

Food Democracy in the Making: Co-Designing for Local Food Networks

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ABSTRACT

This thesis introduces the concept of ‘food democracy’ as a theoretical framework for HCI to engage in human–food interaction. It discusses the efforts to establish a local food network in two deprived neighbourhoods using the online direct marketing platform *The Open Food Network*. Following an Action Research approach, it reports several challenges that arose around development, governance, operation, and economic model of the network. It develops the themes of co-design, co-ownership, cooperation, and a fair business model to address these challenges. It highlights how tensions between environmental sustainability, social justice, and economic viability limit the discourse about ‘affordability’ of local food for deprived communities. Furthermore, it points towards wider system change as a goal for food democracy, and illustrates key elements of a co-design process for the development of local food networks. Finally, it maps out a design space for digital technologies to support local food networks.

ACM Classification Keywords

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local food networks; food democracy; co-design

INTRODUCTION

Today’s globalised food system is unsustainable on many levels. The proliferation of highly processed, energy rich but nutrient poor food causes a many diet-related diseases, when at the same time rates hunger and malnutrition are rising [33, 55]. The corporate control led to market concentration, displacement of peasants, and a commodification of food. Today, as little as 10% of the retail price of food go to the producer, and 60% end up at wholesale and retail [45]. Overproduction and free trade agreements flood and destroy local markets of developing countries [30]. Industrial agriculture, its intense

and monoculture farming practices and reliance on fossil fuels have severe environmental consequences, including air pollution, contribution to climate change, loss of biodiversity, and low animal welfare. Neoliberal policies have undermined the power of the state to regulate, and thus the ability of civil society to influence, where, by whom, and how the food we eat is produced [48].

‘Alternative food networks’ are civil society movements that aim to establish alternatives to the corporate food regime and practice ‘food democracy’ [32]. At their heart is a localised food system, set out to protect the environment, support the local economy, and connect people as food citizens, beyond their confined roles as consumers or producers [55]. Examples of such ‘civic food networks’ include co-production of food through community supported agriculture (CSA) projects, consumer co-operatives, community gardens, or civil society organisations (CSO) that advocate for policy change.

Digital technologies play an increasing role in the way we produce and consume food [14]. HCI has, however, predominantly taken an health and environmental sustainability framing when engaging with food [14]. While civic aspects of food have been addressed, particularly in the context of community gardening [29, 35], a food democracy lens has so far not been applied. Technology has, however, been used by civic and local food networks. One example of this is *The Open Food Network* (OFN)¹, an open source online platform that allows local producers to sell food directly to consumers. Food hubs have an intermediary role. They offer a single shop front with products from several producers, aggregate customer orders, and act as pick-up points. While the OFN and similar platforms have shown considerable success in the UK and elsewhere, a challenge is the adoption of this model in deprived communities. Local food is commonly seen as too expensive for them [24].

This work explores this issue through an Action Research (AR) approach. It discusses the efforts to set up one or several food hubs in deprived neighbourhoods in the Tyne and Wear region and the challenges that were encountered. Data was collected through field notes from direct engagements with potential partners in a local food network, including hubs, producers, transport providers, and strategic partners, as well as semi-structured interviews with key stakeholders. This

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¹<https://openfoodnetwork.org.uk>

thesis discusses the themes developed from this, opportunities to support the development of local food networks, and a design space for digital technologies to contribute to food democracy.

RELATED WORK

This work builds on theoretical and empirical work on local food networks and their contribution to food democracy. Additionally, it draws on a rich body of HCI research on digital technologies and human–food interaction.

Local Food Networks as Food Movement

Conceptually, local food networks can be framed as ‘alternative food systems’ [48], rejecting the global corporate ‘food regime’ [30]. Food regime research recognises three historic phases of global food regimes, a colonial (1870–1930s), an industrial (1950s–1970s) and a corporate regime (1980s to the present). The latter is characterised by deregulation and neoliberal capitalist expansion [30].

Conceptualising Food Movements

Opposition to global food regimes has been active since the first peasants movements in the 1960s and can be classified as reformist, progressive, and radical [30]. The reformist group uses a ‘food security’ discourse that prioritises sufficient access to food [44]. As such it is oriented towards aid and charity and does not question the market-led model [55]. It is thus considered part of the corporate food regime.

The progressive group are ‘food movements’ that use a ‘food justice’ and rights-based discourse. They are oriented towards empowerment of workers and communities through agro-ecology, regulated markets and fair wages. Radical food movements go beyond rights and speak of entitlements and a redistribution wealth and power [30]. A key element of this is the democratisation of the food system, i.e. a shift of power towards increased control of civil society over state regulation and the market. The term ‘food democracy’, as coined by Tim Lang [32], frames

food as a locus of the democratic process: the interest of the mass, the ‘bottom-up’ over ‘top down’, the building of social movements to embed rights into culture/expectations. [32]

Food democracy moves beyond the neoliberal understanding of citizenship as just an expression of consumer choice [39]. ‘Food citizenship’ captures the rights and responsibility people have in a food democracy [55]. Food is not just a commodity, society not just a market, and citizens are not passive and uncritical consumers or producers [37]. They engage in practices “that support, rather than threaten, the development of a democratic, socially and economically just, and environmentally sustainable food system” [56]. This includes deliberation, sharing of ideas, and an orientation towards the community good and an ethical way of doing economy [26, 27, 48]. Closely connected to food democracy is the concept of ‘food sovereignty’. Its ideas have been developed by the international peasants movement *La Via Campesina* [52]. It has a strong focus on the right to food production [58], that implies the need for structural agrarian, trade, and financial

markets to give landless farming people ownership and control over the land they work on, protect developing countries from dumping imports of overproduction food, and end financial speculation [45, 57].

Food Citizenship in Practice

The term ‘civic food networks’ (CFNs) captures areas of food democracy practice. They can be grouped in three levels [5, 48]:

- **Co-production:** This area includes movements that practice closer consumer–producer relationships on the ‘sliding scale of producership’ [51]. A prominent example is ‘community supported agriculture’ (CSA). Within this model consumers typically subscribe to the harvest of a farm, share the production risks, and engage in close negotiations about the production standards. Other examples include farmers’ markets, food swaps, consumer co-operatives, and citizen/parent juries [5].
- **Identity of Producer and Consumer:** This area captures all forms of re-appropriation of food production by citizens community gardening and urban agriculture projects. Their purpose can range from self-fulfilment to re-learning of food skills [26] to cultural integration to political activism by reclaiming of the commons [5].
- **Political Engagement in the Food System:** This area includes forms of direct engagement of citizens with the state to change food system regulations. Such initiatives typically operate on a regional or national level. They include awareness campaigns and protests, as well as active participation in community organisations, food movements, or public institutions, such as food policy councils. Examples include *La Via Campesina* [52] or the Slow Food movement [6].

Food Democracy Critique and Solidarity Economies

Critics of CFNs point out that the self-organising and bottom-up character of CFNs makes them in fact not reclaiming food production and consumption but complicit in fulfilling the neoliberal agenda. They simply fill in the gaps in the safety net that a reducing role of the state has left [39]. This criticism can also be made in regards to the digital civics agenda and its promotion of technology for self-organisation [43]. McClintock concludes in the context of urban agriculture that both views are justified. It is, however, helpful to look beyond this dualism by acknowledging the need for a long incremental shift that can eventually challenge wider policy frameworks [39].

Additionally, a celebratory and unreflexive use of the rhetoric of ‘local’ or ‘organic’ has been criticised as romanticising and anti-political [19], since ‘locavorism’ does not have innately positive attributes [33]. “Promises of sustainability, equality and local empowerment deserve careful scrutiny” [18]. To avoid this ‘local trap’ [6], the study and practice of food democracy needs to critically reflect on the context and form of specific food initiatives. This shouldn’t, however, be used to dismiss the concept of local food altogether, but rather to highlight its complexities [18].

A common criticism of food democracy portrays it as an “elitist’s dream world: [...] Regular people cannot afford to buy high-priced organic food, shop at farmers’ markets, or worry about whether their steaks are locally grown or humanely raised” [24]. Hamilton [24] rejects the argument that proponents of food democracy don’t care if the poor can afford to eat. While he acknowledges that local and organic food can cost more, this is no ground to argue against it. First, local food and ‘Big Food’ can coexist, since more affordable options do not have to disappear. Second, he argues that the values of food democracy, a fair and transparent food system, are truly democratic and not elitist. Similarly, Carolan [8] argues that digital ordering platforms move the normative from a ‘you must’ (buy at the supermarket) to a ‘you may’ (participate in alternative food networks).

This line of argumentation does, however, avoid a discussion of who can realistically participate in food democracy and the complexities of actually doing food democracy for everyone. Economies of scale through collective purchasing [34] could be a way to make food more affordable. Alternative food systems do, however, highlight the notion of solidarity and ethical ways of doing economy, questioning not only the way food is produced, distributed, consumed and disposed, but also the capitalist free market economic model. As illustrated above, this is particularly evident in the concept of food sovereignty [45]. Thus, alternative food systems align with solidarity movements [46] and their creation of social economies and co-operatives as practical responses to social and economic crisis. Such alternative ethical economies move beyond market and the and have been conceptualised as ‘human economies’ [25].

HCI and Food

Within HCI, the space of digital technology and food has seen increasing attention [14]. Researchers have engaged in the design and study of ICT in production (predominantly growing of vegetables in community gardens) [29, 36, 40, 54], procurement and shopping [12, 31, 50, 13], preparation and cooking [11, 21], consumption and eating [1, 11, 12, 15], and disposal [2, 16, 20] of food. Fairly little attention has been given to transport and logistics [14]. In terms of sites of food practices, HCI has historically focused on the household level [23, 15], with communities primarily researched through community garden and urban agriculture studies.

In terms of theoretical framing, health, wellbeing, and environmental sustainability have been two prominent angles to research ICT and food [14]. A ‘situated action’ approach has been taken to explore mundane food activities and the material and social circumstances that shape them [23, 15]. Increasingly food is studied as ‘social practice’ [12, 22, 9]. A civic lens for researching food systems and technology has been proposed before [4, 3, 49, 12] and discussed in a continuous series of conference workshops (e.g. [47]). A transdisciplinary design framework for sustainable food cultures was developed to connect people (through participation), place (through localised approaches), and technology (through networks and interactivity) [10]. Empirical examples of civic food technologies include work with community garden groups [40, 29, 35]. Another notable example is a collaborative recipe online plat-

form [21]. The ability to ‘rewrite’ recipes affords a discourse between cooks and producers of ingredients about what we should eat and the wider agro-food system. Empirical engagement and design for food democracy has, however, been very limited in the HCI community. To the best of my knowledge, HCI has so far not engaged with food using an explicit food democracy framework.

Food Hubs and the Open Food Network

According to the U.S. Department of Agriculture (USDA) they “manage aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers” [38]. Food hubs act as an intermediary between producers and consumers of local food.

The OFN is an open source online platform that provides a directory and market place for local food producers and hubs. The platform doesn’t prescribe a particular business model for a hub. Hubs could be a loose buyers group, a cooperative, a store or farmers’ market offering a click-and-collect service, and more. Producers can also be hubs and offer their own products next to others. From a consumer’s perspective, a hub offers a unified shop front for various producers that supply the hub. A hub runs so-called ‘order cycles’, usually weekly time windows during which consumers can place orders and pay online. At the end of each cycle, aggregated orders get sent to the producers, who then deliver to the physical location of the hub. Orders get sorted and picked up from shoppers during a set time window. Some hubs also offer a home delivery service, or late pick-up from a shed or similar.

An evaluation of the OFN in Australia showed that the platform is perceived positively [31]. It offers an efficient and accessible way to administrate and run orders, it acts as a direct marketing tool, it increases access to fresh and local food, and reduces transaction costs. Issues raised in this study concerned practical features that users would like to see to improve the usefulness and flexibility of the platform. From a digital civics perspective, the open source nature of the OFN bears, however, particular interest. On the one hand, this allows to run the system at low cost. It is free for producers and hubs get six months trial for free, after which there is a £1 monthly fee, with a suggested contribution of 2% of sales on a ‘pay as you feel’ basis [41]. On the other hand, the development of OFN is community-driven, giving hubs and producers greater autonomy to co-create their foodscapes [8]. This aligns it well with the principles of food democracy and differentiates it from functionally similar, but proprietary, price-setting platforms like *FarmDrop*². Carolan [8] argues that while they offer positive alternatives to the mainstream food system, they create new dependencies to a single market player with no participation in governance.

Regarding viable and ethical economic models for local food networks, the sharing economy has become a popular but contested research avenue for HCI. The benefit of sharing platforms like AirBnB and Uber for deprived communities remains, however, questionable and needs further investigation

²<https://www.farmdrop.com>

[17]. Only very recently, HCI has started to research and design for solidarity movements and economies [53].

Research Questions

Connecting the project aims with the theoretical framing discussed above, the following research questions guide this thesis:

1. How can sociotechnical and economic models for local food networks in deprived communities be co-designed?
2. How can design support the development, governance, and operation of such a local food hub network?

The following section outlines how I set out to answer these questions.

METHODOLOGY & PROCEDURE

This work follows an Action Research (AR) approach that has increasingly been adopted by the HCI community [28]. This thesis describes two AR *plan-act-reflect* cycles of an continuously ongoing collaboration that tries to establish one or more food hubs and a corresponding local food network in deprived neighbourhoods in the cities of Newcastle upon Tyne and Gateshead in the North East of England, UK.

Cycle 1: Developing a Partner Network

The project started when Open Lab was approached by the Artisan Baking Community³, an organisation that delivers funded baking sessions in collaboration with local community centres. A missing element of their business model was an effective way for the communities they work with to distribute the bread and the OFN promised provide the technology platform to do this. The aim of the first cycle was to build a network of (potential) partners. The following sections detail the engagements and activities to achieve this.

Plan: Technology and Partner Research

Early on, we made the decision that a local food network can only succeed if a community partner that has already established links and trusted relationships with people supports and joins the project. The partner would ideally be already engaged in food related activities and be willing to act as a food hub. The relations to local residents would hopefully ease marketing and bring in a sufficient number of interested buyers. The community organisation would ideally also provide the space to handle delivery, sorting, and pick-up of food, minimum storage and potentially refrigeration capacity, and staff or volunteer capacity to run the hub. Additionally, we would be contacting potential producers from the region that would be willing to supply the food hub. The goal was to have a balanced and attractive mix of products, but otherwise no specific criteria were set at this stage.

Regarding the technology to support the operation of the hub and the network, besides the OFN also other platforms were considered, in particular the commercial systems FarmDrop

and *The Food Assembly*⁴. All platforms provide a robust and ready-to-use infrastructure so that the development of a new system was not reasonable. For reasons of availability and the benefits of an open source system discussed earlier, however, we quickly decided for the OFN. Its flexibility and free access also suited the experimental and preliminary nature of the project.

For the partner research itself I used a combination of the snowball principle and online research. Existing collaboration contacts from the Artisan Bakery and Open Lab marked the starting point. The contact with an regional food marketing and branding scheme run by a local council provided further contacts. Especially regarding potential producers I searched for businesses online and in a research database of local food producers. Each contact I contacted I also asked for further potential partners. Therefore, in reality this planning stage continued throughout the whole first cycle. In total I researched 48 organisations, out of which 26 could be potential hubs, 18 producers, 3 transport providers, and 7 strategic partners. Strategic contacts are organisations that would not be actively take part in the food network as producer, transport provider or hub, but have valuable experience and contacts that would benefit the network. Six potential hubs were also producers.

Act: Building a Network

Initial contact with potential partners was generally made by e-mail, which introduced the project and the Open Food Network. This was at times followed by phone calls or further e-mail conversation. Altogether I contacted 27 organisations, 15 potential hubs, 10 producers, 1 transport provider, and 5 potential strategic partners. Of these, I had one or more direct engagements with 20 organisations (8 hubs, 6 producers, 1 transport provider, 5 strategic partners), usually in form of a site visit or a meeting at Open Lab or another location. Table 1 details all personal engagements. I documented conversations, meetings, and site visits in the form of field notes and photographs.

Reflect: Local Food Challenges

The meetings and site visits were initially of practical nature, aiming at establishing a food hub and a local food network. Early on they revealed, however, the complexity of the endeavour. Issues of resource capacity, coordination, ownership and affordability arose during the first contacts and developed into patterns over the course of the engagement process. To get a structured overview, I coded and analysed my field notes from the engagements listed in Table 1 using *Thematic Analysis* [7]. Coding was done in two phases. Open coding resulted in codes on values, barriers, conflicts and opportunities to establish a local food network. In a second step I structured and recoded the data set, that resulted in a set of 'tensions'. I found three major themes of challenges: values, ownership and trust, as well as drive to action. To investigate these tensions further I then formulated six guiding questions informed the planning activities of the second cycle:

Value 1: How can aims for social justice be aligned with or overcome a capitalist mode of operation?

³<http://www.earthdoctors.co.uk>, Andy Haddon from the Artisan Baking Community consented to be recognised for their contribution to this research.

⁴<https://thefoodassembly.com/>

<i>Date</i>	<i>Partner Type</i>	<i>Organisation</i>	<i>Engagement</i>	<i>Content</i>
8 Feb	Hub/Producer	Artisan Bakery	Meeting	Collaboration, potential partners
28 Feb	Hub/Producer	Artisan Bakery	Meeting	Online platforms, logistics, ownership potential partners
2 March	Strategic	Open Food Network	Skype	Collaboration, OFN features and experiences
22 Mar	Strategic	Local Council	Meeting	Local food marketing, potential partners
24 Mar	Producer	Baked Goods	Meeting	Community empowerment, products
11 Apr	Hub	Food Coop 1	Site Visit	Food poverty, complex lives, participant observation
13 Apr	Hub/Producer	Artisan Bakery	Site Visit	Visit of potential bakery and hub site
18 Apr	Hub	Food Coop 1	Site Visit	Volunteering, food distribution, participant observation
18 Apr	Strategic	Local Council	Meeting	Food logistics, rural challenges, potential partners
19 Apr	Hub	Community Garden 1	Site Visit	Hub logistics and resources
20 Apr	Producer	Farm 1	Site Visit	Collaboration, product range
24 Apr	Strategic	Growers Community	Meeting	Project idea, potential partners
24 Apr	Strategic	Food Waste Charity	Site Visit	Food poverty, logistics, visit to warehouse
27 Apr	Strategic	Local Council	Meeting	Presentation of project to local producers
28 Apr	Hub	Food Coop 1	Meeting	Collaboration, food poverty
30 Apr	Transport	Delivery Service	Phone	Collaboration, transport costs, rural challenges
3 May	Hub	Food Coop 2	Meeting	Collaboration, products, logistics
4 May	Producer	Farm 2	Meeting	Collaboration, logistics and volunteering challenges
4 May	Strategic	Community Group	Meeting	Collaboration, working with deprived communities
16 May	Hub/Producer	Community Centre 1	Site Visit	Collaboration, logistics, affordability
17 May	Hub	Community Centre 2	Site Visit	Collaboration, logistics, employability
24 May	Hub	Food Charity	Site Visit	Collaboration, food poverty, potential partners
30 May	Hub	Community Centre 3	Meeting	Collaboration, hub location
31 May	Hub	Community Garden 2	Site Visit	Collaboration, volunteering, affordability
6 Jun	Hub/Producer	Artisan Bakery	Meeting	Hub location, products, viability
13 Jun	Hub	Community Centre 3	Site Visit	Hub location, competition
14 Jun	Hub/Producer	Artisan Bakery	Site Visit	Visit of potential hub location and bakery
16 Jun	Hub/Producer	Community Centre 1	Site Visit	Pilot hub, marketing, viability, logistics
16 Jun	Hub	Community Centre 2	Site Visit	Pilot hub, affordability, co-development
7 Jul	Producer	Farmers' Market	Site Visit	Informal discussions with potential producers

Table 1. Chronological list of engagements with potential local food network partners.

Value 2: How can health, environmental sustainability, and affordability of food be addressed in an inclusive way?

Ownership and Trust 1: Who owns a local food network? How are decisions made and different interests balanced?

Ownership and Trust 2: How can openness and trust be fostered in a system of competition and protectionism?

Drive and Action 1: How can motivation for change be turned into action, given the constrained resources?

Drive and Action 2: How can community co-creation become more effective in addressing systemic issues?

Cycle 2: Local Food Network Co-Design

The second cycle of this work focused on two interrelated aspects: First, on a level of understanding, I wanted to unpick the challenges discovered in the first cycle further in collaboration with my partners. Second, on a practical level, two of my hub contacts agreed to run a food hub pilot. Planning these pilots allowed us to discuss ways to overcome the challenges in ways that work for the partners. Following again the plan–act–reflect scheme, the next sections describe the activities of this cycle.

Plan: Stakeholders and Models

To analyse the tensions discovered in the first cycle further, I planned semi-structured interviews with key stakeholders. I used theoretical sampling to decide who to interview. Based on the previous engagements and the coded data, I sampled each of the six questions to find stakeholders that were most relevant to the question and could provide extended insights. This process resulted in five interview partners:

1. Producer 1 (PR)⁵
2. The director of Community Centre 2 (CC)
3. A community engagement coordinator on Food Poverty (FP)
4. Nick Weir, The Open Food Network and *StroudCo*⁶ (NW)
5. A farmer from Farm 1 (FA)

Additionally, planning activities in the second cycle involved the agreement with Community Centre 1 and Community Centre 2 to continue to collaborate with the aim of piloting a

⁵Direct quotes later on use these initials.

⁶Nick Weir consented to be recognised for his contribution to this research. *StroudCo* one of the first hubs using the OFN.



Figure 1. Table set up at a family summer event at Community Centre 1.

food hub at their respective premises. Both community centres are located in neighbourhoods in the Newcastle-Gateshead area with high levels of poverty and low access to fresh and local food. This planning stage involved the decision to start a co-design process to develop localised hub models with the hubs, their residents and the producers that would supply the hubs.

Act: From Challenges to Opportunities

I conducted five audio-recorded interviews with the key stakeholders identified above. In terms of setting up a pilot hub, I followed two separate processes with the two community centres. With Community Centre 1 I had a series of additional meetings, phone calls, and e-mail communication to discuss questions of logistics. A challenge was to find a day and time in the week where both the centre had the capacity to run a hub, producers could prepare the food, and orders would be delivered in an efficient way. We agreed to have a four weeks pilot with weekly deliveries and the hub being open for pick-up on an afternoon. Due to busy schedules and absences over the summer months the pilot was, however, postponed several times and is now due to take place in October 2017.

As I will discuss later, the community centre's biggest concern was the affordability of the food. To avoid having to charge a mark-up on prices, we explored funding options to cover the running costs (primarily staff time) of the hub for the pilot. Additionally, there are ongoing negotiations with producers about affordable price-setting of their products. To promote the food hub among the local residents I joined a family summer event that was held at the centre. As shown in Figure 1, we set up a table with food samples, a promotional flyer I produced, and a laptop and monitor to demonstrate the OFN. We also offered a sign-up sheet for interested people to be informed when the hub starts. At the table I had several informal conversations with potential shoppers and could collect feedback on their perception of the idea.

With Community Centre 2 we agreed to have a pilot at a comparable scale and time frame. For reasons similar to Community Centre 1, discussions have, however, not progressed further. The whole community centre will undergo renovation works in Autumn 2017, which provides an opportunity to start a co-design process with residents to develop a shared vision of a food hub for their community.

Reflect: Mapping out a Co-Design Space

I transcribed the interview recordings and, similar to the analysis in the first cycle, I used thematic analysis to code the data in a two stage process. Finally, I derived themes that discuss opportunities for food hubs and a local food network. I will discuss these themes in detail in the Results section. Corresponding to the research questions, the themes allowed me to map out a) a co-design process for food hub development and b) design spaces for technologies to support development, governance, and operation of a local food network beyond what is currently offered by the OFN and similar platforms.

FINDINGS

The following sections present the themes developed out of the two AR cycles of this research. They represent key areas of concern for my research partners that currently make setting up a food hub in their communities not a straightforward endeavour. At the same time, they represent opportunities to co-design approaches with communities to shape *their* local food network bottom-up. Additionally, they point out design spaces for HCI to develop technologies to support the realisation of a fair and viable local food network.

Food Hubs as Sociotechnical Systems

Online ordering systems such as the OFN help to overcome a fundamental logistics barrier for local food systems. For my partners, they simplify the ordering process for shoppers and for producers as they aggregate demand. They also allow for a bigger range of products and low-demand products, as only what is ordered is delivered. Marketing and direct communication channels between consumers and producers are additional benefits. The OFN as an open source platforms additionally offers great flexibility in terms of the business model of the local food system. This is a distinguishing feature in contrast to closed source systems such as FarmDrop or The Food Assembly, which prescribe very specific models. My partners value the fact that the open source nature also keeps costs low, as no capital investment money needs to be repaid, and allows direct community control over the future development of the platform. The hub model for them gives access to local food to communities and has the potential to be a catalyst for further activity that benefits the wider area. It also creates flexibility for shoppers as they can order on a one-off basis without committing themselves like in veg box schemes. Delivering to a hub instead of individual households also simplifies delivery and keeps costs low.

Delivery can, however, become very complex when several producers need to be coordinated to ensure that food arrives fresh and on time for hubs to sort it. Our attempts to set up pilot hubs clearly highlighted this. Coordinating orders, deliveries, pick-ups, and marketing require a dedicated manager. My partners perceive the delivery logistics currently not well supported by the OFN. It also lacks integration with other platforms and social media sites. Its flexibility also increases complexity. My partners see this as a potential major barrier, particularly when working with deprived communities. Ordering food online instead of going to the supermarket might for many be a new and inconvenient practice, as it requires planning ahead. Partners reported that community members often

have complex lives and no time or energy for this. The biggest barrier, however, is the fact that local food tends to be more expensive and becomes unaffordable for the communities my partners work with. Successful implementations of food hubs can therefore usually be found in affluent areas:

At the moment it is a case of in order to run a commercial food hub it is necessary to appeal to the environmental motivations of higher income shoppers to make the food hub viable. (Nick Weir, OFN)

I will discuss affordability and social impact in detail later, but with OFN's focus on ordering logistics, there is no technology support to deliver social impact.

Local Food's Value Space

Despite these barriers, local food and the OFN food hub model are of interest for organisations that want to deliver social impact. For them, food can be a vehicle to achieve their wider goals, such as a developing a low-carbon economy or happy and healthy communities. Food is seen as quite unique as there seems to be a fundamental quality to food that engages us as humans and brings us enjoyment. Considering the negative impacts of the global food regime, *local* food then has more than just a (varying) geographical meaning. As pointed out earlier, local food is highly value-laden. For my partners local food has the power to connect people (in particular consumers and producers), be more environmentally friendly by reducing food miles, support the local economy and cut out powerful middle men in the supply chain, provide an employability pathway for deprived communities, and has high quality that is healthy, often organic and GMO (genetically modified organism) free. Local food is also connoted with growing and cooking yourself, practices that are seen as both satisfying and educative. Local food therefore promises a fair and equitable food system for everyone. It is fair for consumers who get physical and economic access to good food, to producers and processors who get an living income, and fair for the environment that is protected.

To ensure that this diverse range of values is actually represented the specifics of a food hub and its network need to be carefully developed. My partners frequently pointed to co-design as an approach to realise this.

Developing a Local Food Network: Co-design

Co-design is common practice among my partners when they develop community benefit projects. This usually involves residents and relevant partner organisations. The aim is to "bring in people around the table" (FP) to discuss and develop an idea collaboratively from the start. This ensures broad support and engagement from everyone involved early on. Additionally, "working with local people and volunteers [helps] to develop activities that would help [to] address some of the needs that people identify" (CC). This practice is not only empowering, but it also delivers outcomes that actually benefit the community. In terms of local food, co-designing the hub model is therefore crucial so that the hub has the community's support. Attractive product offers for local people also benefit the hub's economic viability.

Co-design is generally seen as at least partly involving education, in particular about healthy eating, growing and cooking skills, and in the context of food hubs it is also about the ethics of the food system.

Some people have a very purist community development methodology, and so they basically would say, we wouldn't do anything unless the local people want it. No, I don't personally subscribe to that really, because I think that you only know what you know. So, if you go to somebody on our estate [...] [and ask,] what do you want to see at the hub? They'd go, well something for the kids and something for the old people. Because that's all people think about. [...] They can't really imagine quite what else the building could do. [...] And so there's to my mind something about community development, where we actually come together and we bring our skills and expertise and we start to open people's minds, because I've had different experiences to folk around here, and they've got a different experiences to me. (CC)

Partners acknowledged that this understanding might run in danger of being seen as patronising. Any co-design process must therefore carefully balance external and community input.

Governing: Co-ownership

Closely connected to co-design is also co-ownership of the local food system. My partners see this as essential, since the local food system is a network of organisations: "I think it would have to be shared ownership, I don't think it could be controlled by one particular organisation" (FP). The mechanism proposed to realise this is generally a formalised and written constitution and an elected steering group or board of trustees that decides on important questions. As pointed out earlier, the day-to-day work would be carried out by a manager.

Co-ownership and lengthy steering group discussions are, on the other hand, seen as potentially inefficient and resource-hungry. Additionally, co-ownership demands of partners not to be "precious about [their] thing" (CC), i.e. the community benefit should be more important than pushing individual agendas.

Operating: Collaboration

To ensure that a food hub is embedded in the community it aims to serve, partners stress the importance of collaborating with an organisation that is already embedded there and has established trust relationships with residents. Collaboration also helps to overcome an environment of competition, in which not only commercial companies compete on the market, but also charities compete for the same funding pots.

Foremost, however, collaboration is pointed out as the way to go to achieve structural change. Currently, most collaborations are, however, small-scale and transactional. The reasons for this are manifold. One of the aims of charities is to respond to the needs of their community, and this often require immediate action and remedy. Charities also have multiple agenda items that need their constrained resources. A long-term, strategic

venture is therefore a complex risk factor and less manageable than smaller interventions. This practice is reinforced by public intervention programmes that are defined by short political election cycles and funding structures that prefer short projects with immediate benefits.

Some interview partners see that structural change can be achieved through a collective of small interventions that all correspond to a broader agenda. Others criticise that there is no lasting impact once funding runs out and there is a need to develop a strategic vision:

You have people who are passionate and [...] they are often very engaging within the local community, [...] but they don't have any vision of scale of how they get to viability. They don't, generally they don't. They're fragmented, because you can use these examples in the North East, there's multiple orchard projects, but how do you scale it so that it creates a significant alternative to the global food system. (PR)

Collaboration at scale for structural impact is no easy task. My partners have both negative and positive experiences with larger collaborations and point out the following points to consider: a) A trusted collaboration environment needs time to develop. b) Open and transparent communication is important for this. c) Diverging agendas need to be acknowledged. d) Still, the collaboration needs a shared vision everyone subscribes to. e) Someone or a group need to drive this vision. Technology or money is not enough. f) Constrained resources and varying capacity and quality of work need to be acknowledged. g) Pilot projects help to test ideas before committing long-term.

Business Model: Fair for Everyone

Finally, the critical element of a local food system is a business model that reflects the aforementioned values and at the same time is economically viable in the long-run. Experience has shown that food hubs work better in areas with a lack of local food offers and in areas with demand for local food. As discussed, the neighbourhoods of the two hub partners that want to pilot the concept are in areas with a distinct lack of local food.

Important for economic viability is to gradually grow structures as needed. All aspects discussed before, the co-design process, governance structures, and coordination and management need resources. Additionally, the hub should aim at using as much of existing infrastructure (technology platforms, established logistics links, space and storage capacity) as possible.

Fairness

All my partners agree that fairness in the local food system is a challenging goal. As argued before, currently local food is not equitable and fair for everyone, so that one aspect of fairness usually comes at the expense of another one. Local food might not be fair for consumers, since it is not affordable for parts of the population. Food can be made cheaper by using unsustainable production methods, thus exploiting the environment and animals. Also, producers could sell food at production costs, basically running their business as a charity,

but that would mean no income from food production. Food hubs could also provide their service for free by relying on volunteers. This would not only exploit them, but also question the sustainability of this system as volunteers might eventually "burn out" (NW).

Income Generation

Partners floated several models and ideas on how to make the food hub model economically viable. This includes covering the running costs of the food hub, as well as subsidising food to make it more affordable. A straightforward approach is to mark-up prices or charge membership fees. In its simplest form this covers primarily the running costs of the food hub. More complex models introduce differentiated pricing for different people, effectively using wealthier members to subsidise food for poorer members.

Most of my partners currently rely on public funding and they suggested that this could be a model for food hubs as well. Funding can be particularly important in the start-up phase to cover costs, but also long-term to finance the social impact side of the food hub. Most partners, however, have an ambivalent relationship with funding schemes, as they were subject to significant cuts in the UK in recent years and are therefore an unreliable income source.

Some partners, like the Artisan Baking Community or the Open Food Network are not run as a charity but as community interest companies (CIC). This legal form allows them to combine commercial activity and social benefit. Also the charities I engaged with are looking for routes to generate income through trade or paid services that in turn finance non-profitable and charitable work:

We've been quite successful in attracting grant money up to now, but that won't go on forever. And so, the question is, what we do about that, and what our strategy is going forward. And that at the moment is [...] looking for routes where we can generate money. (CC)

The challenge for charities is to find a balance between commercial activities and funding. As a third way, partners suggested social investments or social impact bonds ways of getting private investors to finance the operation of a food hub.

Beyond Subsidising

Partners proposed several ways of avoiding to rely on additional income to subsidise food. First, supermarkets tend to charge high mark-ups on food. For some types of food the mark-up is particularly high, so that the food can actually be produced cheaper locally using a short supply chain. Second, the goal of a large-scale collaboration aiming at structural change is also to grow so that various economies of scale show effect. This would help them reducing production, processing and distribution costs. Third, partners suggested that people could to some extent grow and make food themselves, which would reduce their spending on food. It has, however, been questioned that subsistence through growing can reach a substantial level for most people. Finally, there is the option to sell surplus food that would otherwise go to waste for cheap. This, however, does not present a reliable source of food, at least when only supplied by local producers. Surplus food that

comes from the global supply chains does not support local producers and creates a dependency on the dominant food system.

In summary, partners suggested that the local food hub model, when realised on the principles of co-design, co-ownership, collaboration, and an ethical business model, can potentially present a viable and effective alternative to the current globalised food system. There are, however, several open questions embedded in these proposals that I will discuss in the next section.

DISCUSSION

Building on the empirical findings, I want to unpick how tensions between different local food values and reducing the issue of affordability to economic factors can trap thinking of ways forward. I will point to collaboration as a route to system change, and then introduce two design spaces for local food networks.

Local Food Value Tensions

The first AR cycle showed that there are several value tensions across a network of local food actors. As Figure 2 illustrates, these can be drawn on the axes of environmental sustainability, social justice, and economic viability.

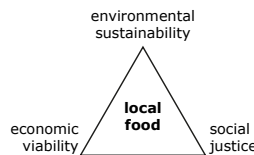


Figure 2. Local food's value space has tensions along the axes between environmental sustainability, social justice, and economic viability.

Within an organisation these tensions can be less visible, as it might prioritise one over the other. For Farm 1 for example, environmental sustainability and economic viability is more important than social impact. For Community Centre 2, social justice and economic viability is more important than environmental sustainability. I have discussed earlier that the values associated with 'local' need to be negotiated, as there is nothing inherently 'good' or 'fair' about local food. In a local food network that tries to connect all actors and incorporate all values into an operational system, these tensions become more apparent. The most prominent tensions are along the axes of economic viability and the other two value sets. Economic viability is connected with the affordability of food, an aspect that deserves further elaboration.

The 'Cost Trap'

Affordability of food has been a key concern for several partners and other organisations I engaged with. However, I want to argue that thinking only in terms of price eschews questioning the fundamental underlying injustice the corporate food regime is built upon. In a fair system producers get paid fairly, and the consumer can afford the food, and the planet and animals are treated fairly. As this work has shown, technology can streamline logistics, help to take out middle men, reduce transaction costs, and thus keep money more where

food is produced and consumed. These savings are, however, not enough for deprived communities. Looking at the value tensions discussed above, making food even cheaper is not a way forward, because then someone else in the system loses.

Reducing the cost of local food through economies of scale is an underexplored area. One of the biggest food hubs on the OFN, StroudCo, with about 85 suppliers and several hundred regular shoppers has so far not achieved a scale that would enable them to make food more affordable.

Unaffordability of food is also connected to the wider injustice in society. The experience of my partners and literature shows that food poverty is also connected with poor housing, poor health, or unemployment. Policy reforms to improve social welfare remain unlikely in the age of austerity and were in fact not brought up as options by my partners. As discussed, local food can provide employability pathways and both community centres I partnered with offer apprenticeships in the food context. The scale this can take is, however, questionable, as a food hub can only employ a limited number of people. As discussed earlier, attracting funding to finance social impact work is seen as unreliable long-term.

I argue that these options are limited as they don't question the underlying economic system. I call thinking about the feasibility of local food networks only in terms of affordability the 'cost trap'. It portrays people as purely self-interested actors (*homo economicus*). The development of existing food hubs was often driven by consumer demand for local food (the locavore phenomenon), but other factors remain unclear [38]. Investing in social good is not common practice yet, but such bonds could be an interesting way of achieving an economic system that is not profit-oriented. Additionally, informal discussion with residents in Community Centre 2 showed that decisions on where to shop are not purely price-driven. Convenience, or certain life circumstances, such as health, access to transport, or childcare responsibilities lead some residents for example to shop at a small high-priced retailer instead of the big, cheap supermarket further away. A food hub in the heart of an estate may therefore bring value that is not necessarily measurable in money.

System Change

Looking beyond the cost trap effectively requires a fundamental system change. As discussed above, charities, funding structures, and politics are currently oriented towards short-term interventions and respond to immediate needs. As such, it is at best treating the symptoms or tinkering with the existing system. The Open Food Network has a bold statement on its home page: "Sometimes the best way to fix the system is to start a new one..." [42]. Based on the findings of this work, the two cornerstones of such a new system are trusted collaboration and a viable economic model.

People and organisations currently live in an environment that does not necessarily foster open collaboration. Reflecting on the first cycle of this research, I have witnessed or experienced myself resistance to collaboration on grounds of 'conflicts of interest'. While it is certainly important to recognise differences in each other's agendas, this should stop

constructive and open communication to build a shared vision of local food networks.

While several partners highlighted the importance of co-design and participatory community development, they also drew some nuanced distinctions on participation. An important element of their role is then to bring in external ideas and experiences into the community.

I have already discussed the challenges of viable and ethical business models. In the context of system change, I want to point to the university as a capacity that deliver research findings and best practice examples, build up knowledge exchange platforms, or provide resources to test new models. Additionally, it can evaluate the impact of new models empirically.

A Guide for Co-Designing Local Food Networks

Based on these considerations, I synthesis a number of elements that could guide co-design of local food networks. While they are presented in linear and consecutive order, they will in reality be very much interlinked and in parallel.

Go public early: It is critical for a local network to have broad support from all partners involved, including residents and producers. If only a small group develops the idea and tries to get others on board, they run the risk of burning out.

Share ownership: Co-ownership is important to provide a governance mechanism that can actually make decisions that are supported and carried by all partners. Steering groups can be one option, but there are many more forms that can be explored.

Develop vision: A key responsibility of the governance structure is to develop a shared vision. This vision can change over time, but it is important to keep partners motivated and identifying with the endeavour.

Keep tasks manageable: While the vision might aim at far fetching system change, the day-to-day work needs to be at a scale that is practical and compatible with other activities and responsibilities. Breaking things down does necessarily mean doing piecemeal work that has no lasting impact.

Pilot ideas: Whether new approaches work or fail can only be tested by trying them out. Piloting reduces the risk of investing a lot of resources into a project that will never work. Nevertheless they require commitment and resources.

Grow organically: Starting small keeps structures and coordination work light. Growth does not necessarily mean number of partners or trade volume, but equality supporting other networks to develop.

HCI Design Spaces

As this research shows, the OFN currently supports the ordering logistics of a food hub well. There is a perceived gap in supporting delivery logistics. The OFN could, however, be more than just a marketplace. There are substantial design opportunities for developing, governing, and facilitating collaboration.

Networking: Currently a significant part of the work of establishing a food network is to research and connect interested

actors. A technology platform to connect organisations engaged in this space could ease the process significantly.

Development: The co-design process outlined above can benefit from technological support, particularly through innovative ways of data collection, deliberation and decision-making.

Coordination: As discussed, beyond ordering, technology could support coordination of delivery, e.g. management of a shared fleet of vehicles and the coordination of delivery schedules.

Knowledge Sharing: An online platform such as the OFN is a rich resource of knowledge and experiences. OFN currently offers a forum for participants discuss topics ranging from technical issues to best practice examples. A more structured knowledge resource could give access to this information in less crowded way.

Reaching Out: Technology could support the promotion of local food networks in terms of marketing, working with media and public campaigning. Spreading the word can attract new participants and help to shift public opinions on the corporate food regime and alternative movements.

CONCLUSION

This research has discussed how local food networks are part of the wider food democracy discourse. Local food's value space aligns environmental sustainability with social justice and economic viability through democratic governance. Digital platforms like the Open Food Network can effectively support food hubs in managing collective order processes. By cutting out middle men they help to reduce the cost of local food. While local food networks have been successful elsewhere, they remain inaccessible to deprived communities as local food tends to be higher priced.

Through a cyclic Action Research approach that aimed at setting up a local food network in the North East of England, this thesis discussed a number of themes that represent challenges and opportunities. It unpicked the multifaceted value space of local food, discussed co-design as an approach to develop, co-ownership to govern, and collaboration to operate a local food network. A fundamental challenge identified is an ethical business model that is fair for everyone – consumers, producers, hubs, and the environment – and at the same time economically viable.

To overcome local food's value tensions and the narrow framing of affordability (the 'cost trap'), and to orient collaborations towards system change, I suggested a guide for co-design with communities as well as technological design spaces to support such. As the work discussed in this thesis is still ongoing, both can be piloted with communities and will certainly evolve. As such, universities and HCI research have a unique role as facilitator to help food democracy become a reality for all groups of society.

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ADDITIONAL MATERIALS

Non-confidential materials can be accessed at this address: <https://openlab.ncl.ac.uk/owncloud/index.php/s/TUGdBptIfZi1SJv>.

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