACT

Participants in the electric vehicle value chain can lower their carbon footprint dramatically with the Circular platform. An electric vehicle's manufacture and sourcing account for more than 70% of its carbon footprint, with the battery accounting for 50% of that. Circular indirectly reduces greenhouse gas emissions of a carbon intensive value chain by providing a platform to assess, measure, and ensure responsible procurement of lithium-ion batteries.

SOCIAL IMPACT

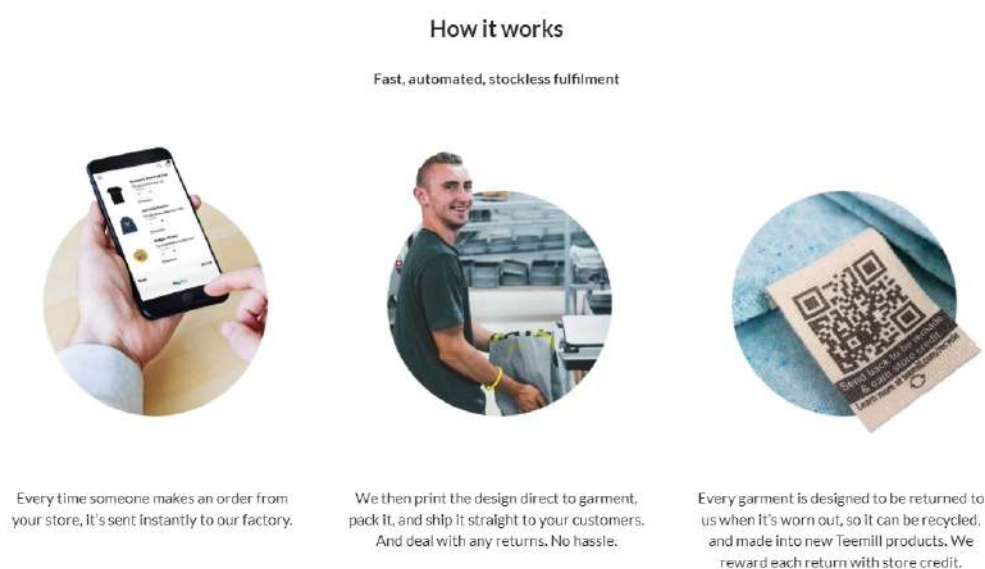
Circular assists its customers in establishing a completely accountable value chain in which producers may keep track of their sourcing decisions. The Circular platform encourages value chain players to quit sourcing hazardous waste streams from areas that use inhumane labour conditions or child labour.

SOURCE: CIRCULAR

7.8. Platform to Start a Circular T-Shirt Business

Teemill's online platform allows charities and other organisations to customise their own webstore for circularly designed clothes. Teemill's plant in the United Kingdom prints and delivers them on demand. This helps to prevent the wasteful creation of "one-use" apparel made under terrible working conditions with cotton sourced in an unsustainable manner.

The integration of a rapid and flexible manufacturing strategy with an integrated online shop design and execution system has been the major breakthrough. The creators recognised that their platform had to provide a superior user experience in order to assist disrupt the current unsustainable t-shirt manufacturing process, thus they prioritised a free access platform with training resources.



Teemill's open platform enables a wide range of organisations to sell t-shirts and earn cash in a circular manner. Teemill is an outspoken supporter of circular business models, which they hope to spread to their enormous client base.

The solution gives entrepreneurs and small enterprises a place to thrive while also being a part of a circular model and network.

ENVIRONMENTAL IMPACT

Lower emissions, fewer plastic pollution, and water savings are among the environmental benefits. Teemill eliminates the need for mass-produced, single-use t-shirts derived from unsustainable cotton harvesting.

The organisation lowers plastic waste by eliminating plastic from its products and packaging. Renewable energy is used to power their operations, and manufacturing robots aid in energy efficiency. The clothes are made of organic cotton that is intended to be returned by

the consumer once it has been worn out, and new clothing is then constructed from the used material.

SOCIAL IMPACT

Teemill is a platform that helps people in underdeveloped countries find work. Teemill's platform has been used by entrepreneurs in underdeveloped nations to start garment enterprises online and sell their designs in rich countries, generating foreign currency to assist their local economies.

The corporation has made it a priority to make manufacturing technologies accessible to everybody who does not speak English.

SOURCE: TEEMILL

7.9. Waste Tracking Software

Rubicon's software-as-a-service and data analysis for garbage, recycling, and smart city solutions provide global tracking of material flows. These services are critical for responsible and long-term waste management, since they enable businesses and communities to completely comprehend and track the composition, flows, magnitude, affects, and costs of their garbage. Rubicon was formed with the goal of eliminating waste in all forms. Rubicon's platform allows businesses and haulers to connect, plan, and track waste pickups, as well as analyse the data collected. Companies can see how much waste is generated, where it is generated, and how it is currently managed.

The service is used by large Fortune 500 firms to identify waste reduction and recycling opportunities as well as to comply with requirements. The platform tracks critical indicators like landfill diversion and averted carbon emissions, as well as supporting sustainability reporting. Rubicon helps users better understand their waste flows and can help them create waste management processes. As a result, it strengthens these organisations ability to take additional circular actions, such as identifying reuse opportunities for newly discovered waste streams.

The screenshot displays the 'Services' section of the Rubicon software interface. At the top, it shows the service location: '915 Mills Dr., IRWIN, PA 15642'. Below this, three service cards are listed, each with a 'Request Service' button.

Service Type	No. of Containers	Container Size	Waste Type	Service Frequency	Days Since Last Haul	Additional Info
Open Top	1	30 Yard	Trash	On-Call	95	Request Service
Open Top	1	30 Yard	Trash	On-Call	-	Request Service
Self Contained Compactor	1	30 Yard	Trash	On-Call	7	Request Service (Dropdown menu open)

The dropdown menu for the 'Self Contained Compactor' service is open, showing the following options: On-Call Pickup, Missed Pickup, Change Service, Container Wash, Container Relocation, Service Issue, and Billing Dispute/Issue.

ENVIRONMENTAL IMPACT

Rubicon's goal is to improve the percentage of waste that is diverted from landfills. Their solutions have a favourable influence on waste creation and the usage of virgin raw materials, resulting in lower greenhouse gas emissions and pollution from material production, as well as waste landfilling or incineration. Organic waste diverted from landfills can reduce methane emissions and pollutants in the air, water, and soil.

SOCIAL IMPACT

Rubicon's innovations improve access to sustainable production in a variety of industries. Contributing to increased recycling may reduce waste dumping and incineration, as well as the dangers connected with them, such as pollution, which has an influence on local communities' health and well-being. Rubicon is a B-Corp accredited company that has a positive social impact by creating great jobs. The company pays for employee health insurance and ensures that employees are treated fairly.

SOURCE: RUBICON

7.10. Technology Meets Informal Waste Collection

In Chennai, kabadiwalla means "waste aggregator-entrepreneur. KabadiWala Connect own a business in Chennai, where they buy scrap metal from street pickers, the first link in the recycling value chain. The kabadiwallas are important participants in this chain; they provide KWC with added value. To date, almost 2,000 kabadiwallas have joined KWC in Chennai. KWC is also assisting them in improving the quality of the sorted material and collaborating to expand the amount of waste purchased through a network.

KWC's solutions offered, include:

- Mapping: Spatially enabled, industry compliant data-collection on informal waste infrastructure in cities in the developing world.
- Digitisation: KYC and transaction-based material tracking and traceability across stakeholders in the informal supply-chain.
- Collection: Hyperlocal reverse-logistics solutions for post-consumer waste management — powered by local informal scrap-shops.



SOURCE: KABADIWALLA CONNECT

7.11. Digitally Trace Raw Material to Its Source

Circularise enables stakeholders from all stages of the supply chain to track raw materials from their origins to their final products. Circularise is able to build a digital thread through the entire supply chain by digitising materials on blockchain, enabling material traceability, measuring the CO2 footprint, and other sustainability indicators such as water savings.

Every year, Europe produces about 58 million tonnes of plastic, of which 25 million tonnes is plastic waste, and there is an urgent need for a circular economy, which can only be achieved by ensuring trust and cooperation between businesses, governments, non-governmental organisations, and consumers. Circularise has a means for all partners in the value chain to become transparent while never disclosing sensitive information.

Circularise employs "Smart Questioning," a patented method that enables stakeholders to pose essential questions (e.g., "Does this plastic part contain hazardous elements?") to a secure dataset (e.g., the bill of materials), assuring transparency while simultaneously safeguarding sensitive information.

The screenshot displays the Circularise website interface. At the top, there is a navigation bar with the Circularise logo and links for 'Solutions', 'Resources', and 'Company'. A 'Contact us' button is visible in the top right. Below the navigation bar, a dark banner promotes a guide titled 'Avoid Greenwashing: How to Make Reliable Sustainability Claims' with a 'Let's go' button. The main content area features the heading 'Trace your materials from source to product' and a sub-headline: 'Circularise facilitates a shift to a circular economy by digitising and tracing materials across complex supply chains on a public blockchain without risking confidentiality.' A 'Contact us' button is located below this text. To the right, there are two data visualizations: a 'Material Composition' chart showing a circular distribution of materials (10%, 33%, 57%) and a 'Supply History & Wastage' flowchart showing the flow of materials from 'Polymer DP' through various stages to 'Product ABC'. The footer lists 'SOME OF OUR TRUSTED PARTNERS' with logos for Covestro, Porsche, Domo, Arçelik, Mitsubishi, and Borealis. A small note at the bottom of the dashboard area states: '*All data in the visuals is encoded for the website.'

SOURCE: CIRCULARISE

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