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From Warehouses To Platforms:

Reinventing Foodbanks Through The Lens Of The Digital Economy

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This Esade institute strives to develop meaningful research, pedagogical content and educational programmes, and to make interventions in the public sphere that will help students, citizens, organisations and companies navigate the social challenges related to exclusion, vulnerability, precariousness and sustainability.

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PART 1

Executive Summary

> "Food culture goes to our very core. How we produce, trade, cook, eat, waste and value food says more about us than we realise: such practices form the structures upon which our lives are built. Food is both the substance of life and its deepest metaphor"
>
> Carolyn Steele

The context

The current model of food distribution seems to be failing: while a fifth of food goes to waste about 25% of families are suffering from food insecurity. Hunger and waste are the two sides of the food paradox.[1] The environmental costs of such a prominent mismatch are notorious, since global food waste generates 10% of greenhouse gas emissions. This contradiction led to the birth of modern foodbanks back in the 1960s. For more than six decades foodbanks have been relevant actors in avoiding hunger and waste, redistributing surplus food and conveniently solving this so-called market failure. However, their current model is still far from efficient and sufficient.

Their organisational dynamics remain at risk since the tasks they perform encompass complex logistic networks and a storage system that needs to be continuously updated to the threat of food perishability. A model which, on top of this, is highly reliant on volunteers for its administration and core activities. In many cases, limited organisational capacity, low efficiency and low digitalisation become important additional barriers to provide an adequate response to the social needs related with food scarcity, particularly in a context that will suffer the consequences of the COVID-19 pandemic for years. Compared to pre-COVID levels, the reliance on assistance coming from foodbanks has increased around 30%. Furthermore, amidst shelter-in-place orders, social-distancing protocols and health concerns, foodbanks saw a sudden descent in volunteers. According to the main international networks of foodbanks, the estimate decline was around 60%. Lines of people queuing to get food supplies have become an iconic image of the aftermath that questions the capacity of governments and civil society to provide safe, affordable and sufficient food for all.

Critical voices have questioned the organisational model of foodbanks, given their incapacity to address the root causes of food poverty or the potential for stigmatisation of food receivers. The food-aid system is fragile and diverse, while aid assistance programmes tend to have significant impacts in terms of dignity and autonomy of people in vulnerable situations. In the opposite direction, cities and town seem to rely more and more, particularly in lockdown periods, on organised civil society to fill the gap left by absent or insufficient public intervention. The solidarity chains orchestrated through the foodbanks encompass certain compassive asymmetries between foodbank volunteers and users. The question is what are the problems that can be addressed more efficiently by foodbanks and which ones rely on institutional and political will? How could foodbanks reinvent their mission and role to "provide both healthy food to those in need and wraparound services so people won't need to use the pantry long-term"? This is what Katie Martin calls Holistic Community Food Hubs. In addition, paying careful attention to the recent developments related to digitalisation and platform-based redistribution models can help to answer some of these questions and start thinking out the foodbank of the future.

1 The food paradox refers to the fact that a third of the food produced goes to waste, while 25% of the world population suffers food insecurity or hunger.

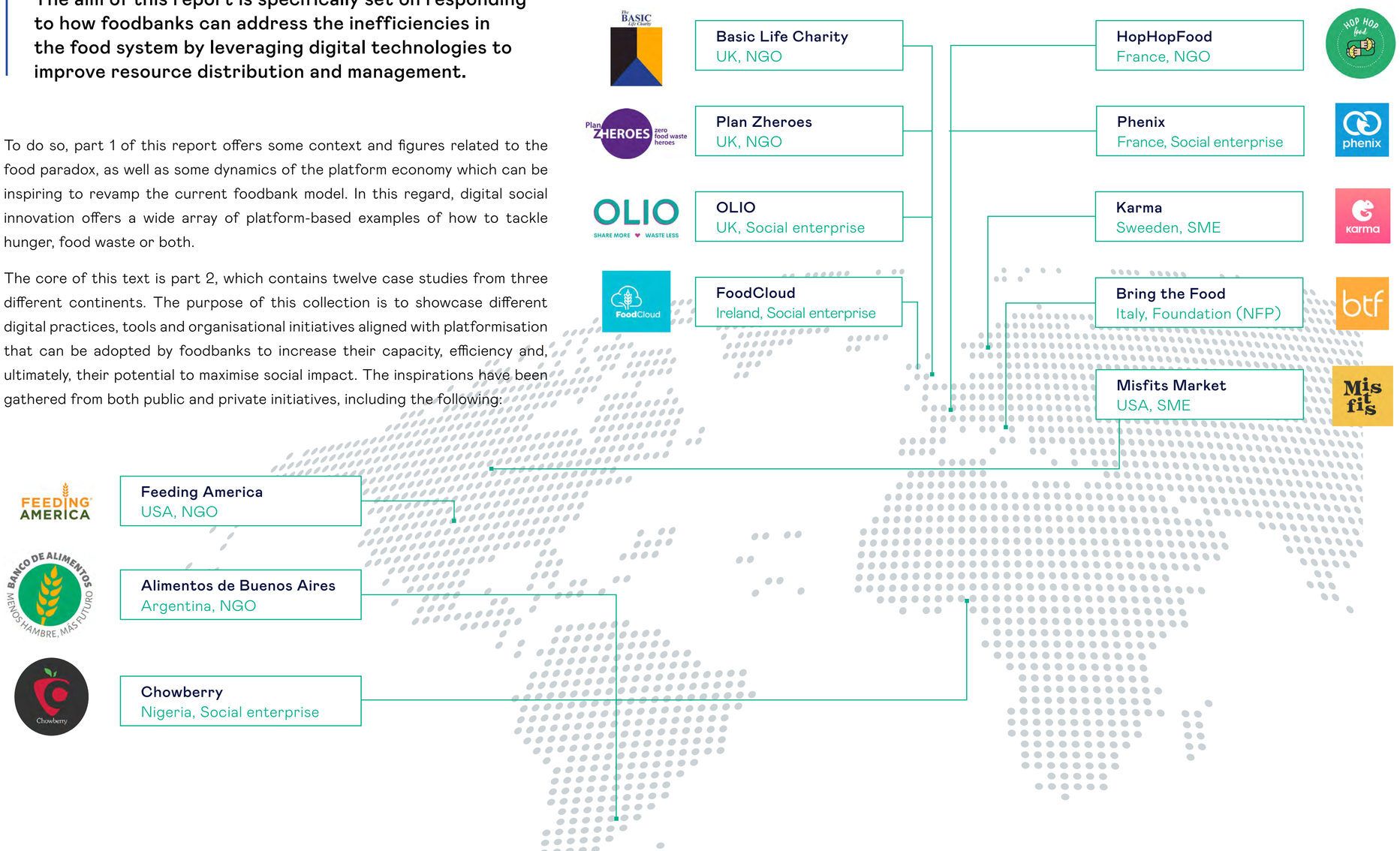
The aim

The aim of this report is specifically set on responding to how foodbanks can address the inefficiencies in the food system by leveraging digital technologies to improve resource distribution and management.

To do so, part 1 of this report offers some context and figures related to the food paradox, as well as some dynamics of the platform economy which can be inspiring to revamp the current foodbank model. In this regard, digital social innovation offers a wide array of platform-based examples of how to tackle hunger, food waste or both.

The core of this text is part 2, which contains twelve case studies from three different continents. The purpose of this collection is to showcase different digital practices, tools and organisational initiatives aligned with platformisation that can be adopted by foodbanks to increase their capacity, efficiency and, ultimately, their potential to maximise social impact. The inspirations have been gathered from both public and private initiatives, including the following:

↓ List of initiatives, by country, legal form and type of match



These cases are meant to be a selection of relevant and inspiring digital transformations that cover a wide range of stakeholders matched through digital platforms, showcasing the sectoral diversity, geographic miscellaneity, and different levels of maturity of the initiatives. Two main cases are developed in depth due to their particular relevance and appropriateness to the purposes of this report. Firstly, Banco de *Alimentos de Buenos Aires* presents an outstanding app capable of speeding up operations and directly connecting donors, entities, and volunteers without using the physical warehouse so representative of the foodbank model. Secondly, we present *OLIO:* a social enterprise born as an impact-driven platform which promotes civic and corporate engagement with the aim of tackling food waste. The ten short cases that follow are presented as brief descriptions of other equally interesting initiatives for foodbanks.

Finally, part 3 concludes with some of the identified trends in digital solutions for food redistribution, as well as some specific takeaways for foodbanks. While the cases differ in their models, approaches and narratives, what they have in common are the new cooperation capacities enabled by digital tools, which in many cases can be easily integrated into the current foodbank organisational models.

Best practices in digital redistribution of food

The cases provide some inspiration to improve current organisational models through digitalisation and platformisation, since all the observed digital solutions are based on a platform and are accessible via web-app and/or a mobile app format. The main differences in this group lie in:

- The specific stage of the food supply chain from which they operate
- Which agents are involved on the supply and demand sides
- Whether the products are donated or purchased and under what specific circumstances.

In this regard, in total, we have found five types or categories of connection (i.e. matching, enabling cross-sector and multistakeholder relations), the business-to-NGO (B2NGO) type being the most frequent relation in our sample. This is a type of relation which, mirroring the role played by traditional foodbanks, operates at the end of the supply chain as shown in Figure 1.

Figure 1. Map of initiatives along the food supply chain according to the position from which they operate.

APPIFICATION OF THE FOODBANK MODEL (B2NGO)

Most of the organisations in our sample seek to provide a match between retailers and NGOs. Retailers can be wholesalers, supermarkets, restaurants and/or other stakeholders in the hospitality sector (such as hotels, event venues, etc.) which need to deal with non-sold / not-distributed surplus food. At the other end of the relation, charities include foodbanks, pantries and/or community groups seeking to make use of this food. Producers and distributors are rarely involved in this type of match. Most of the platforms are oriented towards serving vulnerable people and collectives with special needs, mostly inspired by rather traditional food charity and aid assistance approaches.

At this stage, salient innovations include platforms for food donation where the basic mechanics offer a space for suppliers to offer surplus food and charities to claim the food they need. Some takeaways of our study come forward at this point:

- There is a double strategy where material facilities are supported by a new parallel digital infrastructure. Warehouses (where food is sorted and stored) are placed to meet large, non-perishable and regular donations. This is combined with a platform, the digital infrastructure, which allows speeding up unexpected and/or small pick-ups which may (or may not) involve fresh produce.
- In essence, logistics remain the same as in the analogue world. While the connections are made via the platform, volunteers (individuals) and carriers still play a crucial task in bringing food from donors to charities.
- The digital marketplace acts as a platform to maximise opportunities and turn solidarity into an expansive reality rather than administering donations.
- Digitalisation comes forward as offering a software solution to an organisational problem. In this regard, digitalisation can be seen as a service that for foodbanks mimics the turn towards the *servitisation* of business models that we observe in the overall market economy. For businesses, the incentive to be involved in food donation is that of i) getting rid of a food surplus which otherwise would go to waste (and would generate a cost); ii) collaborating in local solidarity initiatives but also iii) using these donation platforms as a service. Interestingly, most of the platforms make it possible to track and monitor waste and generate insights, which can be useful for corporate waste management.

DIGITALISATION OF WAREHOUSE-TO-DISTRIBUTION RELATION (NGO2NGOs)

This category can be seen as a subtype of the previous one, since platforms are seen as connecting two different types of NGOs: those who have received, stored and/or sorted the donated food (i.e. foodbanks or similar) with other NGOs that are delivering the meals to vulnerable families or individuals (community groups, soup kitchens and so on). At this stage of the supply chain, new digital matches also accelerate the digitalisation of existing food donation networks, facilitating the communication and coordination between foodbanks and charities. As a result, NGOs undergo a digitalisation process that otherwise would have barely started. Algorithmic-driven decision making can be used for NGOs to fight hunger too, ensuring the most convenient and efficient match between entities, based on proximity.

LAST-MILE SUPPLY (B2C)

In this category, retailers directly connect with ordinary end-consumers who are not necessarily in need. Consumers can purchase products which are close to their expiry date at discounted prices.

Though this is a contested model, since it may be seen as indirectly reinforcing waste, other voices point in a different direction. Convenience is put forward to argue that under this model retailers can count on an extra channel for distribution which, in addition, offers the opportunity to advertise their businesses, using e-commerce and a paywall even if they do not have a website. This has been a good solution for small grocery shops during the pandemic lockdowns.

LAST-MINUTE WASTE AVOIDANCE (P2P)

This category includes initiatives which operate in the last stage of the supply chain, but involving only consumers. This approach resonates with other practices in the sharing economy, as the same person can participate in the network as an agent on both the supply and the demand side. This type addresses the threat of food waste rather than that of hunger, using a civic approach. This category is characterised by community-driven actions which aim at fostering local solidarity and social cohesion while seeking to reduce food waste. These initiatives combine the narratives around mutual aid and the benefits of sharing spare food at the community level. Motivations and incentives for individuals who participate in these platforms seem to be akin to those of members who join a social movement, rather than volunteers who seek to help others in need.

ALTERNATIVE FOOD SUPPLY CHAIN

While all the initiatives described this far can be considered redistributors, *Misfits Market* and *Phenix* can be labelled as *alterationist* according to Aschemann-Witzel et al. (2020), as they are modifying the circuits of currently existing supply chains, either creating a parallel supply chain for imperfect food which does not meet the visual standards of the industry, or offering new opportunities to share, donate and reuse across the supply chain.

Three trends to watch

1 UPDATING THE NARRATIVES ON WASTE AND HUNGER

There are several differences among cases regarding their narratives around hunger and waste. Based on the cases surveyed, the more their mission and vision focuses on people in need, the more the narratives around food charity reinforce the moral economy and stress the "food paradox."[2] Most of the organisations (including NGOs and social enterprises) connecting retailers and charities are to be found in the food charity (or sharing for charity) category. On the other side, market *alterationists* and organisations which are connecting B2C and P2P weave the narratives around mutual aid and the benefits of sharing spare food at the community level.

2 VOLUNTEERING SYSTEMS NEED TO BE UPDATED

Many of the cases surveyed rely on volunteers to carry out and deliver core activities. The levels of engagement and activities of volunteers differ from organisation to organisation. In those cases where volunteers are mostly elderly, this has been an important organisational constraint since the beginning of the pandemic. Volunteer dynamics embedded in most food charities are seen as maintaining asymmetries between givers and receivers (donors in relation to foodbanks, and volunteers in relation to users). However, initiatives which rely more on mutual aid and food sharing among peers build their narratives around social cohesion and reciprocity. The role and demographics of volunteers varies widely: while the aid assistance model generally connects with elderly people, the food for community approach appeals to more diverse and younger profiles.

3 UNEQUAL ACCESS TO TECHNOLOGY STILL MATTERS

The potential of digitalisation of services and activities is limited by the capacity of the different stakeholders to have access to devices and internet connectivity. Thus, digital solutions have to bear in mind ways to adapt, bypass or overcome these barriers. The digital divide and digital literacy in our societies are still important challenges that cannot be addressed by the incumbent players analysed up to here.

2 The food paradox refers to the fact that a third of the food produced goes to waste, while 25% of the world population suffers food insecurity or hunger.

The role of foodbanks: Digitalisation, reinvention or both?

While the foodbank model remains under pressure due to COVID-19 and spikes in food insecurity, digitalisation may offer great opportunities to optimise and increase the social impact that these entities deliver. As shown, there are several processes all along the food supply chain where digital solutions are irrupting, speeding up and promoting the generation of efficient matches between the actors at play. Furthermore, the awareness around food waste and its impacts in GHG emissions is encouraging the proliferation of platforms for food redistribution, food donations and food sharing. Nowadays a wide range of stakeholders are mobilised by narratives around the environmental impact of food waste. As observed, those initiatives which connect this global trend with new forms of civic engagement are attracting particular attention.

Historically speaking, foodbanks have become the solution to the food paradox. Now that they are at the forefront of food redistribution for people in need, they have the opportunity to combine their know-how, experience, trust-based networks and existing warehouses with digitalisation. One of the key aspects of platformisation is the implementation of a comprehensive inventory management system with proper digital inventory management tools. The table below shows an example of how warehouses and platforms can be combined to carry out the main activities of any foodbank, in order to increase efficiency and expand their operational and "matching" capacities. Considering the main tasks of foodbanks, the table below provides examples where the combination of analogue dynamics ("warehouse") and digital tools ("platform") offers opportunities to increase operational efficiency and improve their overall performance:

Table 1. Main tasks of a foodbank comparing current activities in physical facilities and the potential opportunities of introducing digital tools

Main tasks of foodbanks	Warehouse	Platform	
Contacting and connecting with donors and with social entities	Regular and non-regular collaborators with surplus food	Claiming the food posted by donors, based on needs, offering the donated food to social	End-to-end control, monitoring and traceability
Receive food	Collecting and receiving surplus food from different entry channels	Stock management control, alert system of due dates, automatisation (e.g. showing minimum stock level of specific product through push notifications to the different hubs)	
Classification	Food sorting and organisation (based on food type, perishability or conservation requirements)		
Storage	Alleviation of the deficit of infrastructures of the social entities		
Distribution	Food exit programmes, and logistics of pick-ups and deliveries	Logistics management and coordination	
Relationships with volunteers	Screening and training of volunteers (face to face)	Volunteer management (profiles, shifts, needs, availabilities...)	
Communication between stakeholders	Traditional bilateral communications	Increased communication and coordination of activities between stakeholders	

The role of foodbanks: Digitalisation, reinvention or both?

Besides, digital tools are only part of the solution, as they require governance and supervision but also demand some levels of co-design to:

i) produce a thorough assessment of the needs they seek to address;

and ii) develop adequate platforms to address the food problem without generating new unexpected social harms.

According to the twelve examples that have been analysed, the expertise historically acquired by foodbanks makes them particularly relevant partners for the design, testing, and deployment of digital solutions for food redistribution at the different stages of the supply chain. In addition to brick-and-mortar infrastructure, foodbanks can progressively expand their role as intermediaries to that of facilitators and digital connectors. Different organisational and technical skills will be needed but the potential for social impact maximisation is already there to be reaped.

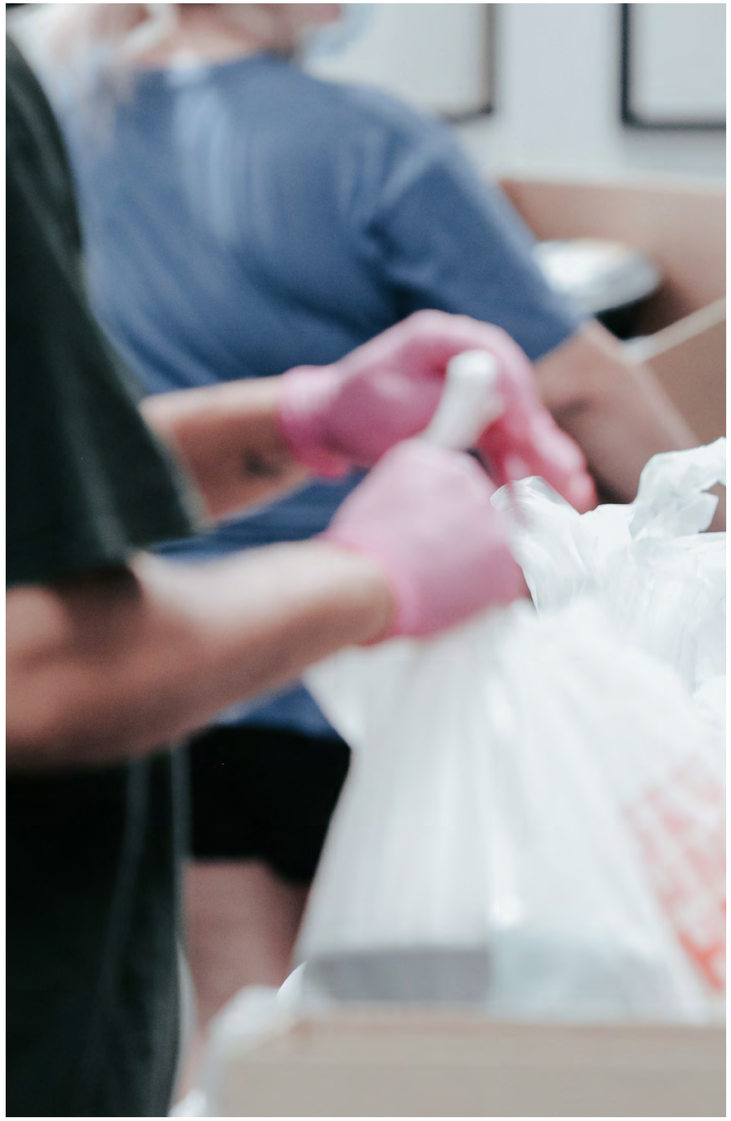
DIGITAL SOLUTIONS IMPLIES MORE THAN ACCESS TO DIGITAL TOOLS

The intermediation role of the foodbank can never be limited to the provision of a digital solution to meet its social aim.

Actually, the key strengths of the foodbank are their capacity to:

- **Facilitate the assessment of needs of the different stakeholders and their readiness and willingness to adopt digital innovations**
- **Co-design the solution with developers and facilitate co-creation spaces with end-users of the apps**
- **Govern the platform (e.g. screen the volunteers, set up golden rules on how to use it, take care of the reputation economy and so on)**
- **Offer offline support and supervision to ensure on-time pick-ups and deliveries**
- **Create a platform to mobilise existing communities as untapped reservoirs of social capital that may serve the needs of a foodbank**

The essence and the power of any foodbank is their social capital. In other words, a foodbank can be understood as a community of people and a network of organisations with a shared mission. These extended communities must be seen as necessarily flexible, capable of building trust between different stakeholders and providing solidarity chains which are indeed adaptable to multiple organisational models. Digital solutions are only part of the debate; now is probably the time to be ambitious and think beyond solving the food paradox, that is, to leverage the digital tools increasingly put to use to address social goals. The time seems ready to redefine the original purpose of these meaningful connections and unleash their true untapped potential.



Context

The global context of hunger and waste: the two sides of the food paradox

Today's food system is based on supply chains, which encompass all the processes involved in bringing food to consumers' tables and dealing with the ensuing waste. This includes production, processing, distribution, consumption, and disposal. The following diagram shows the various stakeholders involved at each stage of the supply chain:

However, the global agri-food industry is off balance: although the world produces enough food to feed 12 billion people, almost 3 billion suffer from food insecurity (FAO, 2020b). According to the Food and Agriculture Organisation (FAO), between 720 and 811 million people faced hunger in 2020 (FAO, 2021). Specifically, it is the current food-distribution model that is failing: even as one-fifth of all food goes to waste (UN Environmental Programme, 2021), a quarter of the world's families are suffering from food insecurity (Michelini et al., 2018).

HUNGER AND FOOD INSECURITY

Despite the global efforts fostered by the UN through the 2030 Agenda and the Sustainable Development Goals (SDGs), for the last six years, hunger has been growing worldwide (SOFI, 2021). SDG 2 in particular aims to 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture' (UN, 2015).

Food insecurity and undernourishment is most pressing in Asia, Africa, Central America, and the Caribbean (SOFI, 2021). For those living in middle- or high-income countries, the main concern is not scarcity, but improved nutrition, for instance, in order to reduce the prevalence of obesity amongst the adult population (WHO, 2017). In this regard, more than half the EU population is overweight and one in seven people is obese (Eurostat, 2021). Additionally, hunger is a complex issue that is normally symptomatic of poverty and deprivation of other material needs.

FOOD WASTE

According to the Food Waste Index Report (UNEP, 2021), around 931 tonnes of food waste were generated globally in 2019, or 17% of all food produced. This leads to huge economic losses for both producers and food operators.

121 kg

Average waste per capita in 2019

17%

Food produced that goes to waste

Households discard:

11% Available food

5% Food services

2% Retail

The causes vary across geographies: in upper-middle- and high-income countries, most of the waste takes place in households at the consumer level. Food waste is also linked to different institutional phenomena, such as oversupply (Steel, 2020), industry standards for aspects such as packaging, the flawed aesthetics of certain products, or looming expiry dates. In the global South, food is wasted earlier in the food supply chain, mostly due to post-harvest losses or lack of infrastructure (e.g. adequate cold storage facilities or transportation means) (UN, 2019).

Accordingly, SDG target 12.3 is to, 'by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses' (UN, 2015). The SDG Index, which tracks and monitors progress on the SDGs in many countries, stresses the importance of gathering and monitoring quality indicators (Sachs et al., 2021). To this end, in 2019, the EU launched the EU Platform on Food Losses and Food Waste, as part of its Farm to Fork Strategy.[3]

The volume of global food waste also has other environmental externalities. Between 8 and 10% of greenhouse gas (GHG) emissions are estimated to correspond to food produced but not consumed (UNEP, 2021). In this regard, the impact of food waste is five times higher than that of the airplane industry. According to estimates published in 2011, were food waste a country, it would be the third largest GHG emitter, behind only China and the US (FAO, 2013). The impact of food waste is also two-way: on the one hand, the agri-food industry is a major contributor to climate change; on the other, the consequences of climate change are particularly severe for producers – who are at the origin of the chain (Andreucci et al., 2017).

For all these reasons, food waste, and food insecurity are – and will continue to be – pressing issues on the agendas of governments, corporations, non-profit organisations, and civil society.

3 The full strategy can be found at: https://ec.europa.eu/food/horizontal-topics/farm-fork-strategy_en (last accessed 31 August 2021).

Foodbanks as a civil society response to tackle the paradox

In 1967, the food paradox prompted John van Hengel to create the first contemporary foodbanks in Phoenix, Arizona, in the US.[4] Their role as a mutual assistance institution was expanded during the Reagan era to offset the dramatic cuts in public spending under the Republican administration.

> Foodbanks are organisations that acquire donated food, much of which would otherwise be wasted, from farms, manufacturers, distributors, retail stores, consumers, and other sources, and make it available to those in need through a network of community agencies.

4 The concept of food banking was developed by John van Hengel in Phoenix, AZ in the late 1960s. Van Hengel, a retired businessman, had been volunteering at a soup kitchen trying to find food to serve our neighbors facing hunger. One day, he met a desperate mother who regularly rummaged through grocery store garbage bins to find food for her children. She suggested that there should be a place where, instead of being thrown out, discarded food could be stored for people to pick up – similar to the way "banks" store money for future use. With that, an industry was born.' Feeding America blog, retrieved from https://www.feedingamerica.org/about-us/our-history (last accessed 20 July 2021).

To fulfil their role and mission of collecting and redistributing food, foodbanks must be efficient. Operational efficiency and capabilities are required across multiple dimensions of their organisational chart (see below):

Table 2. Foodbank dimensions requiring operational capabilities & efficiency

Dimension	Description
Logistics and infrastructure	Includes transportation means and storage facilities, combined with the ability to coordinate efficient pick-ups and deliveries, to preserve edible food
Food provisioning	Corporate donations of surplus food are the main source. The variety and regularity of donations are crucial. Even before Covid, perishable food groups were usually scarce, with the consequent impact on the nutritional balance of the provided food basket
Funding	In addition to food providers, these organisations depend on economic donations and philanthropy, which can be crucial in uncertain times
Stakeholders	Communication and coordination with stakeholders, from donors to local charity groups
Volunteering system	Reliance on volunteers requires recruiting, training, coordination, and supervision efforts
Regulation	The regulations in place, including those concerning liability, food security, hygiene, and food information for consumers, directly and indirectly affect their performance (via stakeholders)

Source: The authors, based on Berti et al. (2021), Cosgrove (2017), Fiocco et al. (2020), Nair et al. (2018), Wageningen Economic Research & Deloitte (2020), and World Economic Forum (2020).

Foodbanks are currently a well-established reality present around the world. By redistributing surplus food – intentionally or otherwise – they have emerged as important actors in alleviating food scarcity and minimising waste. In terms of outreach, there are three main international networks: the Global FoodBanking Network[5] which coordinates foodbanks internationally; the European Food Banks Federation,[6] which coordinates them at the European level; and Feeding America,[7] which coordinates them within the US. In 2020, these three networks encompassed more than 1500 foodbanks in 70 countries, providing assistance to more than 62 million people (Vandenschrik, 2020).

COVID-19 AS A STRESS TEST FOR FOODBANKS

More recently, the pandemic has pushed many people from a state of food poverty into a state of emergency, increasing the pressure on foodbanks and other third-sector organisations. Food demand has increased significantly around the world. For more and more families, maintaining a healthy and/or minimum diet is simply beyond their means. In this context, new segments of society, such as the unemployed and/or dependents, have become foodbank beneficiaries. This is particularly acute in the case of families with children who rely on school meals, students, and elderly people living alone (FAO, 2021).

According to figures for 2020, the aforementioned three main foodbank networks have experienced significant increases in both food provision and demand compared to pre-Covid levels. The following table shows the spikes in the number of people assisted and tonnes of food redistributed:

↓ **Table 3. Increase in food assistance, based on the annual reports of the three main international networks**

	Global FoodBanking Network	European Food Banks Federation	Feeding America
Number of people in need assisted (in M)	16.9	12.8	40
Variation in assistance compared to pre-Covid levels (2019)	+76% (compared to 2018)	+34.7%	stable [8]
Tonnes of food redistributed	919,000	860,000	1,730,000
Variation in tonnes of food compared to pre-Covid levels (2019)	+83% (compared to 2018)	+12%	+30%

Source: The authors, based on annual reports for fiscal year 2020.[9]

5 https://www.foodbanking.org/

6 https://www.eurofoodbank.org/

7 https://www.feedingamerica.org/

8 Reports for fiscal years 2020 and 2019 disclose an approximate number of people in need assisted ('more than 40 million').

9 Global FoodBanking Network (2020) FY 2020 Annual Report: https://www.foodbanking.org/2020annualreport/;
FEBA (2020) Annual Report: https://www.eurofoodbank.org/en/2020;
Feeding America (2020) Annual Report: https://www.feedingamerica.org/sites/default/files/2021-03/FA_2020AnnReport_FINAL_updated0309_v2.pdf
and Feeding America (2019) Annual Report: https://www.feedingamerica.org/sites/default/files/2020-06/FA_2019_AnnReport_d8.pdf.
All reports were last accessed on 20 July 2021.

Importantly, the overall increase in food supplied by foodbanks was significantly faster than the one experienced in the wake of the 2008 financial crisis. According to data from the European Food Aid to the Most Deprived Persons programme, the number of beneficiaries assisted climbed from 14.4 to 19 million between 2008 and 2011 (European Commission, 2012).[10] This 31% increase in the number of beneficiaries thus took three years. The Covid-19 pandemic has produced an equivalent increase (of almost 35%) in just 9 months (for the period March-December in 2020).

Consequently, several high-income countries have put into place extraordinary measures to mitigate extreme poverty, and the situation is expected to worsen in the immediate future. According to a joint statement[11] by the International Labour Organization, FAO, International Fund for Agricultural Development, and World Health Organization, 'tens of millions of people are at risk of falling into extreme poverty'. This means that the economic and social impacts of the pandemic are not only devastating but also here to stay. More specifically, the European Parliament approved the European Social Fund Plus with a budget of €88 billion for the period 2021-2027. All EU Member States will need to spend at least 3% of their funds on mitigating extreme poverty with food and basic material assistance[12].

In this context of social emergency and food insecurity, many foodbank pillars (see Table 3) have come under increasing pressure. Based on the reports published by the main international foodbank organisations, the most frequently described pressures are related to the disruption or discontinuation of donation chains, the temporary scarcity of volunteers, and the increased cost of operating under the new Covid-related public health protocols:

- **Disruption of donation chains:** The regular donation chain for foodbanks was initially disrupted. Foodbanks, which generally receive food donations from retailers, had to find new sources for the provision of food and secure products much earlier in the supply chain. When schools, colleges, restaurants, and cafeterias were forced to remain closed, food donations from retailers and manufacturers dropped off sharply (by 60-70% in the cases of Feeding America and The Global FoodBanking Network).
- **Lack of volunteers:** Between shelter-in-place orders, social-distancing protocols, and health concerns, foodbanks saw a considerable decline in the number of their volunteers. All three of the main international foodbank networks mention this. Feeding America (2020) estimates that the number of volunteers fell by 60%. Depending on each case, the lack of volunteers impacts storage capacity and food sorting (carried out at the foodbank's facilities), the perishability of the food to be distributed (Fiocco et al., 2020), and/or the overall logistics and transportation systems in place (Nair et al., 2018).
- **Increased costs due to Covid protocols:** One side effect of the pandemic has been the increase in costs due to the measures put into place to compensate for the temporary scarcity of volunteers, who often come from older populations at higher risk of infection (Akwii et al., 2021).

> The European Parliament approved the European Social Fund Plus with a budget of €88 billion for the period 2021-2027. All EU Member States will need to spend at least 3% of their funds on mitigating extreme poverty with food and basic material assistance.

10 Food insecurity in high-income countries began to receive more attention from academia, particularly in English-speaking countries (Davis & Geiger, 2017).

11 The full statement is available at: https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems (last accessed 31 August 2021).

12 See dedicated website for further information: https://www.europarl.europa.eu/news/en/press-room/20210604IPR05527/meps-approve-new-social-fund-to-support-young-people-and-the-most-deprived (last accessed 31 August 2021).

LIMITATIONS AND CONTROVERSIES SURROUNDING THE FOODBANK MODEL

Although foodbanks first arose as an immediate response to a situation of food emergency, they have since become institutional pillars and essential services for large cohorts of disadvantaged people (Martin, 2021). Many critical voices consider the foodbank model to have limitations, and the food paradox itself entails certain issues that make foodbanks' social contribution controversial. Some of the main controversies are briefly described below. The criticism is two-fold: of the foodbank model and of the systemic challenges posed by the current agri-food market and industries.

↓ The three levels of controversy

Macro – Foodbanks as complicit in a failed agri-food system → A drop in the ocean of unfair and unsustainable agri-food systems

Meso – Limitations of foodbanks as a business model and their *raison d'être* → Effectiveness and social, environmental, and economic impact

Micro – Limitations of foodbanks as organisations (organising & management) → Operational inefficiencies & constraints (logistics, food provisioning, funding, volunteering, system)

Controversies surrounding the foodbank model

Immediate solutions, long-lasting inequalities? According to a systematic review of the existing evidence, although foodbanks have proved to be an immediate solution to severe food deprivation, their ability to improve overall food security and alter the structural problems driving scarcity is limited (Bazerghi et al., 2016).

From the perspective of social services and safety nets, whilst relying on food donations, as a community, is a cheap, convenient, and simple solution in these situations, it largely remains a partial one. Vulnerable families tend to present a complex set of disadvantages (e.g. immigrant status, social isolation, unemployment, etc.) that foodbanks alone cannot address (Ortiz, 2019).

An instance of moral economy? Food donation could be the best destination for surplus food as it ensures the highest-value use of edible food resources in human consumption. Corporate-sponsored food donations are usually framed as CSR activities, enhancing the donors' reputation (Kolk & Ciulli, 2020), but suspicion regarding the incentives, motivation, and side effects of such corporate generosity remains.

The ethics of compassion vs visualising asymmetries: Solidarity chains and, in particular, the points of encounter that foodbanks and pantries offer are a visible manifestation of how caring communities and different forms of compassion are often embedded in asymmetrical relationships that reinforce existing inequalities between givers and receivers (Surman et al., 2021). Scholars of transformative services are stressing the importance of the well-being of care receivers (Parsons et al., 2021). Some instances of food supply through foodbanks do not meet these standards of care and respect.

The stigma of receiving food: The traditional stigma associated with receiving food generates reluctance amongst people in need, coupled with negative emotions such as 'guilt, shame, embarrassment or a feeling of indebtedness' (Garthwaite, 2016). Additionally, the 'beneficiary' approach can potentially impact the dignity and autonomy of vulnerable people, compounding situations of poverty or scarcity.

Foodbanks need to reinvent themselves: Many authors insist on the need to build stronger safety nets and welfare systems, whilst highlighting the potential for foodbanks to contribute to the transition to more sustainable and just food systems (Berti et al., 2021; Martin, 2021; Spring & Biddulph, 2020). Katie Martin notes that the goal for foodbanks has to be 'to provide both healthy food to those in need and wrap-around services so people won't need to use the pantry long-term' (Martin, 2021:13). She further argues that these organisations can be relevant spaces for individual and collective empowerment: 'Food pantries can create opportunities for people who have experienced hunger to speak up about injustices that hinder the health and well-being of their community' (Martin, 2021:13).

Controversies surrounding the agri-food system

Beyond the food paradox, food system failure: The food paradox frames hunger and waste as market failures, due to overproduction and unequal distribution, that paradoxically lead to reliance on moral economies. Some authors consider the food paradox to mask yet another failure in addition to that of the market and point to the role of the state. This perspective links the austerity policies that have jeopardised several aspects of the welfare state with the neoliberal agenda in the food system (Berti et al., 2021; Surman et al., 2021). This critique has gained traction due to the impact of Covid-19 and the rising demand for food aid. Foodbanks are now part of the government discourse (normalising foodbanks), particularly in the UK (Cappellini, 2021). This in turn diminishes the potential for the more disruptive change that is socially required.

Pending transformation of the agri-food system: The current agri-food system, from field to fork, accounts for 10% of the world's GDP (Editorial Piece, 2020). Whilst food redistribution has been highlighted as a major area of contribution for sustainability transitions (Spring & Biddulph, 2020), other approaches, such as regenerative agriculture, point to deeper transformations for fairer, more resilient and equitable food systems (Hans, 2021). The FAO has proposed several pathways for food system transformation, including climate resilience, peacebuilding policies, and tackling poverty, ensuring that interventions are pro-poor and inclusive (SOFI 2021). In late 2020, the FAO Director-General said that the impact of Covid-19 has underscored 'the necessity of transforming agri-food systems, making them more innovative, productive and competitive, but also more inclusive, environmentally sustainable, and climate-friendly' (FAO, 2020a).

Digital solutions to fight hunger and waste

> "By using different digital technologies and making them accessible we will be able to feed approximately 10 billion people by 2050"
>
> World Bank, 2019

One of the main concerns of researchers, practitioners, public servants, and corporations (in both the food industry and the digital sector) is to determine the extent to which digital technologies can help improve the outcomes of the current food system, with a particular emphasis on food waste (Chauhan, 2020). The digital tools currently available cover a wide spectrum of functionalities, ranging from resource-planning and management software to RFID[13] systems, data processing, cloud computing, and the Internet of Things, amongst others (Chauhan, 2020). What else remains to be seen? How can these tools improve foodbanks' role and help them address the aforementioned challenges?

For the purpose of the present report, how foodbanks can address the food system's inefficiencies by leveraging digital technologies to improve resource distribution and management (Berti et al., 2021; Fiocco et al., 2020; Nair et al., 2018) is of particular interest. Given foodbanks' bridging role, this section will look at the opportunities afforded by digital platforms and the extent to which they might serve as an inspiration for foodbanks.

FOOD AND PLATFORMS

Platforms are often referred to as multilateral markets, supporting an array of interactions across supply and demand (Parker et al., 2016). Their intermediation role is closer to orchestration, mirroring the function of foodbanks within solidarity chains.

So far, the aspects to receive most attention at the intersection of food redistribution and platform-based organisations are those of food waste and the mechanisms for enabling food sharing (Cane & Parra, 2020). In developed countries, interest from researchers and practitioners is centred on the areas of retail business innovation and consumer behaviour (Depa et al., 2018), topics that usually arise in connection with those of responsible consumption (including alternative food networks, the food commons,[14] and agroecological consumer cooperativism) (Espelt, 2020). In contrast, in developing countries, digital innovation has tended to focus on earlier stages of the supply chain (Chauhan, 2020), where food waste is more prominent (Steel, 2020). All in all, some evidence suggests that digital platforms with a social purpose together with sustainability-driven business models are positively impacting the food supply chain in terms of sustainability (Schroder et al., 2021).

— Fighting food waste

Understandably, food waste and food redistribution are attracting increasing attention across various sectors as addressing these issues would be one of the most effective ways to respond to climate change (Project Drawdown, 2020). On the business side, several agents and especially retailers are aware of the financial and reputational impacts of food waste reduction (Lempert, 2018) and are thus prime movers in creating sustainability-oriented business opportunities and innovative solutions (Capgemini, 2017). At the level of citizen engagement, food waste bundles together environmental and social injustice concerns, leading to rapid growth in the number of people committed to expanding redistribution initiatives (Spring & Biddulph, 2020).

Due to their unique capacity to coordinate various players, digital platforms are important actors for tackling food waste throughout the supply chain. Intermediation between supply and demand within an ICT-mediated space allows platform-based organisations to play a variety of roles and become 'circularity brokers' (Ciulli et al., 2020). This includes their capacity to detect and monitor food waste, connect waste generators and potential recipients, increase efficiencies, and create new business opportunities (Schroder et al., 2021).

Some authors have also observed that ICT-mediated ecosystems accelerate the expansion of food rescue beyond traditional actors (such as foodbanks and other hunger-fighting organisations) to complementary organisations (including businesses and producers) (Hecht & Neff, 2019). Platforms that provide alternative supply chains have been called 'alterationists' (Aschemann-Witzel et al., 2018) and have the potential to disrupt the usual supply chains. Alterationist platforms often enable direct sales from original food sources, which aligns with the provision of fairer prices for producers.

13 Radio Frequency Identification.

14 Food commons refers to a model, defined as a civic countermovement to global food challenges. This framework proposes deconstructing food as a commodity to reconceptualise it as a common good, compounded by market rules, public regulations, and collective actions (Vivero-Pol et al., 2018).

Enabling food redistribution

A different literature stream has focused on the platform-based organisations that are currently enabling food redistribution. In general terms, these organisations are known as 'food-sharing platforms', referring to organisations driven by digital technologies that emerge at the confluence of sustainable and collaborative consumption, waste reduction, and community engagement (Martin, 2021; Mazzucchelli et al., 2021; Michelini et al., 2018). However, although social inclusion is seen as a critical issue for sustainability (Schanes & Stagl, 2019), current research seems to pay scant attention to the possibilities for social inclusion of people in need.

Table 4. Common features of online food-sharing platforms

1	Reliance on digital platforms for their core function
2	Oriented towards food-related sustainability goals
3	Connecting supply-chain actors offering edible food surplus with potential requesters
4	Suppliers can share food for free and/or in exchange for a fee

Source: Adapted from Michelini et al. (2018).

In addition to these common features, Michelini et al. (2018) have identified three categories of food-sharing models to address sustainability challenges:

- **Sharing for charity:** food collection and redistribution systems that serve non-profit organisations. This category replicates the existing food-aid scheme of foodbanks in an online setting, usually led by social enterprises or non-profit organisations
- **Sharing for money:** this category is essentially based on a form of for-profit B2C relationship that simultaneously aims to reduce waste and generate revenue. These platforms are present in several industrialised nations, offering last-minute discounts on perishable products. The model has seen a rapid increase in adoption by grocery retailers (Aschemann-Witzel et al., 2018), as it makes it possible to reduce food waste and the associated financial losses. For consumers, it offers the opportunity to save money and contribute to tackling environmental problems (Mullick et al., 2020). Some ethical concerns have been raised regarding these platforms and their outcomes in the long run, particularly with regard to the potential legitimation of waste for retailers and their dual use as yet another tool in the marketing toolbox (Billing, 2020).
- **Sharing for the community:** the third category corresponds to the peer-to-peer model, where surplus food is shared amongst consumers. This is an unprecedented model propelled precisely by ICT-mediated platforms, which have fostered interactions between individuals (Davis & Geiger, 2017). In principle, the narrative of these platforms is closer to instances of mutual support than to examples of asymmetrical food aid. However, preliminary social network analyses have found that reciprocity is more a narrative than a fact, as the roles of offering and requesting food through the platform are well established, static, and difficult to change (Harvey et al., 2020). Additionally, users of such platforms grade high on digital literacy, and even those profiles associated with lower incomes tend to show higher levels of education (Makov et al., 2020).

FOO BANKS AND PLATFORMS: CLICKS-AND-MORTAR?

The advent of technology and ICT-mediated ecosystems provides new opportunities to integrate online and traditional channels (Michelini et al., 2018), combining web platforms and/or apps to support the core activities. According to Bernstein et al. (2008), 'This integration results in the evolution from a "bricks and mortar" organization (which uses only traditional channels) to the so-called "clicks-and-mortar" model (Bernstein et al., 2008).

The platformisation of foodbanks may bring opportunities to increase their operational efficiency, for example, by increasing food recovery (Michelini et al., 2020) or optimising routes and scheduling to achieve cost reductions (of up to 30%) in terms of time and petrol (Nair et al., 2018). Digital tools enable the traceability and monitorisation of processes, facilitating inventory management and the supervision of storage capacity. The digitisation of such interactions paves the way for new sources of data. As a result, new insights can be used to create dashboards and foster data-driven decision making. During the Covid-19 lockdowns, for instance, predictive analytics were useful for pioneering foodbanks, which used data to forecast demand (Fiocco et al., 2020).

Using ICT-mediated ecosystems may also broaden the number and type of stakeholders interacting together, or even increase the number of volunteers (Kolk & Ciulli, 2020) and the diversity of profiles. However, platform governance remains key, as its design correlates with their approach to sustainability, as well as their social, economic, and environmental impacts (Morell & Espelt, 2019). All in all, foodbanks can take on this new role of facilitators and stewards of responsible governance, in addition to conceiving of platforms as spaces for generating trust.

One important challenge for foodbank platformisation is the digital divide, in terms of access to devices and connectivity, as well as literacy. Many foodbanks, particularly in the developing world, that rely on donations and volunteer work can neither afford computers nor have access to the Internet and would need to train their volunteers (Cosgrove, 2017; Townsend et al., 2019).

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PART 2

Introduction to Case Studies

In this section we present twelve different digital initiatives tackling hunger, food waste or both. The purpose of this collection is to showcase different digital practices, tools or mindsets aligned with platformisation that can be adopted by foodbanks to increase their capacity, efficiency and, ultimately, potential for impact. After compiling a database of more than 100 cases, we shortlisted ten examples based on the following criteria:

- Being a platform in the food distribution sector
- Private sector (not-for-profit, social enterprise, corporation)
- Beneficiaries are people in need (in case of corps: aim to provide affordable goods or services)
- Mission includes tackling food waste
- Information about their social impact is available

The sample includes the following cases:

Table 1. List of initiatives, by country, legal form and type of match

	Name	Country	Legal form	Type of match [1]
In-depth	Banco de Alimentos de Buenos Aires	Argentina	NGO	B2NGO
	OLIO	UK	Social enterprise	P2P, B2C, B2NGO
Short	Basic Life Charity	UK	NGO	B2C, B2NGO
	Bring the Food	Italy	Foundation (NFP)	B2NGO
	Chowberry	Nigeria	Social enterprise	B2NGO
	Feeding America	USA	NGO	B2NGO, NGO2NGO
	FoodCloud	Ireland	Social enterprise	B2NGO, NGO2NGO
	HopHopFood	France	NGO	P2P, B2NGO
	Karma	Sweden	SME	B2C
	Misfits Market	USA	SME	B2C
	Phenix	France	Social enterprise	B2B, B2C, B2NGO
	Plan Zheroes	UK	NGO	B2NGO

Source: The authors, based on desk and web research.

These cases are not intended to be a representative sample of the field but rather a varied selection in terms of the range of stakeholders matched through the platform, and the sectoral diversity, geographic miscellaneity, and different degrees of development of the initiatives. Two main cases are developed in depth due to their relevance and appropriateness to the purposes of the study. Firstly, Banco de Alimentos de Buenos Aires presents an outstanding app to speed up their operations, directly connecting donors, entities, and volunteers without using the warehouse. Secondly, OLIO is a social enterprise, born as an impact-driven platform which promotes civic and corporate engagement to tackle food waste.

In general terms the information has been retrieved mainly from secondary data and desk research, based on publicly available information (websites, reports, press releases and social media profiles). For the Banco de Alimentos de Buenos Aires and OLIO the research included a series of interviews with different stakeholders. Regarding the short case studies, all the organisations were contacted and invited to contribute and check the information written in the case studies, and eight out of the ten provided supplementary information.

The analysis of the cases is structured following the framework of five variables for social innovation, which are: social impact, financial sustainability, type of innovation, cross-sectoral collaboration, replicability, and scalability[2].

1 Acronyms explained: a) B2NGO: connects businesses and NGOs; b) NGO2NGO: connects NGOs with each other; c) B2C: connects businesses and consumers; d) B2B: connects businesses with each other; and e) P2P (peer to peer) connects individuals. Based on Michelini et al. (2018).

2 See the model drawn up by Buckland & Murillo (2015): *Antenna for Social Innovation. The Quest for Precision*. Institute for Social Innovation. ESADE. Available at: http://www.esade.edu/esocialhub/centro-de-conocimiento/recursos/antenna-social-innovation-the-quest-precision-0 [Accessed 17 June 2021]

Banco de Alimentos de Buenos Aires

CASE A

Overview General Description	The Banco de Alimentos de Buenos Aires [Buenos Aires Foodbank] is a non-profit organisation that delivers food to canteens and community organisations. It also assists undernourished people (80% of children and adolescents) by rescuing food that is edible but, for various reasons, cannot be sold.
Founded (place, year)	Buenos Aires (Argentina), 2001
Current Reach (countries or regions where it operates)	Conurbano Bonaerense (Buenos Aires metropolitan region)
Prizes, Awards & Mentions	ISO 9001:2015 certified quality management system
Website & Social Media	https://www.bancodealimentos.org.ar/ https://www.facebook.com/bancodealimentos.org.ar/ https://twitter.com/bdalimentos?lang=en https://www.linkedin.com/company/fundacion-banco-de-alimentos/about/ Instagram: @bdalimentos

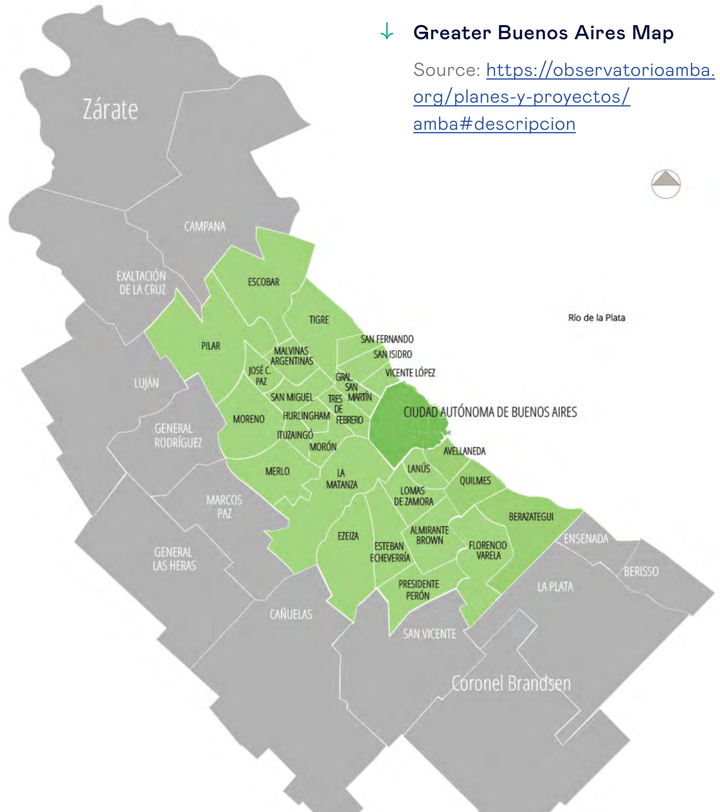
Social Impact	In 2020, they distributed more than 22 million meals through 1,317 charities, reaching more than 500,000 beneficiaries, most of them children.
Financial Sustainability	Their financial resources mainly come from donations, sponsorships and fees for charities.
Innovation Type	They developed the app 'Misión entrega' (Mission: Delivery) to handle donations on a small scale or of perishable products that need to be delivered as soon as possible (i.e. the same day). The app connects donors, volunteers and charities, offering an agile and direct process that is supervised by the Banco de Alimentos de Buenos Aires but does not go through their warehouse.
Cross-sector Collaboration	Their main activity is to create the solidarity chains between donor corporations (donating food, products or logistics services) and social organisations, thanks to volunteers.
Scalability & Replicability	The foodbank model has been replicated in various cities across Argentina. The app could potentially be used for bigger deliveries (i.e. for high volumes, too). It is technically replicable because it is modular (API[3] for integration). They are currently in talks with Banco de Tandil [Tandil Foodbank].

3 API stands for **Application Programming Interface.** The acronym refers to an intermediary software that enables applications to communicate with each other.

Introduction to the case & context

Banco de Alimentos de Buenos Aires (BdABA) was the first foodbank founded in Argentina. They began their activity in 2000, and the first donation arrived in April 2001. Today, foodbanks are present in 16 cities across the country. Argentina is an example of a volatile macroeconomic environment: between 1950 and 2016 the country was in recession about one-third of the time (World Bank, 2018).

The BdABA is headquartered in the Conurbano Bonaerense (a subarea within the megacity known as Greater Buenos Aires). This area is home to more than 10 million people, equivalent to 64% of the population of Greater Buenos Aires and approximately one quarter of the population of the country as a whole.[4]



Greater Buenos Aires Map

Source: https://observatorioamba.org/planes-y-proyectos/amba#descripcion

The BdABA was founded in the midst of a deep crisis that led to the highest poverty levels in the country's history (World Bank, 2018). This depression (1998-2002) came on the heels of a recession that began in the late 1990s, which ultimately led to the end of the convertibility regime in 2001/2002 and, thus, accelerated inflation. As a result, in 2002, 40% of the population of the metropolitan area was living below the poverty line (on less than $5.50 a day) (World Bank Group, 2020).

The initiative began with a group of friends with connections in the food industry, which has a very large presence in the Conurbano. They were concerned about the poverty and hunger the country was experiencing and the amount of food that was regularly wasted. Led by a priest named Rafael Brown, the group read about US foodbanks in a magazine. Inspired by this model, some of them travelled to Houston in 2000, returning with guidelines ('manuales de procedimiento') to start the solidarity chain in underprivileged areas of Buenos Aires. Given their close connections to several companies in the food industry, they entered into talks with potential donors and several charities.

The first donation was delivered in the spring of 2001. Since then, they have been operating as a not-for-profit organisation. Their motto is *'Menos hambre, más futuro'* (Less hunger, more future) and their mission is to match people suffering from food insecurity and hunger with those willing to collaborate, offering a transparent and efficient bridge to ensure that the donations reach the people who need them the most. All the warehouses they have rented over their 20 years of activity have been located in the industrial area of San Martín. The team currently consists of 37 employees across different areas (operations, social, food donors, resource development, human resources & quality, communication). In 2020, they delivered more than 22 million meals to more than 500,000 people.

Timeline of main events since its founding

2000 — The BdABA is founded.

2001 — The first donation is delivered to a charity.

They start with a small warehouse for local storage.

2011 — They rent a bigger warehouse in the same industrial area.

2018 — The 'Ley Donal' (Food Donation Act) is amended - link

2019 — The app 'Misión entrega' (Mission: Delivery) is launched; the pilot runs for about 6 months

2020 — From March on, the Covid-19 pandemic affects their regular activity due to sheltering-in-place measures and mobility restrictions

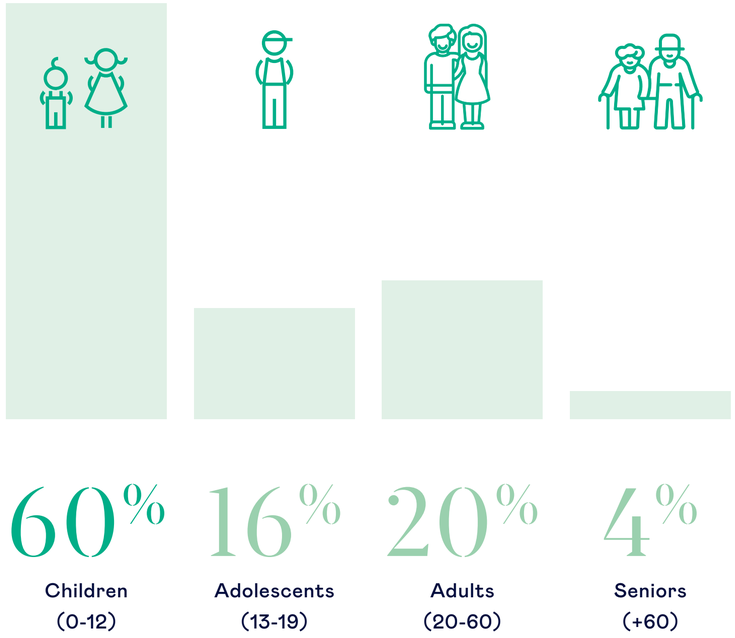
2021 — They will have heir own warehouse in Benavides (thanks to a land donation)

4 The estimated population of Argentina for 2021 is 45.8 million. These data were retrieved from the National Institute of Statistics and Censuses (INDEC) at: https://www.indec.gob.ar/.

THEIR MODEL

As a foodbank, they are replicating the solidarity chain based on donated food and products that are duly sorted, classified and stored. The donations are then distributed amongst social organisations located in the Federal Capital and the Metropolitan Area of Buenos Aires, including community kitchens, nursing homes, school support organisations, and rehabilitation centres, amongst others.

All these organisations feed thousands of people a day, the majority of whom are children (60%) and adolescents (16%):



60% Children (0-12)

16% Adolescents (13-19)

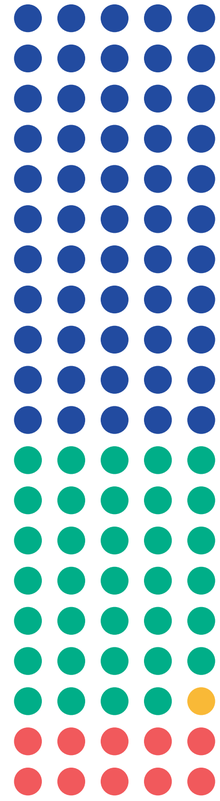
20% Adults (20-60)

4% Seniors (+60)

Source: BdABA (2020)

1. **RECEPTION:** They request donations of food that is suitable for consumption but has been taken out of circulation. The donations are made by stakeholders in the food industry (from food industry companies to retailers and producers). Logistics companies also offer freight services to transport the food from donors to the foodbank's warehouse and from there to the charities.
2. **CLASSIFICATION:** They receive both perishable and non-perishable products, and the warehouse, which spans more than 2,500 m^2, has cold chambers for refrigerated and frozen products. More than 40% of the products reaching the warehouse require a classification process to ensure that they reach the beneficiaries in optimal conditions. The classification and storage are carried out by two shifts of 50 volunteers (one in the morning and another in the afternoon).
3. **STORAGE:** Products in good enough condition to be donated are stored in the warehouse. The warehouse area is in charge of managing all the goods received. Its tasks include receiving and unloading trucks, classification and subsequent storage of the goods, and the preparation of orders for subsequent delivery to social organisations.
4. **DISTRIBUTION:** Once the food has been classified and stored and is ready to be donated, charities are informed of the available stock. Stock management software makes it possible to keep an accurate record of inbound and outbound goods with an alarm mechanism that sends alerts for imminent expiry dates and prevents the shipping of expired products. The integrated software is ISO 9001:2015[5] certified, ensuring the monitoring and traceability of all donations. Every donor can track which organisations receive their food, when, and what amounts.

The volunteer system:



- → **Individuals:** People who donate their time. They can come on a recurring basis (permanent volunteers) or sporadically (occasional volunteers). Individuals accounted for 55% of all volunteers in 2020.
- → **Corporate:** Groups of company employees who, coordinated by their company and within the framework of its social responsibility programmes, donate their time (34% of the total in 2020).
- → **Schools:** Groups of secondary school students who periodically go to the foodbank to classify food, coordinated by their institutions. The activity is intended to raise awareness amongst the students, showing them a different reality and giving them the opportunity to transform it (1% of the total in 2020).
- → **NGOs:** Groups of people coordinated by other social organisations who donate their time (10% of the total in 2020).

Source: BdABA (2020)

5 ISO 9001:2015 is the International Organization for Standardization (ISO) standard that determines the requirements for a quality management system. For more information on the specific quality management system in place at the BdABA, see: https://www.bancodealimentos.org.ar/modelo-de-trabajo/ (last accessed 13 April 2021).

CURRENT SITUATION AND IMPACT OF COVID-19

Before Covid-19, hunger was a persistent problem in Argentina due to the runaway inflation of over 50% that the country has suffered since 2018,[6] high unemployment and negative growth: in the first half of 2019, more than 35% of the Argentine population was living in poverty (around 7% in extreme poverty) (INDEC, 2021). In January 2020, the government launched the 'Argentina sin hambre' (Argentina without hunger) plan, including food cards and other measures to grant access to food for everyone. This plan has been endorsed and supported by the FAO, as Argentina is a paradox: a country in a food emergency but with a huge food-production potential. The FAO estimates that Argentina could be key to global food security, producing food for up to 400 million people around the world.[7]

In March 2020, due to the pandemic and the consequent restrictions on mobility and other sheltering-in-place measures, the BdABA had to adapt their solidarity chain. Their volunteering system was at stake: most of the volunteers at the warehouse are seniors and thus part of an at-risk population group or under lockdown or subject to other mobility restrictions. As a result, only 370 volunteers were able to keep up their commitments (93% fewer than in 2019) (BdABA, 2020). They thus had to cancel their on-site activities.

However, the provision of food was increasingly necessary. According to data from February 2021, the price of the 'Canasta básica alimentaria' (basic food basket) has increased 46% compared to February 2020 (INDEC, 2021). The situation is particularly acute in the Conurbano, where most of the social organisations operate. The BdABA director claims that the number of beneficiaries has almost doubled since the onset of the pandemic, from 260,000 to 500,000 individuals.

During the most restrictive periods of the pandemic, the BdABA staff were receiving, sorting and storing the food, whilst the pick-ups and delivery were organised using a corporate Cabify account. Although mobility was limited and volunteers were in lockdown, Cabify and other ride-hailing services were able to operate due to their classification as essential activities. This experience enabled faster delivery schedules, as 49% of the amount of donated food was delivered directly from the donors to the charities, whilst 51% was picked-up from the warehouse.

Social impact

In 2001, the BdABA delivered more than 300,000 kgs of food, reaching more than 93,000 beneficiaries. Today, it helps feed 500,673 people in 1,317 canteens and organisations in the Federal Capital and Greater Buenos Aires. The numbers increased significantly in 2020 (BdABA, 2020):

↓ **Increase in 2020:**

500,673 (+199%)
Beneficiaries

1,317 (+10%)
Charities

7,698,877 (+53%)
Number of Kg delivered

93% food — 7% essential & personal care products

According to their 2020 Annual Report, July was a record month, with the BdABA receiving 1,882,823 kg of food, and delivering 1,854,144 kg.

FOOD QUALITY AND NUTRITIONAL BALANCE:

The food delivered includes non-perishable (60%) and perishable food (15% frozen or refrigerated; 12% fresh fruits and vegetables).

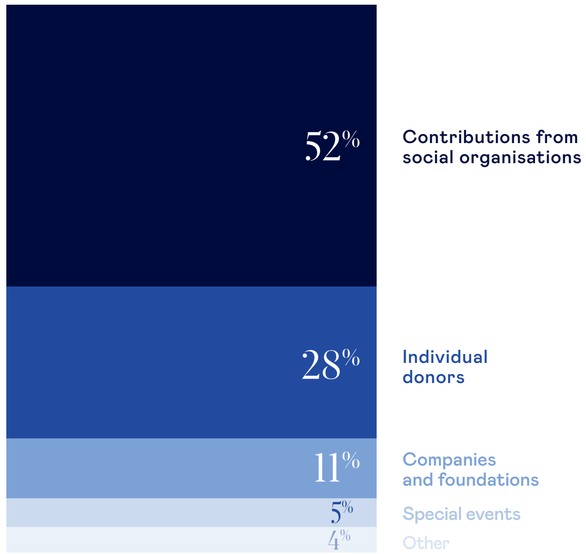
As for nutritional value, 65% of the food is of high nutritional value, meaning it offers a good balance of essential nutrients. According to three nutrition indicators based on the daily recommended allowances, the distributed food meets the recommendations for carbohydrates, protein, and fat, falls short in calcium, iron and fibre, and exceeds the limits for sodium.

6 For more information, see: https://www.telesurenglish.net/news/argentine-anti-hunger-plan-and-food-card-debuts-in-chaco-20200106-0011.html (last accessed 14 April 2021).

7 http://www.fao.org/director-general/news/news-article/en/c/1259401/ (last accessed 14 April 2021).

Financial sustainability

The BdABA is an NGO, and their financial sustainability depends on private donations. Their funding strategies include symbolic contributions by social organisations (covering the expenses of the deliveries), a community of active donors, companies and foundations that donate food or logistics services (e.g. transport), fundraising events, philanthropy marketing and digital marketing. The following table shows the overall share of each source:



Source: BdABA (2020)

In 2020, the funds received increased 55% compared to the previous year. The main strategies deployed during the lockdown weeks were based on engaging individual donors through social media and campaigns, combined with digital events in partnership with corporations. One example was the 'Doná en un click' (Donate in one click) campaign, which raised the equivalent of 6,000 kgs of scarce products such as milk, oil and sugar.

> 'It was an action we launched so people could donate money to us so we could acquire certain products or combinations of products we do not usually receive as donations and that organisations need. We launched a specific platform and an ad hoc campaign for this purpose.'
>
> (Virginia Ronco, BdABA)

> 'We are very happy with these results. First, because they show that people remain strongly supportive and committed. Second, because, thanks to this online fundraiser, we can provide specific products, such as milk, oil and sugar, that are essential for the organisations we work with.'
>
> (Marisa Giráldez, director of the BdABA)

Cross-sector collaboration

All foodbank models are cross-sectoral by definition, as they act as enablers of the solidarity chain, matching surplus food to people in need.

They are well connected and often partner with national and international organisations in the foodbank ecosystem. The BdABA is a member of the Global FoodBanking Network, the Argentine Network for International Cooperation or RACI (a federation of civil society organisations), and the Argentine Foodbank Network.

They also promote and engage in partnerships with around 50 corporations and, in 2020, had 21,865 active givers of all kinds (adding 5,794 new donors).

The surplus food comes from 200 donors (of whom 80 joined in 2020), including food industry companies, retailers, supermarkets and producers. Logistics donors (including 5 new donors in 2020, bringing the current total to 10) offer services ranging from transport to software development.

They are in constant communication with all stakeholders and their sophisticated software helps them track inventory and report the stock efficiently.

Due to the lockdown measures and mobility restrictions, they started offering workshops on nutrition and food handling to 120 people from 60 social organisations.[8]

8 For more information on stakeholders, see:
https://www.bancodealimentos.org.ar/Organizaciones-sociales/
https://www.bancodealimentos.org.ar/voluntariado/
https://www.bancodealimentos.org.ar/donantes-de-alimentos-productos-y-logistica/
https://www.bancodealimentos.org.ar/donantes-de-fondos/

EXAMPLES OF CROSS-SECTOR CAMPAIGNS

The BdABA also contributed to the #SeamosUno (Let's Be One) campaign. As in their beginnings, a Jesuit priest from San Martín mobilised several corporations and was able to collect food that was then delivered by the foodbank. This emergency food drive lasted 6 months and reached 1 million boxes containing 16 kg each (the amount needed to nourish a family of four for one week).[9]

PAPAS DE BALCARCE

In 2020, the BdABA was able to deliver higher rates of fresh products thanks to direct donations from producers. One of the most salient examples was the 62 tonnes of rescued 'papas de Balcarce' (Balcarce potatoes):[10]

> **'Argentina's largest potato-growing region is Balcarce, in the province of Buenos Aires. In 2020, for the second consecutive year, we received a donation of many tonnes of potatoes that were taken by different lorries directly from the producers to the social organisations. The BdABA washed and bagged the potatoes, but the important thing is that we managed to rescue thousands of kilos that would otherwise have gone to waste. The potatoes were fine; they just were not the right size according to the standards of the company that planted and harvested them.'**
>
> (Virginia Ronco, BdABA Institutional Communication Department)

'WHOPPER SOLIDARIO' WEEK

This campaign was a partnership with a frequent donor company, the restaurant chain Burger King, for World Food Day. For one week (from 16 to 23 October), customers could get a Whopper combo meal at a 30% discount, whilst collaborating with the BdABA. For every Whopper sold, Burger King donated a hamburger to the foodbank.

CHANGES IN THE REGULATORY FRAMEWORK

In 2004, Law 25,989 - Special Regime for Food Donations, known as the 'Ley Donal' (Food Donation Act), was enacted in Argentina with the aim of encouraging food donations to help meet the needs of the most vulnerable populations. The Act stipulates who can donate, what products, how it should be done and the rights and obligations of each party. In the first version of the Act, the donor was not afforded any legal protection, as the law did not include any provision limiting liability once the food had been donated and across the solidarity chain. However, in 2018, following a petition that collected more than 500,000 signatures, the law was amended to 'hold donors harmless for damages that might be incurred, provided the donation had been made without concealing any defects in the product and subject to the food-safety controls required by the Argentine Food Code'.[11]

According to the BdABA director, this regulatory change was a breakthrough for small restaurants, as opposed to big chains, which have their own legal services and greater capacity. Whilst it did not have a large impact in terms of donations to the foodbank, it helped attract new donors, such as KFC:

> **'This was great news for food donors like us (KFC & Wendy's), who have entered the market recently (less than 10 years ago). The fact that the donor is no longer responsible for the entire distribution chain mitigates the fears and frictions we had before. That was when we considered starting to donate food. As a brand, it is really helpful to prevent food waste, and the seriousness of Banco de Alimentos de Buenos Aires makes them a trustworthy partner.'**
>
> (Inés Kubisén, KFC & Wendy's)

Following this amendment, in 2018, KFC performed an analysis of the surplus food it generated. At the time, they had 10 restaurants in Argentina and were generating 200 kgs of food waste per week. They started donating food with fixed schedules: volunteers would bring special bags and pick up boxes of about 20 kgs at the restaurant, every Monday and Thursday at 10 a.m.

Their standard states that every meal cooked at the restaurant has to be served within 2 hours. Beyond that point, although it remains edible and suitable for consumption, it no longer meets the KFC standards. Leftover food is refrigerated and spoils after 7 days unless frozen and should thus be eaten immediately.

9 Additional information on the 'Seamos Uno' campaign can be found at: https://www.seamosuno.com.ar/caja (last accessed 14 April 2021).

10 'Salvando papas': https://www.redbda.org.ar/post/salvando-las-papas (last accessed 14 April 2021).

11 'Se aprobó la modificación de la Ley Donal': https://www.bancodealimentos.org.ar/novedades/se-aprobo-la-modificacion-la-ley-donal/ (last accessed 14 April 2021).

Innovation type

The key innovation deployed by the BdABA is the 'Misión Entrega'[12] (Mission: Delivery) web-app. The aim is to be able to handle donations on a small scale or of perishable products that need to be delivered as soon as possible (i.e. the same day). The app connects donors, volunteers and charities, offering an agile and direct process that is supervised by the BdABA but skips the warehouse. In other words, the foodbank provides a digital infrastructure instead of brick-and-mortar facilities. The app was launched in June 2019 and the pilot test was ended in March 2020, due to the outbreak of Covid-19.

THE REASONS FOR 'MISIÓN ENTREGA'S

Several reasons prompted the BdABA to consider developing this app. According to Marisa Giráldez (the director), the main ones were:

- A trend amongst other foodbanks and best practices observed since 2015 and across the Global FoodBanking Network. Successful examples had been launched in the UK, the US and South Africa (connecting retailers and supermarkets with charities directly).
- Difficulties absorbing small donations (around 20 kgs) and/or fresh and perishable products requiring agile processing. Previously, small donations were often lost due to slowness or inefficiency.
- The need expressed by social organisations that lacked the logistic capacity to pick up small donations.
- The need to maximise the durability of the food.
- In addition, volunteers were asking for more flexible ways to help the organisation, other than doing shifts at the warehouse to assist with reception, classification and storage.

WHAT AND HOW

After attending a Global FoodBanking Network meeting where many apps matching donors and charities were presented, the BdABA transferred the conversation to the organisation. Although the existing platforms were a source of inspiration, they could not be directly reused due to the lack of integration with other software. This was the main barrier, as all the BdABA's operations are managed by CallCen, an internal piece of software developed and maintained voluntarily by a donor. This is also the software that is ISO 9001-certified for quality management.

Three years later, in 2018, the plan to develop an app was approved by the Board of Directors and a portion of the financial reserves was allocated to the project.

ASSESSING THE VIABILITY

The first step was to assess the project's viability by surveying the social organisations about their access to an Internet connection and devices, as well as their capacity and willingness to adopt a new platform on a daily basis. They found that 70% of the organisations owned and used mobile phones regularly and most were willing to participate.

After building the business case, and in light of the project's importance, they opted for professional development:

> **'We had a previous experience, in 2011, with developing a sort of ecommerce app for stock management. It was a pro-bono collaboration with people volunteering their time, so the entire process took 4 years. In this case, we wanted to develop it faster, so we opened a tender.'**
>
> (Marisa Giráldez, director of the BdABA)

In early 2019 they opened a tender, which was won by a small SME (SmallCode[13]), which is aligned with the foodbank's vision and mission and has synergies with the technical volunteers.

> **We [SmallCode] decided to submit a bid because it was a social and technical challenge. We are a small software development company; we want to have a social impact and purpose.'**
>
> (Ignacio Godanno, developer at SmallCode)

CO-CREATION WITH STAKEHOLDERS

As the app connects donors, organisations and volunteers (for pick-ups and deliveries), the first prototype involved all stakeholders. The first meetings were dedicated to assessing the purpose and expectations of the technology to be used. The solution had to:

- Be tailor-made and inclusive, considering the needs and abilities of all stakeholders.
- Ensure traceability and integration with the BdABA's current software.
- Make small donations to the social organisations easily visible.

12 The app is available for Android devices in Argentina; new volunteers must be pre-approved by the BdABA: https://play.google.com/store/apps/details?id=ar.org.bancodealimentos.app&hl=en.

13 For more information about SmallCode, visit their website at: https://www.smallcode.com.ar/.

They chose to develop a web-app: the website is based on PHP and is used by donors and the BdABA, whilst the app (built on React Native) is for organisations and volunteers. Everything is integrated with the CallCen backend, the foodbank's central management software:

> **'The key development aspects led us to focus on a complex use case, so we created an MVP [minimum viable product] to resolve the critical path: being able to bring donated food from point A to point B as quickly as possible and under the best conditions. We aimed for a scalable solution with the current technological standards.'**
>
> (Juan Manuel Agüero, SmallCode developer)

HOW DOES IT WORK?

The whole process, which is supervised at every point by the BdABA, can be broken down as follows:

1. The donor (A) posts an offering through the website.
   a. They use 5 categories pre-defined by the BdABA: refrigerated food, dry food, household & personal care products, processed food, fresh fruit & vegetables
   b. All charities located within a radius of 5 km r eceive a push notification.
2. Once a charity (B) accepts the donation, volunteers receive push notifications to pick up the box at A and deliver it to B. This process is also based on geolocation.
3. A volunteer agrees to do the pick-up and delivery.
4. Once the donation has been delivered, all parties are invited to rate the experience (via a very simple survey consisting of 3 yes-or-no questions). It is simple, quick and quantitative.
5. The donation is tracked and stored in the BdABA's main software.

In case of problems, a side chat makes it possible to report unexpected developments as they occur (e.g. A and/or B are closed, a traffic jam, car problems, poisoned food).

As the system is based on geolocation and proximity to ensure agility, it was crucial to include:

- precise and verified geolocations to avoid time waste
- the perishability of the food
- opening hours for both donors and charities
- solutions for exceptions (e.g. some fast-food chains located in shopping malls are not allowed to use the Internet and/or PCs)

After 6 months of development and training sessions by the foodbank (using videos and tutorials), the app was launched in June 2019 in specific areas of Greater Buenos Aires. For this pilot, they included 50% of the partner social organisations, leaving out the less accessible ones and those in the least safe neighbourhoods to ensure volunteer safety.

In addition to the platform development and training sessions, the BdABA had to ensure the logistics for the small and perishable donations, providing insulated bags and coordinating shared coffers.

The app was only available in Argentina and whilst organisations could register freely, volunteers had to be pre-approved by the BdABA. It was developed for Android because that was the operating system used by all the surveyed potential users. The technology is simple and is not resource-intensive for phones, as the range of devices used by the foodbank's users is varied and they are generally fairly basic.

RESULTS AND OUTPUTS OF 'MISIÓN ENTREGA'

The app was up and running for 9 months. In that period, the BdABA and its stakeholders observed several outcomes to be assessed in terms of quality rather than quantity.

> **'In quantitative terms, we moved 400,000 kgs per month, with only 2,000 originating from the app (0.5% of the total). However, we were able to increase the amount of protein and thus improve the nutritional balance.'**
>
> (Marisa Giráldez, director of the BdABA)

Additionally, a slight change was observed in the profile of the volunteers, who were younger, more flexible and had their own means of transport. The initiative attracted students and people between jobs and enabled food donations on Saturdays.

The app project was also well received by the BdABA's staff:

> **'It encouraged teamwork and pride. No one was afraid and the tech volunteers were very open to sharing and co-creating the API to connect with the web-app and app.'**
>
> (Marisa Giráldez, director of the BdABA)

BENEFITS FOR DONORS:

- Possibility of offering their products quickly and agilely, at no extra cost
- Optimisation of food rescuing
- Greater flexibility to make smaller donations
- Solution for highly perishable products

From the donor perspective, and according to the experience of KFC, the app is particularly helpful for managing unexpected developments. Flexibility and agility are ensured as each restaurant is autonomous: it can report any food surplus directly on the web-app, using the restaurant manager's mobile phone.

> 'This is viewed as another standard procedure at the restaurant. It takes one second and is quite simple. It has been widely adopted by workers, to the point where, when it was temporarily discontinued during the lockdown, it was the employees who were asking to reactivate the project as soon as the lockdown measures were lifted.'
>
> (Inés Kubisén, KFC & Wendy's)

Between September and December of 2019, four restaurants were able to donate food through the app. In January 2020, two more were included, bringing the total to six. Over the course of the period, a total of 1,500 kg of surplus food that would otherwise have gone to waste was donated. Furthermore, the chain is considering starting a corporate programme to volunteer with the BdABA:

> 'One of our employees once volunteered to bring the food to the charity himself. It was such a life changer that we are considering including this as a corporate volunteering activity. But most of our workers do not own a car or any other means of transport.'
>
> (Inés Kubisén, KFC & Wendy's)

BENEFITS FOR CHARITIES AND SOCIAL ORGANISATIONS:

- Logistics savings
- Receipt of more donations and a greater diversity of products
- Proactive acceptance of donations via a user-friendly technology
- Training on the use of new digital tools

BENEFITS FOR VOLUNTEERS:

- A new participation channel
- A flexible model for volunteering due to the app's agility and broader schedules (instead of fixed pick-ups)

M.R. started volunteering at the BdABA in late 2019, 5 months after the app was launched. For his first service, he received a special box. He works as a teacher at a local school and has a small van he can use to transport the donations. About the app, he explained:

> 'It reminds me of Uber. You can choose your "mission"; you can choose the ones that are nearest to you or most convenient.'
>
> (M.R., BdABA volunteer since late 2019)

He started with the app but is now helping with fixed pick-ups, bringing food from a KFC to a rehabilitation centre twice a week. He also highlighted the impactful feeling of the volunteer work:

> 'Your time [availability] changes the world. Your service is useful because you are taking the product from point A to point B. You see how your mission has an impact. You talk to them. But it is difficult to commit. The app makes the procedure more agile.'
>
> (M.R., BdABA volunteer since late 2019)

Even the developers have expressed their gratitude for the project:

> 'It is very gratifying. Working with all the stakeholders and developing something privately, without the pressure to scale up from the very first day... Every start-up should experience something like that.'
>
> (Ignacio Godanno, developer at SmallCode)

Scalability & replicability

The foodbank model has been scaled and replicated around the world and several app initiatives have been deployed in various countries.

The 'Misión Entrega' app has been paused due to the restrictions following the Covid-19 outbreak, but the BdABA already has plans to upgrade certain features. After the successful nine-month pilot test, another donor has already provided funds for future development. Two potential upgrades include:

- → Making it possible to use the app for bigger deliveries (high volumes), too.
- → Expanding the logistics partnerships: with the inclusion of Cabify and other ride-hailing service buttons in the app – they had been using a corporate account during the pandemic – which could be a solution for volunteers who are willing to help but do not own a car.

The project has drawn interest across the Argentine Foodbank Network, and the BdABA are currently in talks regarding potential replication with the Tandil Foodbank, also in the province of Buenos Aires. Replicability is technically possible, as the app is built to be modular (including an API for easy integration). However, the interviewees agree that certain factors have facilitated the deployment:

Factors of success:

1. **A clear roadmap and surveys** on viability and key stakeholders' willingness to participate.
2. **Development of a seamless solution for end-users**: usable, user-friendly and efficient (not time-consuming).
3. **Co-creation of the platform with all stakeholders:** simple, minimal buttons, usable, user-friendly, not time-consuming, quick, useful, etc.
4. **Connection and integration with the BdABA's** current software to ensure traceability.
5. **Training for end-users to ensure they can manage** the app.

The future of foodbanks

The interviewees working at the BdABA have a clear view regarding the future of foodbanks, which they see as moving away from the aid-assistance dynamic. In the country's current socioeconomic context, they foresee a risk that poverty could become chronic:

> **'What is needed is comprehensive approaches to tackling poverty, offering quality jobs and food cards. The government programme "Argentina sin hambre" [Argentina without hunger] is now offering food cards for single mothers of children under the age of 6, equivalent to 80 dollars per month. That's a start.'**
>
> (Marisa Giráldez, director of the BdABA)

INTERVIEWEES

- BdABA: Virginia Ronco (Institutional Communication), Maria Gonzalez Crende (Institutional Communication), Marisa Giráldez (director of Banco de Alimentos de Buenos Aires)
- SmallCode developers: (Ignacio Godanno, Juan Manuel Agüero) - https://www.smallcode.com.ar/
- Donors: Inés Kubisen (Degasa, KFC and Wendy's in Argentina)
- Volunteers: M. R.

LIST OF REFERENCES

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OLIO

CASE B

OLIO

SHARE MORE ♥ WASTE LESS

Overview General Description	OLIO is a social enterprise that enables food sharing by connecting neighbours with each other through an application. Individuals and families with food surpluses can donate to their neighbours. OLIO also collects surplus food from businesses through a network of volunteers and distributes it to local communities via the app. OLIO's mission is to help create a world in which nothing of value goes to waste, and every single person has enough to eat – without destroying the planet in the process.
Founded (place, year)	London (UK), 2015
Current Reach	59 countries
Prizes, Awards & Mentions	Recipient of more than 20 prizes and awards, including: · 2020 – Best Food Waste Prevention App (SME News Greater London Enterprise Awards). · 2019 – App of the Year (Business Green Technology Awards) · 2019 – Next European Unicorn, Tech for Good (Vivatech Europe) · 2018 – UN Momentum for Change Award
Website & Social Media	https://olioex.com/ https://www.instagram.com/olio.app/ https://twitter.com/olio_ex https://www.facebook.com/olioapp/

Social Impact	More than 3.6 million users have registered for the app and one-third of users are people in need. Approximately half the food on the app comes from neighbours sharing their spare food. Since their early days, almost 18 million portions of food have been redistributed. Female empowerment is a crucial attribute in its business model: OLIO was co-founded and is currently led by women. Two-thirds of the app's users are women too.
Financial Sustainability	OLIO has been in multiple funding rounds with business angels and venture capital funds. Since 2019, it has raised a total of €8.5 million. The basic version of the app is free for neighbours and the revenue streams are based on two types of transaction fees: the most profitable are the fees for businesses donating surplus food. Secondly, in October 2020, they launched MADE, a marketplace that allows the OLIO community to sell homemade food and handmade crafts.
Innovation Type	Innovation started with the neighbour-to-neighbour food-sharing app and has evolved into an example of tech-driven community engagement. The app was developed using proprietary software, in collaboration with Simpleweb (who are both the app developer and an OLIO investor).
Cross-sector Collaboration	OLIO is cross-sectoral by nature, as it connects neighbours with each other, but also enables food donations from retailers and wholesalers to organisations and charities. They have partnered with more than 100 hospitality firms in the UK alone (including hotels, restaurants and supermarkets).
Scalability & Replicability	Both the digital platform and the business model are replicable in other contexts. OLIO is present in almost 60 countries and the app is currently available in English and Spanish. In some countries, OLIO has expanded due to a bottom-up demand for tackling food waste. Their aim is to scale up and reach 1 billion users by 2030.

Introduction to the case & context

OLIO was founded by Tessa Clarke and Saasha Celestial-One after various corporate careers in publishing, ecommerce and fintech. They met in an MBA programme in 2002, and the company was incorporated in 2015 (North London). The basic concept is a food-sharing app to tackle food waste, enabling neighbours to share their spare food with other neighbours.

> ‘Our vision is for millions of hyper local food sharing networks all around the world. We believe OLIO can help create a world in which nothing of value goes to waste, and every single person has enough to eat – without destroying our planet in the process.’
>
> (OLIO website)

The ‘light-bulb’ moment was connected to Tessa Clarke’s personal experience. Whilst packing up her family flat to move back to the UK from Switzerland, she noticed they still had some good food that they had not managed to eat. It was perishable and she tried to give it away without success:

> ‘I can remember how crazy it seemed to throw all this food away when there were likely to be plenty of people within hundreds of metres of me who would have loved to have it. The problem was they just did not know I had it to share. It was as I was surreptitiously packing the non-perishable items into the bottom of my moving boxes that I was struck by the idea of creating an app that could connect me with my neighbours so I could give this food away instead.’
>
> (Tessa Clarke, Co-founder)

As soon as she landed in the UK, she shared the idea with Saasha, who became the first supporter. Their initial steps were to frame the problem of food waste doing some desk research. They learnt that 30% of the food produced globally goes to waste (FAO, 2019). If it were a country, it would be the third-largest source of greenhouse gas emissions after the US and China (FAO, 2013).

What does OLIO mean?

‘OLIO means a “miscellaneous collection of things” – which is what you will see when you look on the app! It is also the name for a traditional Mediterranean stew; and stew is a dish that is commonly created to prevent food waste. We also chose the name OLIO because we loved the two O’s which could be symbolic of the planet, or the local community and/or the idea of sharing to create a circular economy. And finally, we really loved the word and the way it sounds.’
(OLIO website)

FOOD WASTE AND HUNGER IN THE UK

According to a 2020 report by the Waste & Resources Action Programme, the UK government’s waste advisory body, UK households waste 4.5 million tonnes of edible food every week, which is equivalent to €820 for an average family per year (WRAP, 2020b). Household waste accounts for 70 per cent of total waste, manufacturing for 17 per cent, and hospitality for 9 per cent (WRAP, 2020a).

In parallel, according to the Trussell Trust, between 1 April 2020 and 31 March 2021, foodbanks in the Trussell Trust’s UK-wide network distributed 2.5 million emergency food parcels to people in crisis, a 33% increase from the previous year.[14] The Trust has launched a campaign to envision a future without foodbanks thanks to ‘a benefits system that works for everyone and secure incomes so people can afford the essentials like food and heating’.

THEIR MODEL

The OLIO model was initially inspired by neighbours sharing their spare food with other neighbours to tackle food waste due to environmental concerns. The role and the importance of the sharing community is key, and their storytelling is all about framing food-waste recovery as a social action and calling those who fight waste heroes. Although OLIO is not openly tackling hunger, one-third of the platform’s individual users are in troubling financial circumstances. This offers them a different avenue to access edible food at lower prices that is not subject to an aid-assistance scheme, particularly in the aftermath of the various Covid-19 outbreaks, which have increased pressure on existing foodbanks. In Tessa’s words:

> ‘I feel that the real beauty is that we have created something that is all about community and not charity. Everybody gives and takes with no questions asked, and we’re all united in our belief that no good food should go to waste – the problem of food waste is so enormous globally that we all have to get involved in solving it’
>
> (Tessa Clarke, Co-founder)

In addition to their peer-to-peer origins, ensuring a large supply of food within the platform was key to benefit from network effects and encourage individuals to take the ‘leap of faith’ and join the community (Ciulli et al., 2020). To this end, they started to involve wholesalers, retailers, restaurants, hotels and other players in the food and hospitality sectors. All have considerable amounts of surplus food that is edible and may soon reach its expiry date. More recently (in early 2021), OLIO created a marketplace where users can sell homemade food and handmade crafts.

Thus, the OLIO model is two-fold: individuals and businesses on the supply side, and individuals and charities on the demand side.

14 For further details visit: https://www.trusselltrust.org/news-and-blog/latest-stats/end-year-stats/ (last accessed 28 May 2021).

PEER-TO-PEER SHARING

In this case, individuals are on both the demand side and the supply side. Anyone can create a free account and post portions of food to be shared (including a picture and some information such as the expiry date, location, and pick-up times). Users with unwanted food simply take a photo and upload it to the app, adding a description and indicating when and where it can be picked up. Neighbours who live nearby receive an alert, can browse through the listings, request what they want, and stop by to pick it up.

FOOD SURPLUS MANAGEMENT FOR BUSINESSES

Any business with surplus food can partner with OLIO through the 'Zero Food Waste' programme. OLIO frames this collaboration as providing a sustainable solution to redistribute their surplus food to local communities. They work with caterers, hospitality companies, schools and universities, food service operators, offices, retailers and shopping centres. The only requirement for businesses is to hold a food hygiene certificate.

The demand side can be either individuals or NGOs. OLIO offers a way to deal easily with surplus whilst helping corporations achieve their sustainability goals and measure their social, environmental and economic impact.

THE FOOD WASTE HEROES

Volunteers are the cornerstone for OLIO to handle its operations. More than 75,000 were trained in spring 2021 and are now actively engaged 'Food Waste Heroes'. This sophisticated volunteer programme is also aligned with the goal of fostering a community where people concerned about food waste and the environmental impact can engage and belong.

OLIO offers 6 different ways to volunteer. The main role is to save and redistribute food and items, but they have also created other roles, such as Ambassadors to spread the word, team leaders and business recruiters:

Purpose	Role	Where	Time per week	How
Saving and/ or redistri-buting	Food Waste Hero	Global	2-3 hours	Picks up unsold/surplus food from a local food business and redistributes it on OLIO
	Home Hero	Global	30 mins	Collects neighbours' spare stuff and redistributes it on OLIO
Team mana-gement	Squad Captain	Global	1 hour	Leads a team of Food Waste Heroes to collect and distribute surplus food from a business
Business recruitment	Signing up businesses to OLIO	Global	2-5 hours	Engages with businesses to convince them to collaborate with OLIO
Spreading the word	Community Hero	UK	30 mins	Helps spread the word by going door to door in neighbourhoods
	Digital Ambassador	Global	5-10 mins	Promotes OLIO and the 'share more, waste less' message online and across socials.

Source: https://olioex.com/get-involved/volunteer/

HOW DOES IT WORK?

When a new business enters the Food Waste Hero programme, OLIO carries out an assessment to identify their food collection needs (including the types of food, the amounts, regularity, locations, etc.). Based on this assessment, OLIO recruits and trains a team of volunteers that will arrange pick-ups, collect, and redistribute the surplus food to the local community (either individuals or charities, depending on the case). The volunteers will use the OLIO app to itemise the collected portions of food, allowing people and organisations in the neighbourhood to see what is available and request particular food items.

> **'Keeping it local is key: the longer the kill chain (the out-of-the-freezer period needed to relocate food from donors to OLIO), the higher the risk of food spoiling and hence of food waste and food poisoning.'**
>
> (Simon Blake, Customer Satisfaction & Compliance Manager)

Food safety is a top priority and for this reason OLIO has developed a Food Safety Management System (an online training programme for every volunteer) to ensure the food is handled safely. This system was created in partnership with local government authorities in the UK.

> **'Volunteers' compliance, in terms of both training and ad-hoc procedures to be followed, is one of the main risks for the company.'** (Simon Blake)

The Food Waste Heroes teams are cautiously selected, trained and monitored by OLIO staff. Any user who has previous experience exchanging food within their community and has a rating above 3.5 (out of 5) can apply to volunteer at OLIO. Every application is pre-screened and volunteers then take an online training course and pass an online exam. This training includes a self-assessment on which domestic kitchens and fridges are fit for the purpose of redistributing surplus food. It also includes a section on allergens control, to ensure that accurate information can be passed on to the final consumer. Once the exam is passed, volunteers have an in-person induction prior to their first pick-up. From then on, volunteers are included in a chat community for their local area, which is supervised by staff members at OLIO. Retaking exams on food safety is mandatory to keep volunteering.

THE IMPACT OF COVID-19

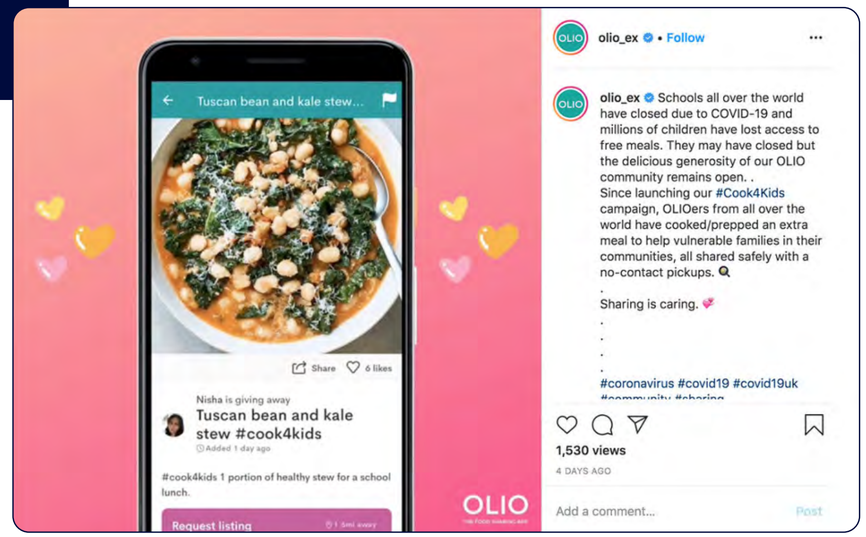
Lockdown measures and other restrictions have entailed a significant shift and a surge in the number of OLIO users, with listings growing by as much as they had in the first five years of business combined. The food distribution process has become more complex due to social-distancing measures on the one hand, and fears and reluctance to eat redistributed food on the other:

> **'COVID-19 has affected food distribution: time-scheduling when collecting food is required so as to avoid gatherings of users in order to comply with the pandemic regulations. However, food quality and shelf life may be impacted the most, as fewer users overall feel comfortable collecting food due to contamination-related fears'**
>
> (Mary, volunteer since 2019)

OLIO opened an entire Covid-19 Q&A section on their website to post updates, recommendations for volunteers and food sharers, hygiene guidance and best practices for safe sharing. Their communication means were also strengthened, particularly the help lines for volunteers.

The surplus of unsold food at restaurants and corporate canteens was an opportunity for OLIO to commit even further to vulnerable families. They promoted no-contact pick-ups and started recruiting more volunteers to ensure their capacity to operate in these exceptional times. OLIO also decided to raise awareness creating two campaigns to engage users and businesses:

- postcards that people in need can fill out with their details to start receiving supplies;[15] and
- the #Cook4Kids campaign, inviting OLIO users to cook and share for kids of vulnerable families during the periods that schools are closed, which limits access to free meals for the children of disadvantaged families.



Social impact

OLIO is one of the most popular platforms in the UK (Michelini et al., 2020). According to data provided by OLIO,[16] the app currently has more than 3.6 million users (or OLIOers, as they call them). The company claims that one-third of the users are people in poverty or with limited financial possibilities. According to interviewed volunteers, their perception is that OLIO has substantially increased the quality of life of the most vulnerable users, who may not have easy access to some products, such as meat, fresh bread or other foods in terms of variety and nutritional balance, which can be found on the platform. Volunteers are a basic pillar for the firm's operation; in the spring of 2021, 75,890 people were engaged.

In terms of magnitude, since it was launched, nearly 18 million food portions have been shared through the platform. Their model, which combines the app and the volunteers' logistics, has proved to be an efficient solution for redistributing surplus perishable food: on average, 40% of all the food listed on the app is requested in less than one hour, and 75% is requested within 24 hours. Furthermore, approximately half of the food on the app comes from neighbours sharing their spare food, and half from 'Food Waste Heroes'. As the goal is to avoid food waste, when the expiry date approaches and there is risk of food poisoning, they opt for different alternatives:

> **'For instance, fruit and vegetables must be given out to users within 24 hours of collection: if any stock remains uncollected, volunteers may opt for an alternative collection point (usually church entrances) as a last resort.'**
>
> (Mary Goncalves, volunteer since 2019)

15 The impact was reported by Reuters: https://www.reuters.com/article/health-coronavirus-food-britain-idUSL8N2BB421 (last accessed 28 May 2021).

16 See the 'Our impact' section at: https://olioex.com/about/our-impact/ (last accessed 31 May 2021).

The OLIO community has grown rapidly in the last three years, but particularly since the Covid-19 outbreak. The following table shows the main KPIs for 2018, 2020 and 2021:

↓ **Table 2. OLIO's main KPIs**

	2018	2020	2021
OLIOers	1.2M	2,615,904	3,631,253
Portions of food shared	2M	9,825,104	17,829,996
Car miles saved (in tonnes of CO_2)	–	28,814,122	52,355,572
Number of volunteers and Ambassadors	35,000	55,621	75,891

In qualitative terms, many volunteers stress their sense of belonging and environmental commitment, as well as their appreciation of the easy access to food:

> 'I'm a student. This way I get free food. I started using Olio to get cheap food and now I'm volunteering once a week. I feel good, connected... I feel environmentally conscious, like I'm part of the community.'
>
> (M.J., volunteer in North London)

Being a volunteer at OLIO also has an impact in terms of community building and personal motivation:

> 'It's a really amazing experience to see that your effort is well received and making a change in people's lives'
>
> (Petko, volunteer since April 2020)

> 'Our volunteers tell us it's a life-affirming experience. They get to go to the stores, see all that amazing food and then give it away to the community'
>
> (Saasha Celestial-One, Co-founder)

Financial sustainability

OLIO is a social enterprise and, since 2015, has been in multiple funding rounds with business angels and venture capital funds. In the past 6 years, they have raised €8.5 million from 14 different investors. The following table shows the publicly available data on the rounds:

↓ **Table 3. OLIO's funding rounds**

When	Transaction name	Amount
October 2015	Seed Round	-
January 2017	Seed Round	€1.85 M
July 2018	Series A	€7 M
January 2019	Venture Round	-

Source: https://www.crunchbase.com/organization/olio/company_financials

According to the website, in 2021 OLIO is not yet profitable and revenues cover approximately 30% the company's expenses.[17]

17 For further details, see: https://help.olioex.com/article/82-how-are-you-making-money (last accessed 26 May 2021).

Business models

The OLIO app is free to use for individuals. One of their fundamental principles is that the core features of the app remain permanently free and available for all. This includes the basic features enabling the neighbour-to-neighbour sharing, thereby fostering the reduction of food waste, which is essential to OLIO's mission.

The current business model relies on 3 different revenue streams, namely, in order of importance:

1. **Food Waste Heroes programme:** targets businesses in the hospitality sector that are willing to donate surplus food. Every company pays a one-off fee when joining the platform and an annual license fee. The final cost varies depending on the size of the company. In return, companies have access to a wide range of indicators to help them measure and report their social and environmental impact (e.g. number of meals saved or CO2 diverted). The logistics of food surplus donation relies on a volunteer system. OLIO oversees overall management, from donation pick-ups to redistribution to local communities. The fees cover and sustain the logistic operations.
2. **OLIO Supporter:** this is a recent subscription scheme, under which individual users can become 'OLIO supporters', paying small fees (€33 a year or €6 a month) to unlock special features of the app, such as making the listings visible on a map.
3. **OLIO shop:** this is still a marginal revenue stream, more oriented towards community building and promoting a sense of belonging through merchandising products (such as OLIO t-shirts or bags).[18] The motto is 'spread the word about OLIO in style'.

In the past they have received small-scale grants and even experimented with donations, but both options have proved insufficient to make the model viable.

18 The online shop is available at: https://shop.spreadshirt.co.uk/olio-shop-online/ (last accessed 26 May 2021).

They have also ruled out other digital business models such as advertising or data monetisation:

> **'As a point of principle therefore, we prefer to avoid a monetisation model that requires us to turn our users into the product'**
>
> (OLIO Q&A)

Growth strategies and success drivers

The growth strategies differentiate the peer-to-peer dimension of the app from the B2NGO side. Their reliance on communities of volunteers serves to build a community, raises concerns about food waste and is also a means to manage logistics at a lower cost.

One driver for success in terms of food business donations has been to offer a simple and sustainable solution to tackle food waste and redistribute the surplus food to local communities with minimal operation disruptions. Access to reports on social and environmental impacts is also an attractive incentive, as is the ability to simultaneously limit the potential harm caused by food poisoning or contamination.

> **'We are working to increase the number of business partners, helping them improve their sustainability by reducing food waste and supporting local communities'**
>
> (Martin Rohleder, sales director)

The Food Waste Heroes programme is becoming increasingly important, as witnessed by the appointment of the firm's first sales director in early 2020.

Innovation type

At OLIO, the initial seed was the aim of having a digital platform to enable peer-to-peer food sharing. Their innovation journey has been long, since Tessa came up with the idea when moving from Switzerland to the UK:

Idea validation: Saasha and Tessa circulated an online survey (using Survey Monkey) to see how people felt about food waste and whether they would be interested in food sharing. They got 328 responses, which were overwhelmingly positive.

> **'Through this we found that 1 in 3 people are "physically pained" throwing away good food. That is a lot of people, who almost every day, are having to throw away food because there's no alternative... there's been no innovation since the rubbish bin! How crazy is that?'**
>
> (Tessa Clarke, Co-founder)

Creating a basic MVP (minimum viable product): This first test was a WhatsApp group between 12 early adopters and 1 retailer. The aim was to observe the relations and communication needs. The feedback was positive.

> **'We invited 12 people who took part in our market research survey, and who said they were physically pained throwing away good food, and we put them all in a closed WhatsApp group. They all lived close to each other, and we asked them for 2 weeks to add any surplus food they had into the group, and we'd see if food sharing started.'**
>
> (Tessa Clarke, Co-founder)

Source: Original WhatsApp screenshot, retrieved from http://simpleweb.co.uk/wp-content/uploads/2015/04/oliowhatsapp.png.

This OLIO proof-of-concept was focused on Crouch End, an area of North London. The two co-founders were familiar with this area and had built up a valuable network:

> 'Crouch End is renowned for its villagey feel and community spirit, and it is also home to dozens of healthy cafes and upscale food retailers, making it an obvious candidate for the OLIO MVP'
>
> (Saasha Celestial-One, Co-founder)

- After this successful trial, they partnered with Simpleweb (the app developer and the first investor in the company) to develop the app in a closed innovation environment.
- It was launched in July 2015 (in the App Store, and 3 weeks later for Android). It reached 1,000 downloads within a month, and almost 6,000 in surrounding areas of Crouch End. The very first version was quite basic, including a posting feature and a simple chat to arrange the pick-up time and location. Like many other marketplaces, and to protect the receivers of the surplus, from early-on in the development they included user ratings: after having exchanged edible food waste individual users can rate suppliers (and vice versa).

> 'As food is a very personal thing, we have used the same checks and measures that anyone would expect from any other sharing economy. So, users have profiles, user ratings, any listing can be reported to the developers'
>
> (Tessa Clarke, Co-founder)

- However, the key to this initial success is not the app itself, but all the networking that the two co-founders had done. They have always been active and visible within the community. They were also active in face-to-face demos on the streets and developed the initial digital strategy:

> 'It's about finding the relevant places where people in the community talk to each other and building relationships through being a regular participant in the community forums (...) If you don't have any budget and you want to talk to people, then find the places online where people are hanging out... None of them are really widely advertised so you just need to do your research'
>
> (Saasha Celestial-One, Co-founder)

In 2016, they switched from the initial closed innovation approach to an open-source strategy, to make the app as global and scalable possible. This shift in mindset was prompted by the bottom-up process of globalisation they were experiencing.

Another innovation made to accommodate a user demand was to include the possibility of adding 'non-food items', as people were posting toiletries, cleaning products and kitchen equipment that they wanted to give away for free. However, in terms of marketing and communication, their central message is still focused on tackling food waste and on food sharing amongst neighbours, emphasising the importance of building local communities. It also stresses the importance of proximity to avoid the kill chain since food sharing needs to be done as soon as possible to ensure food safety.

The current app includes:

- the original section for posting spare food (and other items, including homemade food and handmade crafts);
- a profile section, to manage your personal details and track and monitor your personal impact (in terms of meals saved, water saved, and number of shares);
- an online messaging system for users to request additional information (e.g. pick-up arrangement or product details);
- a map to easily find nearby offers;
- a forum for answering general questions; and
- the most recent innovation, 'Goals', a gamified section that makes it possible to find sustainability recommendations (on products, readings, habits, etc.) and set personal sustainability goals.

Beyond the app, OLIO is currently a good example of how technology can help shape impact-oriented communities. The co-founders have strong backgrounds in marketing and campaigning, and their joint project has benefitted from their user-centric approach and capacity to convey the message of food waste as a top priority to fight climate change. Another driver for success is their commitment to transparency and capacity to empathise with individuals and businesses and interconnect the different roles in convenient and meaningful ways.

Cross-sector collaboration

OLIO's business model and operations are based on a high degree of cross-sector collaboration. They collect food from various businesses and organisations (e.g. restaurants, retailers, caterers, hotels, offices). Businesses contribute to the supply side of the platform, whereas individuals act as bridges for donations to neighbours or NGOs and charities within their communities.

To date, they have partnered with over 100 organisations – many with an excellent track record throughout the UK – to help reduce food waste with the ultimate aim of cutting it to zero. These organisations include companies such as Cranswick, KERB, Hello Fresh, Love Food Hate Waste, The Big Lunch, This is Rubbish, Wriggle, FareShare, Gousto, Fat Lama, City Harvest and Sainsbury's. OLIO partners with local authorities and or associations to help expand the network of platform users.

EXAMPLES OF CROSS-SECTORAL CAMPAIGNS

THE FOOD POVERTY MAP[19]

Innovate UK has awarded a grant and donated £47,000 to create a food poverty map. OLIO has partnered with the N/LAB Centre for Business Analytics at the University of Nottingham to build a food insecurity prediction map based on machine learning, with the aim of helping local authorities target their food support. The proof-of-concept is conceived of as an interactive tool to pinpoint and track areas currently suffering from food insecurity or most likely to fall into food insecurity. It will be designed in conjunction with the London Borough of Havering, using OLIO's real-time, anonymised data.

PARTNERSHIPS FOR ZERO FOOD WASTE EVENTS

In 2019, one of the activities to increase the most at OLIO was the collection of surplus food at events and gatherings. One salient example is its work at the Inspire Europe 2019 event, in collaboration with Tobacco Dock and Alteryx:

> 'The collaboration was a huge success, with OLIO managing to save 338 meals during Inspire Europe by working closely with the Alteryx and Tobacco Dock food teams. This effort not only helped towards saving the environment – the environmental impact of this change represented an equivalent of 612 kg of CO_2 emissions avoided and over 100,000 litres of water saved as a result of this food being eaten, rather than wasted – but also benefitted hundreds of residents in the local community.'
>
> (Tobacco Dock representative)

Scalability & replicability

OLIO has been replicated beyond the UK and currently enables food sharing amongst neighbours in more than 50 countries including the US, Mexico, Singapore, New Zealand and Spain, to name just a few. They have also developed a web version of the app to make it even more accessible, eliminating the need for a smartphone and enabling access from public libraries instead.

FACTORS FOR SUCCESS

OLIO is a single digital product that has been designed and built to grow. It is available worldwide through the main app stores. In terms of language, whilst the app navigation is currently available in English or Spanish, the listings and messaging between users can be done in any language. More localised versions are expected to arrive soon.

One of the key aspects for OLIO's internationalisation is the fact that it was triggered by volunteers self-organising to import food-donation solidarity chains, involving food retailers and charities, mirroring foodbank models. They realised that by 2016, around 10% of OLIO app downloads were coming from overseas. OLIO offers guidance, tools, and materials to set up the Food Waste Heroes programme in other countries or areas upon request.

For peer-to-peer food sharing, it is important to start in any new location with a minimum critical mass to ensure food availability in terms of quantity, diversity and proximity. Those are fundamentals aligned with network effects.

The platform is conceived of as a space for connection and thus leaves any responsibility for taxes, compliance with local regulations or even disputes to be handled at the user level. This approach avoids the potential frictions with legal frameworks across geographies.

Whilst food waste concerns are increasing due to the climate crisis and the food insecurity propelled by the pandemic, the narrative of becoming 'food waste heroes' is easily replicable. As OLIO wants to be an enabler for tackling food waste, they have openly committed to the Sustainable Development Goals agenda.

FUTURE AND NEXT STEPS

The co-founders' vision and ambition is to reach 1 billion users by 2030, which means growing exponentially, from fewer than 4 million in the spring of 2021 to 1 billion in 9 years. As they continue to grow, they will also need to recruit local teams in new geographies, as well as partner with businesses, organisations and governments to pursue their vision of enabling them to tackle food waste worldwide. To reach additional users, the firm should also make it easier for people in need or who are not tech-savvy to access its platform in order to better bridge the potential or existing digital divide.

19 https://www.openaccessgovernment.org/food-poverty-map/97365/

INTERVIEWEE & INFORMANT LIST

- Tessa Clarke – Co-founder & CEO
- Saasha Celestial-One - Co-founder & CEO
- Simon Blake - Customer Satisfaction & Compliance Manager at OLIO
- Mary, volunteer since 2019
- Petko, volunteer since April 2020
- Tobacco Dock representative - Zero Waste Business

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10 short case studies

In this section we present 10 different digital initiatives tackling hunger, food waste or both. The purpose of this collection is to showcase different digital practices, tools or mindsets aligned with platformisation that can be adopted by foodbanks to increase their capacity, efficiency and, ultimately, potential for impact.

After compiling a database of more than 100 cases, we shortlisted 10 examples based on the following criteria:

- **Being a platform in the food distribution sector**
- **Private sector (not-for-profit, social enterprise, corporation)**
- **Beneficiaries are people in need (in case of corps: aim to provide affordable goods or services)**
- **Mission includes tackling food waste**
- **Information about their social impact is available**

These cases are not intended to be a representative sample of the field but rather a varied selection in terms of the range of stakeholders matched through the platform, sectoral diversity, geographic miscellany, and the different degrees of development of the initiatives.

The information has been retrieved mainly from secondary data and desk research, based on publicly available information (websites, reports, press releases and social media profiles). All the organisations were contacted and invited to contribute and check the information written in the case studies, and eight provided supplementary information.

Case Summary

Name	Country	Type	Match[20]
Basic Life Charity	UK	NGO	B2C, B2NGO
Bring the Food	Italy	Foundation (NFP)	B2NGO
Chowberry	Nigeria	Social Enterprise	B2NGO
Feeding America	USA	NGO	B2NGO, NGO2NGO
FoodCloud	Ireland	Social Enterprise	B2NGO, NGO2NGO
HopHopFood	France	NGO	P2P, B2NGO
Karma	Sweden	SME	B2C
Misfits Market	USA	SME	B2C
Phenix	France	Social Enterprise	B2B, B2C, B2NGO
Plan Zhereos	UK	NGO	B2NGO

Source: The authors based on desk and web research

20 Acronyms explained: a) B2NGO: connects businesses and NGOs; b) NGO2NGO: connects NGOs with each other; c) B2C: connects businesses and consumers; d) B2B: connects businesses with each other; and e) P2P (peer to peer) connects individuals. Based on Michelini et al. (2018).

The Basic Life Charity

Foundation (year, place)	2000, UK
Legal form	Non-profit
Prizes & Awards	-
Website & Social Media	https://www.basic.org.uk/pop-up-shops
Description	Basic is a Christian charity in the UK that has run several charity shops and two foodbanks since 2013. Based on their experience, there is a need to find a fairer alternative option to foodbanks that allows dignity and choice, whilst enabling people to shop instead of having to be referred. According to their estimates, 50% of people suffering from food insecurity would never use a foodbank. Their response is community pop-up shops.
Social Impact	These community pop-up shops started in Felixstowe, Suffolk. The number of pop-up shops has since increased four- or five-fold . They offer a wider range of products that tend not to be offered in foodbanks, such as chocolate, flowers or fresh fruit. These shops offer choice and the beneficiary becomes the customer.

Financial Sustainability	Reliance on donations: Food donations Money donations Spaces let temporarily by churches and other community buildings
Innovation Type	The Basic Community Pop-Up Shop aims to collect surplus food and serve it on tables in church halls or other community buildings at certain times of the week. People queue up and 'buy' a large jute bag for £2 (€2.30) and then simply help themselves to what they like. Their inspiration came from the Bible and their experience managing foodbanks.
Cross-sector Collaboration	B2C, B2NGO The Basic Life charity connects retailers with a vulnerable population, in partnership with churches and other community spaces.
Replicability & Scalability	The model is replicable as long as there is a network of donors and the logistics to deal with it all. Basic Life has developed a type of 'franchise' agreement with churches and other organisations that wish to offer a community pop-up shop.

Bring the Food

Foundation (year, place)	2014, Italy
Legal form	Non-profit
Prizes & Awards	-
Website & Social Media	https://bringfood.org/
Description	BringTheFood is a web application used by various foodbanks and collection networks to manage donations. The food comes from restaurants, businesses (small and large retailers) and producer organisations. It is a pilot project developed by the research centre Fondazione Bruno Kessler.
Social Impact	Since its launch in 2015, over 2,500 tonnes of food have been rescued. Donors are mainly producers (1,950 tonnes), followed by retailers (470 tonnes) and food services and restaurants (76 tonnes). In 2019, it helped recover and distribute 2,209,195 meals to vulnerable people. It is also fostering the digitisation and the efficiency of foodbanks in the Trento area.

Financial Sustainability	The app was developed at the Fondazione Bruno Kessler, by the ICT4Good team. Its financial sustainability is based on research grants and funding.
Innovation Type	The app is a pilot test, with foodbanks in the Trento area as the end users. It has three core purposes: - food provision for vulnerable individuals: it selects specific goods from different donations, which are delivered through one of its foodbank partners - optimisation of the use of the foodbanks' resources in logistics and volunteer support - administrative support for transportation logistics and documents for tax purposes
Cross-sector Collaboration	B2NGO The app is the result of the collaboration between a research centre and the foodbanks from around 10 municipalities in Trento. In addition to the activities related to the platform's development, the BringTheFood team is engaged in a series of initiatives for the reduction of waste and the promotion of the circular economy.
Replicability & Scalability	They are currently expanding and replicating the model to other areas in Italy. During the weeks of the lockdown, the platform was used beyond the network of foodbanks in Fidenza to feed essential workers: every day local caterers prepared around 150 meals, which were collected and distributed to staff at the Vaio hospital, public service agencies and security forces.

Chowberry

Foundation (year, place)	2014, Nigeria
Legal form	Social enterprise (2014-2020) In 2020, they became the Chowberry Foundation, now officially based in the US.
Prizes & Awards	2020: Time Magazine Next Generation Leader Showcased at the UN's 75th anniversary 2018: BBC Top 10 Innovations 2016: Rolex Award for Applied Technology
Website & Social Media	https://chowberry.org/
Description	The Chowberry app reduces food waste and feeds families in need by connecting consumers to food and produce that is at risk of going to waste due to expiry or poor sales. In addition, the app links businesses with food manufacturers and producers who make bulk purchases through an automated direct-to-consumer restocking process.
Social Impact	It started with a successful three-month pilot involving 20 retailers that reached about 300 people in Lagos and Abuja, feeding 150 orphans and vulnerable children. By the end of 2020, they reached 1 million distributed meals (in their 7 years of existence). In this period, they have redirected over 30,000 tonnes of food at risk of waste to people facing hunger. During the lockdowns for Covid-19, they have also obtained food through crowdsourcing activities.

Financial Sustainability	From the start, their financial viability has depended on grants, donations and sponsorships. The platform's development, improvement and maintenance is directly supported by the funding collected through awards for African innovators and via partnerships and sponsors.
Innovation Type	A web-based solution, the app enables registered retailers to monitor and track their food products by scanning barcodes on food items and notifies them via the scanned barcodes when these food items are reaching their expiry date. These food products are then offered at heavily discounted rates to the Chowberry online marketplace available to interested customers and NGOs/organisations who can purchase them at very low prices. The closer the products are to their latest-possible sell-by date, the lower their price is.
Cross-sector Collaboration	B2NGO As this is a digital solution and vulnerable families may not have access to smartphones, Chowberry also partners with established NGOs in the area that work to tackle hunger. These aid organisations connect Chowberry to a much larger group of people, buying up and distributing the cut-price food as part of their own outreach projects. They have also worked with local and international organisations and companies to provide assistance and insights on corporate sustainability in the context of the food system. These institutions include organisations such as Barilla Food Company, the EU, the World Bank, the Social Good Summit, Food Tank and others.
Replicability & Scalability	Over a seven-year period, Chowberry has evolved from an ad hoc initiative without formal incorporation to an incorporated entity with footprints and activities in the United States of America and Nigeria and will soon launch operations in Ghana and Zambia.

Feeding America

Foundation (year, place)	1979, USA
Legal form	Non-profit
Prizes & Awards	2017: Finalists for the Drucker Prize
Website & Social Media	https://www.feedingamerica.org/ https://mealconnect.org/
Description	Feeding America is a nationwide network of 200 foodbanks and 60,000 food pantries and meal programmes that provides food and services to people each year. They collect surplus food, which is then delivered to local foodbanks, where they coordinate logistics to deliver food from the foodbanks to the beneficiaries. Feeding America launched a new application in 2017 to connect both parties in real time. MealConnect allows food businesses of all sizes to post surplus food on the MealConnect platform. An algorithm determines the best-suited local pantry or food programme to quickly pick up and distribute the donation.
Social Impact	Feeding America aims to deliver more than 680,000 tonnes of fresh fruit and vegetables each year to people facing hunger. To date, MealConnect has: - recovered 1,100 tonnes of food; - connected more than 9,000 non-profit organisations to food surplus.

Financial Sustainability	Feeding America relies on donations, grants, public food programmes and sponsorships. - MealConnect is free for all users and all donations are tax-deductible. - It was initially funded and designed with support from Google.org and funding from the Walmart Foundation and a $1 million grant from General Mills.
Innovation Type	The MealConnect platform offers: 1. Food donation: available to donors from any smartphone, tablet or computer. 2. Matching between donors and charities: an algorithm helps determine the most convenient matches between retailers and the closest charities. 3. Offline support by the Feeding America logistics team to ensure on-time and accurate deliveries.
Cross-sector Collaboration	B2NGO, NGO2NGO Donors (mainly retailers), entities (foodbanks, food pantries, meal programmes), volunteers, experts in food rescue. Feeding America collaborates with businesses, non-profits, foundations and government leaders committed to reducing food waste in the United States. They collaborate with and empower their foodbank network by maximising their advocacy capacity through training, toolkits and technical assistance.
Replicability & Scalability	The foodbank network model is replicable and scalable and is already present in various countries. The MealConnect platform is used by the whole foodbank network across the US.

FoodCloud

Foundation (year, place)	2013, Ireland
Legal form	Non-profit, Social Enterprise
Prizes & Awards	2019: Green Awards – Green Technology Award 2017: Net Visionary Awards – Best Use of Technology for Social Good 2017: Digital Agenda Impact Award
Website & Social Media	https://food.cloud/ @FoodCloud https://www.facebook.com/foodcloudireland/ https://www.linkedin.com/company/foodcloud/
Description	FoodCloud is an award-winning not-for-profit social enterprise that exists to reduce the environmental, social and economic impact of food waste by redistributing surplus food to a network of charity and community group partners. To do so, they combine two strategies: - Hubs solution: for businesses with volumes of surplus food, such as farms, manufacturers and distributors. They have Hubs (warehouses) in Cork, Galway and Dublin. The hubs work with volunteers, mirroring the foodbank model. - Retail solution: directly connects retailers with surplus food with charities and community groups across the country. Their customised platform is also used internationally to support the redistribution of food in various ways. FoodCloud's aim is to redistribute 25% of available surplus food by 2030, to support Ireland's achievement of SDG 12.3 (global food loss and waste). [20]
Social Impact	Global impact, as FoodCloud technology is used by their international partners (2020): - 42,000 tonnes of food redistributed (almost 18 million meals donated) - 9,500 community groups supported - 134.4 tonnes of CO_2 avoided - Since their start in 2013, they have redistributed the equivalent of 100 million meals.
Financial Sustainability	FoodCloud is supported by operational income, donations and grants. - The initial funding for developing the application came from grants from an accelerator competition programme. - Current funding comes from government grants (EU and Irish and British governments). - Charity partners pay a nominal contribution towards the storage and transport of the food. - Their main revenue stream is their fee-based data analysis services for retailers. Whilst the platform is free to use, they charge businesses a fee to gain access to insights, impact measurement and food-waste improvement plans.
Innovation Type	FoodCloud's retail solution is based on a platform and mobile app: (i) they collect transaction and stock data and conduct data to track business activities; (ii) they act as a platform to connect retailers and charities; (iii) they use geolocalisation to locate businesses and charities. This enhances the redistribution on national and international scales. The system manages profiles for donors and charities, the history of donations they have received and food traceability and has an inbuilt call centre to enable effective live and follow-up support by admin teams.
Cross-sector Collaboration	B2NGO, NGO2NGO FoodCloud has an extensive presence in the food and beverage industry in the UK and Ireland – supermarkets, manufacturers, suppliers and farmers – as well as in the public sector (UN, EU, local Irish and UK governments). They also collaborate with community groups, volunteers, funders and partners.
Replicability & Scalability	Their platform-based model has been replicated and scaled. The Hubs solution is present in Ireland and expanding to the UK. Their retail solution has expanded internationally, including to Australia, Poland and the Czech Republic. FoodCloud technology is currently enhancing the operations of several foodbanks.

21 http://www.fao.org/sustainable-development-goals/indicators/1231/en/

HopHopFood

Foundation (year, place)	2016, France
Legal form	Non-profit, association
Prizes & Awards	Members of 'Green Friday' Tech For Good France Officially recognised as an entity 'for the general interest'
Website & Social Media	https://www.hophopfood.org/
Description	The association was founded with the mission of creating a community of people willing to fight food waste and precariousness. Their core mission is to offer digital and community tools for providing businesses and individuals with simple and free means to engage in local solidarity initiatives. HopHopFood operates a peer-to-peer mobile app that connects individuals and promotes local food donations. Businesses can also use the app to donate to individuals in need. Additionally, HopHopFood manages a network of food pantries.
Social Impact	Since 2018, they have distributed around 200 tonnes of surplus food (equivalent to 550,000 meals), which have been given to people in need in the form of food donations, from individuals or businesses, through its platform or its own pantries. The platform has 30,000 users.
Financial Sustainability	Their viability is based on funds and grants from stakeholders in both the private and public sectors, as well as key players from the social and solidarity economy. One of the main supporters is the French Agency for Ecological Transition (ADEME) and the government of the Ile-de-France region. Several firms located in the region also support and donate to HopHopFood as part of their CSR activities.

Innovation Type	HopHopFood's civic approach began with the creation of a free digital platform for food donations between individuals. Users can create a donor or recipient profile (via the app or the website). The platform offers recommendations about which categories of food and products can be donated and other best practices, including face-to-face meetings for food donations. Homemade meals are not allowed and the platform includes a section for all parties to rate their satisfaction. HopHopFood is also installing small pantry shelves (made of recycled wood) to leave donations and avoid meeting in person. They are located on university campuses and the premises of a number of partners. Some businesses also make local charitable donations of their food surplus. A network of 40 volunteers helps with this initiative, collecting the food at partner shops.
Cross-sector Collaboration	P2P, B2NGO The association is creating a local support community consisting of neighbours, retailers, charities and volunteers.
Replicability & Scalability	The support network is expanding in the Ile-de-France region. The platform is being replicated in bigger cities, such as Paris and Toulouse. With regard to food donations with no in-person meetings and between neighbours, they aim to have 200 wooden pantries in several locations by 2022.

Karma

Foundation (year, place)	2016, Sweden
Legal form	For Profit, SME
Prizes & Awards	2019: Fast Company - Most Innovative Companies (Honouree) 2017 and 2018: Nordic Startup Awards – national winner Endorsed by the Obama Foundation
Website & Social Media	https://karma.life/
Description	Karma is a food rescue app that allows retailers to sell their surplus food to consumers at a lower price instead of having great food go to waste. Restaurants, grocery stores, bakeries and cafes upload their surplus food at specific times, and consumers can choose the specific products (instead of collecting random bags as in other cases). In partnership with Electrolux, they have developed a smart fridge to ease pickups by customers at stores.
Social Impact	By the end of 2020, they had 1,400,000 app users (measured by downloads) and 9,200 sellers offering their products. In the 2016-2020 period, 1,200 tonnes of food were rescued (equivalent to more than 4M meals). Based on the number of meals, approximately 1,800 tonnes of CO_2 have been saved. The headcount in 2020 was over 100 staff.

Financial Sustainability	They have raised more than €17M in different rounds from 19 investors. In early 2020, Karma became financially independent in Sweden. Their main revenue stream is small transaction fees for retailers. They developed gift cards as an adaptive response to the pandemic and restaurant industry restrictions, as a way to advance credit to be spent in 90 days.
Innovation Type	Beyond the app, in partnership with Electrolux they developed a smart fridge. Customers purchase through the Karma app and get a code that unlocks the fridge. The aim was to increase the ability of retailers to handle surplus, without depending on people to hand out the food. According to a pilot test in Sweden, retailers who uploaded around 50 items a day to the Karma site doubled the amount of surplus food sold.
Cross-sector Collaboration	B2C Their main sellers are restaurants, grocery stores, bakeries and cafes. Wholesalers can use communal fridges to offer irregular and unexpected surplus food.
Replicability & Scalability	It has currently been expanded to the UK and France, and is available in a total of 225 cities across Europe. The model is replicable and the development costs of the basic app are relatively low. The smart fridges are being used in communal spaces as well, such as train stations. In early 2021 they were migrating to a huge cloud system to scale their computing capacities.

Misfits Market

Foundation (year, place)	2018, USA
Legal form	For profit
Prizes & Awards	2020: CEO included on the Forbes list of '30 under 30' Social Entrepreneurs
Website & Social Media	https://www.misfitsmarket.com
Description	Misfits Market is a provider of a subscription box service used to reduce food waste. The box contains fresh organic fruits and vegetables that farms and stores cannot sell, with the aim of providing customers with healthy food at a reduced cost. All produce is certified organic and non-GMO. Driven by its mission to bring affordable, quality food to more people, the company leverages direct relationships with farmers and producers to reduce food waste and eliminate inefficiencies in the food system. In addition to fighting food waste, they are committed to social inclusion and aim to provide affordable access to healthy food for everyone. Misfits Market is also committed to making its website's content accessible and navigable for everyone.
Social Impact	Since their start, they have helped rescue 80,000 tonnes of food from producers and farmers. The boxes include food that is edible but does not meet the market standards. Misfits does advocacy to generate awareness about the impact of keeping those standards. The boxes are directly delivered to customers (up to 40% off grocery store prices). Their aim is to avoid food insecurity by making food accessible in terms of price and delivery. During the Covid-19 pandemic, the number of customers has increased 400% and the company currently employs over 600 people.

Financial Sustainability	This startup has raised more than €250M from five investors (€170M in April 2021, after the sudden growth in customers during the pandemic). The main revenue stream is box subscriptions by customers (a basic price for small and large boxes, which can be supplemented with other products).
Innovation Type	Their focus on tackling the inefficiencies of food distribution is channelled through a platform connecting producers and customers. Beyond the box subscription, they are fostering organic agroecology, awareness of seasonal produce and eco-friendly packaging.
Cross-sector Collaboration	B2C Producers and farmers, logistics and customers. They are also launching a regular donation programme with Greater Philadelphia foodbanks to redirect a large amount of produce back to local hunger-fighting organisations.
Replicability & Scalability	Misfits was started in Philadelphia and is now delivering boxes in around 35 states within the US whilst continuously expanding. Although the platform is scalable, adoption and growth of the network of farmers and producers, as well as warehouse and carrier logistics, are growing at a slower pace.

Phenix

Foundation (year, place)	2014, France
Legal form	Social Enterprise
Prizes & Awards	B Corp Labelled as 'Solidarity-Based Enterprise of Social Utility' (a public recognition in France)
Website & Social Media	https://wearephenix.com/en/presentation/ https://wearephenix.com/es Instagram: @phenix.spain Facebook: @wearephenix.esp Linkedin: /phenix-spain
Description	Phenix contributes to the reduction of waste and the transition towards a circular economy. Their aim is to promote solutions to foster a second life for products (food and non-food) through a web platform and a range of collaborative and logistical services: donating to charities, donations for animal food (farms), selling products at discounted prices, or upcycling and reusing. The company presents itself as the 'zero-waste coach' for all stakeholders.
Social Impact	More than 2,5 million users of the app. In 2019, they rescued 40 million meals. In 2021, they avoided 60 tonnes of daily waste (equivalent to 120,000 meals). They allow retailers to reduce their organic waste by about 50% and give a second life to 85% (on average each year) of their not-for-sale inventory.

Financial Sustainability	Phenix has raised a total of €15M in funding over three rounds. One of the investors is Danone Manifesto Ventures. Their main revenue streams are: - Transaction fees for retailers - Consultancy services: Anti-waste coaching for organisations (platform, dashboard to monitor their waste and training) - Zero-waste events (helping hosts to be sustainable)
Innovation Type	Phenix offers a range of tailor-made solutions to avoid waste and give a second life to unsold products. Their approach to waste is holistic. They have several pillars: - Software as a service: a platform to monitor waste, generate insights for retailers and connect charities to nearby retailers - Consultancy and 'zero-waste coaching' - A strong network of partners whose aim is to redistribute food and non-food products - Community building and citizen engagement - For charities they offer assistance identifying matches and logistics for transfers
Cross-sector Collaboration	B2B, B2C, B2NGO 100,000 partnerships with companies and shops, including: distributors, manufacturers, wholesalers, caterers, and local businesses. They also collaborate with a network of 1,500 charities and community organisations.
Replicability & Scalability	Phenix is currently present in France, Spain, Portugal, Belgium and Italy, with over 30 local branches. They are currently preparing technologically to scale up (increase the number of users and their computation capacity).

Plan Zheroes

Foundation (year, place)	2010, United Kingdom
Legal form	NGO
Prizes & Awards	2011: London Leaders chose Plan Zheroes as one of 15 projects to make London a more sustainable city
Website & Social Media	https://planzheroes.org https://www.facebook.com/planzheroes/ https://twitter.com/planzheroes https://www.linkedin.com/company/plan-zheroes/
Description	Plan Zheroes is short for 'The Zero Food Waste Heroes'. They provide a food donation platform that enables businesses to quickly and easily post their donations of surplus food online and nearby charities and community groups to claim it. These charities deliver the collected food to homeless people and other vulnerable segments of society. In addition to the platform, they also organise weekly food drives at local markets. Their aim is to 'get great surplus food to good causes'.
Social Impact	The Covid-19 outbreak exposed unexpected challenges for their model, as most of the donations came from the hospitality industry and these activities had to be temporarily suspended. Their volunteer network also had to shelter in place for weeks. Nevertheless, 2020 has been the most impactful years in quantitative terms. Between 2014 and 2020 they achieved the following results: - 385 tonnes of food saved (53% in 2020) - 900,000 meals reaching frontline charities (47% in 2020) - 853 tonnes CO2 equivalent emissions saved (35% in 2020) In 2020, they supported more than 460 charities. They verify the businesses that join the platform to ensure the food's trustworthy origin.

Financial Sustainability	Plan Zheroes got their initial funding from grants and donations by individuals, which remain their main source of funding. In 2019, they fundraised €55,000. The main sources (collectively accounting for 74% of the total) were donations from individual donors, sponsors and funders in that order. For retailers, access to the platform is free for the first 100 kg within a year. Beyond this amount, they need to join as members. The membership fees range from €14 a month to €165 a year. There is no charge for charities and community groups to use the platform.
Innovation Type	Plan Zheroes make use of a closed innovation approach. The online platform is based on Google map's API and was initially developed by Keytree, a technology consultancy and product developer. Keytree now belongs to Deloitte Business, which continues to provide maintenance for the tool. Through the platform, Plan Zheroes offer customised reports for companies, including food donations for customised reporting periods; a data dashboard with the social and environmental impact; a downloadable Impact Certificate; the food donor marketing pack (poster and window sticker); and community management support.
Cross-sector Collaboration	B2NGO They mainly connect retailers with charities, but their activities also rely on volunteers (who are in charge of distributing food, spreading the word or building relationships) and carriers (both businesses and individuals offering means of transport).
Replicability & Scalability	Their business model is replicable, and they have low operating costs as they do not store food or deliver. The main issue for replicability is identifying enough charities and potential donors in the new targeted area before starting operations. Volunteers can play an active role in recruiting new businesses. They started as a London-based charity and are now expanding their operations to other parts of the UK, such as Birmingham, Leicestershire, Manchester, Leeds, Liverpool, Glasgow and Edinburgh.

Case Overview

The table below offers a brief overview of the twelve cases which have been selected and analysed for their contributions at the intersection of food distribution and digitalisation. For both long and short cases, a brief description is offered along with their key features, considering the scope of this report.

Table 4. Case overview by name, type, innovation, and key feature[22]

Name (Country)	Type	Innovation	Key features
Banco de Alimentos de Buenos Aires (Argentina) Long Case Study	Non-profit	Appification of the process: "Misión Entrega" skips the warehouse, providing digital infrastructure which connects retailers with NGOs and volunteers (who do the pick-ups). Allows collecting occasional donations, lower volumes and fresh food.	· Thorough pre-assessment of all stakeholders' willingness and capacity to adopt the innovation, and co-creation of the app. · Geolocation-based, which is key to managing fresh food (and thus improving nutritional balance). · Solution connected to their monitoring system to track donations.
Basic Life Charity – Pop-up shops (UK) Short Case Study	Non-profit	This charity has started community pop-up shops at the delivery points for end-users, to foster the dignity of choice.	· They offer a wider range of products which tend not to be offered in foodbanks, like chocolate, flowers, or fresh fruits. · These shops offer choice and the customer takes back the responsibility. · People queue up and then 'buy' a large jute bag for £2 and then simply help themselves to what they like.
Bring the Food (Italy) Short Case Study	Non-profit	Web application used by various foodbanks and collection networks to manage donations. The food comes from restaurants, businesses (small and large retailers) and producer organisations.	· Fostering the digitalisation and the efficiency of foodbanks in the Trento area. · It is a use case project developed by the research centre Fondazione Bruno Kessler. · Combines food provision with the optimisation of the foodbank resources in logistics and volunteering support and with administrative support (e.g. on tax returns).
Chowberry (Nigeria) Short Case Study	Social enterprise	Web-based solution which helps retailers to monitor expiry dates. These products are then offered through the Chowberry marketplace at heavily discounted rates for NGOs.	· Low prices instead of donations, so that charities can choose what they get. · Fostering digitalisation of both retailers and NGOs · Recently incorporated as a US-based foundation entering the food tech sector.
Feeding America (USA) Short Case Study	Non-profit	MealConnect platform, used by the nationwide network of foodbanks. An algorithm helps to determine the most convenient matching between retailers and closest charities.	· Geolocation-based, which is key to managing fresh food (and thus improving nutritional balance). · Offline support by the logistic team of Feeding America to ensure on-time and accurate deliveries. · Fostering the digitalisation of the whole network of foodbanks.
FoodCloud (Ireland) Short Case Study	Social enterprise	Platform-based and mobile app that connects surplus food with NGOs (one of the pioneers).	· Offers the same intermediation role as foodbanks. · Pioneering in the field, fostering the digitalisation of charities. · Combination of digital solutions for retailers and FoodCloud hubs (warehouses).
HopHopFood (France) Short Case Study	Non-profit	HopHopFood operates a peer-to-peer mobile app that connects individuals and promotes vicinity food donations. This association was funded with the mission to create a community of people engaged in fighting food waste and precariousness.	· Their core mission is to offer digital and community tools for providing businesses and individuals simple and free means to engage in local solidarity initiatives. · The association is creating a community of local solidarity between neighbours, retailers, charities, and volunteers. · Placing small wooden pantries in campuses and other communal spaces, minimising the contact of in-person meetings.

22 Cases are presented in alphabetical order.

Name (Country)	Type	Innovation	Key features
Karma (Sweden) Short Case Study	For profit	Food rescue app that allows retailers to sell their surplus food to consumers at a lower price.	· Consumers can purchase food at lower prices (bookings through the app, pick-ups at the stores). · Transaction fees to retailers. · In partnership with Electrolux, they have developed a smart fridge to ease the pickups by customers at stores.
Misfits Market (USA) Short Case Study	SME	Offers a subscription box service to reduce food waste. The box contains fresh and organic fruits and veggies which the farms and stores can't sell, with the aim of providing customers with healthy food at a reduced cost.	· Direct relationships between producers and consumers. · Democratisation of organic food (all produces are certified organic and non-GMO). · Tackling inefficiencies of the current food supply system.
OLIO (UK) Long Case Study	Social enterprise	Sociotechnical solution: creating an app for food sharing within local communities. Instead of a solidarity chain the network is framed under the "sharing" mindset.	· Lifestyle and social movement against waste (mostly about food, but also other items to be reused). · A strong volunteer structure with different levels of commitment. · Digital dynamisation of an impact-oriented community, while the revenue streams come from managing retailers' food waste.
Phenix (France) Short Case Study	Social enterprise	Digital solutions to foster a second life for products (food and non-food), through a web platform and a range of collaborative and logistical services.	· Fostering transition to circular economy: a "zero waste coach" for all stakeholders. · Facilitates actions such as donating to charities, donations of animal food (farms), selling products at a discounted price, or recycling and reusing (food and non-food items). · Community and citizen engagement through capacity building.
Plan Zheroes (UK) Short Case Study	Non-profit	A food donation platform that enables businesses to post their donations of surplus food online quickly and easily and for nearby charities and community groups to claim this food.	· Plan Zheroes derives from "The Zero Food Waste Heroes." · Membership fees for retailers, free for NGOs. · Charities can claim which food they need instead of taking what is given by default.

Case Comparison

After reviewing the twelve cases, some commonalities in their scopes and practices have been observed. Below, these are disclosed according to the five variables of social innovation:

Social impact

The measure of social impact is generally oriented to providing account of the amount of food rescued in a certain period of time (in kgs and/or meals), while for those organisations more oriented to food waste, the key measure are the emissions (CO_2) saved from entering the atmosphere. Beyond these common measures, there are other effects under the social perspective which are relevant, such as the dignity of choice of food recipients or the combination of the provision of a technological solution (i.e. a platform or an app) with expanded forms of governance that incorporate the different stakeholders that participate in it. The table below summarises the different social impacts identified and gives some salient examples:

Table 5. Social impact summary and examples →

SOCIAL IMPACT	Salient examples
The dignity of choice is an important aspect which has been highlighted in the case studies. Providing the end-users and beneficiaries with options to choose from becomes a dignifying distribution practice.	**Chowberry, FoodCloud, Bring the Food** (the possibility of claiming specific food needed) **Basic Life Charity, Plan Zheroes, OLIO** (the choice given to individuals in need)
Combination of the provision of a tech solution plus the supervision and guidance required. It refers not only to the new digital tools and matchings at disposal, but also encompasses platform governance, offline support, verification of volunteers or the possibility of being responsive in the event of malfunction.	**Banco de Alimentos de Buenos Aires, Feeding America**
Solutions at a network level to leverage digital innovations at scale.	**Feeding America (USA), Bring the Food (in Trento region, Italy)**
Community building and citizen engagement beyond food charity, framing food rescue as a positive practice for the community to tackle food waste.	**OLIO, HopHopFood, Phenix**
The use of reputation economy practices in order to build trust among users and stakeholders.	**Banco de Alimentos de Buenos Aires, OLIO, Bring the Food**
Alternative models and channels for food distribution (e.g. in agroecology) while providing more direct connections between consumers and producers.	**Phenix, Misfits**

Financial sustainability

Any organisation has to be viable in economic terms to accomplish its organisational mission. To this end, since the sample included inspirations from for-profit and not-for-profit initiatives, several options have been observed to ensure economic viability and sustainability. While foodbanks and NGOs are generally sustained by donations, the platformisation process may bring opportunities to consider other revenue streams. The list below gathers the most common sources for new revenue streams:

- Investors: OLIO, FoodCloud, Karma, Phenix, Misfits Market
- Research grants: All, but particularly FoodCloud, Chowberry, Bring the Food
- Provision of software as a service and data economy insights (e.g. access to dashboards, impact indicators and so on): OLIO, Chowberry, FoodCloud
- Consultancy on sustainability: OLIO, FoodCloud, Phenix, Plan Zheroes
- Transaction fees to retailers, in B2C food rescue schemes: Karma, Phenix
- Subscription boxes (in exchange for a regular fee): Misfits Market

Innovation type

All the innovations are platform-based according to our selection criteria. The cross-case comparison offers some commonalities regarding the new features enacted by the platformisation of services:

- For individual users, the main innovation type emerges from the possibilities of a new mobile app (OLIO, HopHopFood), while for organisations and businesses platformisation materialises as a website or a web-app, available from other devices (Banco de Alimentos de Buenos Aires, Bring the Food, OLIO, Phenix, Plan Zheroes)
- There is a set of core functions which are overarching across the digital innovations:
  - General aspects, which are similar to other sharing economy platforms:
    - Every user has a profile with name and basic information
    - Rating systems and other reputation economy systems to generate trust among users. The potential of this innovation increases if everyone can rate everyone else
    - Appearance of new in-app chat options between stakeholders that make a more direct and agile communication
  - Information provision: allergens, due date, status (and prices when applicable)
  - Easy scheduling of pickup and delivery times
  - Simple matching mechanisms based on similarities (often automated using algorithms), proximity being key for success in terms of logistics and food perishability ("Meal Connect" by Feeding America, or "Misión Entrega" by Banco de Buenos Aires)
    - In this regard, geolocation is present in most of the cases surveyed. Precise locations as well as opening hours are key to ensure on-time pick-ups and deliveries
  - Use of APIs or compatible systems to connect the platform to ensure traceability of stock, control and monitoring of exchanges, etc.
- Self-served pick-up systems to ease the delivery function: wooden pantries (HopHopFood), smart fridges with QR codes (Karma)

Cross-sector collaboration

As the platforms act as intermediaries between different stakeholders which include both supply and demand sides, all the cases are cross-sector by nature.

- Digital layer on stock management to facilitate communication with stakeholders. To ensure access to technology, people in need with low savviness can benefit if there is a "local champion" (be it neighbours, volunteers or a charity organisation) to mitigate the potential digital divide.
- Volunteering system conceived as an option of civic engagement and mutual support (vis a vis classical aid assistance): OLIO, FoodCloud, Plan Zheroes, HopHopFood.
- Innovations made at a network level may speed up adoption processes: e.g. Feeding America is currently helping to digitise the whole network of foodbanks in the USA. A similar initiative is led by Bring the Food in Italy. It has consistently been found across cases that another result of this network-level adoption is the digitalisation of NGOs and the digital literacy of the individuals involved.

Replicability and scalability

The fact that the innovations used are ICT-based offers interesting options for replicability and scalability, as platforms often benefit from network effects (more users means more diversity in the supplies). However, while global digital tools are scalable, local solidarity hubs require positive governance, trust and social capital for the initiative to succeed in different geographies or contexts (Banco de Buenos Aires, FoodCloud, HopHopFood, OLIO, Plan Zheroes).

- Increasing information processing capacity (using cloud solutions, etc.): Karma, FoodCloud
- Digital infrastructure scalable by design or increased computing capacity using cloud services: OLIO

PART 3

Conclusions & Takeaways

Digital solutions for tackling hunger and food waste: lessons learnt

Digital social innovation offers a wide array of platform-based examples of how to tackle hunger, food waste or both. In this report, twelve initiatives have been surveyed which include NGOs, corporations and social enterprises across three different continents. In this section we include some of the identified trends in digital solutions for food redistribution, as well as some specific takeaways for foodbanks.

While these cases differ in their models, approaches and narratives, what they have in common are the new cooperation capacities that are enabled by digital tools. All of them have been selected due to their intermediary role, acting as match makers which seek to fill structural gaps, address inefficiencies and speed up ties that are enabled, completed and monitored through the platforms.

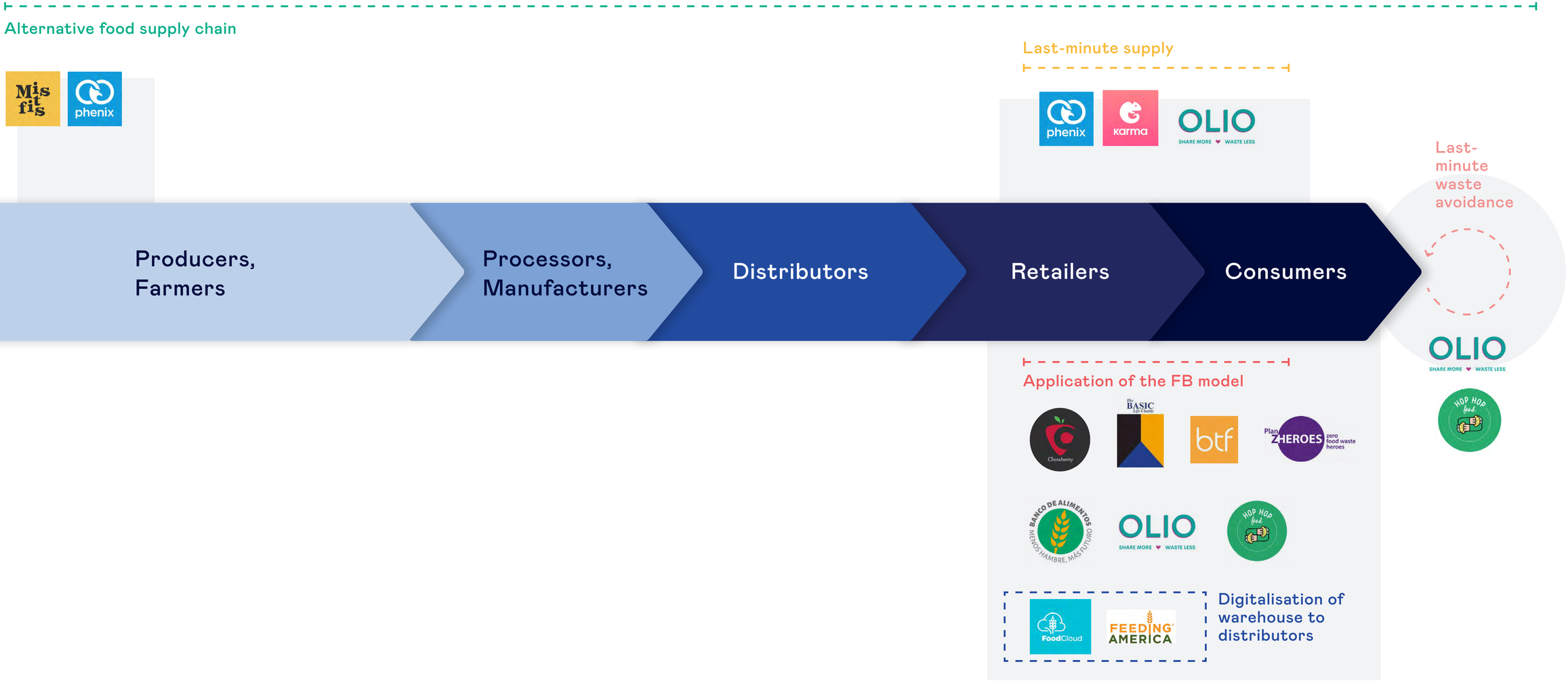
Foodbanks could be amongst the most relevant agents to take stock from the evidence collected here. These organisations are by definition multilateral connectors, enablers of solidarity chains between retailers with surplus food and charities, community groups or people in need. Understandably, these last years, this is a model that has been questioned given their incapacity to address the root causes of food poverty. Their organisational model remains at risk since the tasks they perform encompass complex logistic networks and a storage system that needs to be continuously adapted to the perishability of food and which, on top, is highly reliant on volunteers for its administration. In addition, in many cases, limited organisational capacity, low efficiency and low digitalisation become important barriers to provide an adequate response to the increasing provision of food, particularly in a social context left marked by the consequences of the COVID-19 pandemic.

All in all, the cases unpacked above provide some inspiration to improve current organisational models through digitalisation and platformisation, since all the observed digital solutions are based on a platform and are accessible via web-app and/or a mobile app format. The main differences in this group lie in:

- → The specific stage of the food supply chain where they operate
- → Which agents are involved on the supply and demand sides
- → Whether the products are donated or purchased and under what specific circumstances.

In this regard, in total, we have found five types or categories of connection (i.e. matching, enabling cross-sector and multistakeholder relations), the B2NGOs type being the most frequent relation in our sample. This is a type of relation which, mirroring the role played by traditional foodbanks, operates at the end of the supply chain. The chart below locates the different cases along the food supply chain according to the stage where they operate. Further below, a section explains the main features for each category.

Figure 1. Map of initiatives along the food supply chain according to the position from which they operate.



A) CATEGORY 1:

APPIFICATION OF THE FOODBANK MODEL (B2NGO)

Most of the organisations in our sample seek to provide a match between retailers and NGOs. Retailers can be wholesalers, supermarkets, restaurants and/or other stakeholders in the hospitality sector (such as hotels, event venues, etc.) which need to dispose of surplus food. At the other end of the relation, charities include foodbanks, pantries and/or community groups. Producers and distributors are rarely involved in this type of match. Most of the platforms are oriented towards serving vulnerable people and collectives, inspired by food charity and aid assistance approaches.

At this stage, salient innovations include platforms for food donation where the basic mechanics offer a space for suppliers to offer surplus food and charities to claim the food they need. Some takeaways of our study come forward at this point:

- → There is a double strategy where material facilities are supported by a digital infrastructure. Warehouses (where food is sorted and stored) are placed to meet large, non-perishable and regular donations. This is combined with a platform, the digital infrastructure, which allows speeding up unexpected and/or small pick-ups which may (or may not) involve fresh produce.
- → In essence, logistics remain the same as in the analogue world. While the connections are made via the platform, volunteers (individuals) and carriers still play a crucial task in bringing food from donors to charities. Examples of digitalisation processes:
  - — Appification of a foodbank. Banco de Buenos Aires has put forward “Misión entrega.” This is a platform that connects restaurants, charities, and volunteers. In addition to already existing warehouses, they offer and supervise this new digital infrastructure. Their intermediation role expands to monitor donations and pick-ups, as well as training volunteers for managing food in a safe manner.
  - — App first, warehouse as a consequence: FoodCloud follows a reverse strategy. It developed the digital layer first, and only after reaching a certain regularity with large donations it started building physical warehouses.
  - — Other examples focus on improving the communication among stakeholders and help optimise foodbank resources in logistics and volunteering support. Examples of this strategy are Plan Zheroes, HopHopFood, Bring the Food, Phenix and OLIO.
- → The digital marketplace acts as a platform to maximise opportunities and put solidarity into use rather than administering donations. The only case that doesn’t deal with food donations is Chowberry, which offers a marketplace where charities can purchase from retailers but also from producers at discounted prices.
- → Digitalisation comes forward as offering a software solution to an organisational problem, that is, digitalisation can be seen as a service. For businesses the incentive to be involved in food donation is that of i) getting rid of a food surplus which otherwise would go to waste; ii) collaborating in local solidarity initiatives but also iii) using these donation platforms as a service. Most of the platforms make it possible to track and monitor waste and generate insights, which can be useful for corporate waste management.

B) CATEGORY 2:

DIGITALISATION OF WAREHOUSE-TO-DISTRIBUTION RELATION (NGO2NGOs)

This category can be seen as a subtype of the previous one, since the platforms are seen as connecting two different types of NGOs: those which have received, stored and/or sorted the donated food (i.e. foodbanks or similar) with other NGOs that are delivering the meals to vulnerable families (community groups, soup kitchens and so on). At this specific stage of the supply chain, these new digital matches also accelerate the digitalisation of existing food donation networks, facilitating the communication and coordination between foodbanks and charities. As a result, NGOs undergo a digitalisation process that otherwise would have barely started. A main takeaway comes forward here:

- → Algorithms can be used to fight hunger too. In the case of Feeding America, which is the US network of foodbanks and charities, an algorithm named “Meal Connect” was developed to ensure the most convenient and efficient match between entities, based on proximity.

C) CATEGORY 3:

LAST-MILE SUPPLY (B2C)

In this category, retailers directly connect with end-consumers who are not necessarily in need or living under conditions of poverty. Consumers can purchase products which are close to their expiry date at discounted prices. Examples of this category are mainly start-ups and SMEs, such as OLIO, Phenix, or Karma. Their approach to food waste conveys an important message around the economic and environmental externalities of food waste.

- → The most efficient pick-ups are self-served. Karma, in partnership with Electrolux, have developed a smart fridge to ease pick-ups by customers at stores while testing the same distribution system in public spaces such as train stations. The aim is to increase the ability of retailers to handle surplus, without depending on people to be handing out the food.

Though this can be seen as a contested model, since it may be seen as indirectly reinforcing waste, other voices point in a different direction. Convenience is put forward to argue that under this model retailers can count on an extra channel for distribution which, in addition, offers the opportunity to advertise their businesses, using e-commerce and a paywall even if they do not have a website. This has been a good solution for small grocery shops during the pandemic lockdowns. However, as presented above, apps that sell food at lower prices at the end of the day offer a reselling channel which may eventually normalise the generation of regular food surplus.

D) CATEGORY 4:

LAST-MINUTE WASTE AVOIDANCE (P2P)

This category includes initiatives which operate in the last stage of the supply chain, but involving only consumers. This approach resonates with other practices in the sharing economy, as the same person can participate in the network as an agent on both the supply and the demand side. This type addresses the threat of food waste rather than that of hunger, using a civic approach. This category is characterised by community-driven actions which aim at fostering local solidarity and social cohesion while seeking to reduce food waste. These initiatives combine the narratives around mutual aid and the benefits of sharing spare food at the community level. Motivations and incentives for individuals who participate in these platforms seem to be akin to those of members who join a movement, rather than volunteers who seek to help others in need.

→ OLIO and HopHopFood are the most relevant examples of this category. Both started as free platforms for food sharing among consumers and evolved into sophisticated platforms which leverage the digital tools for redistributing food surplus via different channels. Both P2P platforms connect neighbours who have spare food and seek to share it.

E) CATEGORY 5:

ALTERNATIVE FOOD-SUPPLY CHAIN

While all the initiatives described this far can be considered redistributors, Misfits Market and Phenix can be labelled as alterationist according to Aschemann-Witzel *et al.* (2020), as they are modifying the circuits of currently existing supply chains. While Misfits is directly creating a parallel supply chain for imperfect food which does not meet the visual standards of the industry, Phenix operates at the top of the supply chain, offering new opportunities to share, donate and reuse, for instance by redistributing spare food directly from consumers to farmers.

→ The motto of Phenix goes beyond food waste and fosters the circular economy for food and non-food items.

→ Misfits is aiming at the democratisation of organic food and is closest to agroecology proposals and alternative food networks which seek to connect producers and consumers while trying to improve the economic conditions of both.

Three trends to watch

1 DIFFERENT NARRATIVES ON HUNGER, POVERTY AND WASTE ARE BEING USED

There are several differences among cases regarding their narratives around hunger and waste. Based on the cases surveyed, the more their mission and vision focuses on people in need, the more the narratives around food charity reinforce the moral economy and stress the "food paradox"[1]. Most of the organisations (including NGOs and social enterprises) connecting retailers and charities are to be found in the food charity (or sharing for charity) category. On the other side, market alterationists and organisations which are connecting B2C and P2P weave the narratives around mutual aid and the benefits of sharing spare food at the community level.

The narratives on food waste recovery are framed around economic, social and environmental impacts (Ciulli et al., 2019), while the approach and the scope vary across organisations.

- → The economic impacts may include the monetary benefits or savings for businesses, charities and/or consumers. These are present to a greater or lesser extent for all the organisations
- → The social impacts may include food security alleviation and/or community cohesion
- → Environmental impacts refer to the damage caused by food waste and CO2 reduction.

Best practice: Moving from aid assistance to community approaches helps to foster mutual aid and social cohesion. Examples:

- — OLIO & HopHopFood offering tools for P2P food sharing
- — Misfits Market: Subscription boxes democratising access to organic food, improving the conditions for both producers and consumers
- — FoodCloud

2 VOLUNTEERING SYSTEMS NEED TO BE UPDATED

Many of the cases surveyed rely on volunteers to carry out and deliver core activities. The levels of engagement and activities of volunteers differ from organisation to organisation. From food charities to organisations which foster mutual aid, we see how the former group contributes to maintain asymmetries between givers and receivers, whereas the latter is oriented towards social cohesion and reciprocity. In all cases it is crucial to dispose of solid food safety management processes in place.

Best practices in screening and training volunteers

- — For those cases which connect business (mainly retailers) and charities: volunteers are involved to a great extent in the offline logistics (e.g. pick-ups, food sorting, food delivery and so on), particularly when the cases are NGOs and foster food charity narratives (Banco de Buenos Aires, FoodCloud, Feeding America, Basic Life Charity, Bring the Food, HopHopFood, Plan Zheroes). Food security is a critical aspect and volunteers have to be well trained according to the organisational standards.
- — Volunteering for solidarity vs joining a community of food waste heroes: OLIO is an example of best practices regarding the screening, training and management of volunteers. In their model, people become committed to become food waste heroes and join the community so as to be part of the zero waste movement (the same with Phenix). OLIO offers six different options to volunteer: while the main task is to save and redistribute surplus food and items from retailers to the neighbours, they have also created other roles such as ambassadors who spread the word (offline and online), team leaders and business recruiters.

1 The food paradox refers to the fact that a third of the food produced goes to waste, while 25% of the world population suffers food insecurity or hunger.

3

UNEQUAL ACCESS TO TECHNOLOGY STILL MATTERS

The potential of digitalisation of services and activities is limited by the capacity of the different stakeholders to have access to devices and internet connectivity. Thus, digital solutions have to bear in mind ways to adapt, bypass or overcome these barriers.

Best practice: co-creation of the digital solutions with all stakeholders

— **Example of Banco de Buenos Aires:**

To digitise and speed up the process of small and irregular donations, they developed an app (“Misión entrega”) to connect directly retailers, volunteers and charities.

The first step was to carry out a thorough assessment of the capacity of charities to access technology. The results were interesting:

→ Only 70% of charities had smartphones and/or were able to use them.

→ They had to deliver training once the app was developed.

→ Developers had to buy a specific model of phone to be able to test under the same conditions as end-users (not a simple barrier when coding). The model was finally developed only for Android, since this is the most common system among end-users.

→ Only a smartphone is needed to get access to the app.

— **The “Local Leader” approach (Chowberry):**

A local leader or champion is a person who has good relationships with various people in need and will be responsible for ensuring the effective and meaningful communication between the social entity and end-receivers of food donations. This champion is tech-savvy and can accompany other people in need, avoiding the digital divide. This can be deployed at the level of social entities which are in direct contact with end-beneficiaries.

The role of foodbanks: Digitalisation, reinvention or both?

hile the foodbank model remains under pressure due to COVID-19 and spikes in food insecurity, digitalisation may offer great opportunities to optimise and increase the social impact that these entities may deliver. As shown, there are several processes all along the food supply chain where digital solutions are irrupting, speeding up and promoting the generation of efficient matches between the actors at play. Furthermore, the awareness around food waste and its impacts in GHG emissions is encouraging the proliferation of platforms for food redistribution, food donations and food sharing. Nowadays a wide range of stakeholders are mobilised by narratives around the environmental impacts of food waste. As observed, those initiatives which are connecting this global trend with new forms of civic engagement are attracting particular attention.

Historically speaking, foodbanks have become the solution to the food paradox. Now that they are at the forefront of food redistribution for people in need, they have the opportunity to combine their know-how, experience, trust-based networks and existing warehouses with digitalisation. One of the key aspects of platformisation is the implementation of a comprehensive inventory management system with proper digital inventory management tools. The table below shows an example of how warehouses and platforms can be combined to carry out the main activities of any foodbank, in order to increase efficiency and expand their operational and "matching" capacities. Considering the main tasks carried out by foodbanks, the table below provides specific instances of how the combination of analogue dynamics (i.e. the warehouse model) and digital tools (i.e. the platform model) offer opportunities to increase operational efficiency and improve their performance:

Table 1. how warehouses and platforms can be combined to carry out the main activities of any foodbank ↓

Main tasks of foodbanks	Warehouse	Platform	
Contacting and connecting with donors and with social entities	Regular and non-regular collaborators with surplus food	Claiming the food posted by donors, based on needs, offering the donated food to social	End-to-end control, monitoring and traceability
Receive food	Collecting and receiving surplus food from different entry channels	Stock management control, alert system of due dates, automatisation (e.g. showing minimum stock level of specific product through push notifications to the different hubs)	
Classification	Food sorting and organisation (based on food type, perishability or conservation requirements)		
Storage	Alleviation of the deficit of infrastructures of the social entities		
Distribution	Food exit programmes, and logistics of pick-ups and deliveries	Logistics management and coordination	
Relationships with volunteers	Screening and training of volunteers (face to face)	Volunteer management (profiles, shifts, needs, availabilities...)	
Communication between stakeholders	Traditional bilateral communications	Increased communication and coordination of activities between stakeholders	

Besides, digital tools are only part of the solution, as they require governance and supervision but also require some levels of co-design to i) assess the needs they seek to address; and ii) develop adequate platforms to solve the food problem without generating new unexpected social harms. According to the twelve examples that have been analysed, the expertise historically acquired by foodbanks makes them particularly relevant partners for the design, testing, and deployment of digital solutions for food redistribution at the different stages of the supply chain. In addition to brick-and-mortar infrastructure, foodbanks can now expand their role as intermediaries to that of facilitators and digital connectors.

Digital solutions are more than digital tools

The intermediation role of the foodbank is not limited to the provision of a digital solution. Actually, the key strengths of the foodbank are their capacity to:

- **Facilitate the assessment of needs of the different stakeholders and their readiness and willingness to adopt digital innovations.**
- **Co-design the solution with developers and facilitate co-creation spaces with end-users of the apps.**
- **Ensure and administrate the governance of the platform (screen the volunteers, set up *golden rules* on how to use it, take care of the reputation economy and so on).**
- **Offer offline support and supervision to ensure on-time pick-ups and deliveries.**
- **Create a platform to mobilise existing communities as social capital is the key asset of any foodbank.**

Concluding remarks

The *raison d'être* of this report has been to explore what we can learn from platformisation and digitalisation in order to boost the social impact generated by the foodbank model. In a context conditioned by the consequences of the pandemic, where hunger and poverty are increasing globally and environmental awareness is more pressing than ever, we are confident that there are many opportunities in platformisation to help these organisations attain their goals more effectively. In section 1, several organisational challenges, mainly related to logistics and operations along with paradoxes and dysfunctionalities, were identified. The second chapter allowed us to compile twelve relevant case studies which offer outstanding practices based on digital solutions from different sectors, all related to food waste and food redistribution. Using our five variables on social innovation we put forward in this section how foodbanks can gain insight on specific avenues to render their processes more effective. As observed, digital tools can dramatically increase efficiency. More importantly, though, digitalisation, and more specifically platformisation, enables organisations to engage in a broader conversation about the adaptation of the role and contributions of foodbanks in tackling hunger and food waste.

The essence and the power of any foodbank we firmly believe lies in its accumulated social capital. In simple words, a foodbank is a community of people and organisations with a shared mission that put at the service of society at large their assets, time and personal skills and capacities. When observing foodbanks within the context of their partners and networks, they form extended communities that are able to build trust among each other, creating solidarity chains which can be adaptable to multiple forms of organising and different missions. The provision of digital solutions to a changing environment is only a small part of a larger debate about the changing role of foodbanks. Given the insights collected in this report we are confident that the time has come for these organisations to be ambitious and think beyond the food paradox, leveraging the possibilities provided by digital tools. Foodbanks, located at the centre of this powerful network of connections, have the capacity to readapt their original purpose to the changing social circumstances and unleash the potential of these meaningful connections in as yet unexplored but surely promising directions.

> "Foodbanks and their affiliated charitable networks are **proving, especially in the coronavirus health crisis, that they are a reliable partner.** They not only support charities to help those in need, but also provide an efficient and rapid solution for food businesses with unexpected surplus food. **Foodbanks are an integral part of the food system because they promote the transition from a linear to a circular economy:** what could be lost or wasted is re-valued for the benefit of the economy, the planet, and people. They are fulfilling their mission of mobilising goodwill so that one day the paradox of scarcity in abundance will be a story of the past."
>
> Jacques Vandenschrik, President,
> European Food Banks Federation[2]

2 The full article can be found here: https://www.oecd-forum.org/posts/hunger-in-abundance-why-we-need-food-banks-to-reduce-food-insecurity-and-prevent-food-waste (last accessed 15 July 2021).

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