

The role of Innovative Startups in boosting the circular economy

دور الشركات الناشئة المبتكرة في تعزيز الاقتصاد الدائري

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Abstract:

This research paper aims to highlight the role of startups in the food waste management field to promote the circular economy, we rely on the descriptive and analytical approach and address the literature on the circular economy, startups, and waste management.

The study concluded that food waste management contributes to reducing the waste of natural resources, enhancing the role of the circular economy in its various concepts, and preserving the environment, which is what Winnow has proven in this field.

Keywords: startups, circular economy, food waste management, Winnow Company.

JEL Classification Codes : D18, D21, L23, L26, M11, Q55 ; Q57.

ملخص:

تهدف هذه الورقة البحثية إلى إبراز دور الشركات الناشئة في مجال إدارة النفايات في تعزيز الاقتصاد الدائري معتمدين على المنهج الوصفي التحليلي والتطرق إلى ادبيات الاقتصاد الدائري، الشركات الناشئة وإدارة النفايات.

توصلت الدراسة إلى أن إدارة النفايات تساهم في تخفيض هدر الموارد الطبيعية وتعزيز دور الاقتصاد الدائري بمفاهيمه المختلفة والمحافظة على البيئة وهو ما أثبتته شركة **Winnow** في هذا المجال.

الكلمات المفتاحية: الشركات الناشئة، الاقتصاد الدائري، إدارة النفايات، شركة ويناو **Winnow**

تصنيفات JEL.: D18, D21, L23, L26, M11, Q55; Q57.

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1- Introduction:

Waste food management is an important aspect of modern sustainability measures. It comprises the systematic and responsible management of food waste at all stages of the supply chain, such as manufacturing, distribution, consumption, and disposal. Reducing food waste is crucial for mitigating the environmental impact of decomposing organic matter in landfills while also addressing global poverty and resource scarcity. Food donation programs are one of the most successful waste food management strategies. Furthermore, consumer awareness and education are crucial in reducing food waste by encouraging cautious purchases, meal planning, and limiting wasteful food disposal. Thus, the circular economy is an industrial model that is restorative or regenerative by design and intent, with items, components, and materials always valued at their highest level. It is a waste-reduction approach that evaluates all options across the whole supply chain to use as few resources as possible from the start. (The U.S. Chamber of Commerce Foundation 2015).

The Circularity Gap Report 2023 demonstrates how circular solutions may cut material extraction and usage by one-third, but to put theory into practice, we need real-world examples of how these solutions can be tailored to local circumstances. (circle-economy. 2023).

Startups, on the other hand, are critical to the current global economy because they drive innovation, economic growth, and job creation. They foster new ideas, innovative technology, and entrepreneurial spirit. Startups frequently challenge existing sectors, increasing competition and promoting market dynamism. Furthermore, they play an important role in solving major social concerns such as sustainability and healthcare through the introduction of fresh ideas and techniques. Startups also play an important role in attracting investment, accelerating economic growth, and increasing regional and national prosperity. Furthermore, startups help to diversify economies, reduce reliance on conventional industries, and boost resilience in the face of economic uncertainty. In essence, the significance of startups goes beyond innovation; it includes transforming economies, improving lives, and determining the destiny of industries and society.

So, how can the circular economy benefit from waste management startups in the transformation technology era?

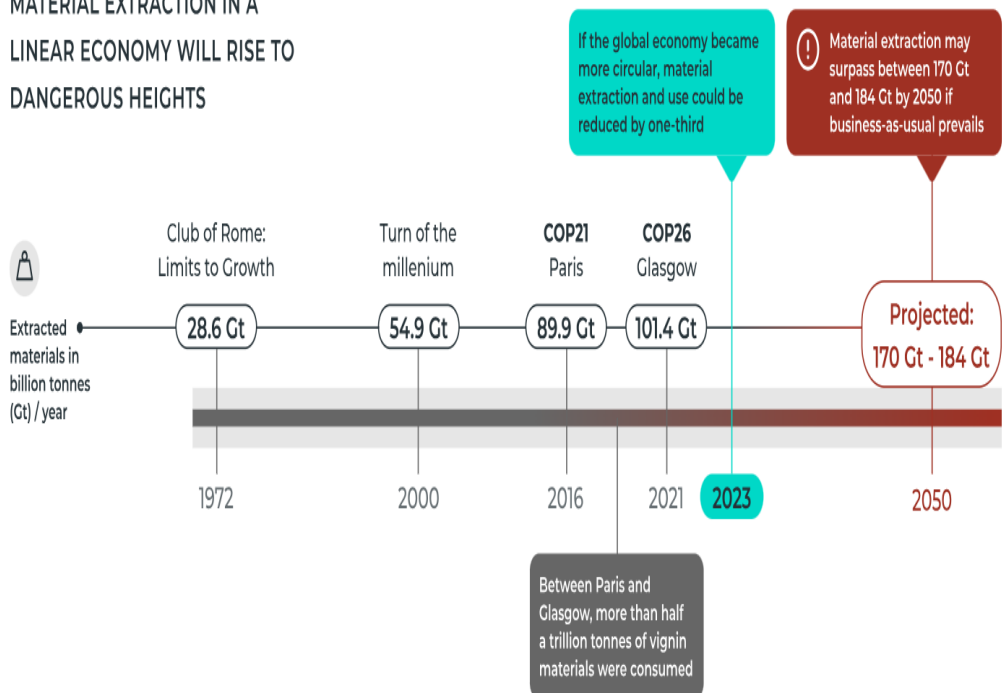
2-Why do we need circularity in the economy?

The worldwide scenario worsens year after year due to increased material mining and consumption. Rising material extraction has reduced global circularity, dropping from 9.1% in 2018 to 8.6% in 2020 and currently 7.2% in 2023. This creates a massive circularity gap: the world relies nearly entirely on fresh materials. This means that more than 90% of materials are either wasted, lost, or unavailable for reuse for years since they are embedded in long-lasting stock such as buildings. (CGRI 2023).

However, with material circularity, we can meet people's needs and wants with just 70% of the resources we presently consume while remaining within the planet's safe bounds. (World Economic Forum 2023).

Figure 01: Material extraction in a linear economy will rise to dangerous heights

MATERIAL EXTRACTION IN A LINEAR ECONOMY WILL RISE TO DANGEROUS HEIGHTS



Source: EPA 2023

2-1 The definition of circular economy

The circular economy is "a production and consumption model that focuses on sharing, leasing, reusing, repairing, refurbishing, and recycling existing resources and things to the greatest extent possible. This extends the product's lifetime". (Johnson 2023)

In reality, this means limiting waste to a minimum. When a product approaches the end of its life, recycling ensures that its materials remain in the economy as much as possible. These may be utilized effectively repeatedly, generating more value. (News European Parliament 2023)

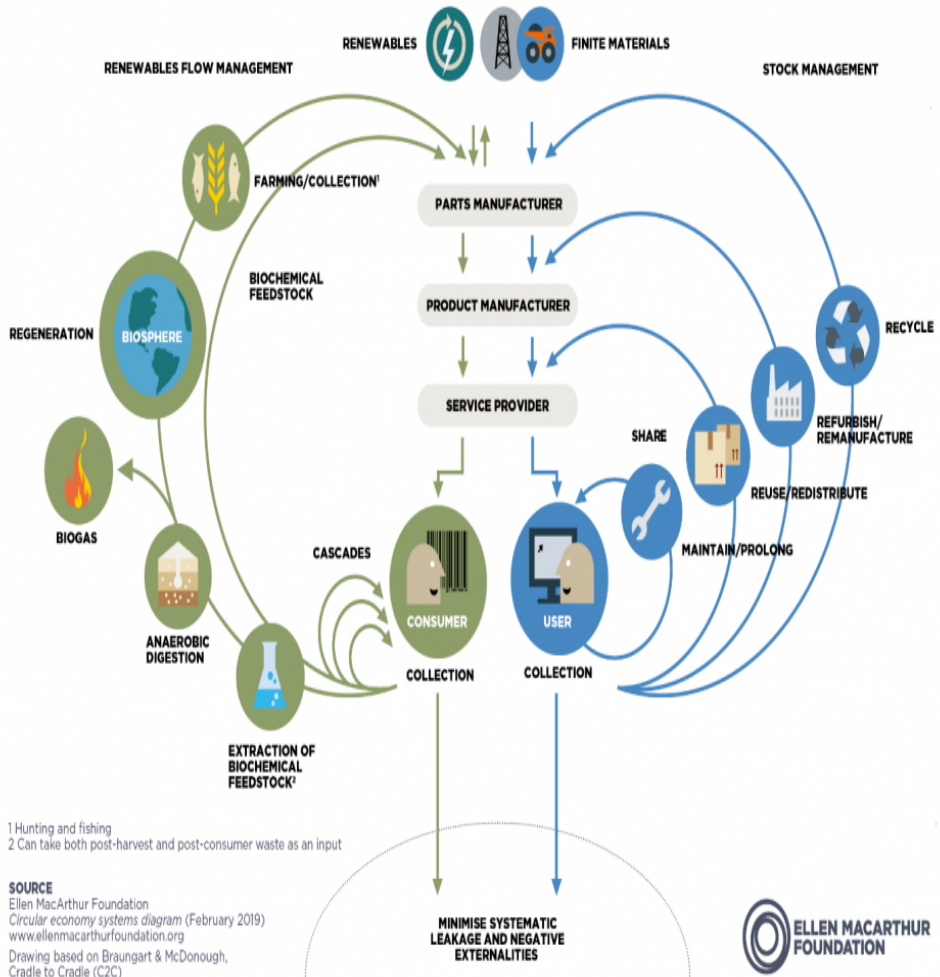
It is a shift from the traditional approach of mining resources, converting them into goods, and discarding the trash. A circular economy minimizes material consumption, redesigns materials, goods, and services to be less resource-intensive, and repurposes "waste" as a resource to create new materials and products. (EPA 2023)

An economic paradigm in which consumption is focused on services such as sharing, renting, and recycling rather than owning. Materials are not discarded at the end of their life but rather reused to create new goods. (sitra 2023). A circular economy is also "a precondition for meeting the EU's 2050 climate neutrality aim and preventing biodiversity loss". (The European Commission 2023).

The circular economy is " a production and consumption paradigm in which resources are reintroduced into the market or used to replenish natural ecosystems rather than being discarded". Its key principles are: (Concina 2023).

- Enhancing product design to reduce or eliminate waste.
- Maximizing product and resource lifecycles.
- We are regenerating natural systems.

Figure 02: The circular economy



Source: (Concina 2023).

In theory, a CE promotes the use of Earth's resources in a way and at a rate that prevents their depletion, as well as human actions that promote the restoration of those resources to their natural condition. (Barros, et al. 2023).

Recycling is an important aspect of the US economy, generating employment, income, and government tax money. (Recycling Economic Information 2020).

3. WHAT IS A STARTUP?

The term startup refers to " a company in its early stages of operation. Startups are founded by one or more entrepreneurs who want to produce a product or service they believe will be in demand. These businesses often begin with large expenses and limited income, so they seek funding from various sources, including venture capitalists and angel investors". (GRANT, 2022).

3-1 Start-ups Features

- ☞ A startup is a firm that is in the early phases of operations.
- ☞ Founders typically fund their firms and seek external financing before they launch.
- ☞ Funding options include family and friends, venture capitalists, crowdsourcing, angel investors, seed funders, and loans.
- ☞ Startups must examine their business location and legal structure.
- ☞ Startups have a high risk of failure, but they also offer distinct advantages, a focus on innovation, and learning opportunities.

Small and medium-sized enterprises (SMEs) and startups are at different stages of adoption than consumers. Companies are actively pursuing digital solutions to improve efficiency and reduce costs throughout their operations. **3-2 Advantages and Disadvantages of Startups**

There are several advantages to working for a startup. There are two benefits: more responsibility and learning chances. Because startups have fewer workers than large, established organizations, employees are more likely to wear many hats and work in a range of jobs, resulting in increased responsibility and opportunity to learn.

Table 1. pros and cons of Startups

Pros	Cons
☞ More opportunities to learn. ☞ Increased responsibility. ☞ Flexibility. ☞ Workplace benefits. ☞ Innovation is encouraged. ☞ Flexible hours.	☞ Risk of failure. ☞ Having to raise capital. ☞ High stress. ☞ Competitive business environment.

Source: (GRANT, 2022)

3-3 What is a tech startup?

A startup incorporates technological solutions into processes or services to improve speed, safety, and convenience. (MacDonald Ventures, 2021).

3-4 How can I start a startup?

There are six foundational steps to creating a fintech startup:

1. **Know the regulations** – Develop a fundamental awareness of the industry's laws and regulations. You should also be conversant with the main regulatory organizations. Understand how each of these laws and regulatory agencies will affect your firm.
2. **Identify your niche** – Identify a specialty based on your target demographic, market launch area and experience. Popular fintech niches include mobile banking, loans/advances, investment management, and insurance technology.
3. **Get familiar with the competition** – Know who your competitors are and what precise solutions are already available so you can fill a specific, unmet market need.
4. **Build a team** – Find a trusted team of professionals with experience in finance or technology who can help you start your business from scratch.
5. **Find funding** – There is some additional work that needs to be done before you can get funding, such as market research and prototype development, but once that is done, you'll need to identify the right

investors, present a compelling pitch deck, and persuade them that your startup is worth their capital, time, and effort.

6. **Build, improve, and launch** – With money to support your expanding firm, you may begin developing and enhancing your fintech product. When dealing with technology, you should plan for a continuous process of improvement as new technologies and trends emerge.

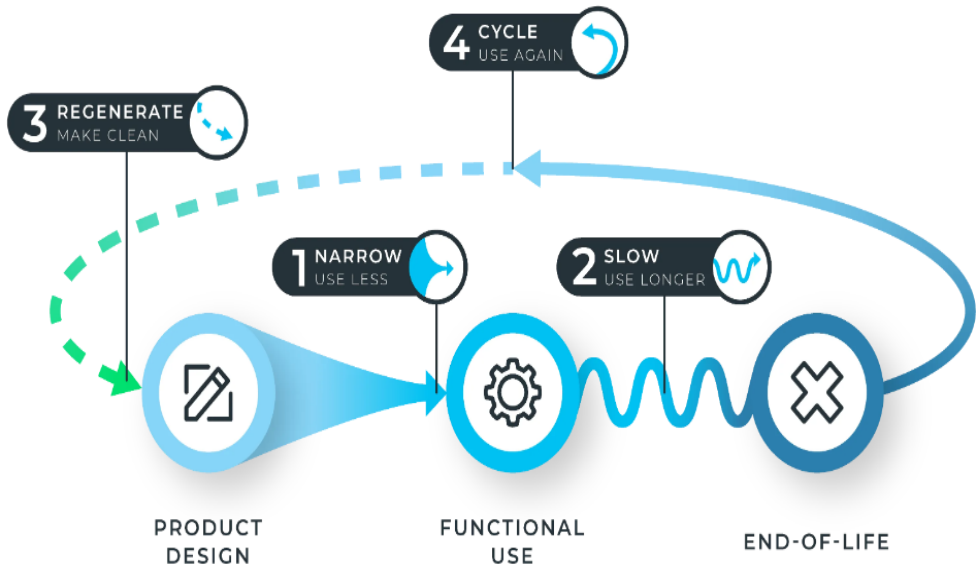
4 – Solid Waste management

4-1 Definition: Solid waste management is " the process of collecting, treating, and disposing of solid items that have served their purpose or are no longer useful. Improper municipal solid waste disposal can lead to unclean conditions, contaminating the environment and causing outbreaks of vector-borne disease—i.e., diseases spread by rodents and insects. Solid waste management tasks encounter significant technical challenges. They also provide a diverse set of administrative, economic, and social concerns that must be addressed and handled". (Nathanson 2023). A significant development in solid-waste treatment and disposal practices was marked by the construction of the first refuse incinerator in England in 1874. By the beginning of the 20th century, (Barros, et al. 2023). Waste management planning exercises may be of most use to a community with limited resources and time to spend on planning. Small but important efforts performed before an event can have a large influence on the efficiency and efficacy of post-incident waste management decision-making. (United States Environmental Protection Agency 2023).

4-2 Generation municipal refuse:

The rates of solid waste generation vary significantly. In the United States, for example, municipal garbage is generated at a rate of around 2 kg (4.5 pounds) per person every day. Japan generates roughly half of this amount, but the rate in Canada is 2.7 kg (nearly 6 pounds) per person daily. In some poorer countries, the average rate is less than 0.5 kg (1 pound) per person per day. These data include rubbish from commercial, institutional, industrial, and household sources. (Barros, et al. 2023).

Figure 03: The graphic below depicts the four flows to achieve circular objectives.

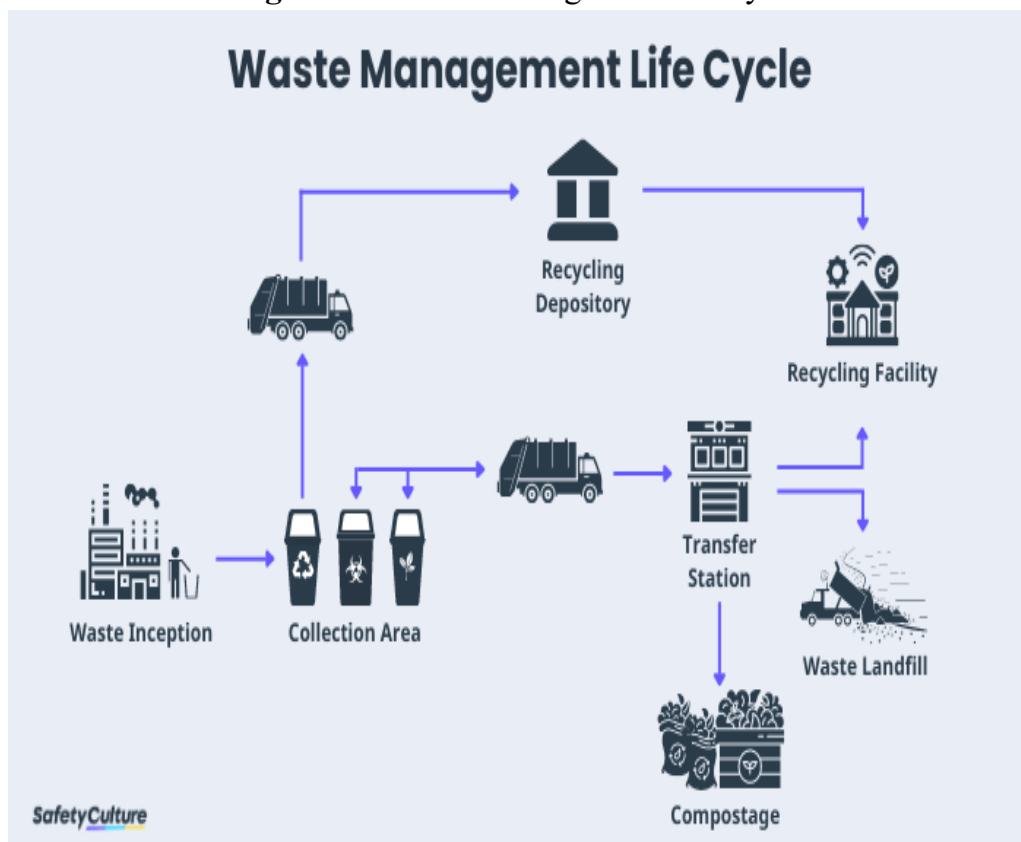


Source: ((united states environmental protection agency (EPA) 2023).

To put human activity back within the planet's acceptable bounds, we estimate that we would need to cut global material extraction and consumption by one-third. This may appear to be a daunting endeavor, but we can do it by integrating circular solutions into four critical global systems.

4-3 What is a Waste Management System?

A waste management system, often known as "garbage disposal", is a simplified method used by companies to remove, reduce, reuse, and avoid waste. It is also a technique in which businesses execute comprehensive plans to efficiently manage trash from its source to its final disposal. Possible waste disposal options are recycling, composting, incineration, landfills, bioremediation, waste to energy, and waste reduction". (Francisco 2023)

Figure 04: Waste management life cycle

Source: (Francisco 2023).

4-4 Waste Disposal Methods

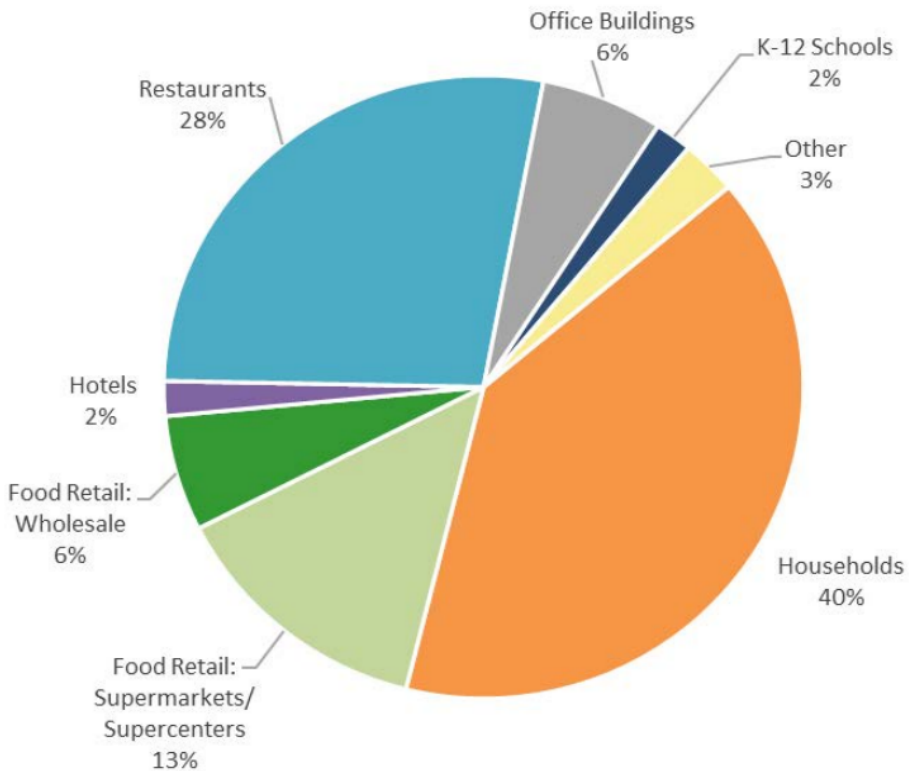
There are several waste management techniques and technologies available. These strategies can be combined or adjusted to build a waste management system that is specific to an organization's requirements. Modern waste management systems promote sustainability. Other waste disposal strategies include reducing, reusing, and recycling rubbish. (Francisco 2023).

According to the EPA, there are six steps in conducting food waste audits.

1. **Develop** audit goals and **define** targeted wastes (for donation, for animal feed, for composting, for recycling).
2. **Complete** a pre-audit questionnaire concerning access to food banks and off-site composters.

3. **Plan** the audit process by determining the waste sorting method, selecting a venue and a date, and obtaining waste sample bins.
4. **Identify** and **accomplish** audit logistics by coordinating with the staff and giving them the necessary supplies for conducting the audit, such as a digital checklist.
5. **Collection** and **sorting** of waste.
6. **Evaluate** audit results.

Figure05: Waste food amounts in the USA



Source: ((united states environmental protection agency (EPA) 2023).

In 2019, according to EPA united states environmental protection agency estimates:

- Food waste totaled 66.2 million tons in the retail, food service, and residential sectors. 40% came from homes, 40% from food service providers, and 20% from food shops. The majority of this garbage (59.8%) was landfilled. Anaerobic digestion, composting, controlled combustion,

land application, landfilling, or sewage treatment were used to handle 349 pounds of food waste per person. The United States aims to reduce food waste controlled via these paths to 164 pounds per person by 2030.

- The food production and processing industry produced an additional 40.1 million tons of waste food. Anaerobic digestion processed the majority of this trash (42.6%).

5- Winnow startup as a Case study:

Most people are unaware of how much food they waste daily, ranging from uneaten leftovers to rotten produce to fruit and vegetable portions that might be eaten or reused.

One-third of the food in the United States remains uneaten. According to the EPA, around 96% of domestic food waste ended up in landfills, combustion facilities, or the sewage system in 2019. The remainder was composted. But Winnow is the number one food waste solution worldwide. Winnow is used daily by thousands of cooks in over 67 countries. (Winnowsolutions 2023) For the sixth consecutive year, the Circulars Awards honored leaders and supporters of the circular economy, ranging from huge corporations to governments, investors, and inventors. Given their efforts to promote the Circular Economy package throughout Europe, the European Commission was predictably awarded the medal for public sector leadership. Triciclos, which operates South America's largest network of recycling stations, won the People's Choice award, while Winnow, which develops technology to help chefs achieve greater visibility in their kitchens and make better decisions, resulting in dramatically reduced food waste and costs, won the tech disruptor category. (World Economic Forum 2019)

5-1 How to work with Winnow

➤ **Track:** Tablet-only solution. Using food waste software, you may identify important waste reduction possibilities while still meeting regulatory standards. Use in conjunction with other products to achieve comprehensive visibility throughout the company.

➤ **Measure:** Tablet and attached weighing system. Food waste may be easily measured using a linked scale and common menu templates. Daily and weekly reports, as well as access to the Winnow Hub, help identify cost-saving options. Designed for tiny kitchens that require simple tracking and basic analytics.

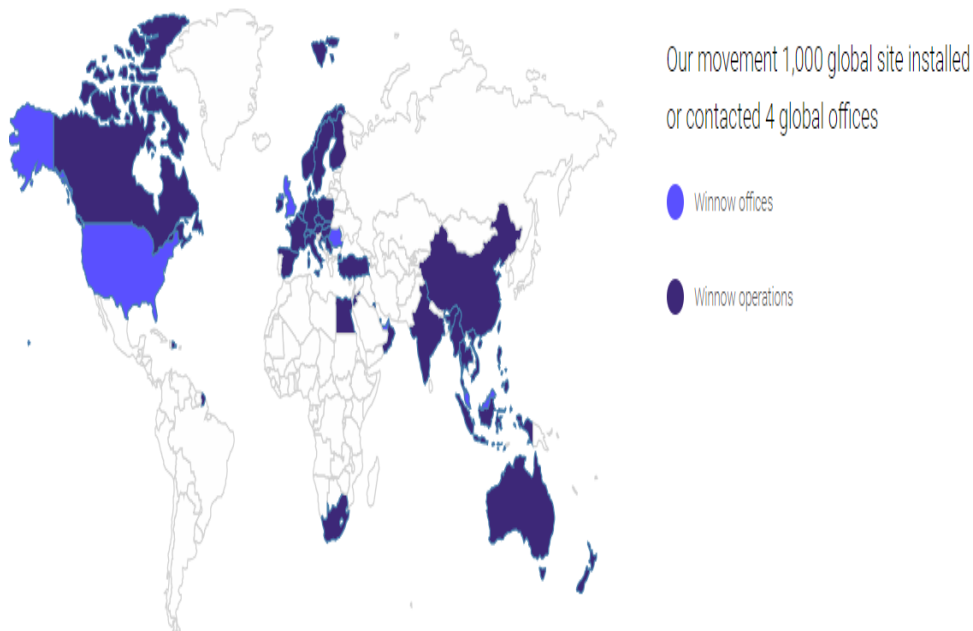
Control: The system has a built-in camera and a linked scale. Use photographs to encourage behavioral change and cost savings. Full access to Winnow's reporting suite, which includes monthly, quarterly, and multi-site reports, allowing you to drive large-scale change.. (**Sanu 2023**)

Compass Group Benelux and Winnow have been working together to achieve a shared goal of halving food waste across all sites by 2030. An initial deployment of Winnow to 50 facilities reduced waste levels by 30%, saving 270,000 meals each year. This Stop Food Waste Day, we're sharing three tales from amazing cooks across Compass Group Benelux. They are utilizing Winnow to create a more sustainable future for everybody.

5-2- Foyer Assurances in Luxembourg

- The Compass Group team at Foyer Assurances reduced food waste by 70% in just four months of adopting the system, resulting in 13,000 meals saved each year. The team worked together to significantly reduce plate waste and overproduction. Here are some pointers from Olivier Chivard, the chief chef.
- The Compass Group team at Foyer Assurances decreased food waste by 70% in just four months of implementing the system, saving 13,000 meals per year. The team collaborated to greatly decrease plate waste and overproduction. Here are some tips from Chef Olivier Chivard.
- Manage stock and inventory: Identify available items on Wednesday to avoid waste on Friday.
 - Avoid refilling the buffet after lunch.

Figure: the geographic proliferation of winnow startup.



Source: (Sanu 2023).

5-3- Rabobank Utrecht in Netherlands

Rabobank began collaborating with Winnow in 2019. The relationship between Compass Group, Rabobank, and Winnow has played an important role in their success, with all parties devoted to the cause. Meet Henry Westbroek, the Head Chef at Rabobank Utrecht. He and his crew are saving 5 tons of CO₂e, the equivalent of almost 20,000 kilometers traveled by a car. To avoid waste from overproduction, they prepare extra "live" food after 1 p.m. for late customers. They also utilize TooGoodToGo to distribute unsold food.

5- 4 Procter & Gamble Belgium

The next kitchen is Procter & Gamble. Their Head Chef, Pierre Sterckx, and his crew have effectively reduced food waste by 75% by avoiding overproduction and implementing more live stations. Using Winnow's reports, they discovered that they were squandering sandwiches during

lunch. Instead, they switched to a live sandwich station, which resulted in fresher food for consumers and reduced food waste.

They are honored to participate in this year's Stop Food Waste Day and share tales from outstanding cooks. They feel that chefs play an important role in the battle against food waste, not just in their kitchens, but also in the lives of customers, whose behavior and food culture are influenced by them.

1- Compass has been working with Winnow for nine years to reduce food waste with AI technology. Compass Group was one of Winnow's first clients, and our technology has since been implemented into important Compass operations, including staff eateries, universities, military institutions, and hospitals.

2- Concina How SAP Germany is minimizing food waste in worker canteens.

In just three months, the SAP team saved 4.4 tons of food, equivalent to 10,000 dinners.

"Seeing the savings that we accomplished was a wonderful experience. The entire crew was ecstatic to see how much we were able to save.

(winnow 2023).

SAP is a global leader in software services and the world's third-largest independent software maker. They hired Compass Group Deutschland for catering services at their headquarters in Germany.

5- DISCUSION AND CONCLUSION

Food Waste Audit Checklists: One of the most significant benefits of a digital food waste audit checklist is that it automatically collects data. These audits are primarily concerned with understanding the food waste stream. With these computerized checklists, restaurants, and other food service enterprises don't have to worry about gathering the information they need to optimize their waste management system, thus:

- Create food waste entries with detailed descriptions, disposal dates and times, causes, and total cost in dollars.
- Submit the completed food waste audit template to regional managers for verification.

- Making staff signatures essential helps to provide a more complete picture of the situations that necessitated food waste disposal.

Sign-off to indicate approval of the explanation. (Francisco 2023)

Although there is no single "best" way of waste management, sustainable waste management methods like reusing, recycling, and composting are often regarded as ideal since they are more ecologically friendly and efficient. The most appropriate solution for a company, however, will still be determined by criteria such as waste kind, local restrictions, and other predetermined needs.

While the momentum and good developments are obvious, we still have a long way to go. According to the Circular Gap Report, just 9% of the resources put into the economy are reused, which is unchanged from last year.

With PACE increasing its efforts in 2019 in collaboration with the World Resources Institute and other partners, expanding leadership, tapping into innovation potential, and beginning to shift global material streams away from linear models, we hope to see the trend improve when we revisit progress in the next decade.

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