

ICT mediated food sharing and food transitions towards sustainable food systems in Singapore



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DECLARATION

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Abstract

With projected population growth of 9.1 billion people by 2050, and accelerated planetary urbanization quickly approaching, there is growing concern regarding the unsustainability of cities. Urban food systems are a focal point for these concerns, bringing into focus the need for sustainable agriculture, and communities, surplus food redistribution, and healthy urban diets. With growing access to the Internet, real-time mobile applications, and social networking websites, ICT (Information and Communication Technologies) mediated sharing of food related resources have been identified as one potentially transformative mechanism towards more sustainable cities and communities. However, there is lack of empirically grounded research on the practice of ICT mediated food sharing in cities.

As a social practice, food sharing has evolved through centuries, from the viscerality of food sharing in subsistence societies and experiences of care and conviviality in kinship networks, to peer to peer engagements with emerging forms of ICT mediated food sharing that facilitate connections between strangers building new social relations and communities. Long recognized as a symbol of solidarity and communalism, ICT mediated food sharing includes new organisational forms, functions and governance model arising from these opportunities. Acknowledging the diversity of food sharing practices in cities today, this thesis explores ICT mediated food sharing and initiatives that enable food sharing practices in Singapore.

Although Singapore is internationally recognised as a one of the most sustainable and food secure countries in the world, the City-State depends heavily on technologies to drive sustainability transitions forward in terms of food production and food waste management. Furthermore, the focus in policy making on development of technological infrastructures and ecological modernisation has weakened State capacity to engage citizens in democratic processes and collaborations on food sustainability issues, leading to a loss of community cohesion, known in Singapore as kampong spirit. Despite this, a range of food sharing initiatives have emerged in the recent years (2012-2020) and are experimenting with collaborative food sharing practices around food. These initiatives utilise ICT as an organisational tool to connect citizens - physically

and emotionally - who are interested in improving the sustainability of their food practices.

Food sharing in Singapore represents an understudied topic in sustainability transitions literature and this thesis broadens the empirical and territorial base of research exploring food transitions by focusing on ICT mediated food sharing practices. The research adopted multiple methods, with interviews undertaken with policy makers and other stakeholders in Singapore as well as interviews and participant observation with five initiatives that engage in diverse food sharing practices from food growing, shared food consumption and surplus food redistribution. It highlights the history and activities of the initiatives, type of participants and their motivations; challenges and barriers to participation, and the role of ICT and sustainability potential of food sharing in the urban food context in Singapore. The research draws on social practice theory to look more closely at the practices and performances of food sharing and reviews theoretical approaches in sustainability transitions literature to analyse more closely the role of civil society actors in food transitions.

The study reveals that initiatives are diverse, scattered across the food system with participants from all walks of life who are primarily motivated by social and environmental concerns. Food sharing initiatives also include diverse sustainability goals and use ICT to achieve their objectives, given the restrictions of civic associational life in Singapore. The research suggests that food transitions are difficult to disentangle because they take place on a multitude of levels, from the long-term structural approaches that tackle national issues such as food security to everyday practices involving ordinary citizens and therefore they are intricately tied to the political cultures, histories of places, and messy processes that involves social relations, ethical concerns and issues of power.

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List of acronyms

- AVA Agri-Food and Veterinary Authority of Singapore
- EOP Ecologies of Participation
- HDB Housing and Development Board
- HPB Health Promotion Board
- ICT Information and Communication Technology
- IDA Infocomm Development Authority
- IMDA Infocomm Media Development Authority
- IRAS Inland Revenue Authority of Singapore
- LTA Land Transport Authority
- MCI Ministry of Communications and Information
- MEWR Ministry of the Environment and Water Resources
- MLP Multiple Level Perspective
- MND Ministry of National Development
- MSF Ministry of Social and Family Development
- NEA National Environment Agency
- NPB National Parks Board
- PUB National Water Agency
- PSD Public Service Division

SDG Sustainable Development Goals

SLA Singapore Land Authority

STS Science and Technology Studies

SNM Strategic Niche Management

URA Urban Redevelopment Authority

List of main contributors to the thesis

This thesis was sole authored by Monika Rut apart from the following co-authored elements. The Table below identifies the main contributions of the co-authors:

Chapter	Contributors	Contribution
Chapter Four	Monika Rut	Fieldwork and data collection Nvivo coding Data analysis Conceptual design Theoretical framing Theoretical interpretation of the results Writing and analysis
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	Professor Anna Davies	Comments on drafts Guidance on the design Guidance on theoretical analysis In-depth editing
Appendix 1	Professor Anna Davies	Research design Conceptual design Theoretical framing Writing and analysis

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Appendix 3	Monika Rut	Fieldwork and data collection Chapter concept and design Writing and analysis
	Anna Davies	Comments on the structure and analysis In-depth editing

PART ONE

INTRODUCTION AND OVERVIEW

CHAPTER ONE

INTRODUCTION

1.1 Background: Urban food system challenges

With the projected population growth of 9.1 billion people in 2050, from which 66 % will be living in urban areas (Searchinger et al., 2019), transitioning towards sustainable food systems that recognizes environmental issues but also the needs of communities, for example for sociality and healthy eating, becomes a challenge for policy regulators, industry and practitioners in food systems. Currently, accelerated urbanization and related intensification of agriculture, rapid industrialisation aggravated by climate change, infrastructure developments such as housing and changes in lifestyles of urban residents are having negative impacts on the sustainability of food systems (Duncan, Rivera-Ferre and Claeys, 2020).

Today, feeding cities with fresh food is dependent on global food trade and agricultural intensification (Odorico et al., 2014). Although many cities encourage urban farming to increase food security in cities and promote community building, growing food in urban areas contributes to less than 20 per cent of all the food produced globally (Corbould, 2013). Importing food from areas outside their agricultural regions makes cities more vulnerable to global food price volatility with the consequences on food security of developing countries (Clapp and Murphy et al., 2013). Research has shown that in the aftermath of 2007-2008 global food crisis in which 44 million people worldwide were drawn into poverty (Sundaram, 2013; Maes, 2010), cities have reinforced their role as food driving forces, thereby increasing support for technologies, global multinational institutions and private agro-food industries to meet demands for food production and food security (Ericksson et al., 2020).

However, while food security is the central feature of urban food policy agendas, the question remains about the amount of food surplus produced in cities that could have otherwise been used to feed people (Stuart, 2009). Approximately 30% of food produced for human consumption around the world is either lost or wasted each year (FAO, 2020). The UN ‘Sustainable Development Goals’ (SDG) identified food waste as an important challenge for achieving sustainable consumption, and Goal 12.3 aims to, halve per capita global food waste at the retail and consumer levels by 2030 (SDG, 2015). Initiatives and organisations that encourage surplus food redistribution through

food rescue and donations are seen as the key players in reducing food waste, addressing food poverty and enhancing food security in cities (FAO, 2020). Besides social consequences of wasting food, cities also experience pressing environmental implications for sustainability of food systems in connection with edible food waste which is incinerated and disposed in landfills. For example, it is estimated that about 11% of all the greenhouse gas emissions including methane and carbon dioxide are produced in the process of food waste decomposition directly contributing to climate change and global warming (Chapagain and James, 2011).

In addition to food production and waste management, food consumption in cities has garnered scant attention, despite its relevance for sustainability. Rapid urbanization of cities, the changing nature of work and leisure and its effect on socio-cultural fabric of the society have an impact on how people eat, where and with whom. Cooking and consuming foods is an important self-empowerment practice for citizens and communities who wish to exercise control over their diets and a central to cultural identity and sense of belonging. Lang and Caraher (2001) refer to culinary transition, as a process in which cultures experience shifts in the patterns of cooking and eating pointing to how culinary skills, knowledges and practices around food are being restructured and fragmented with the changing nature of urban consumption. It has been documented that, due to busy lifestyles and high-intensity occupations in large urban areas, citizens are more likely to consume meals away from home and eat alone. Research has also shown that, eating alone has been associated with unhealthy dietary behaviours, being underweight, and depressive symptoms among older adults (Hughes, Bennett, and Hetherington, 2004; Kuroda et al., 2015).

Such present and future food challenges provide us with a palette to work through questions about how to address urban sustainability issues in cities pertinent to food production, consumption and waste management. In response, Tim Lang's coining the term food miles in 1993 with his message supported by Slow Food Movements, has made consumers and policy makers more aware of sustainability implication of local food networks and their importance in bringing citizens closer to food sustainability issues. This has been evidenced on the example of growing popularity of farmer's

markets, artisan food products and slow food movements in cities in the 2000s (Steel, 2009; Mougeot, 2006). His approach has resonated with Goodman's (2003) 'quality turn' in urban food systems that refers to development of alternative food networks, in support of locally produced food, revitalization of culinary practices, social relations, knowledge and traditions around food. Furthermore, Lang and Heasman's (2004) concept of food democracy has been reintegrated in urban food agendas and food policy councils to engage community and grassroots-based movement in food policies. As a result, new initiatives and consumers behaviours became visible across cities with a potential to enhance new forms of civic food culture including surplus food redistribution, community-supported agriculture and collective urban gardening initiatives that distribute responsibility of sustainable urban food systems on cities, public institutions, citizens and businesses (Davies, 2019).

Diverse engagements with food systems highlight the social and environmental dimensions of food sustainability in which various food sharing practices around shared food production, consumption and redistribution play a significant role in restoring healthy relationships with food and communities (Davies et al., 2017a; 2017b). The reintegration of food in cities and in the life of citizens has also converged with discourses on sharing economies and collaborative consumption which have emerged in the cities in the aftermath of 2008 global financial crisis. Often used interchangeably sharing economy and collaborative consumption are economic models that give visibility to idling capacity and sharing of underused assets or services (including knowledge and skills), for free or for a fee, directly from individuals by means of Information and Communication Technologies (ICT) such as social media and mobile applications (Davies, 2019; Choi, 2014). It has been argued that these ICT mediated forms of sharing have emerged as a need for alternative visions for urban life beyond capitalism and hyperventilating lifestyles (Brenner et al., 2009).

In fact, the 2007-2008 global financial post crisis atmosphere in the cities worldwide has affected citizens and consumers attitudes towards ownership and has encouraged new business and organizational models with a greater environmental and social responsibility. In relation to food, ICT mediated sharing has revitalized urban commons

such as land to be accessed by communities for food growing and increased citizens interests in social innovations such as new organisational and business models for food sharing such as community eating platforms and food rescue networks (Davies, 2019). However, it is less clear what food related stuff, skills and spaces people share in cities and how, and what the form, function and governance model are of ICT mediated food sharing initiatives, and how they contribute to the desired change in which challenges of sustainable urban food systems are taken into consideration. This Chapter, Chapter One, provides a brief rationale for the research by outlining current challenges to sustainable urban food systems globally and in Singapore such as food security, food wastage, and consumption. It introduces the food sharing concept and explains the role of ICT in mediating contemporary food sharing practices. An introduction to Singapore as a case study for analysing ICT mediated food sharing is also provided. Furthermore, the Chapter introduces theoretical approach for the study of food sharing in Singapore and outlines the outstanding gaps in the sustainability transition literature to be addressed in the research.

1.2 ICT mediated food sharing

As a social practice, food sharing has evolved through centuries, from the viscerality of food sharing in subsistence societies and experiences of care and conviviality in kinship networks, to engagement with emerging forms of ICT mediated food sharing that facilitate connections between strangers building new communities and new food visions (Davies et al., 2019). Considered to be in the domain of tight-knit communities, urban food sharing is becoming increasingly integrated in the socio-cultural context of cities worldwide as a means to provide citizens with environmentally and socially sound pathways of food production, consumption and waste management. For example, ICT mediated food sharing, has given greater visibility to sustainable practices that already existed amongst urban communities such as community gardens, communal kitchens and social eating (Davies et al., 2017a). While there is no universally agreed definition, for the purpose of this thesis food sharing has been defined as:

'Having a portion [of food] with another or others; giving a portion [of food] to others; using, occupying or enjoying food [and food related spaces to include the growing,

cooking and/or eating of food] jointly; possessing an interest in food in common; or telling someone about food' (Davies et al., 2017a).

This definition of food sharing includes the sharing of food stuffs, spaces and skills such as sharing land for communal food growing, learning how to cook through participation in community potlucks, participating in food rescue activities or consumer cooperatives, and meeting like-minded individuals to share experiences, skills and social networks. As demonstrated across 100 cities worldwide (Davies et al., 2017a; 2017b), the examples of food sharing occur along the food chain ranging from growing vegetables together, to selling home-cooked meals, using web-based platforms to swap food, to the gifting of food rescued from supermarkets or gleaned from farmers' fields. Some examples of ICT mediated food sharing include self-organised groups that use ICT to perform collective food rescue and coordinate surplus food redistribution, food sharing platforms that facilitate land and harvest sharing, as well as eating together platform for sharing of home cooked meals, and knowledge that enhance culinary learning experiences and practical food skills (e.g. how to cook) (Edwards and Davies, 2018). Food sharing initiatives use ICT tools such as mobile phones and social media platforms (e.g. Facebook, WhatsApp mobile application) to manage day-to-day activities, communicate with participants and larger audiences, self-regulate their engagements in environmental and social matters and build friendships and knowledge networks (Rut et al., 2020; Morrow 2018).

While ICT mediated food sharing is a multi-sited and multifaceted activity as participants in food sharing initiatives seek to transform city-based food systems by connecting people to each other and to urban foodscapes, little is known about the holistic nature of food sharing at a city scale as the comparative analyses remains focused on isolated case studies and small scale communities (Davies et al., 2017b). This means that the sustainability potential of urban food sharing in moving cities towards more sustainable trajectories is largely unknown to the stakeholders in the food systems, including policy makers (Davies et al., 2019). As a result, the overall potential of food sharing initiatives in terms of diversifying local food production, reducing food waste, and nurturing community cohesion is difficult to recognise, and novel

interventions in the foodscapes of one locale are easily dismissed as grassroots niches must compete for access to resources and political support with urban agro-food systems dominated by technology driven agendas (Davies, 2019). Research has also shown that ICT mediated food sharing are often restricted by regulatory regimes, cultural and social behaviours and material circumstances (Davies, 2019). For example, policy makers are often in favour of large and technology-oriented infrastructures that promise to achieve the goals of food security and agricultural production rather than small scale social innovations that are not immediately scalable (Eriksson et al., 2020).

There are challenges over access to resources such as land, challenges relating to pervasive social and cultural norms, and challenges with respect to activating cultural capital to participate in food sharing activities (Schor, 2017). Increased sharing of food related spaces, skills and stuffs in the cities has the potential to reduce wasted resources, labour, time and energy, with noted examples including surplus food redistribution initiatives, and opportunities to extend current activities into new sectors, such as compost programs and new products and services (McKenzie and Davies, 2019). However, while, ICT mediated food sharing empowers communities to become change agents by emphasizing their capacity to self-organise and question State-led visions of urban food systems, it is less clear what challenges citizens face when engaging in food sharing and what is the sustainability potential of ICT mediated food sharing. Therefore, analysing food sharing practices in a context specific settings of urban food systems (e.g. social, political, cultural) and the role played by the different actors (e.g. national governments, grassroots, citizens) is necessary for understanding the essence of the practice and the evolving patterns of ICT mediated food sharing in human societies.

Finally, the consideration of the role of ICT in food sharing parallels with ICT developments in cities and recognises food sharing as a technologically mediated practice and a form of social innovation that fosters a paradigm shift in food production, consumption, and food waste management patterns (Davies et al., 2019; Choi and Graham, 2014). ICT mediated practices give visibility to emergent forms of materialities that originate from digital spaces such as new social connections, knowledges and skills and are manifested through new spatial practices. An example

includes the use of ICT to map edible urban spaces for food growing (Rut and Davies, 2018b) or emergent food sharing infrastructures such as community fridges and food sharing points through which surplus food is redistributed to those who are hungry (Rut et al., 2020; Morrow, 2018). Such bottom up approaches to food sustainability might have implications for grassroots innovations and food democracy within the urban food systems because of their potential to drive legislative change, inspire new business models and enable a broader cultural shift in the way citizens think about food resources in cities. ICT also makes visible different economic models that have always co-existed in cities but have been overshadowed by capitalist economies and relations. Davies et al. (2018a; 2018b) demonstrated that ICT mediated food sharing does not always mean that food is shared for free and among kinship networks. Instead the research has found that sharing food and food related stuff, skills and spaces is often accompanied by other ways of exchange such as gifting, selling or bartering and that ICT mediated food sharing initiatives are made of weak ties where people are less likely to know each other.

In the next section, I will briefly introduce food sharing in Singapore. The City-State was selected as a field site for this research as it represents a novel socio-political and cultural context to explore food transitions beyond western liberal democracies. This is further explored in depth in the literature review section on Singapore in the Chapter Three.

1.3 Food sharing in Singapore

In Singapore, food sharing has been historically rooted in its pre-colonial past as it was considered to be the major cultural and social element of kampongs¹. The literature and

¹ Pre-colonial fishing villages and agricultural huts in which one third of Singapore's population (mostly Malaya communities) lived once the State gained independence from Malaysia in 1965.

historical accounts provide evidence that food sharing practices, including various forms of communal activities such as growing vegetables, sharing household spaces, shaped socio-cultural relations and economic activities of kampong communities (Brownlee, 2018; Duruz, 2011; Chua, 1994). In the process of nation-building, the State has drawn on kampong meanings and associations, to provide a sense of direction to citizens in terms cultural identity (see Chapter Six), and to enhance practices of cooperation, solidarity and harmony between racially diverse citizens, known as kampong spirit. Furthermore, kampong spirit has played a symbolic role in the organisation of food sharing activities in Singapore both as a motivational trigger for businesses and non for profit sector to involve citizens in charitable programmes such corporate social responsibility and for citizens to start their own initiatives that bring community together through communal activities around food (Rut and Davies, 2018a). While historically rooted in the cultural past of kampongs and therefore associated with a shared set of meanings and values that often shape social relations amongst individuals and communities, food sharing has been also manifested in various configurations of skills, knowledges, spaces, and technologies to address sustainability challenges in Singapore, such as food production, food waste reduction and community cohesion.

Although the City-State has been internationally ranked as the most food secure country in the world (Global Food Security Index, 2019), less than 10% of food consumed in Singapore is grown locally compared to 90% of produce imported to ensure stable food supply and food access. State-led narratives of resource scarcity (e.g. land and water scarcity) that are visible at all scales of new agricultural projects, such as vertical farming and smart agriculture, emphasise the role of technology in food provision to strengthen national food resilience and security while at the same time keeping the points of focus on the efficient land utilisation. Concerned about the impact technology might have on food quality, agricultural knowledge, human nature relations, and biodiversity, citizens in Singapore have initiated their own food growing projects, many of which take place in temporarily leased spaces, apartment rooftops and urban farms (Rut and Davies, 2018a; Rut and Davies, 2018b). In recent years (2015-2020), the State has encouraged citizens to participate in Community in Bloom nationwide gardening

program to rekindle kampong spirit amongst racially diverse neighbours. However, less is known about initiatives that emerge outside the Community in Bloom program and whether sharing of land, harvest, knowledge and skills that forms the basis of shared food growing in Singapore could positively contribute to sustainability by extending its scope to include cultural, social and environmental dimensions of food production.

Similar to food growing, food sharing practices have also been visible in food waste management. Food sharing directed at waste reduction include corporate social responsibility volunteering activities with food banks and charitable organisations to leverage food security through food surplus redistribution, and extending beyond formal organisational structures and visions of food provision to new forms of citizen-led participation such as food rescue groups (Rut et al., 2020). In recent years (2018-2020) there has been a growing wave of distributed, self-organised food sharing groups, whose actions directed at saving surplus food from the city-wide food establishments offer a novel view on food waste organisational realities and citizens capacities to mobilise resources, both tangible (e.g. logistics) and intangible (e.g. knowledges, emotions) in a pursuit of practical solution to food waste. In Singapore, food waste has risen by 40 per cent over the past 10 years (2010-2020) and State-led visions of food waste management have been focused on technological innovations and interventions. Still, food sharing within the context of food waste management in Singapore remains understudied and food sharing practices are poorly understood, and largely overlooked in the policy plans towards Zero Waste Nation.

While being active on the ground through various citizen-led actions that contribute to civic engagement in food system governance, food sharing initiatives in Singapore are pointing out their capacity to enact transitions towards more environmentally and socially sound food futures, in which civil society actors seek deliberately to construct their local visions and perform shared practices that enhance food sustainability. Sustainability transitions are processes of fundamental socio-technical change in response to societal challenges (Grin, Rotmans and Schot, 2010). In Singapore, food transitions have been largely focused on technological advancements to increase efficiency and productivity in food systems while leaving other sources and forms of

innovation less tackled, such as social innovations and everyday messy practices of citizen's mobility to transform urban food systems (Rut and Davies, 2018a). Furthermore, emergent research on food transitions has mostly focused on technical innovations or grassroots cultures within the context of western liberal democracies. In Singapore, the model of civil society is based on communitarian principles that underpin civil obedience and loyalty to the State and national orders (Leong, 2000). While citizens are encouraged by the government to adopt more active roles through State-led programs such as Community in Bloom, civic engagement in public matters and policy making remains marginal and limited to public consultations and educational campaigns.

Thus, the study of food transitions in Singapore has potential to reveal issues that are often taken for granted in the context of western liberal democracies such as participatory dimensions of policy making and the freedom of citizens to self-organise and act in their own best interests (as opposed to the State interests). As a practical bottom-up intervention directed at improvement of food systems as well as a cultural practice associated with socially cohesive kampong communities, the concept of food sharing in Singapore is in need of further consideration to understand the significance of food sharing in shifting urban food systems towards more sustainable and democratic trajectories (Avelino et al., 2016).

1.4 The aim of the thesis

The aim of this thesis is to contribute to sustainability transitions research and food transitions in the City-State of Singapore. The focus in the thesis is on urban environments in Singapore, regardless of their scale or population size, where people grow, eat and redistribute food surplus. The terms 'urban', 'city' and 'cities' are used in this thesis interchangeably to denote heterogeneous urban environments where food production, consumption and waste management take place.

This research considers food sharing practices and practitioners in Singapore, their various organisational capacities (e.g. affective, material, cultural, and technical) and operational spaces (online and offline) to reorient patterns of food production,

consumption and waste towards more sustainable trajectories. The evolving and contested approaches to food transitions in Singapore manifested, on the one hand, in socio-technical imaginaries of the City in a Garden, Shared Values and Intelligent Island (discussed in this thesis in the Chapter Six) in which technology and science notably shape societal relations around food; and, on the other hand, by a great diversity of food sharing practices exhibited by citizens in everyday interactions with urban food systems as a means of enhancing connection to food and each other, allow to compare different practices and visions of food sustainability in Singapore. Furthermore, although historically grounded in cultural imaginaries of kampongs and therefore often co-opted by the State in a form of kampong spirit, food sharing in Singapore represents a recent and unique, nationwide movement that nurture citizens capacity of autonomous public activity that has a potential to contribute to democratic food transitions.

The research draws on theories and concepts of socio-technical transitions and addresses outstanding gaps in the literature that were identified in the process of data collection and analysis. These gaps include the need for: attention to geographical location, societal and political contexts and culture of places in sustainability transition research; recognition of civil society actors ranging from political grassroots and nongovernmental organisations but also inclusive of informal self-organised groups, collectives and ordinary citizens in sustainability transitions; and attention to messy realities of food transitions rather than deceptively neat abstract models that tend to overlook questions of politics and power relations and ethical issues. This thesis acknowledges the emergent role of ICT tools and platforms to produce, transform and mobilise civic knowledge in Singapore. By linking both on and offline communities and bridging established organizations to self-organized groups of individuals, the material presented in this thesis contributes to the body of literature concerned with inclusive sustainability transitions (Longhurst and Chilvers, 2019).

The research also draws on social practice theory as a conceptual lens to develop new understanding of what constitutes food sharing practices in Singapore. Thus, the focus is also on practitioners in food sharing as carriers of practices who perform actions

through the use and integration of resources (symbolic, material, physical), and skills, understandings and abilities. In this sense, the research has used multiple qualitative methods that allows the researcher to capture complexity of food sharing practices in relation to: who participates in food sharing; what skills, stuffs and spaces are involved in food sharing in Singapore; what is the relationship between different food sharing practices, organisational realities and the practitioners who enact them; and how a diverse set of influences (social, moral and cultural norms, political orientations, grassroots cultures) shapes food sharing in Singapore. Furthermore, and specifically in relation to sustainability transition research, social practice theory offered conceptual help in the study design and data interpretation of inter-relations between individuals and their social contexts and surrounding socio-technical systems. Adopting social practice lens helped to recognise that food-related practices are constituted through and embedded in socio-technical systems and shaped by culture of places and histories, materials, institutions, and infrastructures (Shove and Walker, 2014; Shove and Spurling, 2013). As a result, the research design for this study provides a nuanced approach in which to explore food sharing sites, practices and actors that are often scattered across urban food systems and situated within larger socio-technical configurations. The purpose of this thesis is to respond to the following research questions:

1. What is the contribution of ICT mediated food sharing to sustainability transitions and food transitions in Singapore?
2. What is the landscape - the form, function and governance model - of ICT mediated food sharing initiatives in Singapore?
3. What are the strengths and limitations of the Strategic Niche Management approach for understanding food sharing and food transitions in Singapore?
4. What is the nature of participation in food sharing and food transitions in Singapore?
5. What does the socio-technical imaginaries analysis reveal about food sharing and food transitions in Singapore?

1.5 Thesis structure

This thesis is by publication, and includes a combination of written material and peer-reviewed papers that have either been published (Chapter Four and Chapter Five) or have been submitted for publication (Chapter Six). The collection of three papers address key empirical and theoretical gaps in understanding around the practice and performance of food sharing and of the sustainability transitions literature. All papers within the thesis contain an introduction, literature review section, theoretical framework, methods section and discussion and conclusions sections. The thesis also includes two additional co-authored papers (Appendix 1 and Appendix 2) and a book chapter (Appendix 3) which have been important in the development of this research. The structure of this thesis is as follows:

Chapter Two sets out the literature review around the three main research themes, namely, food sharing, sustainability transitions and Singapore context which inform the background for the empirical research and data analysis of ICT mediated food sharing Singapore.

Chapter Three provides an overview of the methods used to collect, analyse and discuss food sharing practices and sustainability potential of ICT mediated food sharing in Singapore. This Chapter also acknowledges the limitations of the research design and challenges experienced during the fieldwork.

Chapter Four presents the first publication, ‘Transitioning without confrontation: shared food growing niche and sustainability transitions in Singapore’. Following a series of global food crises and an increasing dependence on food imports, the Singaporean government has begun to support local food production as a means to improve the sustainability of its food regime. This extends to the development of State-led ventures which support shared food growing in the city. In parallel, informal citizens' groups are experimenting with collaborative forms of food provisioning. Both types of initiatives utilise Information and Communication Technologies (ICT) to facilitate their practices of shared growing and seek to reorient the current food regime onto a more sustainable pathway. Drawing on ethnographic research conducted with two initiatives

representative of both organisational positions, this chapter critically examines the efficacy of using a transitions thinking approach to assess their actual and potential contribution to the disruption of the food regime in Singapore. The Chapter first reviews existing approaches to transitions thinking in order to distil insights for examining shared food growing initiatives in Singapore as niche projects. The broader socio-cultural and political context of Singapore's food system and the food growing niche projects which are emerging within it are then delineated, followed by a strategic niche management (SNM) analysis of the two initiatives. Ultimately, the chapter makes two linked contributions: firstly, it diversifies the empirical foundations and the sectorial and geographical reach of sustainability transitions research. Secondly, it provides space for critical reflection on transitions thinking when applied beyond the Western liberal democratic settings from which it emerged.

Chapter Five presents second publication, 'Participating in food waste transitions. Exploring surplus food redistribution in Singapore through the Ecologies of Participation framework'. It is widely agreed that food waste is a global societal meta-challenge requiring a sustainability transition. However, to date, transitions research has been surprisingly silent on the role of public participation in such a transition and overly narrow in its geographical reach. In response, this Chapter examines whether the Ecologies of Participation (EOP) framework developed in the realm of energy transitions provides a relevant conceptual framing for understanding the role of publics within food waste transitions in Singapore. First the specificities of Singapore's socio-political context and its food waste management system is reviewed, before identifying and discussing dominant, diverse and emergent forms of public engagement with food waste issues. This is followed by in depth consideration of how participation is being orchestrated by two surplus food redistribution initiatives as relatively recent additions to the food waste system in Singapore. The analysis finds the EOP beneficial in its elevation of participation within the transitions field. It also provides a useful means to deconstruct elements that comprise participation practices. However, it remains relatively silent about how participation practices themselves change across time and space and supplies little in the way of explanatory power. More concerted and longitudinal analysis is required.

Chapter Six presents the third publication, ‘Socio-technical imaginaries and sustainable food transitions in Singapore: Nature, community, and technology’. The City-State of Singapore declared independence from Malaysia in 1965 to become one of the fastest developing countries in Southeast Asia. In this rapid transition, the State has invested in building socio-technical imaginaries in which particular conceptions of nature, community, technology and culture are enrolled to play a central role in shaping political, environmental and social orders. While visibly dominant, these State-led socio-technical imaginaries, are however not the only imaginaries in play within Singapore. Over the past decade and facilitated by ICT, participants in food sharing initiatives are co-producing alternative meanings, practices and new knowledges around food that elevate particular practices and care relations around food. The aim of this Chapter is to explore and compare the character of these co-existing State and grassroots socio-technical imaginaries. The Chapter draws on policy analysis, interviews and ethnographic research conducted in Singapore with a range of food sharing initiatives which focus on one or more of the following activities: growing; eating and cooking together; and saving food from going to waste through redistribution of surplus. Drawing on Science and Technology Studies (STS), we have found that the interpretative lens of socio-technical imaginaries are productive when analysing State-led and other visions of sustainable food systems in Singapore. It also provides a means for identifying and delineating points of intersection, divergence and dynamism between, as well as the uneven power geometry behind, these socio-technical imaginaries. Although often neglected, results reveal the important role of culture, civil society participation and ethical issues in sustainability transitions, which all point to a messy reality of socio-technical imaginaries in which varied interpretations of care and control are present and co-exist in tension.

Chapter Seven provides the conclusions for the thesis. It highlights how each research question has been answered. Furthermore, recommendation for policy makers and food sharing initiatives from this research study are discussed. The Chapter concludes with recommendation for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this literature review is to lay the foundation for an exploration of food sharing within the context of Singapore and to reflect on the potential impact of ICT mediated food sharing practices on the sustainability of urban food systems. The literature review covers three broad areas, the history and the contemporary forms of food sharing in cities; a critical review of sustainability transitions scholarship, and its relevance to study food transitions in Singapore; and the overview of the socio-political context of Singapore in which ICT mediated food sharing has been taking place in response to food challenges that Singapore has been currently facing. This literature review provides the broad basis for and complements the literature review sections presented in the Chapters Four, Five and Six.

2.2 Food sharing

This section discusses literature which is relevant to the understanding of food sharing practices within human societies. For the purpose of this thesis, the concept of food sharing has been used as an umbrella term that encompasses various food related practices including growing collectively, eating together, redistributing food surplus in conjunction with others, as well as sharing of food related knowledge, skills, spaces and utensils (Davies et al., 2018a; Davies et al., 2018b). This section outlines a brief history of food sharing, and reflects on recent debates concerning emergent forms of collaborative behaviours around food in cities. It also highlights the role of ICT, such as the Internet and mobile application, in mediating contemporary food sharing practices.

According to Jaeggi and Van Schaik (2011) food sharing is considered a distinctive feature of both human and non-human species. Indeed, it is seen as one of the most important forms of cooperative behaviour (Ahedo et. al., 2019). While non-human species share food as means of communication and survival (Wilkinson and Boughman, 1999), the patterning of food sharing amongst humans is complex, and goes beyond the basic but essential biological need for nourishment, it also includes the sensory, emotional and cognitive processes that take place when people spend time to share food with each other (Marovelli, 2018; Jaeggi and Gurven, 2013; Kaplan et al., 2002).

Anthropologists and behavioural ecologists sought food sharing as a form of social survival, reciprocity and exchange, division of labour, and ‘the essence of conviviality that defines humanity’ (Jones 2007, p.2). As a primordial practice dating back to the very beginning of the mankind, food sharing has been essential in analyses of the organization of social life, and the shaping of social identities (Julier, 2013; Enloe, 2003; Binford, 1980). For example, with the introduction of fire and cooking, food sharing led to a recognized opportunity for bonds and relationships to emerge between individuals and community groups (Jones, 2007). With the advancement of food sharing practices related to food procurement and preparation, cooking and consuming meals with others brought commensality and conviviality to communities. The former concept, commensality, addresses the practice of eating together. For example, first sites of commensality are those where people gathered and foods were shared and consumed amongst social groups, marking a sense of belonging and familiarity stronger (Sidenvall, Nydahl & Fjellström, 2000; Fischler, 2011). The latter, conviviality, addresses the act of living together (*cum vivere*). Graeber (et al., 2011) writes about conviviality as a kind of communistic base upon which everything else is constructed in such a way so that people can share things and in turn emphasize that shared consumption is not simply about morality, but also about pleasure.

Attending to commensality and conviviality brought a social level to food sharing, addressing its socially embedded character through sense of cooperation, commitment and care within domestic spheres (Walter, 2009). As mentioned in Ahedo (et al., 2019), such pro-social behaviours further stimulated the formation of trust relationships which not only influenced the welfare of communities, but also encouraged the development of diverse institutions and social networks. Nonetheless, despite the existing studies, the knowledge base on contemporary urban food sharing practices beyond those between close friends and family and including food sharing initiatives remains scarce. The existing body of scholarly literature concentrates primarily on small-scale and isolated communities, and discussions are limited to individual case studies throughout a widely dispersed body of literature on, for example, food banks, soup kitchens and community gardens.

That said, Davies (et al., 2017) developed a taxonomy of food sharing practices for the SHARECITY 100 Database that usefully also includes consideration of spatial orientation, as well as considering what is being shared and how. More than two-thirds (70%) of food sharing initiatives that were found through online search share multiple things, making food sharing a multifunctional and a multi-sided practice. In the category of what is being shared, the researchers found that food sharing initiatives share plants and seeds, fruits and vegetables, meat and fish, food products, compost, tools, land, kitchen space, kitchen devices, knowledge and skills, meals, and eating together (see Davies et al., 2017a, 2017b). Furthermore, different organisational forms ranging from hierarchical (e.g. food banks, charities, businesses) to more horizontal (e.g. social enterprises, community groups, associations) and mostly flat structures (e.g. informal networks, social media groups) share food related stuff, skills, and spaces. Also, while some organisational structures share food by selling (e.g. businesses), the vast majority of transactions and enterprises found in food sharing are, to use the phraseology of diverse economies, alternative market, non-market or non-capitalist (Davies 2017a; 2017b; Gibson-Graham, 2008). Further details on the characteristics of food sharing are to be found in the Table 2.1 and Appendix 1 & Appendix 2.

Table 2.1 Food sharing typology. Source Davies et al., 2016.

Mode					
What is shared	Illegal, illicit, unregulated	Gifting	Bartering	Not-for-profit	For-profit
Stuff <i>From seeds, to unprocessed and processed foodstuffs</i>	Sharing the food that has been 'liberated', foraged or gleaned e.g. 510 fruits,	Providing foodstuff for free e.g. FoodCloud.ie	Swapping foodstuff e.g. Adelaide Hills Produce	To redistribute excess food on a not-for-profit basis e.g. Foodsharing.de	Selling homecooked food that generates income beyond the costs of production

<i>including utensils, food waste or compost</i>	Berkeley, USA		Swap, Australia		e.g. Cookisto, Athens
<i>Spaces From shared growing spaces to shared food preparation and shared eating spaces</i>	Guerilla gardening of public open spaces e.g. Elephant and Castle roundabout, London	Providing spaces for growing for free e.g. The Monroe Sharing Gardens, USA	Providing spaces where food can be exchanged for labour e.g. Local foodstores	Providing spaces for people to grow food on a NFP basis e.g. Milwaukee Urban Gardens	Providing spaces for supper clubs e.g. The Underground Supper Club, Dublin
<i>Skills Including the sharing of knowledge and experiences around food from growing to eating and food waste disposal</i>	Identifying places where gleaning or foraging might occur e.g. Fallen Fruit, Los Angeles, USA	Providing skills around growing, e.g. 3000 acres, Melbourne, Australia	Opportunities to swap learning about growing food, swap seeds and produce e.g. Grow stuff, Melbourne, Australia	Providing training around nutrition or growing e.g. Hunger mountain co-op, Montpellier, USA	Opportunities for travelers to eat at home with locals e.g. Eat With, operating in cities globally

In recent years, there has been renewed interest in various sharing practices in cities under the umbrella concept of sharing economy, collaborative consumption, and other economic activities that are peer-to-peer or person to person, facilitated by digital

platforms. At the centre of these differently labelled forms of transactions is the concept of sharing. Botsman and Rogers (2010) explain the sharing economy as an economic model based on sharing underused assets or services, for free or for a fee, directly from individuals based on trust between strangers, idling capacity, critical mass, and belief in the commons. They further distinguish sharing economy from collaborative consumption, by emphasising new sharing intermediaries such as digital platforms and mobile applications and their role in facilitating sharing of underutilized resources and spaces in various ways communally, commercially, and in hybrid forms (Botsman and Rogers, 2010; McLaren and Agyeman, 2015). While the term sharing economy is more focused on interpersonal exchanges that involve monetary transactions, the concept of collaborative consumption is developed around diverse economies perspective as it focuses attention on alternative community exchange models such as bartering, lending, renting, gifting, and swapping. However, both terms are often used interchangeably to accentuate the performance of peer to peer sharing in real-life situations such as recirculation of goods, utilization of durable assets, exchange of services, sharing of productive assets, and building of social connections (Schor and Fitzmaurice, 2015; Bauwens, 2005).

The emergent peer to peer (P2P), technologically mediated practices of sharing that range from clothing swaps, dining applications, bike and car sharing services, to the global rental platform such as Airbnb, are claiming sustainability benefits in terms of increasing resource efficiency, forging new social relationships and offering possibilities for enhanced economic vitality for participants (Davies, 2016). Some scholars, however, remain critical of business transactions that overshadow diverse economic and social practices which are performed under the banner of community sharing (Schor and Fitzmaurice, 2015; Richardson, 2015; Belk, 2014). Others are optimistic that the emergent ICT mediated sharing practices have potential to transform cities towards more sustainable consumption and production patterns (McLaren and Agyeman, 2015) and bring innovative community initiatives to the mainstream through collaborative processes (Martin, Upham & Budd, 2015).

While the literature on sharing economy and collaborative consumption has only

scarcely investigated the topic of food sharing (Falcone and Imbert, 2017; Privitera, 2016; Michelini et al., 2018), it has inspired a growing body of research that explores food sharing from a perspective of stranger's sharing in which technologies play a significant role such as use of mobile applications and the Internet in general (Davies, 2019; Davies et al., 2018a; 2018b; Davies, 2017). The SHARECITY 100 Database, for example, contains around 4000 food sharing initiatives in 100 cities across Africa, Australasia, Asia and the Middle East Central and South America as well as North America and Europe, exist (Davies et al., 2017a; 2017b). This research indicates the widespread nature of ICT-mediated food sharing practices, if not the scope and extent of those participating in ICT-mediated food sharing.

Furthermore, research on food sharing across 100 cities has demonstrated that food sharing practices are found across the food system (e.g. from growing, to eating, and redistributing surplus or food waste). For example, there is much current interest in shared practices in food production in cities that involve sharing of land and resources for growing food together (Jehlička and Daněk, 2017; Dentoni et al., 2017). Shared food growing in cities can take different forms and be directed at different outcomes. Some examples of shared food growing include informal communities of gardeners who are concerned with soil regeneration, cultivation of native plants and reviving practices such as seeds saving (Pottinger, 2018; Alkon and Agyeman, 2011); food growing collectives and urban farms that combine social outreach and commercial food production (Taylor and Lovell, 2014); and online forms of collaborative consumption to swap backyard grown foods and compost (Davies et al., 2018a; 2018b; Belk, 2014; Schor and Fitzmaurice, 2015). While having a sense of community and connection to nature are the most commonly reported sustainability benefits of people who come together to share time, space and skills to grow food (MacKenzie and Davies, 2019), shared food growing has been also sought with a potential to reduce food miles, slow down food consumption (Coley et al., 2009), enhance diverse food economies (Hill, 2014), improve food security and access to nutritious, and culturally acceptable foods in a way which maximises community self-reliance and social justice (Alkon and Agyeman, 2011). Furthermore, scholars discussed shared food growing as a form of citizen's empowerment to participate in co-creating urban spaces. For example, a

growing body of literature has conceptualized shared food growing initiatives as spaces of democratic citizenship practice for mobilizing the community, and educating citizens about their rights on how to participate in the city politics (Davies et al., 2019; Campbell and Wiesen, 2009). Despite this, studies investigating shared food growing have been primarily focused on single case studies (e.g. community gardens, urban agriculture, community cooperatives), and falling short on comparative analysis to provide more background on what constitutes the practice of sharing within the context of urban food growing, how food sharing is performed across diverse food growing sites and diverse organisational models, and what is the role of ICT in mediating shared food growing practices. These research gaps are explored in greater depth in the Chapter Four on shared food growing niches in Singapore.

The research on urban food sharing also shows that food sharing initiatives are multifunctional, and participants tend to engage in other food sharing activities such as food waste reduction by for example, gleaning and foraging surplus from urban yards (Morrow, 2020) and rescuing discharged yet still edible foods from supermarkets for own consumption and for sharing with charitable organisations (Edwards and Davies, 2018; Morrow, 2018). The topic of food sharing directed at food waste reduction has attracted attention amongst academics, policy makers, the charitable sector, and activists (Weymes and Davies, 2019; Davies and Legg, 2018; Evans, 2014; Midgley, 2013). Such food sharing initiatives comprise a range of different actors (charitable organisations, NGOs, religious groups, social movements and businesses); infrastructures (storage facilities, means of transportation, mobile technologies); regulatory regimes (food safety laws, liability agreements); and motivational drivers (necessity, altruism, pro-environmental behaviour, fun and socializing). However, the main scholarly debates concerning surplus food redistribution have been largely polarised between food security arguments and critiques of emergency food supply initiatives (e.g. food banks, soups kitchens) which are often embedded in the same industrial food system that produces food insecurity (e.g. private donations) (Williams et al., 2016). Between the polarisations of these two critiques, Cloke (et al., 2017) have suggested looking at relational qualities of food sharing initiatives and to consider socio-material and affective engagements between people who share food. This

relational nature of food sharing initiatives has been further explored in the comparative analysis of surplus food redistribution collectives in Singapore presented in the Chapter Five.

Furthermore, the literature has hardly provided any clear information on how food sharing practices internationally are being affected by regulatory regimes. For example, shared food growing initiatives in Singapore, Dublin and London are often vulnerable to land management decisions and temporary leasing agreements from local authorities, which are making the long-term existence of such initiatives precarious (Davies et al., 2019). Furthermore, food rescue and surplus redistribution activities are also subjected to stringent food safety regulations, which often do not protect food sharers from the risk of liability in cases where the food shared was contaminated and the cause of third party health damage. In the analysis of the legal conflict between German food authorities whose food safety concern over the use of temporary storage facilities for donated or rescued surplus food, known as public fridges, Morrow (2018) concludes that the regulatory systems in which surplus food circulates put people who share food at risk of legal censure, limiting their access to commons. This is also the case with informal food rescue groups found in Singapore, whose collective practices of saving surplus food from wholesale markets are in conflict with multiple regulatory domains such as the right to citizens assembly and self-organized actions, which are not allowed under current State regulations.

Despite regulatory controversies surrounding ICT mediated food sharing initiatives, shared practices around food are considered to have a positive impact on the sustainability of food systems (Davies, 2019). Biggs (et al., 2010) suggest that food initiatives which are mediated through social technologies play a central role in creating a transfer from an overdependence on centralized models of food to a more distributive model of critical infrastructure provision: adaptive, localized, open and network based. Furthermore, they note the capacity of ICTs to connect people, in real time, with the impact of their consumption practices (Biggs et al., 2010). Hearn (et al., 2014, p. 209) suggests that through access to ICT mediated community networks through which knowledge about producing food, urban foraging, waste reduction and cooking is

shared, people are reconnecting to ‘traditional and scientific sources of knowledge about food in socially meaningful ways. Lekakis (2014) suggests that such digitally mediated connections may also have an impact on mobilizing consumers to engage in support of alternative food systems such as fair-trade markets. Others have also recognized the role of ICT mediated food sharing in fostering new digital forms of commensality. Kera and Sulaiman (2014) describe how online sharing information about food leftovers has brought people together in forms of shared dinners. Also, for many food sharing initiatives ICT is a tool for organisation that is altering the balance of power between public institutions, governments and citizens by raising awareness about social and environmental issues (Rut et al., 2020). As a result, the ICT mediated food sharing also fosters democratic engagement, social responsibility, and ethical decision-making with regard to urban food systems.

Finally, it should be emphasized that food sharing practices are a multi-faceted phenomenon resulting from the interaction of people and their habitats. Food sharing is strongly influenced by histories and cultures of places such as traditions, cultural practices and collective narratives. Thus, in order to gain better understanding of food sharing, it is important to consider the socio-cultural contexts in which food sharing practices are taking place and to reflect on the role of cultural inheritance that can lead to the embedding of new sustainability visions in the social fabric (Hegger et al., 2007). As discussed in the Chapter Six, food sharing in Singapore is connected historically as a cultural, social and political feature of kampongs. Practices are also affected by symbolic interactions between the State and citizens, being used in different ways to inspire, suppress or lead to development of new socio-technical imaginaries. Thus, future work of food sharing must also attend to cultural contexts if we are to better understand sustainability potential of food sharing across urban cultures. In the next section that follows literature concerned with sustainability transitions research is reviewed.

2.3 Sustainability transitions

This section discusses literature on sustainability transitions defined as processes of fundamental social change that lead to transformations of socio-technical systems for the provision and use of resources, such as energy, water, food. Unlike other

sustainability approaches, such as eco-innovations, environmental economics or degrowth theories, transitions scholarship has developed a multi-actor and multi-level perspective to explore socio-technical systems in transitions (Köhler et al., 2019). In this regard, transitions literature directs attention to the networked experiments and actor's dynamics within various social groups which are co-evolving along with many other dimensions such as, technologies, politics, practices, cultural meanings, and civil society (Geels, 2020).

The approaches found in transitions research such as the Multiple Level Perspective (MLP) allow for greater interpretation of the open-ended relationship between stability (regime) and change (niche) and provide useful analytical lens to grasp the complexity of food systems change. Food systems are complex socio-technical configurations conceived from a network of actors, activities, and technologies and drawn together within a nexus of environmental, social, political-cultural, economic, and ethical relationships. Studies of the food system can contribute to wider critical engagements with transitions scholarship through its focus on the issues of power and politics, ethics and the role of agency and place based-configurations (Lawhon and Murphy, 2012). This section outlines key characteristics and criticism of sustainability transitions research that, combined with literature review on food sharing and Singapore informs the research presented in the following chapters.

Initially, the research on transitions has drawn on innovation, technology and business studies, evolutionary economics, and history of science (Costanza, 1992; van den Bergh, 2007). However, with growing contributions from different disciplines, transitions scholarship has forwarded insights from a broad range of social science theories, including institutional theory, actor network theory, practice theory, and approaches from political economy in search for collaborative solutions to complex global challenges such as climate change (Longhurst and Chilvers, 2019.; Geels, 2019; Köhler et al., 2019). Developed within western scholarship, sustainability transitions are considered to be long-term (25–50 years) radical transformations and structural changes of societal systems such as the energy system, mobility, and food, leading to renew socio-technical arrangements with a potential to replace incumbent regimes (Rotmans

and Loorbach, 2009). Major historical transitions included, for example, shifts from cesspools to sewers (Geels, 2006), from sailing ships to steamboats (Geels, 2002), and from horse-driven carriages to automobiles (Geels, 2005a).

Although early transitions research focused mostly on historical transitions and technologies that enabled them (Geels, 2010), sustainability transitions scholarship has in recent years broadened its focus by taking into consideration ongoing forms of transformations and new relational perspectives on innovation journeys (Chilvers and Longhurst, 2016; Garud and Gehman, 2012). The majority of the publications are still focused on development of technologies within energy and transport systems and with a focus on Northern European countries. However, in recent years a growing number of articles emerge that describe other societal domains such as food, housing, and waste and diverse geographical contexts including contributions from scholars from Africa, Asia, Australia and Americas (Köhler et al., 2019).

Despite the predominance of technological foci (e.g. innovations that are technology-based) and the top-down orientation (e.g. participation of technology experts, research and development laboratories), sustainability transitions also include innovations in social practices and social relations (Stirling, 2015; Seyfang and Haxeltine, 2012). These encompass aspects of the ‘ordinary arenas of everyday life’, citizens’ empowerment at a grassroots level, and connected practices that organise the time-space of social life, bridging together individual lifestyles and socio-technical systems (Shove and Walker, 2007, p. 770; Schatzki, 2002). A number of recent contributions have focused on exploring collaborative consumption models and consumer cultures in sustainability transitions, such as eating and washing (Devaney and Davies, 2016; Martin et al., 2014; 2016; Martin and Upham, 2016; Shove and Walker, 2010) and grassroots innovations for sustainable development including renewable energy communities investing in clean energy (Hargreaves, Longhurst & Seyfang, 2013; Smith and Sayfang, 2007).

Multiple theoretical frameworks that have been employed by transitions scholars to discuss change processes towards sustainable pathways, such as the Multi-Level Perspective (MLP), the Technological Innovation System approach (TIS), the Strategic

Niche Management (SNM), and the Transition Management (TM) have all a shared goal of capturing ‘co-evolutionary complexity and key phenomena such as path-dependency’ (Köhler et al., 2019:6) and focusing analytical attention on novelties such as a new technology, a method of production, service or a practice. For the purpose of this thesis, I will discuss two main theoretical approaches that are at the centre of sustainability transitions literature, the Multiple Level Perspective (MLP) and Strategic Niche Management (SNM) and acknowledge recent theoretical contributions from social science literature and their relevance for sustainability transitions research. The MLP and the SNM provided useful analytical tools to examine shared food growing niches in Singapore and to understand what factors may influence processes of change at different levels (i.e. niche, regime and landscape), and how levels interact through dominant and emergent political, social, environmental, economic and cultural practices (Rut and Davies, 2018a).

The MLP was developed to be a heuristic tool for analysing innovation journeys and change processes across diverse sectors and national contexts (Geels, 2019). Proponents of the MLP argue that transitions occur through dynamic processes within and between three analytical levels. These include: Niches (micro level; locus of radical innovations) which are protected areas (e.g. research and development laboratories, market experiments, demonstration projects) that consist of experimental projects or clusters of innovations (Kemp et al., 1998), providing supportive networks and acting as incubators for sustainability experiments supported by local-global networks (Smith and Raven, 2012); Regimes (meso-level; locus of established practices and associated formal, normative and cognitive rules) are interrelated and co-evolving configurations of actors and social groups, technologies, knowledge, skill sets, routines, regulatory demands, policy preferences, infrastructures, and cultural and symbolic meanings (Geels, 2011). Regimes tend to change only incrementally but sometimes they can undergo transformations or reconfigurations within their internal dynamics (Lachman, 2013); Landscape is an external structure which changes slowly and influences niche and regime dynamics (Rip and Kemp, 1998). It includes exogenous developments, such as major economic events, environmental and political shifts, or cultural and societal movements, which can sometimes destabilise the dominant regime (Roberts, 2017). The

landscape level in the MLP framework constitutes a source of pressures on regimes that leads to tensions and windows of opportunity for niches to emerge and develop (Smith et al., 2010). Sustainability transitions research guided by the MLP approach has focused mainly on niche-regime interactions and participation of large systemic actors such as governments and industry. It has therefore been criticized for its bias against a bottom-up theory of change, for example, lacking attention to change processes that can be built through small-scale local collaborations, experiments and grassroots actions (Biggs, 2020; Geels, 2011). Furthermore, proponents of social practice theory have criticized the MLP for the lack of attention it places on carriers of practices, such as users, consumers and citizens, whose actions are entangled with socio-technical systems through the performance of everyday life (Shove, 2012).

While MLP captures dialectical relationships between micro-level actors and macro-level structures (Seyfang and Haxeltine, 2012), the Strategic Niche Management (SNM) offers a practical approach to examine how niches and innovations within them develop to be competitive within regimes. The SNM approach departs from a technical artefact and it has been employed to study and see innovation journey of technological niches towards the goal of sustainable development in a constructive and measurable way (Rip and Kemp, 1998; Geels and Raven, 2006; Schot and Geels, 2008). The SNM suggests that innovations that emerge in protected areas (e.g. protective policy measures, subsidized demonstration projects) can be strategically crafted through various niche-internal processes such as managing expectations, building social networks, and learning (Kemp et al., 1998). Niche experiments can either ‘fit or conform’ to become competitive with mainstream socio-technical regimes such as energy or food systems; or ‘stretch and transform’ by empowering niche actors to participate in political debates to potentially challenge incumbent regimes and their practices (Smith and Raven, 2012). Although initially, the SNM approach has been used exclusively to examine technological and market based innovations, some authors have tested its applicability to explore community actions and grassroots innovations (Seyfang et al., 2014). As discussed in the Chapter Four, social niches, whose cultural values and practices are different than the one attributed to technical niches, require

more attention to the underlying issues of power and politics within niche building processes.

In the recent years, some researchers have also sought to move away from the apparently hierarchical structure of transitions frameworks (e.g. macro-meso-micro) and structure (regime) - agency (niche) dichotomy and focus attention to relations, networks, and practices that make transitions processes possible (Shove et al., 2012; Jones and Murphy, 2012; Shove and Walker, 2007). This has led to a number of different studies and integration of relational approaches (e.g. social practice theory; Ecologies of Participation (EOP)) that provide a better account of the agency and actors dynamics in transitions (Chilvers and Longhurst, 2015). For example, the proponents of social practice theory have argued for an analytical approach that focuses on the practices and their daily reproduction (Shove and Walker, 2007; Hargreaves et al., 2013). While discussing transitions in everyday practices, such as washing, Shove and Walker (2010) drawn attention to the elements of washing practices (e.g. bodily activities, meanings, ideas and materials) which circulate horizontally between the three analytical levels in the MLP (niche-regime-landscape). They highlight the relational aspects of transitions in which socio-technical systems, such as cleaning regimes, are produced and reproduced by the ongoing performances of practices and socio-psychological factors. Another relational approach to transitions, EOP framework, was developed to encourage the comparative studies of diverse and interconnected forms of participation in sustainability transitions (Chilvers et al., 2016). Chilvers (et al., 2016) suggest that transitions are co-produced through the performance of collective participatory practices in which diverse publics participate. As it is discussed in the Chapter Five, the EOP approach proved to be useful analytical tool in unpacking different forms of participation in food waste management and to shed light on the relationalities that permeate food waste transitions in Singapore.

While sustainability transitions scholarship has been widely criticized by practitioners and academics alike, much of the criticism comes down to the point that transitions are too concentrated on technological innovations and the participation of the elite actors (Lawhon and Murphy, 2012; Smith and Stirling, 2007). Others opine the narrow

conceptual scope of transitions analyses (e.g. focus on major transitions such as energy systems) (Walker and Shove, 2007) suggesting this overlooks spatial and sectoral distribution of innovations (Truffer, Murphy & Raven, 2015). Furthermore, limited attention has been given to socio-psychological, material and cultural aspects of socio-technical systems. The empirical material presented in this thesis draws attention to the newly formed organisations and informal networks responsible for initiating the recent wave of participatory food sharing experiments in Singapore. As such, this thesis fill gaps in knowledge concerning: participation in sustainability transitions and the issue of power and politics; the role of place in sustainability transitions; and transitions towards sustainable food futures.

Participation in sustainability transitions, and the issue of politics and power

While there is a rapidly growing body of knowledge related to civil society actors as agents of change, and their engagement with sustainability issues, the role of bottom-up and citizen-engaged transitions has been underplayed in the transitions literature (Stirling, 2015; Seyfang and Haxeltine, 2012). In particular, relatively less attention has been given to community initiatives and self-organized networks of practitioners (e.g. urban farmers, food rescuers), and various social actions and innovations (e.g. food sharing networks, consumer cooperatives) in exerting pressure on dominant practices of unsustainable regimes (Seyfang and Smith, 2007; Hargreaves, 2013).

Furthermore, the issue of human agency has been less considered in transition scholarship (Smith, Stirling and Berkhout, 2005), while the mediatory role of technology has been given central stage (Seyfang et al., 2013). Lawhon and Murphy (2012) discuss how the focus on technical artefacts has limited participation to industries and governments, and has impoverished transitions by ignoring the issue of politics and power. Transitions are inherently political processes that involve multiple actors and power relations that may be perceived through different manifestations, such as access to resources (e.g. funding, public land), vision(s) of sustainability, and regulative, cognitive and normative rules (Geels and Schot, 2010). However, while transitions scholarship has addressed the question of ‘who wins, who loses, who is included and excluded, and what life ...in the sustainable societies of tomorrow’ (Smith

and Stirling, 2018, p. 91; Avelino et al., 2016), less attention has been given to the socio-political power-geometries that influence and structure processes of niche building in the political contexts that are less democratic.

Also, limited attention has been given to subjective perceptions and experiences of those participating in transitions who make use of cultural resources to legitimize innovation journeys. For example, several scholars (Geels, 2020; Geels and Verhees, 2011) show that niche and regime actors use culture (such as storytelling, narratives) to articulate their visions with the aim of persuading relevant audiences (e.g. policymakers, founders). However, the focus within those studies, remains directed towards the generation of shared meanings and symbolic socio-technical interaction which are limited to selective groups of participants (e.g. experts, scientists, governments, media) while overlooking others (e.g. practitioners).

Furthermore, scholars are called on to ‘carve out the social in socio-technical transitions’ by taking into account the behaviour of ordinary people, citizens and consumers (Wittmayer et al., 2016, p.10 in Lestar and Böhm, 2020). For example, some scholars have aimed to understand how people’s agencies shift away from neoliberal free-market economics and ‘resource efficiency mantras’ towards more pro-environmental behaviours and different ways of achieving life satisfaction (Lestar and Böhm, 2020, p. 56; Trainer, 2019). Others discussed various forms of collective agency, expressed through institutions, social movements and actor’s groups (Geels, 2020). However, while the focus on social mobilisation expands the role of an under-researched social dimension of transitions, less attention has been given to socio-affective processes that enable or constrain participatory actions in sustainability transitions (Bögel and Upham, 2018; Seyfang and Haxeltine, 2012). In the Chapters Five and Six, the focus is placed on socio-cultural and affective interactions that are enacted when participating in food transitions in Singapore.

The role of place in sustainability transitions

One of the main criticisms of sustainability transitions research that has only recently been addressed in the literature is its lack of geographical diversity for understanding

spatial dimensions of innovations. There has been limited attention to place itself, and its local histories, political cultures, ethical dilemmas and socio-cultural milieus that influence and shape transition processes at the local level (Hansen and Coenen, 2015).

Places are relational and networked entities (Pierce et al., 2011) and therefore the engagement with place-based transitions must recognise the richness of relations between actors, but also material and symbolic cultures, histories, imaginaries and social networks and institutions (Binz et al., 2020). When considering the role of place in sustainability transitions, the focus shifts from transitions outputs such as technologies to processes and outcomes, such as cultural and social change demonstrated on the example of new social practices and novel forms of organising (Longhurst and Chilvers, 2019). Hansen and Coenen (2015) identified various place-specific factors that need to be taken in consideration in sustainability transitions such as place-based imaginaries and policies for mobilization of actors, the role of informal institutions and local cooperative cultures, natural resource availability, and needs and demands as important drivers for the emergence of innovative niches.

Furthermore, to enrich the understanding of place-based transitions some recent contribution has been made to discuss transitions beyond the European context. A few examples include urban mobility experiments in India and Thailand (Raven et al., 2017); energy transitions in China (Ren et al., 2015); low carbon transitions in South Africa (Baker et al., 2014); green grow transitions in Indonesia (Jupesta et al., 2011), and eco-city projects in Singapore and China (Frantzeskaki et al., 2017). However, despite growing interests in how transitions perform across different geographical locations and socio-cultural settings, the research remains somewhat impoverished from a cultural perspective, ignoring the detailed specificities of local histories and cultures in places. Although Geels (2019; 2020) and others (Köhler et al., 2019) acknowledge the importance of culture as a toolkit (Swidler, 1986) of symbols, stories, rituals, and worldviews, which niche actors may use in varying configurations to address societal problems, the focus within the literature mostly remains on dominant cultural values and cultures of communities that are privileged to have access to economic resources and political power. This is also visible in how sustainability transitions are often

focused on dominant socio-technical imaginaries within political cultures, regimes and centres of power, while giving less attention to the distributed, diverse and humble visions of sustainable futures with a border set of ethical concerns, such as care, that emerge within civil society settings (Jasanoff and Kim, 2015; Longhurst and Chilvers, 2019).

This thesis directly contributes to the knowledge base on the role of place specificity in sustainability transitions. The empirical material presented in this thesis to test the applicability of transitions frameworks such as MLP, SNM, and EOP, was collected during in-depth ethnographic research in Singapore that involved the contextualised study of culture, places and people. In particular in Chapter Six attention has been given to how dynamic cultures can inspire new socio-technical imaginaries that may open up alternative models of social and cultural change for sustainable food futures.

Transitions towards sustainable food futures

With global challenges arising due to climate change, food systems represent a prominent research area for sustainability transitions (Hinrichs, 2014). The existing body of literature claims that transitions are necessary to transform neoliberal and corporate food regimes into alternatives configured around the goals of sustainable development such as elimination of hunger, food security, healthy nutrition and sustainable agriculture (SDG Goals 2) (Davies et al., 2019; Hinrichs, 2014; Brunori et al., 2013). However, the study of food systems in transitions remains relatively scarce compared to other sectors such as the energy and centred on European case studies.

A few authors have looked at food niches that may lead to new regimes configurations, such as urban farming (Diaz et al., 2013; Bui et al., 2016), decentralized food chains (Tregear, 2011; Maye and Kirwan, 2010), alternative food provision networks (Brunori et al., 2011), and ICT mediated food sharing (Weymes and Davies, 2019). Food transitions scholarship continues to demonstrate the impact that alternative food practices such as community farming and food sharing networks have been able to achieve in terms of enhanced community wellbeing, reduced food waste and sustainable food consumption (Mackenzie and Davies, 2019; Davies et al., 2018a; Davies 2019;

Maye and Duncan, 2017). However, these examples remain as small-scale isolated case studies and confined to localized projects that are underrated in socio-technical transitions literature in terms of their capacity to scale and change unsustainable patterns of production and consumption in cities (Davies, 2019; Maye and Duncan, 2017). Instead, technology driven agro-food transitions such as hydroponics, vertical farming, and climate controlled environments are given more credibility over social innovations in terms of their potential to boost efficiency and scale productivity of food creation in resource scarce urban settings (Hosseini Farhangi, 2019). However, the proponents of agriculture 4.0 remain relatively silent about the effects of technologies on socio-ecological relations around food (Rose and Chilvers, 2018). This is despite the fact that food scholars have already shown that participation in food growing and eating together can enhance a sense of collective identity, neighbourly reciprocity and shared consumption (Taylor and Lovell, 2014) in ways which can provide better access to ‘a safe, nutritious, and culturally acceptable diet, achieved sustainably and in a way which maximizes community self-reliance and social justice’ (Hamm and Bellows, 2003, p. 37).

2.4 Singapore

This section starts with an acknowledgment of the literature on smart urbanism, identifying the need for a more critical assessment of the smart city imaginary and smart citizenship in the context of Singapore. The section continues with the literature review that draws attention to existing research examining the socio-political, environmental, and cultural context from which food sharing practices unfold and outlines the main characteristics of Singapore’s urban food systems.

Smart Urbanism

In the origins of the smart city imaginary, Cugurullo (2018) clearly demonstrated that the nation-states desire for advancements in science and technology, which was driven by neoliberal promises of efficiency and techno-urban renewal provoked necessary questions about how citizens could participate in smart city projects to advance the idea of civic empowerment and, consequently, bring about a more inclusive smart

citizenship. There is already a quite extensive literature concerning the origins and the nature of smart cities in general with a focus on technologies, governance models and the actors involved (Meijer and Bolívar, 2016; Zanella et al., 2014; Kitchin and Dodge, 2011). However, relatively few studies have discussed the role of people in smart cities and the many ways in which citizens draw on their everyday experiences to develop diverse sociotechnical arrangements, challenge power structures, and question technocratic visions and practices in order to shift smart cities imaginary towards more fair and democratic (Perng and Maalsen, 2020; Kitchin et al., 2017; Sadoway and Shekhar, 2014; Townsend, 2013; Wolfram, 2012).

Ho (2017, p. 3103) notes that in Singapore the smart city imaginary has been increasingly associated with the concept of good urban citizenship, where citizens through their everyday use of ICT gain new awareness and become “consumers of government (data) services”. Furthermore, most of the literature on smart cities has operated with a simplistic view of smart citizens, which are discussed either as an ‘epistemic community’ of knowledge experts and policy makers or as an ‘advocacy coalition of stakeholders’ interested in technologisation and marketization of the city services (Kitchin et al., 2019; Kitchin et al., 2017). Also, smart citizens have been narrowly conceptualised in the literature as either a technologically enabled service users or citizens consumers that prioritise consumption choices and individual autonomy over collective public good (Kitchin and Cardullo, 2019). Although some smart city initiatives such as Living Labs, citizen-science, and open source software communities have emerged to empower entrepreneurial careers and to establish a creative class of ICT enabled urban makers, these initiatives have been often criticised by academics and practitioners alike for co-opting citizens contributions into wider economic and neoliberal imperatives and creating as a result apolitical spaces and practices (Perng and Maalsen , 2020; Cardullo et al., 2018; Morozov and Bria, 2018; McLaren and Agyeman, 2015). Thus, concerned about the problematic framing of smart cities as citizen-focused or citizen-centric, scholars in the recent years have become increasingly interested in addressing troubled ethical relations between the systems, structures and governance of smart cities and the nurturing of a sense of citizenship, providing more thought to political, social and spatial injustices arising as a

result of top-down steered strategies for public participation in the design of smart cities (Kitchin et al., 2019; Greenfield, 2013).

Furthermore, in the recent years some smart cities have become hubs of rapidly emerging grassroots-led initiatives aiming at democratizing smart cities by connecting the notion of smart citizenship to local intelligence and to the themes of citizen's access and autonomy, activism and innovation, and to transparent and participatory governance (as opposed to an ongoing appropriation of smart cities resources, skills and expertise by global corporations) (de Lange and de Waal, 2013). An example of such is the city of Barcelona, where the change in political administration in 2015 (shift from centre right city council to municipal government led) brought about a re-politisation of the smart city urbanism by shifting away from technocratic governance towards the achievement of a technological sovereignty (Charnock, March and Ribera-Fumaz, 2019). The latter representing an opportunity for the city of Barcelona to enhance citizen's ownership over the smart city data and infrastructures for the service to local communities rather than global capitalist interests. Beyond the example of Barcelona, a number of smart cities around the world including Amsterdam, London, and Seoul, have also become carriers of alternative visions and moved forward by supporting smart citizen-led initiatives that have long existed in cities before the rise of the smart city branding (e.g. community gardens, repair cafes, hackerspaces). This is particularly visible in case of the Sharing Cities movement that initiated to harnesses digital infrastructures, such as public access to Wi-Fi, and the use of smartphones to foster new forms of solidarity and conviviality (North and Nurse, 2014), and to enhance smart city activist cultures, for example by producing new spatial imaginaries and knowledge politics (Sadoway, 2013; Elwood and Leszczynski, 2012). Thus, despite the polarisation of the scholarship on smart cities urbanisms and the tensions between top-down visions of urban smartness and citizen-led activities that are not oriented towards market relations or orchestrated within institutionalised contexts, there remains a viable need to explore messy entanglements of smart citizenship that have a more explicit focus on activist, civic, grassroots, and other groups in order to leverage a dominant smart city imaginary. By revealing the ethical implications of socio-technical imaginaries in Singapore and by demonstrating the potential of community-driven and activist

initiatives, it becomes possible to enact a vision of a smart city that shifts away from practices of technocratic stewardship and civic paternalism to citizen's right to a smart city. The work of this thesis then, and in particular the Chapter Six, aims to respond to the emergent calls in the smart cities literature for research to expose, propose and politicize the smart city phenomena (Kitchin et al., 2019).

Singapore

Singapore is a sovereign City-State in Southeast Asia made up of the island of Singapore and about 62 smaller islands, with total landmass of 710.2 sq. km and population of 5.75 million (Davies et al., 2017). The City-State gained its independence from Great Britain in 1963 and it was merged into the Malaysian Federation. However, due to differences in ideologies, policy making, and ethnic relations, Singapore withdrawn from the federation to become an independent City-State with complete sovereignty gained in 1965. Since the independence, Singapore has been governed by the People's Action Party (PAP), a central-right political party that became a political force to stay in power until the present day (2020).

While pursuing a strategy of the economic growth enhanced by neoliberal policies based on favourable imports and free trade, Singapore has been mainly investing in the development of socio-technical imaginaries that, such as the Intelligent Island and the City in a Garden, have positioned Singapore as a global Smart City hub in Southeast Asia (Hoe, 2016). Existing studies on the Singaporean developmental state and its road to knowledge based economy have prioritized the importance of economic development in national policy making (Saxena, 2011; Toh, 1998), have focused on pragmatism as a governing ideology (Chua, 1997), and the political economy of social control that has underpinned Singapore's relentless rise to the status of a high income country (Tremewan, 2016). Scholars have variously criticised the ruling elite for imposing political conditions that circumscribe citizens freedoms, actions and participation in policy matters (Leong, 2000) and steering economic narratives in politics that reinforced its reputation as a 'survivalist technocratic state' (Goh, 2001, p. 25 in Han, 2017).

The government's asymmetric concentration on achieving economic stability involved development of ICT infrastructures to aid entrepreneurial spirit, maintain control over society, and achieve sustainable development of food sector and its economy at large. In 2014, the State launched the Smart Nation policy programme with a goal to create a hyper-connected country that harnesses technologies to enhance the quality of citizen's life and the environment. Some areas of focus included ensuring an open data marketplace for citizens, businesses and governmental agencies to share information and enhance new business models and improving food systems performance through investments in high tech sectors and companies such as waste to energy plants and agriculture 4.0. Nonetheless, the Smart Nation policy programme has been criticised for lacking imagination due to its focus on the automation of services and surveillance systems, which have threatened democratic process and also discouraged civil society actors from participating in developing own ideas and projects (Gonzaga, 2019). In fact, Singapore's civil society actors and associations have been often characterized as being 'in the shadows, neutered or incapacitated compared with local state and business elites' (Douglass et al., 2008:13 in Sadoway, 2013). Furthermore, authors have sought to determine if the technology driven agendas that prioritise technology investments and economic returns have reduced participatory opportunities and devalued community mobilisation in social and environmental matters (Sadowy, 2013). In fact, many believe that the State's goal of ecological modernisation discouraged environmentalists and grassroots initiatives from mobilising citizen's engagement in environmental protection and conservation practices such as protection of wetlands, and natural reserves (Han, 2016).

Neo (2007) and Wong (2012) stress that environmental governance in Singapore has been developed on the anthropocentric view of non-human nature, for example by placing validity on technical interventions, such as green technologies, rather than ecological conservation and biodiversity protection. An example of this includes the State-led socio-technical imaginary of the City in a Garden; the concept that was first introduced by the Prime Minister Lee Kuan Yew in 1967 with a political mission to transform Singapore into a city that is 'green and clean' and one that integrates parks and greenery into the everyday life of Singaporeans (Tan, Wang & Sia, 2013). In fact,

the number of green spaces in Singapore has increased from 13 in 1975 to 350 as of 2019 with a 47% green cover to service a growing population of almost 6 million (National Parks Board, 2020; Tng and Tan, 2012). Within the program itself, citizens have also gained some rights to access green spaces for the purpose of community gardening. Scholars, however, argue that the State-led community greening projects are being used instrumentally to try and retain a disappearing sense of community within densely populated neighbourhoods, rather than empowering communities to become less reliant on the food imports (Tan and Neo, 2009).

However, in recent years (2012-2020), critics of the political powers have noticed a slight shift towards co-creation in policy making that allows citizens to express their opinions more openly as well as build a more active relationship with governmental agencies through public consultations initiatives (Leong, 2000). Sadoway (2013), for example, discusses the rise in online participatory practices such as eco-campaigns revolving around land use and conservation issues in Singapore and how these have powerful mediation effects in terms of citizen's knowledge and action mobilization to organise and push through collective ideas that may attract attention and acceptance of the policy makers. In Chapter Four, the discussion section focuses on various challenges that civil society actors face in Singapore when trying to access State resources such as land and financial support for development of food projects that are not immediately technological in their design or geared toward profit in their objectives. Chapter Four also suggests that grassroots agricultural projects can scale up (in terms of access to resources) only if they align with the government's current political and economic goals, such as enhancing community cohesion and intensifying food production.

Food production is one of the biggest challenges for Singapore's food security. The City-State is one of the world's most land and water constrained countries, with only 0.5 % of land in Singapore devoted to agricultural use (Tortajada and Zhang, 2016). In the aftermath of the 2007/2008 food crisis and COVID-19 outbreak in 2019, the government became keen to experiment more with local food production. A number of policy responses such as Food Security Roadmap (2013) and the '30 x 30' food plan

(2020) were introduced to boost local food production by 30% by 2030. However, this policy goal has also involved shifting the focus from traditional agricultural land to agro-technology solutions such as vertical farming. State ownership of land in Singapore is about 80% and the usefulness of land has been based on utilitarian values and the development-oriented goals, such as housing, military, industry which has limited citizens access to land as an essential productive resource for community activities (Goh, 2001). The research presented in this thesis shows that despite stringent land regulations and a State focus on technology in food production, there is a renewed interest in agricultural practices amongst citizens. As discussed in the Chapters Four and Six, participants in shared food growing initiatives in Singapore are building a ground-up movement to encourage public to take ownership of edible spaces in Singapore and to create a source of alternative, entrepreneurial and social food production venues to increase participation in collective food growing, healthy eating, and community bonding.

Furthermore, over the last ten years (2000-2020), food waste has become an alarming social and environmental concern in Singapore. Recent governmental reports on food waste has indicated an increase from 558,900 in 2007 to 800,000 in 2019 questioning Singapore's challenge to become a Zero Waste Nation by 2030 (Zero Waste Nation, 2020). Singapore's food waste management model gives a priority to circular economy solutions through redistribution of unsold and excess food (NEA, 2019). However, current food waste strategies emphasize technology infrastructures such as food digesters and incinerators to process surplus food while social engagement with food surplus is undermined by a lack of political, technological and social infrastructure for redistribution. In 2012, the Ministry of National Development announced the formation of an Inter-Ministry Committee with a goal to enhance Singapore food security by reducing food wastage (Tortajada and Zhang, 2016). Since then, a number of initiatives have emerged in the movement to address food waste in Singapore who have been working together on building public awareness and redirecting surplus food from landfills to composting initiatives, charities and households. Chapter Five discusses dominant, diverse and emergent forms of participation in food waste management in

Singapore and presents a landscape of practices and actors involved in surplus redistribution practices.

Redirecting food surplus from eating establishments to households, charities and individuals suggests that more than 50% of food waste takes place daily in restaurants and hawker centres² (Channel News Asia, 2017). While the habit of eating out is pervasive in Singapore, it also erodes the domestic mode of food provision (Kong, 2015). Furthermore, there is a growing public concern that knowledge of traditional recipes and food cooking techniques that constitute Singapore's culinary heritage has been in decline. 'The decline of home cooking'- an article published in the Straits Time (Oon, 2013) describes longing for communal meals with ingredients that cannot be found in the modern-day eating out establishments; a form of gastro-nostalgia that boosts interests in eating together and home-cooking. There are also concerns that a decline in home cooking will negatively affect the national identity of Singaporeans in which food plays a central part (Henderson, 2016). For example, food consumption practices in Singapore are often rooted in histories of past social structures, such as the kampongs mentioned in the introduction to this thesis, and their system of social relations and cultural meanings (Duruz and Khoo, 2014). It is not uncommon for Singaporeans to recall rustic stories of the past that bring back nostalgic longing for culturally diverse and informal economies of food sharing carried by street food peddlers (Brownlee, 2018). The State, grassroots initiatives, and the actions of citizens have time and again returned to the nostalgic view of cooking and sharing food with neighbours and strangers to retrieve community spirit (see Chapter Six). Chapter Six illustrates the many ways in which cultural meanings have motivated citizens to participate in food sharing initiatives. Engaging in shared activities, participants are reminded of symbolic, affective and material engagements with food that in turn inspire practices aimed at encouraging new socio-technical imaginaries of sustainable food futures and communities.

² Shared eating and cooking spaces regulated by the State.

2.5 Conclusions

This literature review outlined the knowledge base for investigating the practice and sustainability potential of ICT mediated food sharing in Singapore. It has identified that there is a limited amount of empirical research on the contemporary food sharing practices in cities. While a well-established body of literature exists on food sharing practices and behaviours amongst small-scale hunter gatherer societies, less evidence is available on the ICT mediated food sharing in cities. Thus, more research is needed to identify the form, function, and governance model of food sharing initiatives, their sustainability potential, and where and how food sharing occurs despite multiple regulatory steps that affect food sharing behaviours in cities (Davies, 2019). The literature review on sustainability transitions suggests that there is a bias towards bottom-up change models (Geels, 2011), and that greater attention should be directed towards civil society actors and the issues of power and politics that are enmeshed within transitions. Furthermore, sustainability transitions scholarship has given less consideration to histories and culture of places in which transitions are taking place, and has only limitedly engaged with food transitions. In Singapore, ICT mediated food sharing is an emergent activity that has experienced major development in recent years (2012-2020) in response to food sustainability challenges such as national dependency on food imports, decline in cooking traditions and commensality and food waste production. However, due to a lack of understanding regarding the nature of food sharing practices in urban settings, and in particular in Singapore, it is less clear who participates in food sharing, whether ICT mediated food sharing contributes to sustainable urban food systems. In the next Chapter, I will discuss the methods used to collect and analyse the data on ICT mediated food sharing in Singapore.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This thesis draws on empirical data collected during the field research in Singapore (2017-2018) on the practice and sustainability potential of ICT mediated food sharing. It builds on the analysis of ICT mediated food sharing activities in 100 cities which culminated in the SHARECITY 100 Database (Davies et al., 2018a; 2018b). More than 4000 initiatives were found using Google search terms relating to food sharing spaces, skills and stuff. This initial data presented in the SHARECITY 100 Database provided comparative detail of what is shared, how it is shared, the organisational model and the technologies used by initiatives to share food related spaces, stuff and skills (Davies et al., 2017a; 2018b). Singapore was selected as one of nine cities (the others being London, Dublin, Melbourne, Barcelona, Berlin, New York, Athens, and San Francisco) for in-depth ethnographic research. Singapore was selected as a contrasting case study compared to the other locations, being an Asian city with the highest number of food sharing initiatives in the database compared to others: Mumbai, Bengaluru, Chennai, Jakarta, Manila, Hong Kong, Shanghai, Beijing, Seoul, Tokyo, and Toyama.

To answer the research questions set out in Chapter One, a multiple-method qualitative approach was adopted. Data collection methods included the selection of case studies that illustrated specific food sharing practices identified in typologies of food sharing (Davies, 2019) such as growing food together, cooking and eating together and saving food from waste via surplus redistribution. Applying a range of data collection methods from participant observation, online engagements, semi-structured interviews and using multiple sources of evidence (visual, textual, documentary and audio) allowed for more triangulation of the fieldwork findings as well as comparative analysis of case studies. This methodological angle provides a nuanced approach with which to explore food sharing sites, practices and actors participating scattered across the urban food systems. While this Chapter describes main methodological design used for data collection and analysis of food sharing in Singapore, each individual Chapter presented in the Results, Discussion and Analysis Section contains methods of analysis which are tailored to theoretical needs of this thesis for analysing food sharing across and within selected case studies. In this Chapter, I will first describe the methodological approach

undertaken to collect research material. Then I will discuss data collections methods and conclude with data outcomes and analysis.

3.2. Methodological approach

In order to fully grasp the inherent complexity of food sharing practices I drew on a suite of methods that allowed me to investigate food sharing across multiple sources of data, including ethnographic and case study approaches. This was particularly useful to capture, investigate and compare diverse food sharing practices and to connect social science research and sustainability transition scholarship in the final stage of data analysis. The methodological approach adopted combined ethnographic research methods such as informal conversations during food sharing activities, open-ended, semi-structured interviews and participant observation (Fetterman, 1989) and case study research approach (Yin, 1984) that focused on a particular food sharing initiative as the unit of analysis to provide boundaries around a fluid object of study (Rosenberg and Yates, 2007).

Ethnographic research

Ethnography is defined as a qualitative research in which the data is often gathered through long-term participant observation, where a researcher closely observes and interprets ‘the shared and learned patterns of values, behaviours, beliefs and language of a culture-sharing group’ (Harris, 1968 in Creswell, 2007, p. 68), and records this information in notes referred to as thick description that consists not only of facts, but also of personal reflection and an interpretation of data (Geertz, 1973). Ethnography allows the relationship between socio-political, historical, symbolic, and affective conditions and everyday practices to be continuously re-examined; a process that is essential in social science research (Smith and Gallo, 2007). Traditionally, ethnographers spent great length of time living in other cultures and studying people in their natural habitat with the questions on what, who, why, how and when being central to the ethnographic inquiry (Hammersley and Atkinson, 1995).

However, while ethnography allows the exploration of new, and culturally specific phenomena, conducting an ethnographic research and analysing qualitative data collected during long-term fieldwork is an intense process that not only involves ‘systematic, rigorous, labour intensive and time-consuming exercise’ (Kumar, 2014, p. 5718) but also financial resources. Thus, in the recent years, the time-intense method of ethnographic research that follows anthropological tradition of long-term participant observation has shifted towards more hybrid understanding of ethnography (Hammersley, 2018; Pink, 2016). For example, today’s ethnographers combine different data collection methods such as interviews and focus groups during ethnographic fieldwork. Furthermore, their work depends much on ICT tools such as laptops, voice recorders and mobile phones to collect research materials across field sites (Preissle, 1999) and to participate in the culture and the life of people that they are studying without being physically present at the same geographical location (Pink, 2016). Also, when time for long term ethnographic research is limited by funding, researchers have combined ethnographic methods with other approaches such as case studies and interviews to achieve greater data collection quality (Visconti, 2010; Hill, 1991).

Case study research

A case study approach is defined as an ‘empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’ (Yin 2003, p.13). The case study approach is particularly useful for answering research questions of an exploratory nature such as ‘how’, ‘what’ and ‘why’ (Cresswell, 2011), which may shed light on underlying psychological and social processes of actors involved (Harding, Fox and Mehta, 2002). Case study research can take many forms; Yin (1993) has identified three types of case studies: exploratory, explanatory, and descriptive. Stake (1995) included some others: intrinsic (e.g. when the researcher is interested in the case study); instrumental (e.g. when the case study is selected to understand something more general than the case); and collective (e.g. when a group of case studies is selected to examine a ‘phenomenon, population, or general condition’ (Stake, 2000, p. 437). For the purpose

of the research, I employed collective case study approach, often referred to as multi-sited analysis, because the study of food sharing in Singapore was designed to take place at several different locations that allowed me to conduct comparative analysis between selected case studies. Thus, the strength of the case can be improved by selecting from larger list of case studies and engaging multiple methods, such as, participant observation, interviews and documents review for the purpose of triangulation (Yin, 1994, 2009).

Multiple methods

Combining ethnography and a case study approach has been considered as an inclusive and a flexible research methodology for conducting in-depth analysis of a phenomenon in the context of social science research (Willis and Jost, 2007; Merriam and Tisdell, 2015; Parker-Jenkins, 2018). With regards to food sharing in Singapore, the multiple-method qualitative approach was preferred. It provides multiple types of data and contributions that are not always obtainable with other research methods such as questionnaires, statistical surveys and historical studies. The multi-method approach that combined ethnography and case studies was designed particularly to answer the research questions of the ‘how’, ‘what’ and ‘why’ of food sharing practices and initiatives and to collect data that was representative of socio-cultural and political context of Singapore and sensitive to the multi-layered nature of contemporary food sharing (Davies, 2019).

A multiple-method qualitative approach has been often criticized for being time-intensive, and providing in-depth knowledge that is only limited to a specific context and circumstances, lacking in rigour in the data collection process due to subjective judgment, with diverse contexts often providing limited foundation for scientific generalisation (Yin, 2003). However, as already demonstrated by other researchers, such criticisms can be largely overcome by the way research questions are designed, the fieldwork is planned, the types of outcomes envisioned, the style in which data collected is analysed, interpreted and the research findings are discussed and communicated (Parker-Jenkins, 2018; Crooke and Olswang, 2015).

In Singapore, the advantage of adopting a multiple method approach allowed me to: i) collect data on food sharing practices that integrates the perspectives of different actors involved (individuals, community groups, grassroots initiatives and governmental agencies); ii) interpret results in the context of structural challenges, barriers and limitations that are inherent in the socio-political and cultural context in which food sharing initiatives exist; and iii) capture voices of all participants including those whom might have been excluded from State visions of sustainability or silenced due to censorship and limited freedom of speech and self-expression. Thus, adopting a multiple method approach I was able to collect novel information that is empirically informed.

Positionality

I kept a notebook of reflections on my positionality which informed my data collection practices in the field. Through this practice of reflexivity, I became aware of my own attitudes, biases and assumptions that emerged during the fieldwork and acknowledged my influences on the recording and interpretation of data. I also became aware of how others saw me; to acknowledge my role as a female researcher. Before conducting the fieldwork in Singapore, I had already spent prolonged periods of time (at least 12 months) living and working in Singapore as an organizer of a sustainability festival that took place in various locations across the City-State such as museums, universities, artistic residencies and public spaces and in collaboration with diverse actors, including policy makers, scientist, artists, academics, activists and citizens. Because of this work experience, I already had valuable place-based knowledge of Singapore's culture, political traditions, environmental policies and social context which helped me greatly to plan the fieldwork in terms of deliverables within given fieldwork timeframe (5 months).

During the fieldwork, I explored the value of conceptual, affective and ethical reflexivity (Rut and Davies, 2018a). Conceptual reflexivity required openness to experiment with the concept of food sharing itself within the culturally diverse context of Singapore. The formation and circulation of ideas around the meaning of food sharing varied depending on participants' age, gender, ethnicity and education. In some

situations, I needed to take a reflexive stand away from the broader conceptual vocabulary that food sharing represents in a western research context. Discourses touching on political issues such as food justice, food rights, and land access were sometimes unfamiliar to participants and lay outside their common understandings or experiences. In the process of collecting data in the field, it was also important to acknowledge the affective dimensions generated by the research that occurred when cultivating researcher-participants relationships. By demonstrating dedication and attention to the issues that were of concern to food sharing initiatives and practitioners and by giving back (e.g. free time, skills and knowledge) to the food sharing communities, I was able to establish trusting relationships with participants that are necessary to generate authentic and productive data (Hammersley and Atkinson, 1983).

Also, a number of situations experienced in the fieldwork such as opening up about personal issues and sharing intimacies led to a blurring of the boundaries between the researcher and the researched and culminated in friendship. Furthermore, ethical reflexivity was needed as the research began to shift towards a more collaborative approach in which I became the co-organiser of events (such as workshops) and thus in the position of influencing the understanding and practice of food sharing experienced by the community of sharers being researched. For the reasons mentioned above, keeping a fieldwork diary, containing descriptions of the surroundings, events, relations, thoughts, feelings and dedicating time to think reflexively were an important to conduct an in-depth, qualitative and culturally sensitive research for the duration of the fieldwork. Finally, before, during and after the fieldwork in Singapore I was also reflexive and sensitive of ‘multiple and changing milieu’ (Clair, 2011, p. 117) in qualitative research and in particular the growing influence of ICT on the contemporary food sharing practices (Davies, 2019). As there is no firmly established methodology for integrating virtual worlds into qualitative research (although see Pink et al., 2019), I considered the ICT tools (such as the Internet, mobile phones and applications) as mutually inclusive field-sites for the research (Markham and Baym, 2008; Markham, 2013). By doing so, I was able to stay connected with food sharing initiatives and to cultivate relationships with participants despite not being physically present in Singapore.

3.3 Data Collection

Singapore has a rich history of food sharing that is both culturally and socially specific to kampongs (in the example of shared food growing and sharing food with neighbours) but also politically promoted for the purpose social cohesion, sense of place and national identity (Bahrawi, 2019). Because of its multi-layered nature, food sharing also attracts interests from both ordinary citizens, businesses and environmental and social activists' due to its possibilities of practical applications in many fields, for example community volunteerism, corporate outreach, business marketing and activism, to mention a few. Food sharing in Singapore is also a relatively unregulated activity for a few reasons. First, Singapore has very strict land use zoning regulations which makes it very difficult for food sharing initiatives to gain access to land for farming and gardening purposes or to obtain food license for selling locally grown food. Also, strict food safety laws and lack of national regulations to facilitate redistribution of surplus food, such as for example lack of Good Samaritan Law³, reflects an underdeveloped surplus redistribution infrastructure, with a very few official actors and weakly-regulated network of ad hoc community responses to reduce food waste (Rut et al., 2020). Second, Singapore has a unique view on the role of civil society developed in the years of nation building process, shaped by the Shared Values⁴ strategy and

³ The Bill Emerson Good Samaritan Food Donation Act ('Good Samaritan Act') is a federal law aimed at 'encouraging the donation of food and grocery products to non-profit organizations for distribution to needy individuals' 10 by providing a national standard of liability protection for both food donors and the non-profits accepting these donations.

⁴ The five Shared Values are: 1) Nation before community and society above self, 2) Family as the basic unit of society, 3) Community support and respect for the individual, 4) Consensus, not conflict, and 5) Racial and religious harmony.

influenced by Confucianism culture. Although Singapore is de facto a multi-party parliamentary system of representative democracy, civil society actors felt left in the shadows of politics and policy making and intimidated about taking part in overtly public political activities (Sadoway, 2013). Laws and regulations restricting access to common space and freedom of speech and expression have increasingly become a concern of activists, artists and civil society actors. Finally, Singapore's unique geographical settings have shaped the ways in which State has designed and implemented sustainability policies by giving priority to technical actors and technological innovations which often discount and overlook the creative potential of citizens and civil society actors in the sustainability transitions.

Case selection

As outlined in the previous section, a variety of methods were used to understand the practice of ICT-mediated food sharing in Singapore. The SHARECITY100 Database was used to make the selection of case studies for in-depth research. Singapore was ranked 27th out of 100 in the SHARECITY100 Database with 50 initiatives identified active in the City-State. Food sharing initiatives in Singapore were identified, analysed and categorised according to: what is shared; how is it shared; how the sharing is organised; the flow of sharing; and the claims being made by sharing initiatives (see Davies et al., 2017 for a full explanation of the methods used to create the database). The initial information about food sharing initiatives was taken from 'About', 'What we do', 'Who we are' sections of web and Facebook pages of food sharing initiatives. This provided a broader perspective on the characteristics and activities of food sharing initiatives in Singapore including: organisation, mission, year of establishment, economic, environmental and social claims, what was shared and how it was shared. The extraction of information from social media websites (Facebook, Twitter and other) addressed different types of data and in some cases filled in remaining gaps in information needed for analysis. For example, additional information about what is being shared and how was gleaned by interpreting photos and videos, reading user generated content, and engaging users in live-chats. Extracting knowledge directly from social media profiles of food sharing initiatives also facilitated access to parallel peer

networks that food sharing initiatives interacted with through ‘following’ or ‘liking’.

This on-line snowballing technique was particularly useful for developing a broad picture of food sharing landscape within geographical areas and in Singapore.

I analysed the mapping data of food sharing initiatives in Singapore to better understand the extent and type of food sharing practices Singapore. Through this analysis, I was able to familiarize myself with food sharing landscape in Singapore in which informal food sharing activities co-exist with State-led initiatives, social enterprises, businesses and non-governmental organizations and from those select four case studies for the comparative analysis which illustrated different characteristics. The fifth case study (SG Food Rescue) was selected during the fieldwork in Singapore (Table 3.1a and 3.1b).

Table 3.1a Food sharing case studies in Singapore.

Case study	What is shared	How is shared	Organisational model	ICT
Edible Garden City (Founded in 2012)	Land, tools, space, knowledge and skills	Selling	Social Enterprise	Social media Website WhatsApp group
Foodscape Collective (2015)	Land, seeds, spaces, tools, food, meals, compost, knowledge and skills	Bartering Gifting	Informal	Social media Google map Website WhatsApp group

Food Bank Singapore (2012)	Space, tools, logistics, food, knowledge and skills	Selling Gifting	Charity	Social media Google map Website WhatsApp group
SG Food Rescue (2018)	Food, spaces, tools, knowledge and skills	Gifting	Informal	Social media Google map Website WhatsApp group
Share Food (2016)	food, meals, knowledge and skills	Gifting Selling	Business	Social media Google map Website WhatsApp group

Table 3.1b Food sharing case studies in Singapore.

Description of the case studies
<p>Edible Garden City encourages growing food in underutilized spaces such as rooftops and sidewalks, and believes that growing food re-connects urbanites to nature, conserves natural resources, and cultivates a sense of community. Main activities include growing food and education.</p> <p>Website: https://www.ediblegardencity.com/</p>

Foodscape Collective works towards a fair and inclusive circular food system through community-building, education, well-being and research. Foodscape Collective conducts food sharing, workshops, and outreach, documentation and mapping and research activities.

Website: <https://www.facebook.com/FoodscapeCollective/>

The Food Bank Singapore strives to bridge the gap in the market by collecting surplus food in the market and providing it to organisations and people in need of food. Main activities include corporate social responsibility programs.

Websites: <https://www.foodbank.sg/>

SG Food Rescue brings together people passionate about reducing food waste in Singapore. The main priority is to rescue food that was discharged by food establishments such as markets, bakeries and restaurants. Main activities include educational programs for schools.

Website: <https://sgfoodrescue.wordpress.com/>

Share Food is an online platform and a mobile application to share traditional recipes and home cooked food and meals and to raise awareness about food waste in Singapore. Main activities include sharing recipes, cooking and eating together.

Website: <https://www.sharefood.sg/>

The decision to include fifth case study in the research at the later phase was made for two reasons: (1) at the time of co-designing the SHARECITY 100 Database and mapping food sharing initiatives in Singapore the SG Food Rescue group had not yet been developed and therefore could not have been identified as a case study; (2) and once the group was established in 2018, it became the largest and most diverse citizen-led surplus food redistribution network in Singapore illustrating the dynamics of the

space of ICT mediated food sharing. Before undertaking the fieldwork, I was also able to identify locations of main food sharing sites and get in touch with the founders, employers and participants in food sharing initiatives.

While taking notes of differences and similarities between different food sharing initiatives in the database I selected initiatives which directly aligned themselves with the concept of food sharing (shared use of land, sharing surplus food, sharing food with others). In the selection of case studies, I was interested in food sharing initiatives that were diverse in what they shared (for example: land, seeds, compost, produce) and how they shared (e.g. selling, sharing, bartering, gifting). I was interested to see whether multi-functionality and heterogeneity around what is shared could lead to multiple processes and outputs/outcomes that might have had an impact on society (for example improved community well-being), environment (reduction of food waste) and culture (emergence of new values and beliefs). For example, an organizational model of a social enterprise that focuses on selling and gifting and multi-use of land for food production and food waste utilization, might have an impact on alleviating social imbalance through job creation, reducing carbon emissions and landfills and contributing to the city's food security strategies. The initiatives that were selected for the fieldwork in Singapore were multi-functional (e.g. included more than one of the following: sharing stuff, skills, space), diverse organizational models (business, charity, social enterprise, informal), diverse uses of ICT (social media, maps, website, applications), diverse forms of exchange (gifting, collecting, bartering, selling) their role in the food system (e.g. growing, cooking/eating, or surplus redistribution of, food, or all three) and sustainability potential (food security, food waste reduction, social cohesion).

Shared food growing included those initiatives and their participants who grow food together with others (Edible Garden City and Foodscape Collective). Participants involved in shared food growing were sharing plots or land for growing, sharing seeds, tools, harvests and knowledge. Two shared food growing initiatives were chosen because of their involvement in sustainability and security of local foodscapes such as the 'growing your own' movement and their diverse organizational models. Activities

in these two food sharing initiatives ranged from food production for selling and gifting, compost swaps and plant swap and educational initiatives including workshops and public tours. Cooking/eating together represents those food sharing initiatives that encourage people to spend time cooking together, sharing home-cooked meals with strangers, sharing recipes and culinary traditions, and organizing potlucks and educational events such as workshops and demonstrations. Two case studies were selected (Share Food and Foodscape Collective) because of their ICT component (mobile application and the use of WhatsApp mobile application) and intention to share food with others as a means of establishing social relations, preserving culinary heritage and reducing food waste. The case studies focused on eating together were the most challenging aspect of the fieldwork. First, there were not many eating together events which I could participate in, in order to collect data, and second, with a small number of participants (40) and high maintenance costs, the Share Food Application was closed down in 2018. Rescuing and redistributing food surplus included food sharing initiatives which rescued food from vegetable markets, supermarkets and restaurants and donated it to charities or used it for their own consumptions. The two initiatives (Singapore Food Bank and Singapore Food Rescue Group) were involved in two different types of food rescue and redistribution across Singapore with a goal to reduce food waste. These included i) practices of those who organized food rescue actions, and those who chose to collect and consume still edible but discarded food from public and private bins ii) practices of those who are part of the Food Banking network in Singapore (charities, corporate doors, volunteers) and who donate surplus food from corporations, supermarkets, restaurants, and bakeries and cafes and redistribute to charities.

Data collection practices

Fieldwork was conducted in Singapore in two phases and for a total of seventeen weeks. During the first phase (2017) I spent 12 weeks in Singapore collecting empirical data on four selected food sharing case studies (Edible Garden City, Foodscape Collective, Singapore Food Bank and Share Food). During the second phase (2018) I spent 5 weeks working with two selected case studies on co-designing sustainability

indicators and collecting ethnographic data on the fifth case study (Singapore Food Rescue Group). Methods used for data collection included participant observation, face to face interviews and informal conversations. Participant observation included participation in various activities across the five case studies. These activities are outlined in the Table 3.2.

Table 3.2 Characteristics of participant observation in Singapore.

Case study	Participant observation
Edible Garden City	Volunteering (farming and gardening activities); participating in workshops, participating in public events such as tours, educational speeches, and launches; sharing meals with employees; visiting Edible Garden City farms and gardens; talking to the employers, volunteers, participants and founders
Foodscape Collective	Participating in workshops; organizing workshops (bread-making workshop); visiting community gardens and individual food growers, eating together and cooking together; talking to the employers, volunteers, participants and founders
Singapore Food Bank	Volunteering at food redistribution events and sorting food in the storage room; participating in private events such as corporate social responsibility programs; visiting Food Bank office space; transporting food from donors to beneficiaries; meeting donors, beneficiaries, and charities; redistributing food, collecting food from donation boxes; talking to the employers, volunteers, participants and founders

Singapore Food Rescue Group	Participating in dumpster diving activities; participating in food rescue events and activities; visiting dumpster diving sites; eating food together, redistributing food to community fridges; talking to the founders and participants
Share Food Application	Visiting founders in their office space; meeting home chefs in their homes, participating in shared diners, sharing meals; chatting online with home chefs

I was able to quickly establish connections to the initiatives and commence research due to a pre-established familiarity with local culture and through links with research institutes and academics which were established prior to fieldwork. I also had a research residency at Singapore ETH Centre during the time spent in Singapore. As a researcher in residence, I was granted access to main office and research facilities and also had interesting conversations and knowledge exchanges. Nonetheless a number of known and unexpected challenges emerged during the data collection process. The known challenges that occurred during the fieldwork included:

1. Self-censorship of respondents to avoid sharing information that might be damaging to their reputation and to that of their employees; fear ‘of saying the wrong thing’; presence of State controlled media, and dominance of State grassroots organizations, imposing limitations for citizens to express their own views and not to echo the State propagated, to be critical and take a stance on issues of citizenship, social justice and environmental concern.
2. Limited time for conducting fieldwork due to high costs of living in Singapore.
3. Administrative bureaucracy and difficulty with accessing policy representatives, agencies and the regulatory bodies.

4. Language restriction (e.g. inability to speak Mandarin, Malaya, Tamil and to communicate to elderly who do not speak English).

Challenge (1) was partially overcome by simply spending a lot of time with employees and participants in food sharing initiatives that allowed informal conversations and spontaneous interactions to take place. These interactions often took place outside their work environments and work hours. For example, when meeting participants for dinner, going to a conference together or joining social events such as Sunday church service, I was able to encourage them to open up about their personal worldviews and perspectives on sustainability issues in Singapore. Also, it is important to underline that in Singapore, European citizens are seen as liberal and open individuals who are not burdened nor restricted by the political culture of Singapore. Thus, when talking to a European researcher, many participants felt that they could talk freely about their dreams and desires, experiences and failures and to share feelings and concerns without fear of judgment. Furthermore, by organizing a food sharing mapping workshop⁵ in the Singapore Hackerspace in collaboration with two local researchers from the National University of Singapore I was able to engage academics, people working in the government, participants in food sharing initiatives and citizens generally in thought provoking discussion of the issues that are not openly discussed in public domain such as land access, food security, food poverty, and community activism. The hands-on format of the workshop challenged each other views, thus enabling critical reflection to take place.

The challenge of limited time for conducting in-depth ethnographic research (Challenge 2) was partially overcome by means of technology. I joined dedicated social media websites (Facebook and WhatsApp mobile application) and became an online ‘friend’ of founders, employees, and participants encountered during the fieldwork. In this way, I was able to follow the journey of food sharing case studies when no longer being

⁵ <https://sharecity.ie/krautsourcing-ideas-food-sharing-singapore/>

physically present in Singapore. Also, whilst spending a lot of time (30% of the fieldwork time) traveling between different field-sites, I used the ‘travel time’ to record personal reflection and field notes from participant observation. Writing when traveling between field sites was an important practice to save details of the fieldwork experiences but also to reflect on the broader cultural and societal context in which I was conducting the fieldwork. The locations and the means of public transport in Singapore developed naturally into prominent research sites. On the metro, in buses and taxis as well as the platforms and stations from which people arrive and depart were one could learn from passive observations and casual conversations, leading to significant understanding in regard to the patterns of behaviour, the scenarios of interaction, and then attitudes and demeanours that manifest in the collective of public spaces.

One of the most difficult challenges to overcome during the fieldwork was arranging and conducting interviews with policy makers and regulators (Challenge 3). I used electronic communication and phone calls to contact different governmental agencies and request an interview. While most governmental agencies provided me with a quick response such as a link to a website with detailed information on existing legislations and regulations, they declined to meet me or speak to me personally. I was able, however, through personal connections to get in touch with a few policy makers from the younger generation with whom I conducted informal conversations on the topic of sustainability, food security, food safety, community activism and land use.

The predicted challenge related to a language barrier (4) did not turn out to be a significant obstacle for data collection process as majority of the participants in food sharing initiatives spoke English. When the challenge arose, for example when interacting with elderly gardeners, I asked younger participants to assist me and to translate conversations.

The unexpected challenges during the second fieldtrip to Singapore arose due to pregnancy, curtailing my ability to participate in physical fieldwork activities. For example, dumpster diving which required accessing public garbage bins and lifting heavy boxes of vegetable or gardening that involved a probability of being infected with ZIKA or Dengue virus carried by the mosquitos.

3.4 Data Analysis

By the means of a multiple method approach, I was able to capture holistic representations of food sharing in Singapore, acknowledging the diversity of actors, places and practices that existed within each of the case study. I managed to collect a large amount of primary data - 55 interviews, 50 participant observation engagements (e.g. participating in a food sharing activity such as surplus food collection and redistribution or attending a gardening session in a community garden) and 6 informal conversations with people working for the government) (Table 3.4).

Table 3.4 Number of interviews with food sharing initiatives in Singapore.

Case Study	Interviews
Edible Garden City	12 employees including the co-founder 4 stakeholders (board members and sponsors)
Foodscape Collective	13 participants including three co-founders
Singapore Food Bank	5 Charities 3 Employees including the co-founder 2 donors
Singapore Food Rescue Group	5 interviews including the co-founder
Share Food Application	11 interviews including two co-founders

The interviews were recorded with the permission of the interviewees, conducted in English by myself, and transcribed by a research assistant and myself. Fieldwork notes that were taken during participant observations and field visits complemented the interview data. The field notes that I captured would include: descriptions of food sharing spaces and places (e.g. gardens, farms, homes), a description of the food sharing activities carried out (e.g. growing, eating together, sharing knowledge) and participants behaviour and emotions such as surprise or anger, peoples' outlook, spaces visited, informal conversations, gender dynamics, and range of socio-economic statuses such as class, education, ethnicity. With the consent of the participants photographs and videos were also taken.

All data was transcribed and entered into Nvivo software program which was used to investigate qualitative data systematically by organizing research materials, coding interviews and fieldwork notes and aggregating data findings by nodes. Table 3.5 includes list of codes for data analysis.

Table 3.5 List of codes for data analysis.

- | |
|--|
| <ul style="list-style-type: none">• Barriers and conflict
(interpersonal, inter-organisational, land, boundaries, negative transgressions, challenges)• Care• City in a Garden• Community
(social cohesion, social stigma, inclusion/exclusion, social isolation)• Cultural diversity and identity
(age, gender, abilities, ethnicity) |
|--|

- Education
(training, discussion about awareness raising, “people need to be educated about...”)
- Ecologies of Participation
(collectives, food waste actors, mediation, enrolment, objects, subjects, model of participation, creativity, public engagement)
- Finances and operations
(what happens in the organisation? Funding, reporting, revenue sources, infrastructure, processes of operation, activities)
- Food qualities
(freshness, organic, taste, edible and inedible, health and nutrition, viscerality)
- Food sharing landscape
(interactions, partnerships and collaborations, between initiatives within city links to other cities)
- Food waste
- Future plans
- Goals and motivations
- Kampong spirit
(community, human nature relationships, more than human relationships, control, digital)
- Labour
(Paid work, unpaid work/ volunteers, seasonality, flexibility, precarity)
- Memories and Feelings

- Modes of sharing
(gifting, bartering, collecting, selling)
- Outcomes
(evaluation of impacts, measurements, Benefits/ claims, such as empowerment, etc.)
- Policy, rules and regulations
(internal governance and external government; such as planning; ie. around decision making)
- Risk and uncertainty
(such as financial, food insecurity, health & safety (food safety))
- Scale
(geographical scale, territory, such as local, translocal)
- Strategic Niche Management
(visions, expectations, learning, networking, knowledge, innovation)
- Smart Nation
- Sustainability
(when people talk about sustainability in whatever context – social, sustainable plans, environmental)
- Technology
- Urban space

To analyse the data, I undertook three phases of Nvivo coding. In phase one, interpretative coding was carried out to explore and identify common themes, ideas, keywords and nodes within the fieldwork data and across nine cities. This involved the creation of main coding themes that were negotiated between the SHARECITY researchers during the initial process of the data analysis to allow for comparative

analysis of data across the urban areas. In the phase two, I added emerging codes to reflect a number of further themes discovered that were specific to socio-cultural context of Singapore (e.g. kampong spirit, Garden City, Smart Nation). In phase three, common themes for comparative analysis were identified on the basis of interviewees, fieldwork notes and secondary data such as policy documents, academic articles, media coverage, and data collected on the Internet (e.g. social media websites, blogs). These common themes for comparative analysis between case studies are: 1. Food sharing as a socio-technical niche; 2. Bottom-up participation in food transitions in Singapore; and 3. The role of place specificity (and its culture, histories, ethical concerns) in sustainability transitions. This process also allowed me to use theoretical frameworks to develop an understanding of empirical material and food sharing phenomenon within and across the case studies. Overall, in each of the chapters in the Results, Discussion and Analysis Section, the methodology section explains the use of Nvivo codes for the purpose of empirical analysis and theoretical interpretations of the research findings.

Furthermore, to triangulate fieldwork data, it was necessary to compare multiple data sources derived from different phases of the data collection process and sources of the fieldwork (Hammersley and Atkinson, 2007). Triangulation is a use of multiple methods to study interrelated phenomena from different perspectives (Denzin, 2007). It may be done by using several sources for data collection (such as combining secondary data with field notes), by including more than one researcher in the data analysis, by utilizing multiple methods or applying various theoretical backgrounds for interpretation of data (Decrop, 1999). In the process of data analysis, I explored different ways of triangulating data to improve the validity of my interpretations. First, I looked for similarities and differences by comparing diverse sources of evidence within and across case studies (e.g. interviews, fieldwork notes, and between fieldwork data and material from literature, information obtained on the Internet, policy documents, media reports photography and video). In this way, I was able to produce more valid and diverse understanding of food sharing phenomena and to address a broader range of political, cultural, social issues (Mathison, 1988; Bush, 2007). Also, being part of the SHARECITY research team helped me to identify triangulated themes, codes and keywords across different geographical areas and between researchers. For example,

triangulation between researchers in the first coding phase produced diverse perspectives in the data analysis and checked the credibility of the emergent themes as five researchers analysed the data separately, discussing similarities and differences and negotiating common codes for data analysis. Most importantly, triangulation allowed for more confident interpretation of research findings, more acute attention to similarities and differences between food sharing case studies as well as to communicate the findings of the fieldwork data to third parties in the process of co-writing the articles. In Singapore, triangulation of fieldwork data and other information sources ensured greater accuracy of interpretations of the fieldwork findings in ‘an attempt to relate different sorts of data in such a way as to counteract various possible threats to the validity of our analysis’ (Hammersley and Atkinson, 2007, p.184).

Direct interview quotes and extracts from the fieldwork notes are used to support the narrative throughout this thesis and add depth to the analysis presented in the Results, Discussion and Analysis section. To ensure confidentiality and integrity of the data, the analysis does not disclose the actual names of the initiatives or participants. Instead direct quotes are followed by unique identifiers. Due to inherent diversity in food sharing initiatives (e.g. different organisational models, size of initiatives, governance structure, type of participants), the identifiers developed for this thesis are anonymised and abbreviated (Table 3.6). Type of participants included in the fieldwork research is specified based on the role they have played in food sharing initiatives. For example, founder, co-founder, employer, recipient, participant. The interviews and engagements with policy makers are identified in this thesis as Policy.

Table 3.6 List of identifiers for food sharing initiatives.

Name of the food sharing initiative	Anonymised identifier	Abbreviated identifier
Edible Garden City	Social Enterprise	SE

Foodscape Collective	Collective	FC
Singapore Food Bank	Charity	FB
SG Food Rescue Group	Group	FG
Share Food Application	Business	FA

3.5 Conclusions

This Chapter has presented the methodological approach and methods of data collection and analysis in the study of food sharing in Singapore. This methodological approach allowed me to immerse myself in the culture of Singapore, to explore different food sharing practices and to critically investigate issues around sharing of food related stuff, skills and spaces. Whilst providing a justification for the selection of research methods, case studies and field sites, this Chapter also acknowledges the role of the researcher in knowledge production and discussed the challenges encountered in the field, with Singapore in particular representing a unique field site for researching food sharing. The methods aimed to produce novel empirical knowledge on the form, practice and sustainability potential of food sharing in Singapore and new theoretical knowledge to address criticisms and broaden sustainability transition research and frameworks. This Chapter also presented a detailed overview of the main analytical design for conducting research on food sharing in Singapore.

PART TWO

RESULTS, DISCUSSION AND ANALYSIS

CHAPTER FOUR

Transitioning without confrontation? Shared food growing niches and sustainable food transitions in Singapore

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Shared food growing niches and sustainable food transitions in
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4.1 Introduction

'I remember my grandmother stayed in a traditional townhouse in Cairnhill. In the front, there was a rambutan where we always went climbing and plucking stuff. Behind, there was a huge mango tree with a bee hive. It was our playground to run up and down, and go back to the garden. And there we see our grandmother and her neighbours growing different fruits like mangosteen, jambuayer, starfruit, durian. She had herbs like pandan, lemongrass, kaffir lime, sand ginger, blue ginger. There you got the flavour of pomegranates' (FC, Participant)

Few visitors to Singapore would recognise this reflection on childhood gleaning, foraging and growing in a City-State now dominated by the contemporary infrastructures of smart city. While Singapore is gaining recognition for its green initiatives, many are highly technological in focus and ecologically modern in articulation. This is exemplified by the SuperTree Grove within the Gardens by the Bay, where large metal tree-like structures are decked with more than 200 plant species and over 100, 000 individual plants. These vertical gardens are heralded for their green functions, including their ability to provide shade and harvest solar energy. However, while their cement core contains restaurants, few of the products served will have been grown in Singapore as it imports more than 90% of its food. Within just a few generations Singapore has transitioned from a village-based society to a bustling metropolis and patterns of food production and consumption have also altered radically as a result, raising sustainability concerns around dependency on food imports. This chapter explores how grassroots initiatives which employ shared food growing approaches have emerged in Singapore in response to these concerns and are promoting a sustainability transition around food in order to: raise awareness around food; develop skills for growing food in order to reduce reliance on food imports; and build social networks through shared urban growing activities.

Shared food growing, that is sharing land, spaces, skills, produce and tools for food production, particularly that which is mediated by information communication technologies (ICT) has gained visibility internationally through attention to urban agriculture, food sharing platform economies and alternative food movements in recent

years (Davies et al., 2017a, Davies, 2017b; Eizenberg, 2012; Staeheli et al., 2002). It includes diverse collective practices at a range of scales, from the household level, to community gardens, urban farms and even forms of guerrilla gardening. Claimed benefits of shared food growing include their contribution to food security through more diverse food systems and empowering communities to learn skills to grow their own food, gain access to land, and exercise their rights as citizens (Rut and Davies, 2018b). However, little research has been conducted on these activities in Singapore to establish the veracity of such claims. Neo et al., (2017, p. 7) and Tan and Neo (2009) suggest urban greening activities in Singapore such as community gardens have always been a City-State priority and ‘means toward the end of building an inclusive community spirit and co-creating a greener Singapore, where the community that is envisioned in is reflective of the state’s articulation’. Thus, the perception of communal sites for sharing spaces, land, skills, produce and tools as a form of State-organized civic activism and community bonding offers an important starting point to further reflect on the socio-political capacity of the City-State and its citizens in niche building processes around food, community and nature.

In response, the goals of the Chapter are two-fold: (1) to document how actors are attending to food transitions through ICT-mediated shared food growing; and (2) to interrogate the SNM theoretical framework for understanding niche building processes in the context of Singapore. These goals are approached by first outlining the nature of Singapore’s food system and then by reflecting on the current architecture of transitions and its implications for studying food transitions in Singapore. This is followed by an explanation of the methodological approach adopted and details of the two contrasting case studies which form the empirical material for the Chapter. A Multi-Level Perspective (MLP) reading of Singapore’s food system is then conducted and a SNM analysis of two grassroots initiatives that focus on shared food growing. The Chapter concludes by highlighting the significance of social and political genealogies for both understanding past transitions and also shaping future transitions. We call for continued efforts to widen the body of empirically-informed research on attempts to reconfigure food systems onto more sustainable pathways beyond western liberal democracies and to explore more carefully what place, power and politics mean for such

reconfigurations. For instance, much of the existing transition literature assumes that niches can disrupt regimes if they adopt the right strategies and are adequately supported (Schot and Geels, 2008; Kemp et al., 1998), but what might constitute appropriate strategies and support for a niche in Singapore?

4.2 Background

Singapore is densely populated and relatively young City-State, having only been established in 1959, with a landmass of 710.2 sq. km and a population of 5.6 million which is projected to rise to 6.9 million by 2030. As a result of rapid population growth and urbanization, Singapore faces a range of sustainability challenges such as resource scarcity, which includes a shortage of land and water, as well as the dependency on imported food. To address some of its sustainability challenges, the Singaporean government has been steadily building their vision of Singapore as a City in a Garden (NParks, 2014; Tan et al., 2009), which has become a political mantra to ‘ensure efficient management of [natural] resources in maintaining tropical oasis’ (NParks, 2008, p. 1). However, this vision has been criticised for portraying ‘manicured parkland image derived from a colonialized, westernized sub-conscious … a reinvented topicality reminiscent of hotel-resort horticulture’ (Geh and Sharp, 2008, p. 183). This State promoted image of Singapore as efficient, tidy and controlled, has altered human-nature relationships, particularly affecting social and cultural values, urban lifestyles and practices such as growing food (Tai-Chee Wong et al., 2008). In addition to environmental challenges, Singapore is also undergoing social changes, including a weakening sense of cohesion and identity, referred to by both State and citizens as a loss of kampong spirit (Lazaroo, 2017). Singaporeans remember kampongs through activities such as communal cultivation of vegetables and fruits trees, rearing pigs and poultry, and engagement in informal food economies, such as hawking and food sharing (Brownlee, 2018). Often laden with romantic nostalgia, there have been growing calls for a renewal of kampong spirit in ways which are fit for the twenty-first century; essentially seeking to recreate a kampong 2.0 (Yeo, 2016).

While many of these traditional forms of social interaction with nature, food and community have disappeared, the City-State has developed three national food

provision strategies: increasing imports from around the world; vertical and indoor technology in farming; and the internationalization of food supplies by establishing agricultural farms overseas (MND, 2017; Singapore Food Security, 2014). However, concerns about the risk of global challenges, such as climate change, causing disruption to food supply, alongside State recognition of the negative implications emanating from a weakening sense of collective identity, have led the government to support greater experimentation with local and shared food production. Growing food has been considered by the government as a critical buffer against global supply shocks (Koh Poh Koon, 2017), a national duty to ensure that Singapore has food supply resilience (Wong, 2017) and provide a platform for community bonding that can better approach social sustainability problems (Koh Poh Koon, 2017).

Looking back at the history of food provision, in 1965 after gaining independence, 25% of land was used for agricultural purposes and Singapore was food self-sufficient (Deakin et al., 2016). However, from 1980 onwards there has been a shift from growing food on the land to relying on global food trade, with a focus on imports and technology in farming. It is estimated that less than 10% of the food consumed in Singapore qualifies as locally-produced according to the Agri-Food and Veterinarian Agency (AVA). By 2014, only 1% of land was allocated for farming, most of which was located within the Kranji farmland and agro technology parks. The agrotechnology parks have a total land area of 1,465 hectares and circa 200 farms that produce livestock, eggs, milk, fish, vegetables, fruits, ornamental plants, birds and dogs (World Agriculture, 2017). In 2017, locally-farmed vegetables, fish and eggs contributed to just 8%, 8 % and 26 % respectively of Singaporeans' food consumption (AVA, 2017a).

There are a number of factors that have contributed to the current food provision system. First, the City-State is known as an international hub for food trade. Its strategic geopolitical context has led to an influx of imported and inexpensive products, which has heightened citizens expectations for food to be diverse, convenient and accessible; a commodity. Three supermarkets chains, the NTUC Supermarket, the Cold Storage and the Sheng Siong Group control 83% of the domestic food market (Singapore Business Review, 2012). At the same time, traditional food ingredients that were once grown

locally with indigenous herbs used in signature Singaporean dishes increasingly hard to find and are becoming unfamiliar to new generations of Singaporeans.

Second, in Singapore land is not permanently zoned for agriculture and there is no official land allocation for food production. In 2015, the arable land was estimated at just 0.8 % of total land area, and employment in agriculture dropped to its lowest level of 0.12 % of total employment in 2017 (The Global Economy, 2018). While the land can be leased from the government from three to twenty years, the City-State priorities on housing and military services have led to the disappearance of much previously available farmland. In fact, in 2017 the only remaining farmland, referred to as farmers' countryside by the Kranji Countryside Association (KCA)⁶, was taken back by the government after 20 years of farming history. With a State-led vision that the future of farming should rely on technology, science and engineering (AVA, 2017b) traditional soil based farmers find themselves in a weak position to compete for access to land with agro technology companies.

Third, economic and technical views on the future of food production have marginalised the social and the cultural dimensions of food. Indeed, the government's farm transformation map (AVA, 2017b) envisages a further shift from traditional farming techniques to tech savvy agro-specialists, with a predicted upsurge in vertical farming, automation and robotics to increase farm productivity and overcome resource and land scarcity. This technologically-infused vision fits with wider narratives of Singapore as a smart city, but fails to acknowledge the socio-cultural dimensions of food, from growing to consumption. As mentioned by the head of Kranji countryside in a response to the government plans to remove 62 farms from the farmland, 'farming is not just production - there's heritage, culture and education. These intangible assets are

⁶ Kranji Countryside Association (KCA) is a non-profit organization that promotes local agriculture, food security and sustainability.

very critical for nation building in Singapore. Knowing where your food comes from is something that every parent hopes every child (will) know' (Wong, 2017: para. 4).

Finally, grassroots initiatives interested in shared food growing activities have limited opportunities to access land. For, while the government has long been committed to developing City in a Garden, with already 47% of Singapore covered in greenery (Chew, 2018), it has been argued that nature in Singapore 'has been altered to a consumable form, a scientific sanctuary for observing and contemplating' (Kong and Yeoh, 1996, p. 402), rather than enabling interactive practices such as community growing. In this context citizens find it increasingly difficult, if not impossible, to grow their own food. As mentioned in interviews with initiators of shared food growing activities: '*Singapore [is about] high tech [farming] but there is so much green land that is only green land. It is not productive land, it is not communal land and it is not land that people are engaged with digging in soil, understanding the plants, meeting people eating*' (FC, Participants).

To begin to address some of these challenges, the government responded by making land available for growing in underutilized spaces, such as rooftops, community gardens, and by leasing gardening allotments in public parks. In fact, by 2019, the City-State has planned to lease 1000 garden allotments in HortPark, suggesting a diversification of the food system may be imminent. The question is whether this diversification will enrich or disrupt the dominant food regime or whether these initiatives will only ever be demonstration examples of alternative food provisioning practices. Exploring the relationships between dominant regimes and emergent alternatives is the bread and butter of transitions approaches and the following section sets out the state of the art in the field.

4.3 The architecture of transitions thinking

In the literature, transitions are often referred to as a 'gradual process of societal change in which society or an important sub-system of society structurally changes' (Avelino and Rotmans, 2000, p. 19 in Kemp and Loorbach, 2006). In this sense, transitions are concerned with systematic changes and reconfigurations of 'technology, policy,

markets, consumer practices, infrastructure, cultural meaning and scientific knowledge' over time (Geels, 2011, p. 24). In the last ten years, transitions studies have stimulated much debate about changes in complex systems such as energy and mobility (Shove and Walker, 2007; 2010; Lawhon and Murphy, 2012) through frameworks such as the Multi-Level Perspective (MLP) and the Strategic Niche Management (SNM) approach.

The MLP consists of three analytical levels (Table 4.1) - regimes (macro level) characterized as dominant socio-technical structures, which include set of institutionalized rules, practices, products, and technologies (Rip and Kemp, 1998; Geels, 2002); an exogenous landscape (meso level), which influences the interplay between niche and regime, and is associated with trends such as regulatory shifts, environmental disasters, or cultural trends (Hinrichs, 2014); and niches, described as loci for radical innovations. The interactions between these three levels, it is argued, drive socio-technical transitions (Geels, 2011; Smith et al., 2010).

Table 4.1 Definition of the regime, landscape and niche components of MLP.

Landscape	Regime	Niche
<p>Landscape is a physical environment that changes over time.</p> <p>Landscape includes cultural, political, and economic conditions that are shaping over long-terms developments and can lead to stress on the regime level.</p> <p>Sources: Schot and Geels, 2008</p>	<p>Regime is an established system that guides socio-technical practices.</p> <p>Regime is embedded in technological structures, and also in cultural, political, scientific, market and industrial dimensions.</p> <p>Sources: Geels, 2011:27</p>	<p>Niche is an isolated network of actors within a socio-technical system.</p> <p>Niche aims to compete with established regime and change dominant socio-technical practices.</p> <p>Niche characterized as grassroots are value-driven, focused on social needs and intrinsic benefits such as identity, self-expression, recognition, and belonging.</p> <p>Sources: Kemp et al., 1998; Schot and Geels, 2008;</p>

		Smith and Seyfang, 2013; Wolfram, 2017
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According to MLP, transitions involve dynamic shifts at the regime level and opportunities for structural changes. These can happen because of changes at the landscape level, for example by opening ‘lock-ins’ such as established technologies and rules known for negative environmental or social externalities, or by the growing influence of innovative niches, which can also destabilize regimes by unlocking potential for radical practices at the micro level by enabling new policies, practices and services. In both cases, transitions can take different pathways, and are influenced by different agencies, strategies, resources and interactions between actors (Farla et al., 2012). MLP is a useful framework to understand what factors might influence processes of change at different levels, and how levels interact through dominant and emergent political, social, environmental, economic and cultural practices. However, the framework has also received criticism for its geographical naiveté (Lawhon and Murphy, 2011), with concerns about whether MLP is ‘designed to travel’ to other scales and socio-political contexts (Heiskanen et al., 2009 in Lawhon and Murphy, 2011, p. 363) and how place specificity shapes sustainability transitions (Heiskanen et al., 2009; Hansen and Coenen, 2015).

The niche is key in transition literature as it is directly linked to experiments, innovations and opportunities for change (Smith et al., 2010). It is argued that niches experiments operate in a protective space, which allows for transformative socio-technological practices to emerge (Smith and Stirling, 2008; Smith and Raven, 2012). The protection can help to creates conditions for change, which if aligned with pressures from the landscape level may lead to changes within the dominant regime. Meanwhile, the concept of SNM has been developed as an approach to support policy makers and other actors in fostering experiments explicitly focused on sustainability transitions (Raven, 2012). Two major shortcomings of SNM have been identified by researchers; the limitation of focusing only on internal niche building processes and the overemphasise on technologies as novelties. To address these shortcomings, scholars have broadened the scope of SNM by linking it to external factors in niche-regime

interactions and landscape shifts (Schot and Geels, 2008; Geels, 2010). Raven (2012) and others (Van den Bosch and Rotmans, 2008) have developed templates for assessing SNM, which include attention to external factors as well that influence how niche are incubated, protected and supported (or not). By mapping interactions between niche and regime, and by studying niche building processes in their totality, SNM has become characterised as a ‘useful addition to existing policy instruments that have neglected the value of experiments’ (Schot and Geels, 2008, p. 548), which can also include socially-driven innovations and non-technological experiments. Socially-driven innovations are however challenging to traditional transition thinking as they may be ‘neither strategic nor managed’ (Seyfang et al., 2007, p. 41), and require more imaginative policy support and attention to socio-political context in order to scale up and stabilize (Davies et al., 2017a).

Attending to external factors in niche building such as socio-political context, and the role of civil society actors in shaping sustainability transitions, has enriched SNM and accepting that innovations need not be solely technical has opened new research avenues (Monaghan, 2009; Hielscher et al., 2012). Nonetheless, it remains that the reach of transitions thinking has been fairly delimited, with little attention to transitions beyond western liberal democracies (although see: Swilling and Annecke, 2010; Broto et al., 2012; Mans, 2014; Huang et al., 2017) and to actors beyond public, private and research sectors only recently receiving more attention (Smith and Seyfang, 2007; van Weile and Romijn, 2018).

Transitions frameworks have also been applied unevenly across sectors. For example, in 2012, only 3% of empirical transition research focused on food systems (Markard et al., 2012). Although this is changing with food transitions increasingly being considered by a suite of scholars interested in sustainability (see: Maye and Duncan, 2017; Devaney and Davies, 2017; Pascucci and Duncan, 2017; Kirwan et al., 2013; Bui et al., 2016), there remain questions regarding the appropriateness of MLP and SNM to identify novelties that often operate in the shadows of neoliberal food systems, such as shared growing and food sharing (Jehlicka and Danek, 2017; Grivins et al., 2017). Within this emerging body of food transitions research, niche building processes

specifically have received limited attention, with a few notable exceptions. Smith (2006), for example, critically examines niche development processes with regards to the organic food markets in the UK. He outlines the plurality of possible outcomes in niche-regime interactions that may result either in appropriation of the niche by mainstream regime, or in its reconfiguration (Smith, 2006, p. 455). This dialectical relationship between niche and regime was used as a departure point from which to reflect on what type of policy measures might be needed to support niches towards food sustainability transitions. Drawing out the significance of the social dimensions of food, Bui et al., (2016, p. 102) conceptualize community farming projects in the UK as socio-technical niches that are ‘building new visions of farming and food issues and (re)defining the network of relevant actors’. Similarly, White and Stirling (2013) employ the concept of niche to reflect on niche building processes for communal food growing practices in the UK. They suggest that the nature of civil society, reduces the potential for structured ‘outsider’ governance strategies, such as SNM (White and Stirling, 2013, p. 84). To date, there have been few studies of sustainability transitions of any kind in the context of Singapore. In this sense, Singapore offers a novel geographical reality in which to extend consideration of MLP and SNM, and to assess the applicability of such transition tools in this understudied setting. Singaporean politics, societal values and environmental challenges differ greatly from western countries in where transition thinking has been predominantly employed. Addressing concerns of Hinrichs (2014) and Markard et al., (2012, p. 962) regarding how can scholars contribute to the debate on sustainability transitions in food systems, the Chapter provides a new perspective on niche building processes, and niche regime interactions by reflecting on the role of place, power and politics in food system transitions. While recognising socio-political sensitivities and narratives, the Chapter looks specifically at socially-oriented, and collective forms of organization, and reflects on challenges of change in the food provision regimes using multi-method ethnographic analysis conducted with selected shared food growing initiatives in Singapore.

4.4 Methodology

This Chapter draws on research conducted examining the role of socially-driven and collective and collaborative practices around food that utilise ICT, termed shared food

practices for brevity here (see Davies et al., 2017a; 2017b). The research included documentary analysis of policy reports and online analysis of ICT-mediated food sharing initiatives through their websites and social media networks. In addition, ethnographic research was conducted in Singapore. During this period, 60 semi-structured qualitative interviews and 40 engagements with people who share, including participant observation as a volunteer, participant and organizer of food sharing events, were conducted. Interviews were completed with founders and employees of food sharing initiatives as well as participants, volunteers, donors and beneficiaries. Face-to-face encounters with food sharing initiatives took place daily on their home-ground, including homes, gardens, farms and restaurants. Five informal interviews were conducted with representatives from the government concerning food security, safety, urban agriculture and development. Additional interviews were conducted with stakeholders from various food sharing networks, including community gardens, resident committees, zero waste organizations, environmental groups, and student organizations advocating for food waste reduction.

Interviews explored the history and evolution of food sharing initiatives, including attention to organizational models, motivations, and activities. The challenges and barriers that food sharing initiatives are facing were addressed, as well as their impact and sustainability potential. The role of ICT tools in shaping the food sharing activities was also interrogated. With agreement of interviewees, interviews were recorded, transcribed, and coded using the software program Nvivo to identify patterns, commonalities and divergences of experience in the data. Relationships between food sharing initiatives, and their respective histories, finances and operations, goals and motivations, and future plans were also illustrated. Additional coding was conducted for processes such as niche, learning, networks, and expectations. A number of direct quotes from fieldwork are used in this Chapter to illustrate salient points.⁷ The names of

⁷ In places these have been edited to provide clarity. Where this occurs, any additions are marked by square brackets surround added text i.e. [example].

interviewees and initiatives have been anonymised and an identifier developed for each interviewee.⁸

Two initiatives form the empirical focus of this Chapter. Both initiatives were selected because of their use ICT tools such as social media platforms, Google maps and WhatsApp mobile application to organize their activities, disseminate their strategies and approaches to food as well as build public awareness around sustainable food practices in Singapore (Rut and Davies, 2018). The initiatives were both established by male and female Singaporeans, who are in their thirties and still living with their parents, some of them working multiple jobs or part-time. They self-identify as the millennial generation.

Social Enterprise

The concept of the Social Enterprise was developed by a group of Singaporeans and non-nationals in 2014, many of whom had experienced collective farming overseas. Working with, and on, the land was a transformational experience for these individuals who on their return sought a more '*self-sufficient lifestyle within a community*' (*SE, Employee*). As highlighted in the interview:

'When I was working on different farms in Australia I lived on a couple of fully self-sufficient farms. [Farmers] grow food in food forests, they try to own solar power and they deal with their own waste disposal [...] This was inspirational sustainable lifestyle to me. Coming back to Singapore, I felt that this is what I wanted to do' (SE, Employee)

The decision to adopt a Social Enterprise model was motivated by a vision to: '*do something that was driving [the grow your own food] movement and not just a business that is revenue and profit driven*' (*SE, Founder*). To distinguish themselves from

commercial farms, the Social Enterprise first focused on exploring edible landscaping, which included building edible gardens for privates, companies, restaurants, public institutions, and food education activities such as teaching gardening skills in schools and at pop-up community events. In the first two years of its activity, the Social Enterprise did not have their own physical space that they could use for meeting and shared food growing, and all the activities were based on part-time collaborations. However, its profile grew rapidly because of collaborations with established food venues, which gained them an extensive coverage in the local and international press, as a champion of grow your own food in land-scarce Singapore (Lee, 2016) and attracted more stakeholders interested in local food production. In 2016, the government leased land to the Social Enterprise to develop a community farming model that unlike other farms in Singapore, would be located within walking distance of HDB flats to make farming more accessible to the general public.

In 2017, the Social Enterprise set up a community farm, including twenty employees and a growing team of volunteers. The community farm focuses on using food growing technologies such as aquaponics and hydroponics for vegetables, edible flowers, mushrooms as well as an insect farm and a fish farm. Within Singapore's political context, the Social Enterprise and its community farm model can be considered as a small-scale socio-technical experiment with strong backing from the government, which supports initiatives that work together to innovate, co-create and transform farming sector through technology (AVA, 2017). The technology aspect of the community farm aligns with the City-State mission to promote the new face of urban agriculture by increasing productivity, maximising land use and using technologies to support farming which can be scalable within congested urban environments (URA, 2018). The farm also has a clear social agenda which has developed around its social mission to extend practices of growing food in the city with others and employ vulnerable Singaporeans; essentially to build a more inclusive farming model and an active site for experiential engagement with food. As a result of this positioning the initiative, as a socio-technical experiment, provides a relatively protected environment as it directly engages with government priority areas around high-tech agricultural techniques and rekindling kampong spirit.

Collective

Similar to the Social Enterprise, the Collective emerged as a result of individuals traveling abroad, learning about farming, and participating in shared growing initiatives. One founder was especially inspired by a sense of openness and sharing when visiting a community garden in Perth:

'I noticed that [the garden] was run by the residences for the residences and if you wanted some chilli, you could pick some chilli, etc. I was thinking about Singapore back then, and how Singaporean gardens are all locked up. There are only for a few people [...] I wanted to bring [this type of garden] to Singapore' (FC, Founder)

Upon her return from Australia, she started a community garden, which inspired her to learn about growing techniques from other food growers in Singapore. The community garden became a meeting space for those interested in urban farming, and in 2015 the Collective came alive with four founders interested in sustainability of local foodscapes. First, the Collective developed a Google map of edibles in Singapore. By using crowdsourcing techniques such as Google forms, information about food, growing practices, and food spaces in Singapore was gathered. The map was developed in an attempt to '*help people to see what each other's [growing] and help with encouraging [sharing] knowledge about growing food in the city*' (FC, Founder). As one founder said that '*the mapping session actually caught the attention of the Ministry of National Development... we posted the event...then subsequently we were invited by the Taskforce on Urban Farming [to talk about our goals and activities]*' (FC, Founder).

The Collective identifies itself as an informal and self-organized community group '*composed of residents of Singapore, who have come together because of a shared interest in [their] local foodscape*' and to share knowledge on '*the landscape of food*' (FC, Founder). Although, the founder's aspiration is to establish a community supported agriculture based on partnership between food growers and consumers, the Collective continue to function primarily as an online platform that promotes knowledge and skills sharing about growing, healthy eating and waste reduction. The platform has circa 3000 followers, some of whom meet spontaneously to share plants,

seeds, vegetables, to share land for growing or to participate in shared food growing activities such community farming. Key activities include educational events such as workshops, exhibitions, gardens and farm visits.

In contrast to the Social Enterprise, the Collective has no clearly formulated goals beyond their online vision to ‘Grow food, cook well, eat well, live well’. There is also an informality embedded in the structure of the Collective (which is entirely volunteer run) that has affected its chances of receiving government support:

‘When you talk to the Government everything has to be structured. You can’t just say, I want to create a food forest, give me a piece of land. You need to give proper reasoning, understanding of what is the purpose? I think this is [why] we are probably not ready if you want to talk about engaging the Government with small groups [like the Collective]’ (Policy)

Despite the lack of tangible support from the government, in contrast to that experienced by the Social Enterprise, the Collective has continued to grow in an informal way, with more people attending their events interested in discussions on ‘*what the community could achieve to make [our] local food supply more resilient*’ (*FC, Participant*). In the following sections the experiences of these two experimental shared food growing initiatives will be examined using MLP and SNM frameworks.

4.5 Grassroots actions in food system transitions in Singapore: MLP and SNM analysis shared growing experiments

As discussed in the Section 3, MLP suggests that system level change emerges when macro and micro pressures combine or align to destabilise the dominant regime. In turn, regime destabilisation creates windows of opportunity for new practices (Markard and Truffer, 2008; Geels, 2011). Building on the review of Singapore’s food system conducted previously, MLP is used to deepen understanding of external factors that enable shared food growing niche (see Table 4.2).

Table 4.2 Mapping landscape, regime and niche in Singapore.

Landscape	Regime	Niche
<p>The landscape level in MLP is characterized by external trends and exogenous factors that might create opportunities for change (Geels, 2002). In Singapore, the landscapes pressures are manifested physically through ongoing trends of urbanizations and decreased availability of land through time; growing awareness of environmental issues amongst the populace, such as climate change and its implications on resource scarcity, as well as food waste generation; international food trends including vulnerability of global food supply due to food price volatility and ‘nutrition transition’ causing an increase in diet-related diseases such as diabetes and heart disease; as well as long-term political trends such as population growth, economic development as well as the lack of alternatives in mainstream politics.</p> <p>The landscape pressures in Singapore also reflect on the long-term socio-natural and cultural trends</p>	<p>In the MLP, the elements that constitute the regime can be considered as dominant rules and policies, structures, values, practices and beliefs stabilized over time (Geels, 2010; Sterrenberg et al., 2013). These have been developed through State-led polices and strategies, which focused on achieving food security and food safety in the face of land-scarcity and dependency on international food supply.</p> <p>Thus, the current configuration of the food provision regime is highly stabilised through favourable import policies with one of the world’s lowest tax on imported materials, which account for the influx of affordable and accessible foods; public funding schemes for support of economies of scale and farming technologies to maximise the outputs and intensify local food production; and practices and beliefs of convenience-oriented consumers who prioritize food affordability.</p>	<p>The niche level in MLP is characterized as locus of radical innovations (Smith et al., 2010). In Singapore niche emerge from a dynamic interplay of both thinking about the future food system, and doing things together to address novel approaches and new practices to overcome the challenges of import dependency and shortage of local food supplies. These include forms of collective food growing such as community farms and gardens, social and food entrepreneurship such as learning and sharing knowledge about do-it-yourself food growing systems and more commercially orientated food growing technologies to grow food on non-agricultural land and in tropical climate conditions such as vertical farming, aquaponics and hydroponics, climate controlled food growing containers.</p> <p>It is also the case that niche development is being driven by circular thinking in food systems as opposed to the regime linear approaches to food</p>

<p>caused by the transition from rural-like settlements to smart City-State. Kong and Yeoh (1996) suggest that the societal development in Singapore focused on economy and resource efficiency brought about reduction of natural habitat and led to a socio-natural dilemma: on the one hand, natural resources has been destroyed to satisfy needs of growing populations; and on the other various policies and civic actions were introduced to support constructed vision of 'City in a Garden' with new socially-defined understandings of human-nature relations.</p> <p>Moreover, cultural changes such as rapid globalisation resulted in ambiguity of cultural identity in Singaporean society, which has been affecting the sense of belonging and social cohesion known as kampong spirit.</p>		<p>production and waste management, and include innovative practice directed at food waste reuse and redistribution through community and commercial composting; permaculture food design strategies for closed loop urban farms; food redistribution initiatives such as food rescue groups, food sharing networks and community kitchens; and ground-up social movements including zero waste and grow your own.</p>
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In Singapore, a key driver for change in the food systems has been identified as the global food crises post-2007 that led to a 12 % increase in prices of Singapore's food imports (Deakin et al., 2016). This global scale landscape level event provided momentum for alternative food practices and new technologies, and with them new configuration of actors to challenge the status quo of the food provision regime. While the two case studies described in the Section 4 provide illustrative examples of experimental niche projects, the fieldwork has also found that there are other multiple interconnected actors that share intrinsic benefits of growing together (see Table 4.3) (Seyfang and Smith, 2007). In fact, shared food growing has been often referred to as an emerging movement:

'There's this ground-up movement for food. People are interested in urban farming or in just growing their own food [...] some of the vocabulary from ground-up movements does go into the Government when the people from these organisations start speaking to the Government' (FC, Founder)

Table 4.3 Characteristics of shared food growing niche actors

Niche actors in shared food growing in Singapore	Key activities
Community/Informal groups	Learning about urban farming skills and growing your own food; food growing for recreation, educational purposes or community building; need for an alternative approach to food systems; focus on social and environmental sustainability; exploring collaborations and connecting different actors in the food systems such as farmers, chefs, composters, food rescuers; rekindle kampong spirit
Companies (For profit)	Exploring market opportunities for locally produced food; experimenting with food growing technologies such as aquaponics, hydroponics and climate-controlled farms; influencing the government by

As		offering solution to environmental problems such as food waste, food miles; lobbying for public support
	Social Enterprises	Addressing social and environmental challenges; exploring new economic models (social economy); creating market opportunities for socially disadvantaged; providing education services; community bonding activities; rekindle kampong spirit and contribute to State-led City in a Garden vision
	Public Authorities and Political Grassroots (known as Residents Committee (RCs)	Learning about new socio-technical practices; creating new economic and social opportunities for shared food growing niche; enhancing local food production targets; rekindle kampong spirit and foster City in a Garden vision
	Users (volunteers, consumers, prosumers)	Personal enjoyment for gardening; co-creating an inclusive community spirit and a greener Singapore; sharing knowledge, skills and interacting with others on how to grow and what to grow in Singapore; selling, and giving away home-grown produce; consuming home-grown produce; participating in outreach activities such as workshops; rekindle kampong spirit

previously discussed, shared growing is not new to Singapore. It was present in the pre-and post-independence period, when growing food with others was embedded in the social fabric of kampongs. A quest for kampong spirit is often articulated as a main motivational driver for Singaporeans to initiate or participate in shared food growing initiatives. Kampong spirit is also strongly emphasized in the State-led community growing initiative Community in Bloom⁹, a nationwide gardening movement. However,

⁹ Community in Bloom is a network of community gardens which brings together residents through growing activities. According to the National Parks, there are 1000

in these State-owned and privately rented forms of community gardens, access to land is managed by grassroots residence committees¹⁰, which approve or reject citizen's request for access to land based on whether they comply with vision of City in a Garden and kampong spirit. As mentioned by Chua (2015) and Tan and Neo (2009), citizen reliance on political intermediaries such as residence committees who control access to land and shape nature of citizen engagement leaves little room for experimentation.

However, although, in Singapore experiments and social movements are legally restrained from creating 'scandals, shocks, [and] protests' (Penna and Geels, 2015, p. 69), to enact changes at the political and societal level, which are typically identified as necessary for transitions, the use of ICT and knowledge exchange around non-political grassroots interventions for food sustainability are opening up spaces for discussions of alternatives in ways which are harder to capture and control. In order to explore the capabilities of the two-shared food growing initiatives to disrupt the dominant regime in Singapore, SNM analysis is conducted in the following section, drawing on the frameworks developed by Raven (2012), Smith and Raven (2012), Schot and Geels (2008) and Kemp et al., (1998).

community gardens, which are state owned and engage over 20,000 residents in community growing (NParks, 2016).

¹⁰ The Residents' Committees (RCs) were introduced in 1978 to promote neighbourliness, racial harmony and community cohesiveness amongst residents within their respective RC zones in Housing and Development Board estates. Run by residents for residents, RCs also work closely with other grassroots organisations like the Citizens' Consultative Committees and various government agencies to improve the physical environment and safety of their respective precincts.

Articulating niches: A SNM analysis of shared food growing Singapore

Raven (2012, p. 1) proposes a phased process for identifying ‘chances and hindrances’ that niche projects, such as the Collective or the Social Enterprise, could face in their attempts to destabilise the unsustainable food system in Singapore. Further, Smith and Raven (2012) suggest that experiments are fuelled by narratives which can either empower a niche to become a radical innovation or remain competitive under the incumbent regime. To examine the fate of the shared food growing niche in Singapore, niche building processes are explored, giving attention to processes such as visions and expectations; social networks and learning.

Vision and Expectations

In SNM, expectations are important for setting up a clear vision that is shared among many actors (Raven, 2012; Kemp et al., 1998). In case of the Social Enterprise, expectations are developed around their goal to create a network of community farms along the community supported agriculture model, to contribute towards local food security and empower disadvantage Singaporeans by ‘*providing jobs for vulnerable populations*’ (*SE, Employee*). Furthermore, the Social Enterprise seeks to export its farming model to neighbouring countries, fostering an open source social innovation model that is made in Singapore and diffused internationally:

*‘I feel that a way to scale fast [the community farm] the open sourcing is the best. Open sourcing the model to countries that are working with local urban farming institutions is potentially how we would like to spread. It needs to drive a movement again. It needs to be, many people doing a model that is then proven and tested’ (*SE, Founder*)*

There are also expectations around the shared ownership of ideas, actions and space, often lacking in the corporate-led work culture in Singapore. This was illustrated through fieldwork conversations that identify the Social Enterprise as a ‘*learning space for everyone*’ (*SE, Employee*) where ‘[we] come together, share the resource, share

experience, share conversations' (SE, Employee). Key regime actors such as governmental agencies, view the Social Enterprise as an exemplar of citizen action (albeit State-supported) that brings community together through shared growing and cultivates sustainable social relationships with a larger food community.

For the Collective, expectations have been forming organically through participation by a range of civil society actors. In the interviews, founders and participants expressed confidence in fostering a 'space for gathering' for those who are interested in supporting '*local growers, local farms, or those who grow food on their own ... integrating food sustainability to local milieu'* (FC, Participant). In its organic and decentralized structure expectations evolve through different methods for engaging people in knowledge sharing practices, such as garden visits, cooking together and sharing food related stories online. Despite the lack of a clear vision as mentioned in an interview with one of the founders, the Collective is being recognized amongst environmental groups as '*one of the few organisations that looks into aspects of food sustainability research, activism or advocacy'* (FC, Founder). However, such alignment is not always welcomed:

'I don't like to use the word 'activist' because the traditional definitions of activism are usually affiliated to confrontational politics [...] basically illegal acts. Which I think in the context of Singapore is either not – what's the word to use? – it's clamped down by the Government, number one, not effective, and does not have any broad appeal by the public. So, in essence the public is not ready for confrontational politics' (FC, Founder)

This negative perception of activism pervades public life in Singapore making it more difficult for the Collective to articulate their expectations, set up the shared vision and imagine a future of more radical actions for sustainable food transitions.

Network formation

Transition scholars stress the importance of the involvement of new actors in strengthening the capacity of niche building processes; often known as network formation (Smith and Raven, 2012; Schot and Geels, 2008; Kemp et al., 1998). In both

the Social Enterprise and the Collective, network formation takes place through a snowball process. First, collaborations are initiated with informal groups and individuals interested in local food production, and then by deepening the engagement with networks of organisations, private companies and stakeholders, such as restaurants and hotels, social services including retirement homes, educational and community centres and governmental agencies.

For the Social Enterprise, network formation is key to scaling up productivity and fostering kampong spirit. As mentioned by interviewees and experienced during participant observation, this networking is mostly directed upwards towards governmental agencies and established businesses:

'There's a lot of challenges [...] finding space, finding people that want to help us. Not volunteers, but big people, like big brands here in Singapore. [...] I think we've been working with the Government and we've been successfully helped with a few brands here, with a few companies here [...]' (SE, Employee)

Networking upwards with big brands was enabled by a strategic partnership with a food and beverage company through which the Social Enterprise gained access to restaurants and businesses willing to share underutilized spaces for food growing purposes.

Collaboration with social service organizations for people with disabilities led to a social entrepreneurship award given by UBS Bank, mentorship from established social impact foundation and further networking opportunities with social venture capital investors.

The Collective meanwhile has built its network with less strategic partnerships and more collaborative engagements with individuals and informal interest groups, such as community gardens, dumpster diving and zero waste communities. It focuses on networking horizontally to other interest-driven groups through participatory activities such as workshops, social gatherings, exhibitions and festivals. These are often discussion-based events with food acting as a social agent that brings Singaporeans with different ages, professions and cultural backgrounds together. Informal exchanges such as barter and gifting are part of the gatherings, in which plants and seed swaps are

meant to empower participants to start collaborations around growing together and share spaces for food growing. The Collective has also developed strong bonds by networking through volunteering with important actors in the food sharing landscape such as the farming campus Ground Up initiative and the Food Bank. These actors are frequently mentioned in the interviews and user engagements in reference to shared values such as local sustainability, food waste reduction and sustainable lifestyles. The Collective has also been given attention through platforms that connect actors who work in broader environmental and social justice fields, such as Green Drinks Singapore and Nature Society.

Learning

According to Kemp et al., (1998) niches revolve around interactive learning processes aiming at improving everyday operations and strengthening network formation. Schot and Geels (2008) distinguish between first-order learning that is referred to accumulating facts, data and lessons, and second-order learning focused on alternative ways of valuing and supporting the niche. Given the fact that both initiatives have relatively underdeveloped and hybrid organizational models, the learning processes observed during the fieldwork were aligned primarily to first order learning. Learning happens via collective processes and is performed either via learning by doing (trial and error to solve problems as they arise) or learning with others (by interacting with partners and community).

In case of the Social Enterprise, learning has focused on setting social directions, developing technical aspects and new financial arrangements (Raven, 2012). For example, in order to access farming knowledge and to develop a social mission that aligns with the State narratives of kampong spirit, the Social Enterprise spent considerable amount of time engaging with various partners. These included corporate-run food and beverage companies that were able and willing to share office space and administrative support with the Social Enterprise; public institutions that work with the Social Enterprise to develop a work curriculum for young adults with disabilities; and other commercially orientated partners who are the main providers of aquaponics, climate controlled containers and hydroponics. The partners provide the growing

systems while the Social Enterprise ‘*can synchronise how the social side of things could benefit urban farming*’ (*SE, Employees*). The interactions enabled the Social Enterprise to solidify the design of the farm and speed their productivity by launching weekly veggie bundles with a learning mission to teach Singaporean customer about the benefits of locally produced ‘*fresh, healthy, safe, and organic food*’ (*SE, Employees*). The benefits of learning for the Social Enterprise are explicitly articulated as ‘*collective wisdom*’ and ‘*sharing of alternatives*’ (*SE, Employees*), but by interacting with commercial partners in the food growing scene, the Social Enterprise is also positioning itself at the forefront of innovative hi-tech agricultural projects that are part and parcel of the governments vision for the future development of the City-State.

For actors in the Collective, learning is focused on ‘*new perspectives and new understandings*’ (*FC, Founder*), rather than strategically articulating end-learning goals. In this sense, new knowledge production is formed through everyday interaction amongst participants, and rising awareness about alternative practices of food growing, such as how to build do-it-yourself food growing systems in the space of the balcony. The collective learning is embedded in small-scale participatory experiments enhanced by the use of ICT tools such as Google maps and social media platforms. For example, WordPress and Facebook are used as learning conduits to virtually connect actors in the food chain that, previously tended to work in the isolation. Online crowdsourcing maps of locally grown food, and compost exchanges give visibility to alternative food practices in Singapore and connect food growers. As one interviewee commented, these small-scale experiments are ‘*bringing people together through different aspects of food [such as food growing and food wastage]*’ (*FC, Participant*). ICT is an important tool for building this knowledge community (Bach and Stark, 2005) in which learning goes beyond the often-constrained understanding of civic space in Singapore (Sadoway, 2013).

Most importantly, the Collective sees learning as a space for reflexivity (Raven, 2012); to question, discuss, compare and think through sustainable alternatives to local foodscapes. Workshops, guided tours, and social gatherings organized by the Collective

in which participants engage in the acts of questioning everyday food related habits around growing, eating, shopping, and wasting food:

[the Collective] is really about teaching people metacognitive skills to interact with each other but also to interact with the environment and to make sense of things, not just take everything for granted' (FC, Founder)

4.6 Benefits and limitations of SNM approach in Singapore: Transitions without confrontations?

The findings of the fieldwork presented in this Chapter are significant for transition tools such as SNM and scaling potential of shared food growing projects as a form of grassroots niche in non-western contexts (Wolfram, 2017). SNM was useful to highlight the social dimension as a driving force for niches to develop competences (McCallum et al., 2009), articulate needs and soft skills while avoiding exclusion (Avelino, 2009), negotiate roles, identities and practices (Moulaert et al., 2007), and foster collaborative actions to develop shared expectations and reflective learning (Sayfang and Smith, 2007; Raven, 2012). The limitation of SNM is the lack of attention given to the exogenous factors such as place specificity, power and politics, which influence niche building processes and undermine SNM assumptions that experiments scale up in linear way following logical path (Hargreaves et al., 2013). Singapore's place specificity shaped by socio-political narratives around activism in particular highlight SNM's lack of attention to socio-political configurations in which niche projects develop.

Reflecting on the Social Enterprise and the Collective, both niche projects are far from what might be considered 'radical' experiments in other socio-political contexts, instead representing consensual attempts to incorporate alternatives within existing regimes. Also, they are more likely to conform to the prevailing socio-political discourses i.e. City in a Garden and kampong spirit 2.0, rather than calling for an 'opening and re-configuring of the regime' (Smith and Raven, 2012, p. 1033). However, such regime-alignments do not come without a compromise, and while the regime-aligned socio-

political discourses are instrumental in strategically steering niche building processes, they are also constraining.

For the Social Enterprise, which is the only community farming project in the City-State which has been granted access to land without a competitive tender process, there were expectations that it would rekindle kampong spirit through community activities. At the same time, the Social Enterprise is also expected to achieve quasi-commercial productivity standards to prove that the community farming model is a profitable investment for the authorities and commercial partners. Arguably, these expectations have steered the Social Enterprise to become a type of agri-entertainment service focused on activities of weekend-volunteerism. This has created the perception of a corporate-run farm that uses slogans of community farming as a way to advertise locally produced food for wealthy expat consumers. Government requirements to foster experiments that adhere to the dominant narratives of eco-efficiency means that the Social Enterprise has given priority to commercial partners over forming connections with community actors. Consequently, the community farming model was unsuccessful in engaging with other non-commercial initiatives in the shared food growing niche. As a result, the Social Enterprise resembles more what Smith and Raven (2012, p. 1033) consider to be a socially engineered experiment legitimized through state support and socio-political narratives, and seeking to become ‘competitive on conventional regime criteria’.

The Collective, in contrast, has been formed through experiments involving neighbourhoods, households, institutions, and academics, all interested in developing a more radical food movement able to ‘stretch and transform regimes’ (Smith and Raven, 2012, p. 1030). While the cooperation of different actors is still a key factor for its niche building processes, it is the self-organization of citizens that shifts the action from strategic steering to collective reflexivity. This differentiates the Collective from other forms of community-driven initiatives in Singapore often associated with ‘activities that are deemed civic, cultured, and civilised’ (Lee, 2002, p. 102). As mentioned in the interview:

'Most things in Singapore can be done very effectively top-down because we have a very effective government machinery. For civil society organisations, this is a lost opportunity for any form of advocacy. Here, you always need political support, be it for climate change, be it for food resilience, be it for anything that you want to advocate for' (FC, Founder)

A number of scholars have underlined that transitions are inherently political, and that niches are political spaces that ‘exercise innovative power collectively’ (Avelino, 2017, p. 509; Avelino et al., 2016). However, there are different styles of politics and socio-political relations which can make it harder or easier for niches to change regimes. In Singapore, this collectively exercised innovative power can be seen as pulsing softly in the tissue of niches in an attempt to increase socio-political awareness; it is primarily a commensal act. On the one hand, regimes are more likely to remain unmodified while acting as a host to innovative niche practices, on the other, niches demonstrate structural and ideological flexibility to obtain support from and acceptance of regimes. In the long term, however, such commensalism can become a mutualistic relationship, in which a niche would co-exist within the status-quo, perhaps scaling up and out to become a key additional player in the regime. Or it might become a parasitic relationship, in which the regime would benefit extensively from the niche without the niche having any impact on or influence over how wider transitions occur. As demonstrated by the case studies of the Collective and the Social Enterprise, in Singapore, niche-regime commensalism seeks to build sustainability transitions without confrontation and can be typified by a level of political control towards civil society actors and a lack of counter narratives (such as radical food activism) to the current regime.

Furthermore, socio-political narratives can either protect or exclude niche actors as well as influence their practices. While reflecting on the niche building processes of the Collective, innovation lies in the capacity to produce and share new narratives, sometimes ambiguous and utopian, that can create new civic spaces for radical change both on- and off-line. Thus, the questions of democratic interaction between political and societal structures is an important aspect of transitions in Singapore. However,

exogenous factors can suppress sites of grassroots transitional potential (Markard et al., 2012), and radical change might well need strategic manoeuvring. In Singapore, collaborative activity enabled with ICT is creating a ‘space for the transition (...) from both the bottom-up and top-down, simultaneously’ (Jurgilevich et al., 2016, p.4), as it offers incubation spaces for confrontations to be safely voiced, engaged with and negotiated by diverse niche actors in shared food growing.

4.7 Conclusions

Responding to the calls for more productive links between research on food systems and sustainability transitions (Hinrichs, 2014), this Chapter contributes to transition studies around food systems by examining shared food growing niche activities in the specific socio-political context of Singapore. This research found that transition frameworks developed and primarily applied in western contexts and market based innovations are relevant when interrogating grassroots sustainability transitions in Singapore. However, Singapore’s unique socio-political context including its strong government presence presents significant challenges to developing radical socio-technical transitions that diverge from regime narratives. This was clear when examining the niche building processes of the Social Enterprise and the Collective and their differential capacities to gain policy and support of other niche actors to scale-up. Thus, the key transitions terms such as ‘radical innovation’ requires rethinking with respect to place, power, politics, when performing SNM analysis of grassroots niches. Ultimately, it has been argued that despite niche-regime commensalism, shared food growing can contribute to sustainability transitions in Singapore given its demonstrable ability to foster social innovation. However, questions are still outstanding: Can State-supported niches achieve the required level of transformation without radical deviation from current regimes and the potential confrontation that could demand? Also, will citizen-led projects be able to continue their self-organizing activities beyond the State through the mediating spaces of ICT? Answering these questions requires longitudinal research to build on the data developed in this Chapter, but to date there is reason to be optimistic that the relatively accessible and unpoliced spaces created by ICT have potential to foster innovation, radical or otherwise, and ultimately retain the potential to challenge regimes. So, while the Chapter has broadened the ‘visibility fields’ around

sustainable food transitions (Spence and Rinaldi, 2014) in Singapore, further research is still needed to fully explore judgments about the sustainability credentials of niche activities that are made both by the State, citizens and by the initiatives themselves.

CHAPTER FIVE

Participating in food waste transitions: Exploring surplus food redistribution in Singapore through the Ecologies of Participation Framework

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5.1 Introduction

Food waste remains a significant challenge in the 21st century. It is an arena in need of a sustainability transition. However, the reduction of food waste creates a myriad of complex and intertwined challenges with social, political, economic, environmental and technical dimensions. While some of these challenges are experienced in many countries, linked to global food supply chains, others can be highly contingent on local cultures and particular histories of places. This Chapter widens the territorial and conceptual reach of research on food waste and responses to it by focusing on Singapore, where food waste remains an understudied topic despite becoming an issue of concern for policy makers and publics alike.

Food waste in Singapore grew by 40% between 2009 and 2019 (NEA, 2019). In response, the government introduced a policy goal to become a Zero Waste Nation by 2030 in which diverting food waste from disposal will need to play a significant role. Ong (2019:2) stated that in 2018 Singapore produced ‘800,000 tonnes of food waste that translates to 486 million meals a year which would allow [Singapore] to provide [food] for everyone who struggles with food security’. However, the City-State has limited infrastructure to redistribute surplus food from waste streams. It does not have a Good Samaritan Law to encourage the donation of food to charities and reduce liability for donors and there is no official definition of, or statistics on, food insecurity provided by the government (Glendinning et al., 2018). While government actions have been limited to supporting charitable food provision, there is an embryonic landscape of citizen-led food redistribution initiatives emerging. These initiatives stress the importance of connectivity between people and places with a focus on ICT (Information Communication Technologies) as an important technology enabling participation. This Chapter examines the attempts to enrol wider publics in these surplus food redistribution initiatives as a means to reduce food waste and to stimulate societal change in relation to food in Singapore.

While sustainability transitions are concerned with radical transformations of socio-technical systems (e.g. energy, food), research in this field remains relatively quiet about the participatory processes that bring citizens closer to democratic ideals and

inclusive transitions (Corsini et al., 2019). This is despite a longstanding interest in public participation in policy making and planning (Arnstein, 1969) and growing literature focusing on food waste practices and their policy implications (Schanes et al., 2018). In response, we draw on ethnographic research to explore the relevance of the ‘ecologies of participation’ (EOP) approach (Chilvers et al., 2018) for understanding food waste transitions in Singapore. In terms of defining participation in this context, we follow the argument made by Chilvers et al., (2018) that public engagement in science, policy and behavioural change does not form into discrete cases, rather diverse forms of participation interrelate in wider systems. As a result, we use the term participation to refer to activities from formal participation in policy making to the diverse actions that people take in relation to food waste in their everyday lives.

Following an overview of public participation in policy-making and food waste management in Singapore, the components of, and rationale for, adopting the EOP approach to examine food waste transitions are set out. The empirical material gathered in Singapore is then discussed in relation to two key dimensions of the EOP, i) the forms of participation in food waste management, and ii) the orchestration of food surplus redistribution initiatives in Singapore. The Chapter concludes with a reflection on food waste transitions in Singapore.

5.2 Participation, policy and food waste in Singapore

In Singapore, participation in policy making has been largely shaped by socio-historical processes of nation-building (Chang, 1968). Scholars have argued that early post-independence policies from the 1970s through to the 1980s had the effect of suppressing ‘constitutive components of individual and collective identity’ (Chua, 1997, pp. 26-7), for example through the abolition of dialects in mass media and cultural productions in favour of the government-sanctioned languages of English and Mandarin (Chua, 1997), and promoting a strong achievement orientation for a competitive capitalist workforce. However, in the wake of expanding social stratification and fears of a hollow national identity in the late 1970s the Singapore

government developed a Shared Values¹¹ strategy in the early 1980s. The Shared Values strategy has been described as an ‘uncharacteristic promotion of an explicit national ideology’ (Chua, 1997, p. 30) and a ‘conscious effort to … check the insidious penetration of liberal individualism in the social body’ (Chua, 1997, pp. 31–2). Wee (2007) summarised this period as an attempt to recreate Singapore as a modern Asian state; to shake free of the colonising legacy of Western modernity and establish ideological sovereignty. Chua (1997, p. 39) has argued that Singapore’s approach to creating a modern Nation-State was framed as explicitly communitarian, albeit honed by market rationality, with the early decades post-independence (1970s–1990s) focused on achieving economic competitiveness.

The concept of Shared Values has been reiterated by the government sporadically since its first appearance, and has been revisited in recent calls to revive a sense of kampung Spirit in Singapore. Kampung Spirit refers to the practices of solidarity across differences, communal spirit and neighbourliness that typified pre-industrial kampungs (village/home in Malay) in Singapore. Prior to the 1980s, the focus on collective shared values in nation-building policies were criticised for ‘generating the feeling’ (Noh and Tumin, 2008, p. 29) of togetherness but preventing more active forms of citizenship. According to Leong (2000, p. 438), ‘any discussion of citizen participation [was] inevitably linked to State domination and administrative control over the government’s fragmented and underdeveloped civil society’. However, since Lee Kuan Yew stepped down as Prime Minister in 1981, a new governing class has become more interested in forms of deliberative democracy (Leong, 2000). In fact, Prime Minister Lee Hsien Loong mentioned in his inaugural speech that ‘[Singaporeans] should feel free to

¹¹ The Shared Values refers to five statements with the goal of forging national identity: nation before community and society before self; family as the basic unit of society; regard and community support for the individual; consensus instead of contention; racial and religious harmony (Tan, 2012).

express diverse views, pursue unconventional ideas [...] have the confidence to engage in a robust debate' (Lee Hsien Loong, 2004 in Noh and Tumin, 2008, p. 24). As a consequence, the government has pursued a more consultative environment with a strong focus on co-creation as a 'form of a collective enterprise, and less an elite-driven phenomenon' (Hui and Kuah, 2014, p. 1) that has inspired many to use ICT to participate in environmental matters (Sadoway 2013).

Formal participation in food waste policy making, however, has been primarily limited to industry, with an emphasis on maximising energy recovery from waste. Food waste is handled by the National Environmental Agency (NEA) through various channels such as collection centres, recycling bins, industrial composting, and animal feed. To promote food recycling, the NEA and the National Water Agency (PUB) have launched a series of pilot projects (2016-2018) to test the feasibility of using on-site systems to treat food waste at food markets. In 2019, the agency released positive findings that the process of co-digesting food waste and used water sludge can triple biogas yield, showing the feasibility of maximising resource recovery from food waste through co-digestion (NEAb, 2019). The government also launched the 2019 Year Towards Zero Waste campaign along with the nationwide recycling movement - the #RecycleRight campaign¹² - to 'support relevant ground-up projects' (MEWR 2019a, 2019, p. 1).

While there has been a turn towards more inclusive governance approaches, citizen's involvement in policy making remains limited. A few civil society groups, such as Zero Waste SG and LepakInSG, were invited to facilitate a public consultation for the Zero Waste Masterplan Singapore 2019. However, in the resulting Masterplan they are considered as education providers encouraging people to 'recycle right' rather than integral to, and influential within, policy-making processes (MEWRA 2019, p. 82). Also, participation in environmental policy making in Singapore has been limited to 'selective groups of environmental organizations as long as they contribute to the

¹² <https://www.towardszerowaste.sg/recycle-right/>

existing power structures and regime legitimacy' (Doyle and Simpson, 2006 in Han 2017, p. 4). This means that in a tightly controlled political regime such as Singapore, civil society actors and initiatives remain marginal; effectively they are seen as targets of State-led environmental policy rather than co-designers or critics of the State's goals (Han, 2017).

However, elsewhere, analysts of policy change have suggested that transitions without broad public participation in its many forms will be impoverished at best (Chilvers and Longurst, 2016). In the following section, we first examine how public participation has been addressed in transitions literature to date and identify the key characteristics of the EOP approach developed in the energy transitions context, we then employ this approach to examine participation in food waste management in Singapore.

5.3 Transitions and participation: the emergence of the EOP approach

Analyses of public participation have long emphasised the varying degrees of control and power afforded to participants in policy settings, from mere tokenism to citizen control (Arnstein, 1969). While attending to power is an emerging feature of transitions research, matters of public participation have tended to be considered rather generically as a pre-requisite for sustainability transitions to be far-reaching, deep-rooted and effective (White and Stirling, 2013). Participation in sustainability transitions has variously focused on the involvement of industry, scientists and the government, but ordinary citizens are less frequently seen as key figures (Lawhon and Murphy, 2016). Although citizens through their everyday actions may enact practices, such as waste recycling, which are seen as pivotal for moving towards sustainability in other fields of research, the bulk of transitions scholarship has not given serious consideration to their role as agents of change (Vihersalo, 2017). Furthermore, where publics are examined through transitions frameworks, they are commonly seen as 'subjects of study rather than participants in governance or innovation processes' (Braun and Könninger, 2018, p. 677). This often means, as Cardullo and Kitchin (2017, p. 18) have argued, that public participation in formal policy contexts is framed in a post-political way that 'provides feedback, negotiation, participation and creation, but within an instrumental rather than a normative or a political frame'. In response, scholars have developed the

ecologies of participation (EOP) approach to grasp interactions between diverse actors participating in energy transitions (Chilvers and Longhurst 2016; 2017). The EOP approach gives visibility to multiple objects, subjects, and models of participation that relationally act on each other in wider socio-technical systems, through collectives defined as ‘human and non-human elements such as material and social technologies, social practices, knowledges, ideas, narratives, and modes of organising’ (Chilvers and Longhurst, 2015, p. 3) (Table 5.1). Collectives may co-exist within or beyond particular constitutional stabilities, and they have the potential to challenge dominant imaginaries by co-producing new knowledges, meanings, and forms of organising (Chilvers and Longhurst, 2015). As Jasanoff and Kim (2015) suggest, new visions of the future can originate in the actions of individuals whose intentions, motivations and interests can be transformed into widely shared imaginaries. The orchestration of collectives; a process that involves both enrolment of publics and mediation between participants, describes the ways in which publics participate in transitions (Table 5.1).

Table 5.1 The EOP components (Adapted from: Chilvers et al., 2018).

EOP Components	Description
Objects	Material devices, issues and concerns
Subjects	Participating actors (human and non-human)
Models	Procedural formats of engagement, expertise or technology of participation, political ontologies
Mediation	The process in which collectives are held together

Enrolment	The process in which actors are drawn into a collective
Constitutional Stabilities	Policies, infrastructures, practices, socio-technical imaginaries, and forms of public reason that have become established within national political cultures over historical time

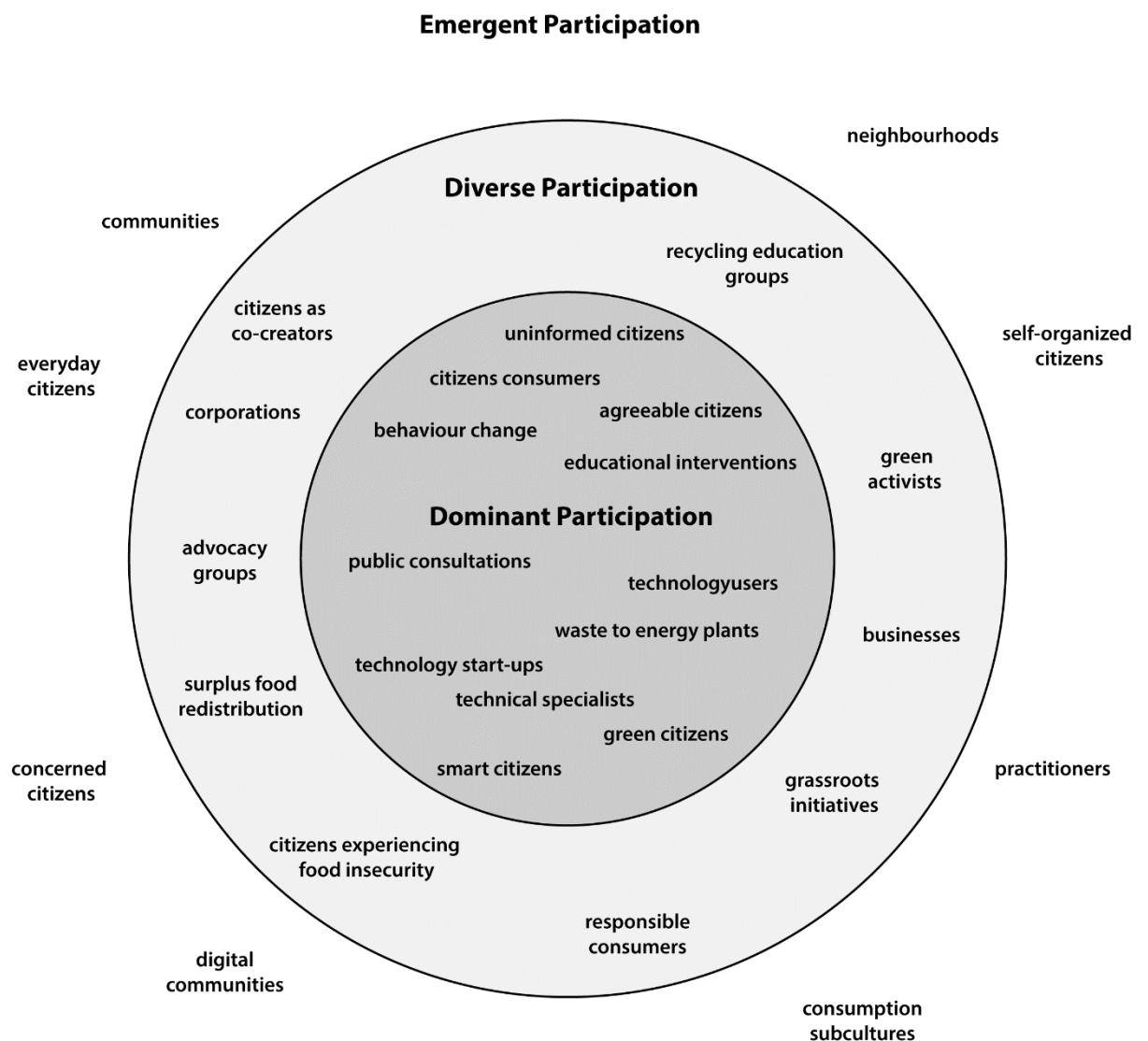
The focus of this Chapter is on emergent (citizen-driven) and diverse (corporate and charitable sectors) as key action areas in surplus food redistribution. We also acknowledge dominant participation as it is preferred by the State actors for its emphasis on technology as the primary tool of transitions in food waste management.

Although public engagement with food waste management is well established in the literature, particularly in the domestic setting (Evans et al., 2012), explicit consideration of sustainability transitions in relation to food waste remains scarce (Weymes and Davies, 2018). Attention has instead tended to focus on technologies and infrastructures of food waste management (Eriksson et al., 2015; Midgley, 2014). However, as the transformation of ‘surplus material’ becomes increasingly complex materially and socially, there is a need to reflect on the macro-social dynamics in which waste circulates (Gille 2010; Bulkeley and Gregson, 2009).

Identifying and examining these complexities requires a form of research which allows a rich picture to be created, such as ethnography. While the use of ethnography in the study of food transitions remains relatively scarce (Rut and Davies, 2018a; Davies, 2019), ethnographic methods such as participant observation can deepen understanding of the macro-social relationships by drawing attention to the material, affective, and spatial performance of practices. The EOP approach explicitly recognizes the value of ethnography in making sense of the ‘partiality of all forms of collective and the elements (material and otherwise) which are assembled in order for the collective to function’ (Chilvers and Longhurst, 2015, p. 40).

To untangle macro-social dynamics of surplus food redistribution, we first draw on Chilvers et al.'s (2018) mapping of dominant, diverse and emergent participation in the energy transitions in the UK and use these categories to discuss forms of participation that influence and are influenced by the food waste system in Singapore (Figure 5.1). Then we analyse orchestration processes within the two surplus redistribution collectives. The novelty of this task goes beyond the application of the EOP to a different transition challenge; it also broadens relational perspectives on sustainability transitions by giving attention to waste as 'a concrete materiality and in concrete relationships' (Gille, 2010, p. 1053).

Figure 5.2 EOP in the Singapore's food waste system (following Chilvers et al., 2018).



5.4 Methods: Researching participation in food waste transitions

This Chapter draws on material gathered by the lead author as part of an ethnographic study of food sharing in Singapore conducted between 2017-2018. Two initiatives, here referred to as a Group and a Charity to ensure anonymity, were selected as case studies because of the different forms of participation that they engender, namely diverse and emergent. Access was gained to the initiatives informally, through personal connections. It has been maintained through trust, listening and dedication. In total, fifteen interviews of an hour each were conducted with founders, employees, donors, beneficiaries, volunteers, and private individuals. The interviews covered the history, goals and evolution of the initiatives, including motivations for participating in them and the nature of activities developed. The challenges and conflicts that these initiatives face were also addressed, as well as their impact and sustainability potential. Social media platforms that the initiatives used were explored to identify the role of ICT as a tool of public participation in matters of environmental and social responsibility.

In addition to the interviews, participant observation (which included the collation of field notes, conversations and photographs) was undertaken. During participant observation, interactions were sought with participants reflecting the diversity of those involved in activities by age, gender, ethnicity, and the role they held in the initiatives. The empirical data reflects the experiences of participants aged between 20 and 60 years old, both women and men, of Chinese, Malay, Indian, and other ethnic backgrounds. The participants included those who were employed, unemployed or retired. Informal conversations were conducted with government representatives on the topic of food policies and regulations. The fieldwork data was analysed using inductive coding, where codes were assigned to segments of the participant responses and a grounded theory approach was used as a way to identify themes within the data (Glaser and Strauss, 1967).

5.5 Participation in food waste management in Singapore

Dominant forms of participation

Dominant forms of participation - defined as participation shaped by the system of which they are part - have matured in line with the internationally-recognised waste management hierarchy, often referred to in the governmental reports as ‘3Rs’ (Reduce, Reuse, Recycle) (NEAb, 2019). These are primarily enacted by government efforts to ‘promote responsible consumption behaviours’ (Grandhi and Appiah Singh, 2016, p. 483) and advance circular industry processes mainly targeting co-digestion facilities for biogas and electricity production. Using the EOP terminology, dominant participating *subjects* in food waste management include citizens-consumers, the food and hospitality sector, industry, knowledge institutions, and the government. *Objects* of engagement are formed around technological know-how that includes material devices such as food waste digesters that facilitate high volume waste management systems, providing market-based efficiencies. The systems of food waste removal that they facilitate do not require citizens to modify their actions to reduce their food waste production, whereas the educational materials, that include visual reminders not to waste food in eating establishments aim to ‘change...[consumers] mind-sets and behaviours’ (MEWRa, 2019, p. 3), do.

Furthermore, the emergence of large-scale technical infrastructures (e.g. waste-to-energy plants) reinforces an industrial approach to food waste management which does not discriminate regarding the different fractions of food waste as edible or not. The existence of these technical infrastructures also undermines the feasibility of alternative arrangements, particularly those involving messy, distributed and deliberative practices with diverse publics. Indeed, the government-sanctioned ecological credo of a ‘clean and green Singapore’, emphasises the role of the government as the overarching driver of transitions, with citizens’ responsibility contained by calls to act as good green subjects in accordance with that government lead. As a result, the dominant *models* of participation, such as educational programs, tendering processes and industry contracts, are shaped by the image of a clean city and technologically advanced government that attracts foreign investments and business innovations.

Diverse forms of participation

Diverse participation in Singapore - defined as more marginal participatory practices than those which comprise the dominant approaches - includes practices that operate within the food waste management system but contest the focus on the techno-politics of waste management (e.g. incineration) that dominate. Diverse participation includes wider spaces of, and more active options for, public participation. It takes into consideration the whole food life cycle and incentivizes dialogue between local food producers and retailers, charities, recycling groups and consumers about systemic inefficiencies that create risks, barriers and opportunities for those involved in surplus food redistribution. This has led to the development of new business models and the repurposing of food waste by-products exemplified by the social enterprises Unpackt and Ugly Food.

Diverse participating subjects include food donors, recipients, and volunteers whose involvement shifts the focus from technological fixes to active public engagement aiming at socially and environmentally responsible actions. These subjects have concerns about the impacts of food waste, the lack of city-wide food redistribution infrastructures (e.g. cold storage, transportation) and consumer obsession with food aesthetics (e.g. how food looks). Objects of diverse participation are also evident in initiatives seeking to address matters of poverty and exclusion, for example, the presence of material infrastructures such as food donation containers, communal kitchens, and community fridges are challenging to the rationale behind Singapore's incumbent social policies such as the concept of self-reliance¹³. Finally, diverse models of engagement such as programs, partnerships and community actions exist that involve corporate social responsibility (CSR) initiatives, grassroots and voluntary welfare

¹³ The concept of self-reliance focuses on the individual as primarily responsible for its own social and economic welfare and family as the first line of support before requesting the Government for social or economic assistance.

organisations. In some cases, these initiatives are able to inform the government about social inequalities particularly around access to food, housing and care of the most vulnerable communities.

Emergent participation

Emergent participation in Singaporean food waste matters - which incorporates forms of participation which challenge the established system - has grown with the increasing accessibility of ICT. Networking sites and applications have given citizens (at least those who can access it) a new means to connect with others (Rut and Davies, 2018b). Appearing on the fringes of the formal food waste management system, emergent subjects include those involved in consumption subcultures such as food scavengers, trash hunters, foragers, freegans, dumpster divers, bio-hackers and artists whose practices seek to disrupt conventional thinking about food in Singapore. Through interactions and relationships among communities, neighbours and practitioners, participants bring to the fore and connect matters of food waste to soil regeneration, sustainable diets, and the climate emergency. Objects of engagement are multiple, from community gardens and waste disposal facilities to homes and hacker spaces and from smartphones and Google Maps, to micro-blogs. Emergent participation includes self-organization models, with human and non-human actors interacting, taking actions and making emotional connections through networks, platforms, performances, missions, and innovations. Citizens self-organizing around environmental and social issues in Singapore are however far removed from the forms of protests and civil disobedience that are emerging elsewhere. Even taking ownership of projects and actions can be seen as radical in Singapore (Leong, 2000), as discussed in the following section on orchestrating surplus food redistribution.

5.6 Orchestrating surplus food redistribution: Enrolment and Mediation

Group

The Group emerged in 2017 as a result of dumpster diving activities¹⁴ with a mission to rescue and redistribute '*unwanted food to whoever is willing to consume it, not just to the needy*' (*FG, Co-founder*). Initially, the enrolment of participants, took place during ad-hoc 'veggie hunts' actions of salvaging unsellable food from the Little India wet market¹⁵. Participants include individuals between the ages of 18-60, with a particular preponderance of students, mothers working in the home and retired female citizens, alongside charities (who receive surplus food) and vendors and wholesale distributors (who donate unsold food). Participants can select 10% of rescued food in recompense for their free labour.

In 2018 the Group claimed to save between 2 and 3 tonnes of fresh produce every week, despite operating without transportation and cold storage. Also, the Group does not own its own equipment. Trolleys and boxes which are used to move surplus from bins and food stalls to the collection points are shared with the vendors. As such, the Group makes use of shared resources to build an adaptable infrastructure. In doing so the Group relies on personal networks and the kindness of strangers to maintain its operational capacity.

Participants enrolled in the Group can take up the roles of organizers, drivers, stackers, communication leaders, trolley and basket managers. While some participants are assigned to roles because of their physical strength, others can also self-enrol in activities by joining events as 'observers' and 'newbies'. Food vendors are enrolled

¹⁴ Spontaneous acts of saving food that was thrown by vendors in to the bins.

¹⁵ Little India is an ethnic district in Singapore.

informally during food rescue actions and charities are approached by the Group via email, phone or in person. Beyond the formal roles required to function, the Group provides space for participants to design activities themselves:

[Participants] don't have to ask the leader - tell us what to do! ... some are good at initiating things and some have certain type of resources... there is an avenue for them to contribute in some way...' (FG, Participant)

As a result, participants demonstrate diverse motivation patterns. For example, freegans are interested in practices that disrupt capitalist food markets; kiasu¹⁶ participants are driven by monetary savings from getting free food; and others join in seeking to expand their friendship circles, something that the initiative enables through casual meet-ups. In between the lines of these motivational factors participants also co-produce new orientations within the food rescue context. For example, some food rescuers seek out the spontaneous taste of frugality, eager to gain experiential skills such as scavenging and self-provisioning that boost their senses of self-confidence in their ability to abandon consumerist lifestyles. Some participants reported a change in their life-habits such as renouncing perfect food, cycling more, working for environmental and social causes, leaving corporate jobs and growing and sharing backyard foods.

Furthermore, during the participatory moments that the Group provides such as rummaging through bins, feeling dirtiness on the skin from dumpster diving, and encountering others such as street cleaners and garbage collectors, migrant workers and vendors, participation nurtures intrinsic experiences that cross cultural, legal, moral and material boundaries. For example, in the act of asking vendors for unwanted items, participants confront disapproving looks, questions, and narratives (of waste as bad, and the recipient who does not pay as destitute) inspiring a re-evaluation of social taboos

¹⁶ Selfish, self- centred behaviour.

around food. Through such experiences, participants also become aware of food system controversies such as the scale of illegal food imports that permeate Singapore food markets, as mentioned by the co-founder in a public post:

'We have learned from wholesalers that importing vegetables without a permit is a common practice...that we are consuming illegally imported food without realising it.... [and] smuggled food [comes with a] higher level of pesticides' (FG, Co-founder)

Furthermore, viscerally enhanced experiences, such as a feeling of moral urgency to redirect food from waste to those who are in need also motivates participants to start their own food sharing points¹⁷ which act as connective spaces of affective solidarity (Juris, 2008), providing food but also care, as mentioned in an interview:

'I put food at the block, and then aunties and uncles on wheelchairs they come. They don't have the luxury of buying vegetables... I better give food to those who are old and cannot dumpster-dive so they can cook and eat with their families' (FG, Participant)

By choosing to salvage food, participants also access various places and spaces of food waste production which in turn become ad-hoc enrolment sites for the Group. As documented in field notes during participant observation:

'Collection points attract transient publics hopping on and off the metro into vegetable stalls, hawker centres and coffee shops. People come by randomly, glimpse at the boxes full of rescued papayas, bananas, curry leaves, and snake beans. Some try to start a conversation, looking confused at this unusual public gathering' (FG, Fieldwork notes)

Such food rescue gatherings place the emphasis on edibility, as participants perform a 'look-smell-taste test' while saving sprouted potatoes, bruised papayas, mushy baby kailan, yellowing bok choy and oddly shaped watermelons. Although there is a concern

¹⁷ Food redistribution points usually arranged spontaneously in the common public areas such as streets, void-desks etc.

amongst the rescuers that mouldy foods may accumulate poisonous mycelium of fungi and therefore be dangerous for consumption, one of the participants mentioned: '*each of us has our own immune level*' to highlight that food safety is an individual responsibility (*FG, Participant*)

Furthermore, the way in which food and bodies intersect spatially in the performance of food rescue also arouses an embodied awareness that provides a stimulus for participants to be reflexive about one's own capacity to participate in local sustainability actions. As one participant mentioned:

'it is a new culture...[a] learning journey for me... Singapore... cannot function alone by the government...you have to have self-groups to come in and help' (FG, Participant)

However, while participants share environmental concerns, often explicitly acknowledging food waste as a collectively-felt issue, the group does not consider themselves a sustainability movement. This is because the narrative of sustainability in Singapore is framed in a language of technocratic pragmatism, to which citizens cannot relate and attach meaning:

'We are not leaning towards...[a] sustainability movement...food is something that we all relate to but sustainability, and the jargon around it, not so many people will be attracted to it, lots of people will be turned off' (FG, Participant)

In terms of mediation, which refers to the ways in which collectives are held together by devices, processes, skills and technologies, the Group has used social media to awake a sense of shared responsibility for food waste '*as a social and political problem so people can think beyond food*' (*FG, Participant*)

ICT is also crucial when it comes to mobilization of resources across diverse food rescue spaces. This is illustrated in the statement below which recounts how ICT was used to rapidly mobilize collection of a surplus that suddenly came to light:

'Someone tipped us off...within the WhatsApp chat group, Food Rescuers stepped forward, offering their transport service and fridge space. Within an hour, we cleared both [food] pallets' (FG, Co-founder)

Also, a feeling of togetherness that creates greater interaction within the Group is often mediated through participant's use of ICT. As observed below, participants commonly aim to create an ICT mediated 'network of embedded ties' (Bosco, 2006, p. 159) that is more likely to provide care in times of vulnerability and cultivate a collective sense of purpose that goes beyond saving food:

'There are some people...maybe distressed or depressed...food rescue helps because you have a higher purpose...to be able to help other people...and then you might [connect to] like-minded people...all these helps and some people will leave the WhatsApp chat groups, but for people who are able to reach through it is therapeutic and healing' (FG, Participant)

In addition to such affective qualities that shape processes of mediation, a feeling of enjoyment was seen by participants as a way to keep participation levels high, as the Group creates unconventional opportunities for creative offline engagements, such as potlucks.

The Charity

The Charity was established in 2012 as a philanthropic arm of a food distribution company. It has a status of an Institution of Public Character¹⁸ and offers tax breaks to corporate donors. The Charity is located in the company headquarters, in a commercial property that is not easily accessible to the public. It shares storage and office space with the founding company, providing a level of physical infrastructure and human resources. As mentioned in an interview with the co-founder:

'... donors [prefer] to work with us because, [we] can accept bigger amount of donations, [we] have trucks, and a warehouse' (FB, Co-Founder)

Although the Charity claims that in 2017 it redistributed over 720 tonnes of food to over 200 organizations in Singapore, the organization remains small with two full time employers that do '*everything from stock-picking, warehousing, advocacy, getting donors, meeting beneficiaries, etc.*' (FB, Co-Founder)

The Charity is comprised of other collectives such as family service centres, care homes, religious associations, and universities, schools, and corporations. Participants from these collectives are enrolled as recipients and donors by the signing of a liability agreement. In the absence of the Good Samaritan Law, the liability agreement releases the donors from the moral responsibility of having to consider health-related risks before donating surplus. This also shifts the power structure around enrolment in favour of the corporate donors. As one employee of the Charity puts it, '*we don't reject anything because we don't want to push donors away... We want to take as many donations as possible*' (FB, Employee).

¹⁸Institutions of a Public Character (IPCs) are exempt or registered charities which are able to issue tax deductible receipts for qualifying donations to donors.

However, such a focus on optimising donations can lead to challenges in terms of downstream redistribution, particularly in relation to religious dietary requirements, cultural norms and social values, as explained by a food recipient:

'We serve Muslim families... sometimes when the [Charity] has food that is near expiry...we would love to take it but because it is not halal we can't just force [it upon beneficiaries] (FB, Recipient)

Although, participants can register to volunteer via the Charity website, the majority of the volunteers are enrolled through Corporate Social Responsibility (CSR) programs that offer team building events to corporate donors. Such volunteering opportunities are however limited to corporate experiences, as participants are instructed to focus on a single task and supervised to '*sweat out their CSR hours*' (*FB, Co-founder*). Most of the participants are instrumentally motivated as they feel privileged to '*give back to community*' (*FB, Fieldwork notes*). By volunteering their time and money to '*help the less fortunate*' they appraise their actions of seeming altruism and empathy with a self-serving morality (*FB, Fieldwork notes*).

A few programs run by the Charity, such as door-to-door donations, allow the volunteers to access households experiencing food insecurity and collect information on their composition and dietary preferences. Collected information is then eventually used by the Charity to design wholesome donations programs that are meant to support healthy eating habits amongst the most vulnerable:

'[Healthy food packages includes] vegetables, lactose-free milk, olive oil, oats. It is to teach them that to eat healthier does not need to be expensive but it's just about maybe putting a bit of corn into noodles or a bit of tuna or sardines into meal. Just a bit more thoughtful of how they consume' (FB, Co-Founder)

The Charity also employs ICTs to '*communicate and handle [everyday] operations*' (*FB, Employee*). Unlike the Group, the Charity follows the best-before-date label to assess food edibility:

'Every day [a donor] has four to five pallets of organic vegetables, yoghurts, milks ... [We] have a WhatsApp chat group and we match [donors with] beneficiaries ... [beneficiaries] will go directly to [the donor] and pick up the items' (FB, Co-Founder)

ICT is also used for advertising the initiatives' capabilities and services, to:

'market [the Charity] like a company... [as] we have to keep fresh in the donors' mind and into the corporates' minds so that they keep coming back. So that's why we always need to have new [social media] projects going' (FB, Co-Founder)

Facebook and YouTube are essential tools of audience development as they help the Charity to raise awareness by engaging online users in playful activities such as '*donating recipes... [sharing] videos on how [to] prepare cheap and economical healthy food*' (FB, Co-Founder). The Charity also employs various bureaucratic processes, such as annual reports and board meetings that provide corporate donors and the government with better understanding of the decision-making process and actions undertaken within the framework of its activities. Such formalized mediation procedures allow the Charity to maintain its legal status as a charitable organization.

5.7 Discussion

Over the past decade, the food waste sector in Singapore has been in a phase of early transition. The policy goal of the 2019 Year of Zero Waste and the Zero Waste Masterplan is to efficiently close resource loops, and this, combined with strong commitment to technological solutions and the cleanliness culture of the 'City in a Garden', is shaping Singapore's formal vision for moving towards low food waste futures. In applying the EOP approach, we were interested in digging beneath these narratives and understanding who participates in food waste management in Singapore, how, why, and in which way.

The EOP analysis shows that the collectives examined in the Chapter are orchestrated in different food waste contexts; corporate philanthropy (Charity) and grassroots food rescue (Group). The Charity is shaped by prescribed set of rules that are tailored to align with, rather than disrupt, the dominant system. Enrolment is managed in a linear

manner in which models of participations are pre-given, as participants perform their duties as donors, recipients or volunteers (mostly middle-aged, employed and young students). Participation is defined by a spatial locus, with specific tasks to be completed at assigned private locations. The Group, in contrast, adopts organic forms of engagement in which participation is sustained through the interaction with strangers, material resources and spaces and places of food waste production.

People in all walks of life and occupational status (e.g. students and retired citizens, freelancers, entrepreneurs and unemployed) are drawn into food rescue actions. The Group also creates a multitude of social ties built around shared intentions, concerns and emotions which supports a feeling of communal identification. While the political establishment has rhetorically made place-based emotional and social affiliation a goal through its push for a revitalization of Kampung spirit, the mode of orchestration practiced by the Group demonstrates how such affiliation might be effectively constructed. Also, while the Charity has used ICT to administer food donations, the Group harnessed the ubiquity of mobile phones and high connectivity between the users to increase spontaneous participation (especially among young adults) across food rescue spaces and time scales.

The access to the food waste spaces in which collectives operate also influences who is included in surplus redistribution practices, and how. The ad-hoc rescue actions of the Group are directed at saving large amounts of a few types of fruit and vegetables that are made available at wholesale markets. As a result, the self-organized model works well for household collectives whose participants see waste as a resource while collecting fresh produce that meets their taste preferences. However, this form of participation might become problematic for charities and food insecure households if there is insufficient food to meet healthy and culturally-specific dietary needs. Thus, structured participatory models such as the Charity that offer stable donations are preferred by collectives with reduced mobility and limited or no access to cooking facilities to process raw vegetables.

Our EOP analysis also suggests that self-organized models of participation may enable moves towards emancipatory practices such as civic engagement in food waste

reduction. For example, the participants of the Group drew largely on the ideas and forms of experiential knowledge that are co-produced as spaces of food waste and bodies (and their affective dimensions) intersect. Experiential knowledge, such as the perception of food edibility, and the feeling of shared actions and emotions that the ordinary citizens co-produce through new learning journeys and soft skills, help to maintain collective responsibility and inspire new socio-technical imaginaries. While observing the practice of rescuing food from waste as a process of negotiation between diverse motivations and socio-material elements (e.g. waste, community fridges, food sharing points, mobile phones) it was possible to trace new social imaginaries that are mobilised to increase public participation in food waste transitions. We demonstrated that the models of participation that are closer to the local cultures and informal practices are more likely to manifest gentle expressions of disagreement with hierarchies of waste management and technological credo. They can also inspire new imaginaries which envisage different consumption paradigms with empowered citizenry, adaptive infrastructures, and sustainable lifestyles.

However, being a flow of shared goals and desires, new socio-technical imaginaries emerge and stabilise differently across diverse political cultures and waste regimes (Gille, 2007). Although governmental agencies have recently involved civil groups in a dialog about reducing waste, the collectives have not yet proliferated enough to demonstrate the tangible benefits of their actions to the government (besides the aspect of community-building). Thus, their presence remains on the periphery of the dominant political processes. While the top-down technocratic pragmatism has resulted in remarkable policy outputs, such as the reduction of pollution and waste (Han 2017), it also distracts from the critical role of citizen-led political action, leading some to suggest that sustainability transitions require strong democratic societies that are capable of radical transformations (Corsini et al., 2017). In Singapore, the longstanding (albeit still evolving) State-citizen relations mean that radical action currently remains on the fringes of society and is relatively invisible for many in the public sphere. The Group's emergent qualities are therefore manifest in its support for unfamiliar citizen-led behaviours in public spaces, 'caring equally for autonomous agency and the social

collectivity' (Stirling, 2015, p. 30). As one participant suggested, food waste transitions in Singapore might involve realising the democratic potential of citizens:

'We have a lot of [political] fencing around, finding some crack in the fencing to come up and hopefully nobody discovers, so we are testing. People are quite afraid, is this against the law what we are doing? [We] don't have confidence yet. I think we need to boost our confidence level higher' (FG, Participant)

Yet, the EOP analysis also reveals that unlike energy, participation in food waste transitions is deeply embodied. It involves a sensory and affective dimension, which in turn creates a range of new desires and visions able to inject a sense of public urgency and action into the issue of food waste. Such intimate relationalities allow the macro-social analysis of participation in transitions (Gille, 2010), and demonstrate embodied experiences of the ethnographic encounter, from which data was generated. Food was followed from waste bins, food stalls and storage rooms to households and charities, highlighting issues of access to food waste streams, infrastructures of food sharing, and care practices of redistributing waste, as well as organizational realities, individual preferences, and felt bodily experiences. The research also shows how the use of ICT signals the changing nature of participation in public matters in Singapore. It allows citizens to self-regulate their engagement in collective actions in a way that overcomes longstanding restrictions on civic associational life (Sadoway, 2013).

5.8 Conclusions

This Chapter provides a novel view on the nature, structuring and practice of participation in surplus food redistribution as a means to reduce food waste in Singapore. The EOP approach has made possible the identification of diverse food waste reduction practices, from policy programs and infrastructures of waste management, to informal food rescue activities that are gathering pace in Singapore. Furthermore, the use of an ethnographic lens has shed light on the heterogeneity of food waste management in Singapore and allowed greater exploration of the EOP components through the integration of culture-specific motivations, material and organisational realities and visceral experiences.

Our analysis suggests that positive experiences of participating in surplus food redistribution can gently challenge the meanings, practices and hierarchies of dominant food waste imaginaries by increasing citizens' engagement in co-creating alternative visions and practices to technocratic solutions. There is, however, a clear need to explore the impact of participation in surplus food redistribution initiatives on citizens' sense of agency and empowerment over longer timescales. Longitudinal research following the fortunes of the case studies and the forms of participation they foster would provide a richer picture of participation in the making. There are also outstanding questions about whether there are significant differences between participation dynamics in different sectors undergoing sustainability transitions. Finally, more attention to cultural dynamics - which result from local histories, community relations, shared imaginaries and care practices that influence the way actor's collectives shape future visions and actions - is needed to enrich our understanding of sustainability transitions globally.

CHAPTER SIX

Socio-technical imaginaries and sustainable food transitions in Singapore: Nature, community, and technology

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6.1 Introduction

Singapore was founded as a trading post by the British East India Company in 1819. After British colonial rule (1918-1942) and Japanese occupation and post war period (1942-1962) Singapore joined the Federation of Malaysia in 1963 to become an independent country two years later. After declaring independence, Singapore's foremost goals have focused sharply on rapid economic development and the establishment of a strong national identity. These goals can be seen as socio-technical imaginaries, defined as 'collectively held and performed visions of desirable futures ... animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology' (Jasanoff, 2015, p. 19). Essentially, they are visions of what a good life is and how to achieve it (Jasanoff, 2015). Since independence, the State has developed and implemented a suite of project visions, which seek to convey more nuanced futures for Singapore's human-non-human nature relations (e.g. City in a Garden), notions of community (e.g. Shared Values) and the role of technology (e.g. Intelligent Island). These nation-specific socio-technical imaginaries collectively envisage science and technology playing a dominant role in shaping sustainable food transitions in Singapore (Rut et al., 2020; Rut and Davies, 2018a). However, they are not the only ones circulating in Singapore. As this Chapter demonstrates, there are also emergent collective visions of sustainable food futures emanating from the grassroots, which are exemplified by food sharing initiatives. Examining these socio-technical imaginaries, this Chapter reflects on their respective characteristics, power geometries and pathways towards sustainable food, identifying points of intersection and divergence between State and grassroots visions. It considers the implications of these co-existing socio-technical imaginaries as productive and problematic, mapping a range of potential futures for the imaginaries themselves.

Socio-technical imaginaries are considered to be a powerful cultural resource that can affect visions and implementation of sustainability transitions (Longhurst and Chilvers, 2019). Indeed, sustainability transitions scholarship places importance on the emergence of socio-technical innovations in response to sustainability challenges, identifying imaginaries of sustainable futures such as low-carbon energy and electric cars (Geels, 2019). Such imaginaries however are often driven by dominant

technocentric approaches to resource management, such as efficiency-related technologies that sideline the contribution from civil society actors, and recognition of alternative practices and messy social realties (Corsini et al., 2019; Seyfang and Smith, 2007).

Furthermore, sustainability transitions approaches (e.g. Multiple Level Perspective, Strategic Niche Management) have been criticised for underplaying alternative visions of sustainable food futures, many of which originate from informal civil society settings such as groups and collectives (Rut and Davies, 2018b; Stirling, 2014; Smith, 2006). Research on participation in food waste transitions in Singapore has already established a case for greater consideration of civil actors to enrich and democratise these transitions (Rut et al., 2020), but there has been little consideration to date of co-existing socio-technical imaginaries. To address this gap, we draw on ethnographic research of food sharing initiatives in Singapore whose participants nurture imaginaries of sustainable food futures, leading to ‘spontaneous bottom-up ‘culturings’ of knowing and doing’ (Stirling, 2015, p. 1). Since socio-technical imaginaries are often considered to be primarily technological in nature (Miller, 2019; Jasanoff, 2015), we focus on ICT-mediated food sharing in which technology is primarily a facilitator rather than a driver of social interactions around food. In turn, this provides a means for citizens to carry out collective actions and connect diverse stakeholders in food systems in a pursuit of shared food futures. In this regard, we consider technology as a necessary form of organisation in food sharing initiatives that sustains emergent grassroots activities in Singapore (Bakardjieva and Feenberg, 2002).

The aim of this Chapter is to develop a better understanding of the ways that State-led socio-technical imaginaries have sought to shape food transitions in Singapore, and how this compares with those of grassroots actors involved in food sharing. We ask: (1) What are the dominant State-led socio-technical imaginaries and how have they influenced food systems in Singapore? (2) What are the characteristics of socio-technical imaginaries emerging from grassroots food sharers? (3) How do these co-existing socio-technical imaginaries compare? And more prospectively, (4) How might these co-existing socio-technical imaginaries evolve in the future? To develop our

responses to these questions, we first set out the conceptual framework, present methods and then discuss the State-led and grassroots socio-technical imaginaries, identifying common but differentiated themes across both related to i) human-non-human nature relations, ii) conceptions of community, and iii) the role of technology in society. The Chapter concludes with consideration of the lessons to be learnt from taking a socio-technical imaginaries approach and potential futures for increasing the sustainability of the food system in Singapore.

6.2 Socio-technical imaginaries, transitions and culture

Within the social sciences, imaginaries are co-produced by interested actors who seek to nurture a collective system of meanings in the making of social order (Groves, 2016). Imaginaries in this sense reside in the reservoir of norms, values, beliefs and culture that do not rest in individual minds, but are collective interpretations of a social reality which help actors build their policy preferences and shape political action (Eaton et al., 2014). More directly than imaginaries, socio-technical imaginaries are rooted in modernity and entangled with aspiration of control over socio-ecological worlds (Arora, 2019; Stirling, 2018). Although often driven from the top-down within countries, socio-technical imaginaries ‘are not limited to nation states (...) but can be articulated and propagated by other organized groups, such as corporations, social movements, and professional societies’ (Jasanoff, 2015, p. 5).

However, to date less attention has been given to the roles played by civil society actors and their shared perception of futures that should or should not be pursued. A few notable exceptions within sustainability transitions studies have applied the concept of socio-technical imaginaries to analyse national energy policy-making as part of a transition to lower carbon energy systems (Longhurst and Chilvers, 2019; Delina, 2018; Smith and Tidwell, 2016; Chatterton, 2016). These studies point to the underlying messiness of, and variation in, transitions imaginaries that emerge within civil society settings and a broader set of ethical concerns such as justice, power relations and access to resources (Longhurst and Chilvers, 2019). For example, Smith and Tidwell’s (2016) analysis of the energy-producing communities in the American West suggest that socio-technical imaginaries are bounded at local scales and matters are transformed in the

lived experience of publics. Similarly, Delina's (2017) comparison of dominant and resistant socio-technical imaginaries in the production of Thailand's energy future shows that alternative imaginaries permeating policy making can be key to democratising energy transitions.

Sovacool and Hess (2017, p. 719) suggest that viewing sustainability transitions through the lens of socio-technical imaginaries has an advantage of focusing on 'cultural meanings and the common narratives that vibrant societies often have about who they are, where they have come from, and where they are headed (...'). Culture shapes everyday practices and responses to complex societal challenges such as climate change (Hoffman, 2015). Transitions scholars see culture as a contested process, where competing niche and regime actors draw selectively on cultural resources such as stories, narratives and discourses with an aim of influencing transitions politics (Rosenbloom et al., 2016; Hermwille, 2016; Geels and Verhees, 2012). For example, energy transitions are narrated differently by industry actors (who frequently emphasize efficiency related technologies and behaviour change from the top down) compared with civil society actors (who often emphasize bottom up governance of energy and changing practices of everyday energy use). Adopting a socio-technical imaginaries approach gives visibility to diverse cultural resources such as stories and ways of imagining that can then widen democratic debates, broaden ethical concerns and support the development of collective identities (Rut et al., 2020; Jasanoff, 2015; Seyfang and Haxeltine, 2012). It provides a perspective that destabilizes dominant techno-scientific visions which can overshadow local visions, realities and roles played by civil society actors in transitions (Delina, 2017). As conceived by Jasanoff and Kim (2015), the socio-technical imaginaries approach requires consideration of how ethical, social, and political commitments are built in (or not) to trajectories of socio-technical development, thereby facilitating scrutiny of ethical questions - such as care - that have been largely overlooked in transitions research (Köhler et al., 2019).

In the section that follows we consider socio-technical imaginaries as configurations of policies, technologies and infrastructures, as well as practices, rules ways of knowing, doing, and organising (Longhurst and Chilvers, 2019). Our analysis aims to compare

socio-technical imaginaries that co-exist within the hierarchical, competitive and State dynamics and those co-produced with grassroots actors and intrinsically tied to the everyday experiences with food systems such as growing food together, eating and cooking and sharing food surplus. We discuss State-led socio-technical imaginaries that have emerged in Singapore in the process of the nation building and reflect in particular on their influence on shaping national needs and instrumental political priorities around food and sustainability. As we follow the ‘structured hardness of technological systems, policy styles, organizational behaviours, and political cultures’ that define socio-technical imaginaries we also uncover ‘subjective and psychological dimensions of agency’ in socio-technical imaginaries that open up possibilities of resistance and change and inspire ethical actions. Before this, the methods used to generate the empirical foundations of the Chapter are detailed (Jasanoff, 2015, p. 35).

6.3 Methods

This Chapter draws its insights from analysis of policy documents emanating from the State, literature review including news articles, interviews with policy makers and food sharers and a participatory ethnographic study conducted in multiple food sharing settings in Singapore (between 2017 and 2018).

According to Jasanoff (2015; pp. 5-6) socio-technical imaginaries include ‘the visions of single individuals, gaining traction through blatant exercises of power or sustained acts of coalition building...[and they] encode not only visions of what is attainable through science and technology, but also of how life ought, or ought not, to be lived’. Following this line of argument we include participants in food sharing initiatives as ‘carriers of practices’ (e.g. Shove and Pantzar, 2005; Reckwitz, 2002) whose imaginaries gain traction through collective moments and actions that emerge from everyday experiences with food as they participate in shared activities. The food sharing initiatives involved in the research are outlined in Table 6.1.

Table 6.1 Food sharing initiatives case studies.

Initiative identifier¹⁹	Organisation	Activities	Goals²⁰
SE	Social Enterprise	Sharing land for food growing Sharing skills and knowledge	Grow your own food Reconnect with nature Conserve natural resources Cultivate a sense of community
FC	Collective (Informal)	Growing together Eating together Sharing food knowledge	Bring individuals and communities together through gardening, eating together and sharing food related skills, knowledge, and spaces
FB	Charity	Corporate social responsibility Food poverty relief programmes	Provide food to vulnerable communities Reduce food wastage
FG	Group (Informal)	Saving food from waste Sharing surplus food Eating together	Prevent edible food from going into the landfill by rescuing and redistributing it to people who can use it

¹⁹ Anonymised identifier used throughout the Chapter.

²⁰ These goals were identified through the analysis of the fieldwork data and mission statements found on the websites of the food sharing initiatives.

FA	Business (Mobile Application)	Eating together Sharing meals and food products	Share home cooked food Share traditional recipes Reduce food wastage
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As comparison is one of the methods for drawing out distinctions in socio-technical imaginaries (Jasanoff, 2015) this Chapter compares socio-technical imaginaries at the State and grassroots level. Although food is not the central element in the State-led socio-technical imaginaries discussed in the Chapter, the projects that define them have become powerful visions in the resistance to State-led articulations of sustainable urban food futures.

Fifty qualitative interviews were conducted and five months of participant observation with the food sharing initiatives in Singapore was undertaken. The interviews covered questions about the history, organization, motivations, activities, regulations, the role of ICT and the sustainability potential of food sharing. The participant observation took place both online and in physical locations around Singapore. Online engagements included chatting with participants, ordering food, commenting on photographs, and providing feedback from food sharing events. Volunteering at urban farms, community gardens and food rescue events, as well as participating in shared dinners, potlucks and collective cooking activities in private homes comprised the face-to-face interactions.

The fieldwork material was coded using Nvivo software. A number of codes were first identified to track three State-led socio-technical imaginaries which influence their approach to the food system in Singapore such as the City in a Garden, Intelligent Island, and kampong spirit. A set of three high level codes emerged in this analysis: human-non-human relations; conceptions of community and technology which were then examined in relation to the food sharing initiatives' goals, motivations and visions of participants in food sharing initiatives and shared activities that were performed at different locations in Singapore (e.g. gardens, farms, eating spaces, homes, charities). Keeping in mind Jasanoff (2015) call to be attentive to the meanings and symbols in the construction of socio-technical imaginaries, we drawn attention to cultural meanings in

the fieldwork data such as kampongs as a shared symbolic resource in the formation of food sharing practices in Singapore.

Our goal in this Chapter to focus on participants in food sharing initiatives (e.g. founders, employees, volunteers, collaborators and casual observers) and their affective and material elements was intentional to demonstrate that grassroots socio-technical imaginaries in Singapore are relational and thrive in contexts of social engagement. Presenting diverse voices in food sharing, we wanted to highlight the distributed nature of socio-technical imaginaries and the potential of technology in driving emerging food grassroots culture in Singapore where ‘individual activities may coalesce into movements...assert desirable social futures and demonstrate material possibility of such futures (...)’ (Moon, 2015: p. 174 in Jasanoff, 2015).

All data from the fieldwork has been anonymised and is identified by an identifier allocated to each participant to ensure confidentiality. The identifier details the abbreviation of the initiatives’ assigned name and the type of interviewee (e.g. Participant, Employee, Founder, and Policy) (Table 6.1). The quotes from the fieldwork are used to illustrate the articulations of the socio-technical imaginaries and the processes and voices that inform them in Singapore.

6.4 Socio-technical imaginaries in Singapore

Socio-technical imaginaries draw attention to the way State actors legitimize science and technology investments through ‘mingling policy action with collective visions of a better future made possible through technoscience’ (Eaton et al., 2015, p. 227). After independence, Singapore’s national goals have been rapid economic development, to catch up with economically more advanced nations through the State’s investments in ICT (Vu, 2013). State actors sought science and technology as key tools to address their contingent conditions such as limited access to natural resources, a multicultural society and a desire for economic stability, but also to create an outward-facing impression of urban smartness (Cugurullo, 2018). In the process of imagining the nation, the visions of the good life and ideal social order have been subordinated to the goals of economic

growth and development of strong national identity as exemplified by socio-technical imaginaries such as the City in a Garden, Shared Values and Intelligent Island.

Overlaying these socio-technical imaginaries, and in response to the social and environmental issues that have emerged in the last decade, such as an underdeveloped civil society and natural resource degradation (Leong, 2000; Han, 2017), both the State and citizens have begun to remobilise historical and cultural meanings with the structures and practices of past communities in Singapore, called kampongs²¹. In Singapore, kampongs is the term used to describe fishing and farming villages, and the culturally diverse communities sharing the same living spaces in pre-industrial Singapore. This marks a reversal in State narratives for example as in the early phase of the nation building²² (1965-1980) where kampongs were described as ‘congested squatter settlements’ in which ‘almost a quarter of a million people lived in dilapidated slum conditions, crammed six to a room, with many more residing in squatter colonies along the city fringes’ (PSD, 2019, pp.1-2). Kampongs were seen as the antithesis of modernity and a barrier to achieving the State socio-technical imaginaries. While they continued to exist in Singapore until 2007²³, they were eventually erased, both physically as well as socially, leading to the disintegration of the vernacular cultures

²¹ Both the State and citizens use kampong or kampung interchangeably and sometimes kampong is capitalised but there is no rule. So for clarity, we use a consistent lower case spelling throughout the Chapter.

²² Most of the research on nation building in Singapore distinguishes between two phases: the first phase starts after independence in 1965 when a top priority of the government was economic development, and the second phase starts from the late 1980s onwards to promote sense of national identity (Ortmann, 2009).

²³ Kampung Lorong Buangkok was the last traditional village removed from the Singapore's mainland in 2017 (Thean, 2018).

and the attendant practices and relations to nature, food and communities they fostered (Wee, 2007).

Since 2010, the term kampong spirit began to reappear in policy discussions in which importance of social ties and place-based belonging for community well-being was recognised. In this sense, kampong spirit²⁴ evokes a sense of cohesion and care for others and communal ways of living among racially diverse communities (Brownlee, 2018; Chua, 1996). Also, in recent years (2012-2020), citizens have begun to feel more empowered to imagine and articulate a ‘desired future for the nation’ (Fong and Koo 2014, p.2) as exemplified in public hearings such as Our Singapore Conversations (Ong, 2015). Within these conversations practices such as growing food together, foraging, sharing leftover food and eating with neighbours, and sharing time, knowledge and skills with strangers - all practices with cultural associations to kampong spirit - became central to democratic food transitions (Rut et al., 2020). By accepting and even utilising the concept of kampongs themselves, the State has most likely sought to soften the effects of rapid modernization in relation to nature, community and technology as embodied in the socio-technological imaginaries examined below. In the sub-sections that follow, we discuss the three State-led socio-technical imaginaries made of rich layers of project visions and allied actions that shape food futures in Singapore.

City in a Garden

In 1963 Singapore’s Prime Minister Lee Kuan Yew planted a mempat tree, in a symbolic act to achieve First World standards. He wrote in his memoires: ‘after independence, I searched for some dramatic way to distinguish ourselves from other Third World countries. I settled for a clean and green Singapore’ (Lee Kuan Yew in Nielsen, 2017, p.

²⁴ Also appears as kampung spirit or Kampong Spirit and variations of these.

296). Since then, the goal of a ‘cleaner and greener future’ has been enacted through the socio-technical imaginary of a City in a Garden and environmental policies such as Clean Air Act (1971), Singapore Green Plan Action (1993), Sustainable Singapore Blueprint (2015) and the Zero Waste Masterplan (2019). These policies have variously prioritised science and technological fixes to resolve negative environmental externalities such as pollution and waste (Han, 2017; Goh, 2001). The socio-technical imaginary of the City in a Garden was created by State actors, architects, and landscape engineers whose project visions supported by media outlets presented a narrative of a resource scarce City-State that can only overcome sustainability challenges through means of ecological modernisation (Bernard and Heng, 2014). Various socio-technical projects, such as sky rise greening and cultural artefacts including recreational parks and greenways have sought to nurture nationalistic ideals of Singapore’s ‘good life’, a sense of pride, and a feeling of liveability while simultaneously articulating some of the key strategies around human-non-human nature and society-food relations.

However, the socio-technical imaginary of the City in a Garden has also been realised through master projects such as Gardens by the Bay, that have been sharply criticized by environmentalist groups, because they propose using nature as a developmental resource to attract foreign investments while ignoring biodiversity and citizens relations to bio-cultural heritage (Neo, 2007). Furthermore, food security policies such as the Food Security Roadmap (2013) that aims to diversify food supply by setting up overseas farming facilities, and the ‘30 by 30’ (2019) policy plan aimed to increase self-sufficiency in food production by 30% by 2030 are all focused on smart technologies. This emphasises Singapore’s aspiration to be a leading player in the new farming paradigm which is science and technology based (Montesclaros, Babu and Teng, 2019). With the State-authored vision that the future of food production should rely on technology and science, grassroots actors find themselves in a weak position to compete with agro-technology companies for access to land and financial support (Rut and Davies, 2018b).

However, in an interview with a policy maker it was revealed that citizens recognize the desire and need to grow their own food in Singapore:

'Government is much [more] interested in industrialised technologically intensive food production...the narrative says it [makes] no sense to have an agricultural land in Singapore. But maybe people should feel encouraged to grow food because there is ... space to do it. [In] national spaces there is much greenery [but] none of it is edible, there is no food forest anywhere' (Policy)

While the State has made moves to encourage citizens to reconnect to nature and food growing, actions have been boxed into a narrow range of community gardening activities that are centred on the pursuit of racial harmony (Tan and Neo, 2009). For example, the Community in Bloom project, which was established in 2005 as a State-led nationwide nature movement with the goal to ‘rekindle a bit of the old kampung spirit’ (Seow, 2014:1), has been criticized by academics and practitioners alike for reducing food related activities to recreational gardening as opposed to enhancing food resilience in neighbourhoods and communities (Tan and Neo, 2009).

Shared Values

The State’s nation building process was grounded in a belief that the ‘sense of belonging and feeling of togetherness (‘oneness’) will not develop naturally in a heterogeneous society’ (Wah, 1992, p. 17). In addition, it was the State’s view that advancing techno-political agendas could only be achieved by limiting citizen’s participation in policy making, given the socially and culturally diverse urban fabric of Singapore (Leong, 2000). This led to various forms of socio-cultural engineering in which State actors focused on development of a cohesive multicultural society. For example, the State has drew on historical cultural meanings associated with kampong spirit such as neighbourliness and generosity towards strangers to reinforce community belonging, racial harmony, shared moral values and communal cultural identification within neighbourhoods (Bahrawi, 2019). This was translated into the material and

organisational fabric of new State developments, such as the design of HDB²⁵ housing with kampong-like communal spaces such as void decks (empty spaces at the ground floors of HDB blocks) and community centres and a requirement for residence committees to encourage bonding between different ethnic groups that reside together. Furthermore, the implementation of ethnic quota policies²⁶ in populating housing developments has perpetuated a State-backed notion that cultural cohesion in diversity can be planned and efficiently managed.

To promote a strong sense of a community, a number of State-led community visions have been articulated, namely ‘Our Shared Values’ (1991), the ‘Singapore Family Values’ (1995), the ‘Singapore 21 Vision’ (1999), and ‘Our Singapore Conversations’ (2012). These have been designed by the State to develop a stronger sense of communitarianism, in which citizens are encouraged to abandon individualistic spheres of action, ideas and concerns to fulfil national needs such as support for vulnerable urban communities. In particular, the notion of having ‘Shared Values’²⁷ has been instrumental in promoting an image of a caring community that ‘looks out for each other...’ (National Integration Council, 2019:1). Furthermore, the establishment of community services in Singapore has continuously been influenced by the State belief in ‘many helping hands’ with a goal to facilitate the nation-building by encouraging

²⁵ The Housing & Development Board is the statutory board of the Ministry of National Development responsible for public housing in Singapore. HDB is also used in a reference to housing infrastructures.

²⁶ To ensure a better racial mix in HDB estates, the government established ethnic quotas for HDB neighbourhoods and blocks. The permissible proportion of flats in each neighbourhood for Malays was 22 percent while the permissible proportion of flats in each block was 25 percent. For Chinese, the permissible proportions were 84 percent and 87 percent respectively, and for Indians and other minority groups, the figures were reduced to 10 percent and 13 percent respectively (Wong, 2013).

²⁷ Nation before community and society before self; Community support and respect for the individual; the family as the basic unit of society; Consensus in place of conflict; and Racial and religious harmony.

citizens and their respective ethnic communities ‘to solve [the] problems of the poor but also to strengthen [a] sense of togetherness, cohesion and self-reliance within society’ (Parliament, 1991, p.7).

While the meaning of ‘many helping hands’ emerged in a top down manner as a community self-help framework to address structural challenges such as food insecurity and poverty in Singapore, it became in time a form of technological and bureaucratic care provision. Food poverty relief initiatives and the provision of social aid via corporate social responsibility events in which multinational corporations donate, often unhealthy, food surplus to vulnerable communities emerged (Rut et al., 2020) leading to concerns that social issues are seen by the State as simply matters of charity instead of a central component of their responsibilities to citizens. As mentioned in an interview:

‘We are too institutionalised in Singapore... [Community] actions are lost because our neighbourliness is lost.... [people are] prejudiced against the low-income...To break this barrier you would have to take time to get to know people ...we have big fundraising campaigns on TV and they raise millions...But to share with a neighbour, to make people go a bit out their way to walk and talk and do something interactive...we don’t do it... [we need a] mind-set shift on how to bring back the kampong spirit’ (FB, Participant)

This suggests that the State-led vision of community has tended to gloss over the messy realities of social life by overlooking matters of concern such as changing needs of citizens of which justice and autonomy are crucial yet neglected in the Shared Values socio-technical imaginary.

Intelligent Island

In the early years of independence, the State made a decision to shift the focus of developmental policies from raw material processing industries towards the information economy (Mahizhnan, 1999). By the 1990s this refocusing incorporated a more advanced rhetoric in relation to the need to develop an information society. This decision to position Singapore as an international telecommunication node next to

Japan, Taiwan and Hong Kong was closely connected with the State's desire for establishing a higher standard of living that would involve integrating ICT in everyday aspects of public life. As outlined in 'A Vision of an Intelligent Island: IT2000 Report (National Computer Board, 1992, p. 2) this position sought to make Singapore an 'Intelligent Island ... among the first countries in the world with an advanced nation-wide information infrastructure. It will interconnect computers in virtually every home, office, school, and factory'.

The project vision of an Intelligent Island has evolved in the 21st Century with various policy projects extending the State-led socio-technical imaginary with monikers of connected and smart technologies as embodied in 'Connected Singapore' (2006), Smart Nation (2014), and Intelligent Nation (iN2015). All of which have focused on promoting technological progress as the main engine for economic growth and sustainable development. The application of science and technology to development agendas was critical for Singapore in achieving the initial stages of modernisation already experienced by the other advanced capitalist nations in the region (Lim, 2002). This strategy worked as within 15 years of independence Singapore was recognised in the global economic market as one of the fastest developing economies in Southeast Asia. The State sought to induce a positive 'attitudinal change' among citizens (National IT Working Committee, 1985, p. 48) towards technology with regard to acquiring ICT skills, upgrading job qualifications and making technology a personal responsibility in terms of national survival and social responsibility (Lim, 2002). Furthermore, the national broadband network, Wireless@SG was established to enhance digital habits in citizens such as online shopping and entertainment that would exhilarate State-led transition into a global city, 'universally recognised as an enviable synthesis of technology, infrastructure, enterprise and manpower' (IDA, 2007, p. 1).

To ease technological transitions and enhance productivity through new models of citizenship 'centred on creativity, flexibility and entrepreneurship' and not purely nostalgia for kampong time that has passed (Gonzaga, 2019, p. 153) the State has also explored digital possibilities for kampong spirit 2.0 (Heng, 2017). For example by encouraging corporate giving through digital campaigns such as SG Cares movement or

financing technocratic housing developmental projects that such as ‘New Urban Kampungs’ aims to measure psychosocial factors ‘whether residents are cohesive, or feel a sense of belonging to their neighbourhood’ that might help guide future State-led design and planning strategies (Today, 2020, p. 1).

Still, many citizens in Singapore remain sceptical towards tightly-disciplined technical expertise and technology-based innovations as solutions to sustainability problems. As mentioned in one interview:

[I don't think technology is a solution] we are petroleum nation, we are linked to deforestation, to illegal sand trade and wildlife trade... [with] 90 % [of] food imported, waste is the major issue. We do need a lot more people to be engaged, to pay attention, the social and environmental problems accumulated to a level that there is no one solution but many solutions. We should take this time to build a community and really strengthen interpersonal relations because when things will crash there will be everyman for himself (FC, Participant)

In contrast with the acknowledged plurality of food sustainability challenges in Singapore (Rut et al., 2020; Rut and Davies, 2018a), State-led socio-technical imaginaries have reduced the complexity of food related issues to socio-economic developmental goals in support of strategic and commercial needs of the country. The State policies supporting City in a Garden, Shared Values and Intelligent Island socio-technical imaginaries have further structured and simplified collective ideas and actions, particularly those with regard to nature, community and technology excluding plurality of perspectives that concern non-human nature, and the use of ICT to involve citizens in policy-making processes. Furthermore, the national prescription to subordinate individual desires to the State needs (e.g. communitarianism and multiculturalism) and the depoliticisation of wider social issues produced by the omnipresence of techno-corporate environments in the lives of citizens have curbed individual freedoms and ability to imagine, create, and empower social agency. While the State’s use of kampong spirit might resonate in part with broader understandings of sustainable communities and food systems, there are tensions between the State and civil society actors about the co-option of grassroots initiatives by technocratic elites,

preventing emergent forms of participation and activism from flourishing (Rut et al., 2020).

In the next section, we explore participants' experiences and visions around food, and as enacted through their practices of food sharing, examining their socio-technical imaginaries in this space with respect to human-non-human nature relations, conceptions of community and the role of technology.

6.5 Grassroots socio-technical imaginaries of sustainable food

Food sharing initiatives in Singapore such as urban farms and gardens, food rescue groups, knowledge sharing networks and communal eating have goals of enhancing a sense of community, connection to nature and targeting changes in everyday practices around food such as growing, eating and saving food from waste (Rut et al., 2020; Rut and Davies, 2018). The backgrounds of the participants in food sharing vary: some stem from the corporate sector but left their jobs in a pursuit of simpler lifestyles while others are civil servants, academics, students, self-employed, freelancers, and the semi-retired. The age of participants ranges from 17 to 60 years and are mostly middle-class Singaporean nationals. Increasingly more, participants in food sharing bring to the fore the ethical concerns (e.g. care for nature and community) that have been overlooked in the State-led socio-technical imaginaries. The goal of this section is to emphasize these concerns and discuss the characteristics of socio-technical imaginaries emerging from grassroots food sharers.

Human-non-human nature imaginaries amongst food sharing participants

A common theme during fieldwork with food sharing initiatives was the importance of food for connecting people to non-human nature through growing cycles and processes of fertilisation and decomposition inherent to the food system. When discussing with participants their relationship with nature explicitly, many felt estranged from the existing physical manifestations of the City in a Garden socio-technical imaginary '*that always look proper, neat and clean*' (*FC, Participant*). It was felt that the enactment of this imaginary characterised the State's desire to control nature, and this in contrast to the

wild landscapes of historical kampongs and the relative freedom of citizens to forage for food in those spaces in the past. As one participant mentioned:

'My granddad would come back randomly with massive soursop and a bag of bananas and mangos...he foraged it... because [in kampongs] there were fruit trees, and if you go into the forest you would find stuff. It is illegal to do it nowadays' (FC, Participant)

Grassroots imaginaries articulated by food sharers recall practices in vernacular kampongs which involved agriculture and animal husbandry. In many interviews, when asked about their motivations, participants would fondly recall the earthiness of kampung communities expressed through a shared desire and necessity for '*producing one's own food*' (FC and SE, Fieldwork notes), '*rearing chickens*' (FC and SE, Fieldwork notes), which are projected onto a further imaginary of '*going back to basics*' and getting '*back in touch with nature*' (FC and SE, Fieldwork notes). As one participant described it:

'[We want to] create an ecosystem at the community level [of] what used to be in Singapore 60 years ago before it got developed into the first world country...we call it kampongs where all the races held together, walk into each other houses and share community atmosphere' (SE, Employee)

In a longing for simpler and more authentic communal ways of living, the grassroots imaginaries encountered in the research and amongst food sharers contrast with the narrow conception by the State of food security and the fixation with highly technical urban agriculture focused on '*raising productivity no matter the method of food production*' (SE, Employee). Many participants distanced themselves from technologies being promoted by the State, such as climate controlled farming (Montesclaros, Babu, and Teng, 2019), calling for an approach which instead lets '*nature take its course*' (SE, Fieldwork notes). As described in the fieldwork notes which recorded interactions with an urban farmer:

'...we are land scarce but it doesn't mean we have to treat nature as something foreign to us, something that serves rather than is a part of us...we use technology to control plants rather than taking care of them and nourish them' (SE, Fieldwork notes)

It is due to such concerns that small parcels of public and private land, and vacant spaces such as rooftops, were able to be converted into permaculture gardens and food forests. It was argued by participants that by attending to the needs of nature they become caring of neglected ecological worlds (Puig de la Bellacasa, 2015). As observed during the fieldwork, most of the shared food growing sites examined in the research have developed composting practices and facilities for biodegradable waste to improve soil health. As one participant mentioned:

'Whenever we prune something, we straight away put it under and around plants and we put things on top of soil and it will eventually break down into compost, it is protecting the soil, it provides fertility to plants, it keeps soil moist and it helps all forms life in there' (SE, Fieldwork notes)

With growing concern amongst food sharers over soil erosion due to industrial land use, participants further opposed the soil-less food growing methods promoted and supported by the City in a Garden that ignores indigenous varieties of food plants and natural farming techniques which however are an important element of natural heritage in Singapore. For example, during the events organised by Collective and Social Enterprise participants are exposed to new practices such as seed saving as they learn how to grow food from seeds they shared. The outcome is cross-pollination of relations, stories and food growing knowledge from which new collaborations are formed across the initiatives. As mentioned in an interview:

'[The] first thing that we did [when we started the collective] was saving seeds... we opened a seed bank. We were giving away seeds to people at the markets. But we didn't want to just give seeds we wanted people to see the value in seeds. So we started sharing plant cuttings. And [some people] opened their houses [and invited us to host workshops and community events]' (FC, Co-Founder)

While taking care of soil and preserving seeds, participants rejected aspirations to overtly control nature in the way that dominates the State-led socio-technical imaginaries. They recognised nature as living matter with a web of interrelationships and independencies. These affective dispositions such as care for non-human nature

as a matter of ordinary experience involved a concern for natural resources and habitat and a desire to increase citizen's engagement with biodiversity and its maintenance. As described in an interview:

'Before we built this garden it was an empty piece of land...now you take a look at the dragonflies...there's bees, there's birds, there's earthworms, there's millipedes. There's just a lot of wildlife that's going on. We are constantly building soil. We are conserving water that is cooling this place... it's just quite soothing in terms of how therapeutic it can be. You hear different sounds of wildlife. You can hear birds chirping, sounds of the leaves rustling' (SE, Employee)

The feeling of contemplating nature, described above, has led some participants to reclaim local knowledge of indigenous plants, many of which are now under threat of extinction due to the loss and fragmentation of natural habitat, by learning about their cultural meanings and medicinal value. Participants felt that preserving knowledge of indigenous plants and their cultural uses that used to be '*traditionally passed down through generations*' should be part of the City in a Garden socio-technical imaginary, as many believed that gardens in Singapore should include '*medicinal plants, not just food and flowers*' (SE, Employee).

An example includes a participant who collaborated with an 89 years old gardener to establish a website of herbal remedies and indigenous plants of different cultural communities (Malaya, Indian, and Chinese). She said in an interview about the experience:

'Over a year, I collected over 40 recipes and put [Uncle Tan's] knowledge on the website ... nowadays when I forage I can recognise medicinal plants and because of this I started making herbal teas for others' (FC, Participant)

This grassroots imaginary, focusing on human-non-human relations sees the practices of shared food growing as not just desirable, but a matter of national survival in terms of maintaining cultural and natural heritage. Through experiencing nature-culture relations around food directly, participants in food sharing mobilise and transform their

imaginings and livelihoods, connecting to local heritage in ways which go beyond the narrow focus on cleanliness, orderliness, and efficiency found in the State-led socio-technical imaginary of the City in a Garden (Chua, 2011).

Community imaginaries in grassroots food sharing participants

Improved social relations and community well-being were identified by the participants in food sharing initiatives as key elements of a desired future for Singapore. During fieldwork, participants recalled vernacular kampong communities and their communal gestures in relation to their activities around food sharing. Activities such as '*giving things away and not asking for anything in return*' (FC, SE, FA, *Fieldwork notes*), '*sharing resources and minds together to help a neighbour*' (SE, *Participant*) and '*knowing everybody's names*' (FC, SE, FA, *Fieldwork notes*) were articulated as a means to enhance a feeling of community and foster affective ties between culturally diverse participants.

However, while some participants referenced kampong spirit, which forms part of the State-led imaginary espoused in the Shared Values, as a motivational stimulus '*to keep the spirit of giving*' (FC, *Fieldwork notes*), the majority was cautious of an overly engineered approach to community building, sharing a belief that '*community [needs] to come together...through their own initiatives*' (FC, *Fieldwork notes*). As mentioned in an interview:

'... kampongs were destroyed [and] trying to restore the spirit without kampongs is hopeful but difficult, because when everyone is living in square boxes...the [values embedded in kampongs such as openness to strangers are neglected] ...kampong spirit takes time and energy ... when people want to live in an industrial society [such as Singapore] they cannot [adhere to the values of a village society as articulated in the kampong spirit]' (FG, Participant)

The statement above suggests that participants felt disconnected from the State conceptions of racial harmony, suggesting that people in Singapore are culturally and

socially disconnected because of controls that prevent citizens from forging relations naturally. As one participant stated:

'We don't study in depth our social system because this is a controlled environment and we are told about good things and not allowed to talk about bad things. We don't know about each other's cultures and races...racial harmony is a blanket that we use to keep everything in peace' (SE, Participant)

Furthermore, participants interviewed during the fieldwork felt that the State-led vision of cohesive communities living harmoniously and sharing resources, clashes with the goals of modernisation. In fact, participants still felt that the State's goals to transition Singapore from a tropical backwater with no natural resources to one of the world's wealthiest economies (Yew, 2012), was a process in which social relations and community autonomies were marginalised as people '*stop[ped] focusing on what they want to do but how to be better than [others]*' (SE, Participant). One participant said:

'I think we are traumatized [because of the] industrial progress narrative that Singapore has... when you look at the history of Singapore the whole desire for industrialization is attached to the idea that we used to be backward in the past. And so, we have to progress and develop in the future ... it is very hard to cure trauma...people don't get over it because we think we are not traumatized...' (FG, Participant)

It is well known that in the predominantly Chinese culture of Singapore, there is a certain vulnerability amongst them when asking for support (either emotional or substance) and asking for it is often viewed negatively, as a sign of losing face (Hwang, 2006). However, observations made during the fieldwork suggested that among participants in food sharing there was a shared desire for greater spiritual connections for restoring a healthy community, and renewing a caring culture that is awakened through ordinary interactions (Puig de la Bellacasa, 2015). Often, recalling kampong nostalgia for a past characterised by ethos of co-existence, participants in food sharing initiatives consider care as a vital necessity to maintain 'sustainable and flourishing relationships, not merely survivalists or instrumental ones' (Puig de la Bellacasa, 2012, p. 198) and through which new community imaginaries take shape that otherwise would

be ‘discounted, or crushed, by the productionist ethos’ (Puig de la Bellacasa, 2015, p. 708). For example, by sharing intimacies about mental health problems while engaging in food sharing, experiences which are typically unusual topics of conversation in Singapore, could be addressed and collectively approached. Essentially, acting as recuperative practices from the ‘*stress of urban life*’ (FC, Participant). As one participant mentioned:

[we care] how to be kind to one another and patient with one another...to support autonomy to do what you love and not feel that...no one cares about it because everyone cares about efficiency and [material] stuff (FC, Participant)

Processes of individual and collective journeys of self-healing were activated through food sharing, which gave participants’ the space and ability to vocalize their feelings, often for the first time, and without embarrassment. Participants also become motivated to engage in spontaneous activities to tackle the issues of social disadvantage facing vulnerable communities such as food poverty. For example, when participating in ad-hoc community actions such as rescuing surplus food from wholesale markets and stocking community fridges in government housing facilities for low income communities (Rut et al., 2020), participants shift their engagement from tactical interventions such as pitching ideas, executing tasks, and measuring social impacts, to a slow community change in restoring connection to others that raise awareness and encourage reflexivity. This was captured in one interview:

‘Applying for welfare [in Singapore] is a real red tape. People might not get it easily, and there are some pockets of people who are forgotten...they fall between the cracks... there are too many people comfortably sitting up there who don’t care about small problems, but the small problems will snowball culturally. And food problems, everybody needs to eat. So, we want to continually collaborate...’ (FG, Participant)

Focusing on slow community change also helps participants to overcome ‘*space and time constrains*’ (FC, Co-Founder) and provide routes out of corporate charity programs as they self-organise and emerge on their own in a bottom-up manner. For example, food sharing initiatives such as the Group have emerged to address the issue

of food justice by highlighting spontaneous food redistribution interventions and empowering self-organised networks of individuals to fight food waste and poverty in Singapore (Rut et al., 2020). Such self-organisation of communities challenges the corporate orientation and neoliberal underpinnings of the State interventions, within the many helping hands belief, and the uneven power relations between donors and beneficiaries that such activities embody. There are many examples of situations in which participants have mobilised citizens and resources to participate in grassroots environmental and social actions in support of food redistribution to vulnerable communities. As described in one interview:

[The café] was closed on Monday, so we used the kitchen and people came and help...aunties were in charge of cooking and volunteers washed vegetables. When the café closed down we had to find a kitchen...a friend had an access to a co-working space...there was a kitchen and a pantry so we run the soup project in there...then we found a vegetarian restaurant ...and the owners let us use their kitchen. We cook there bee hoon noodles in the afternoons so we can distribute 320 meals a week to old folks who live in the rental blocks ...it has been 8 years now' (FC, Participant).

As the interview suggests, it is often a form of organisational spontaneity and '*accidental kind of community*' (SE, Participant), which is inherent to many food sharing initiatives operating informally in Singapore and the one that enables a new imaginary of a community to emerge. The grassroots imaginary discussed in this section enhances 'concern, worry and taking responsibility for others' well-being' as participants caring modalities resist hierarchical relations set out by the Shared Values socio-technical imaginary and reinstates values of human wellbeing as matters of care and justice rather than of charity (Arora, 2019; Puig de la Bellacasa, 2017).

Technology in grassroots socio-technical imaginaries

For food sharing initiatives, their engagement with and use of ICT plays a key role in widening the State-led socio-technical imaginary of the Intelligent Island to become more inclusive of diverse actors, such as home-chefs, food growers and rescuers, and composters, who currently remain invisible to policy-makers. As observed during the

fieldwork, the ICT platforms and tools that food sharing initiatives have been using on a daily basis (e.g. mobile phones, applications and social media) act as connective space through which individual and collective imaginaries can be shared, and understood as not only possible, but making it feasible to '*create a social and cultural awareness*' (*SE, Fieldwork notes*) of food sustainability issues in Singapore.

Despite the pervasiveness of conversations surrounding the topic of food in Singapore, participants in food sharing felt that diverse cultural food ways (e.g. recipe sharing, commensality, and culinary diversity) at the heart of Singapore's multicultural identity are being disrupted by commercialisation of food systems. In this regard, food in Singapore is often perceived by locals as a form of a living culture, whose longevity is furthered by performative aspect of sharing that involves continues mixing of cultures, people and places (Henderson, 2014).

In particular, an increasing concern over commercial food preparation in hawker centres has brought different participants together through ICT mediated food sharing, such as home stay mothers, retired citizens and food entrepreneurs to cook at home and share food with strangers. This is taking place as a counter movement to the increasing homogenisation of food cultures in Singapore. It also acts as a means to preserve culinary traditions and biodiversity in food; an imaginary that involves practical doings such as growing native plants food and cooking, as well as symbolic mobilisation that has its roots in the food sharing culture that existed in kampongs. As mentioned in one interview:

'When I joined the food sharing platform this for me was like a revival of the kampong spirit... The whole tradition of how things are made and taste, who is cooking what, and how passionate people are about food. Sometimes [I would find out who is cooking just a] few blocks away. This is the way to bridge people together' (FA, Participant)

For several participants, ICT was fundamental in '*realising a dream of becoming a [food] entrepreneur*' (FA, Participant); a desirable future shared by many young people in Singapore which is hardly achievable because of the State focus on automation in food services (e.g. vending machines, ready meals), stringent food safety regulation, as

well as high rental costs. Participants in food sharing initiatives reported having started small-scale, non-high-tech entrepreneurial activities, such as baking vegan breads, preparing protein cakes, catering home-cooked food, because of the online support they received from food sharing communities. As one participant mentioned in an interview:

'ICT mediated food sharing communities are very encouraging...they will share with you where to find ingredients or materials for packaging... when you post a question you would get a reply within a few hours...I feel again it comes back to community spirit ...' (FA, Participant)

While ICT mediated food sharing blurs the boundaries between strangers and neighbours, friends and customers, traditions and innovations, online-offline interactions encourage participants to share knowledge of locally grown ingredients, cooking techniques and healthy diets. There were many examples of cultural learning that emerged from online exchanges and mixing of culturally different participants interested in food and sustainability, as illustrated below:

'I realised that communities were using different plants parts; Indians use lemon grass to make decoration, but it is the steam that is used by the Thai for the curry paste. And I didn't know that chekkurmanis is edible until my Filipino helper told me...if somebody shares with you a traditional recipe you can work it around, make it more contemporary and sharp the texture as you want' (FC, Participant)

Participants also felt that ICT enables '*bartering culture amongst strangers*' (SE, Participant). For example, participants in food sharing have used ICT to connect with others interested in sharing kitchen spaces, gardening plots, plant cuttings, seeds, and compost. These various bartering engagements allow informal economic practices to foster community collaborations and potentially social innovations (Smith, 2017). A few examples noted during the fieldwork include collaborative mapping sites which are used to exchange and source localised information and resources such as public spaces to grow food, or how to use local ingredients in cooking (Rut and Davies, 2018b). Also to note is that although food in Singapore is a common conversational topic that brings people together and forms communities, less information and educational material is

available on food sustainability issues, such as food waste, food quality, and culinary skills. For this reason, participants in food sharing use ICT as a channel of engagement for sustainability matters. As mentioned in an interview:

'mainstream media might censor news about environment and social issues but with social media you get to know things faster and chances are it might be raw but it is the truth ... As a country we are relying too much on technology and science to solve these issues...we talk about Smart Nation. But what is Smart Nation? Is it just technology and science to solve our current economy, environmental issues?' (Policy)

While the above statement points out the limitations in the Intelligent Island socio-technical imaginary in terms of data transparency and information sharing, it also suggests that ICT mediated food sharing may be one of the only non-deliberate knowledge and information exchange practices, which lends visibility to the complexity of sustainability issues in Singapore. For grassroots initiatives in Singapore, many of which operate informally, ICT is essential in terms of organisation and management of everyday activities (Sadoway, 2013). For example, ICT mediated food sharing communities have brought citizens together whose involvement in sustainability issues such as surplus food redistribution has increased civic participation in the context of emerging food activism (Rut et al., 2020). However, the widespread use of ICT for community self-organising and knowledge sharing poses a challenge to the existing censorship regime in Singapore. The 2019 Protection from Online Falsehoods and Manipulation Bill, which is popularly known as Fake News Bill, allows ministers to control social media channels. How this bill will impact such activities is yet to be established.

The fieldwork also suggests that participants in food sharing initiatives use ICT to enhance collaboration between different actors in the food systems (chefs, food growers, consumers, food rescuers, composters) and by doing so they expand the reach of sustainable food systems to include everyday practices such as cooking, eating, growing, skills and knowledge sharing, and practitioners whose activities are oriented towards care for nature, community and culture. Furthermore, in the process of sharing information online, participants often create rumours, impressions, and

recommendations, which form a buzz of information locally, which then can inspire people to change their food related behaviours (McCauley and Stephens, 2012). This has been made visible through the way sharing information online has motivated citizens in Singapore to become engaged in collective actions and to the extent that they believe that they are contributing to sustainability, for example by rescuing and redistributing edible foods (Rut et al., 2020).

The use of ICT in food sharing initiatives shows that citizens are creative and responsible citizens whose use of technology is crucial for public engagement and increased awareness towards a more participatory Intelligent Island that emerges from everyday practices connected to food in the city. The grassroots imaginaries then present a vision of technology in which social and technical are inextricably intertwined emphasising dysfunctionality of large scale technology oriented socio-technical imaginary in favour of a more people-driven Intelligent Island (Corsini et al., 2018).

6.6 Comparing State and grassroots socio-technical imaginaries

Over the past few years, civil society actors have become more involved in the political, social, and environmental transformations leading to sustainable food futures in Singapore. For example, emergent citizen-led participation in food waste management and growing popularity of urban agriculture in Singapore expanded the range of social and environmental motivations and actions leading to new imaginaries which envisage food transitions as a social process with empowered citizenry, adaptive infrastructures, and sustainable lifestyles (Rut et al., 2020; Rut and Davies, 2018a).

From the perspectives that are dominant in sustainability transitions and Science and Technology literature, the emphasis in our findings on grassroots socio-technical imaginaries may appear focused on the individual sphere of actions that shape local engagement in food matters, as research on socio-technical transitions and imaginaries has mostly focused on macro-level relations (e.g. changing nature of energy supply and use, society-technology relations) (Jasanoff and Kim, 2015; Geels et al., 2018).

However, we demonstrate that the engagement in food sharing is always undertaken within relationships of interdependence (e.g. to other participants, initiatives, nature, and the State), which is both materially interdependent (enabling food production, food welfare provision and activism) and also symbolic and emotional - involving kampong gestures and meanings, collective desires and hopes (Groves et al., 2016). By taking this approach we have demonstrated that food transitions are dispersed into embodied practices, socio-affective relations and material infrastructures (e.g. technologies) and that socio-technical imaginaries are emerging out of a diverse range of societal and ecological concerns and perspectives on the values implicit to culture and histories of places (Groves et al., 2016). Participants in our research are not discussed as isolated carriers of practices. Instead, they are relational, and through relations that they have to nature, community and technology they engage with the ethical dimension of State-led socio-technical imaginaries, such as care.

As relational and interdependent practice care embodies everything ‘we do to maintain, continue, and repair our world...that includes our bodies, ourselves, and our environment, all of which we seek to interweave in a complex, life-sustaining web’ (Fisher and Tronto, 1990, p. 40). Research on care is diverse and goes beyond just a moral stance by making people engaged in practical everyday knowing and doings (Arora, 2019; Stirling, 2018). Focusing on soil care for example, Puig de la Bellacasa (2017) emphasises the affective and ethical dispositions that care practices involve as we collectively become caring of vulnerable and neglected social and ecological worlds, whether that is in relation to the wellbeing of humans or non-human nature. Manifestations of care are also culturally specific to places and communities, as they involve practices and knowledge often described as vernacular and affective that are in need of further valorisation to understand sustainability challenges (Arora, 2019; Parsons et al., 2013). Attending to care in socio-technical imaginaries is therefore an important part of recognizing the role of culture in sustainability transitions (Stirling, 2014; 2019).

In drawing attention to State-led and grassroots socio-technical imaginaries, this Chapter has demonstrated that food transitions co-produced with civil society actors

represent more diverse ‘open-ended relations’ that in turn create ‘mutualistic pluralism of caring imaginations of Sustainability’ (Stirling, 2019, p. 14). This is in contrast to State-led food transitions, whose realisation is constrained by multiple resistances (e.g. economic focus, social control, technological innovations) and hierarchical State-citizen relations (Table 6.2).

Table 6.2 Comparing socio-technical imaginaries.

Theme	Dominant State-led socio-technical imaginaries	Grassroots-led food sharing socio-technical imaginaries
Human-non-human-nature relations	e.g. The City in a Garden Control Efficiency Modernisation Anthropocentric Attractiveness Cleanness	Relations of care Interconnections Diverse More than human worlds Place-making Biodiversity
Conceptions of community	e.g. Shared Values Peripheral/subservient to economic and ecological modernisation Homogenising Family values Kampong spirit Racial harmony Social stability	Core Diverse/heterogeneous Agency Trust Heritage Spirituality Civil liberties Relationships
The role of technology	e.g. Intelligent Nation Technology as driver Automation	Technology as enabler Inclusion

	Top down technology and citizens control Technocratic nation	Bottom- up participation(diverse, dynamic, self-organised) Intelligent citizens
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Our analysis has shown that in Singapore State-led socio-technical imaginaries have evolved with a set of techno-political goals whilst using science and technology to overcome food systems challenges such as resource scarcity and weakening of cultural and social ties that fundamentally support Singapore's national identity. The State-led imaginaries also highlight a tension between (1) State efforts to progress towards a singular vision of sustainable food futures expressed in a language of techno-optimism and national interests and (2) citizens capacities for democratic participation in sustainable food transitions that enable more diverse visions and realities to emerge and sustain themselves in their goal to foster social innovations, care and food justice (Miller, 2019; Agyeman et al., 2002).

As a result, State-led socio-technical imaginaries demonstrate the prevailing interests of incumbent actors in food systems change such as agro-food industries and corporations as well as infrastructures and tools of bureaucratic control such as that of censorship of local practices and radical imaginations that tell alternative stories. As such, in the State-led socio-technical imaginaries, food transitions are reduced to technocratic food futures, in which the focus is on food security, and thus on the appropriate management and regulations of resources in terms of production, consumption, and waste management (Diehl, 2020). Also, as the priority has been given to science and technology in the decision making process for improving efficiency around the national supply of food, marginal attention is given to socio-political and environmental issues such as socially-sustainable, small-scale, community-structured alternatives. Furthermore, public participation in food transitions has been reduced to acting as passive nodes in the chain of unrestricted food consumption and efficient food waste disposal, while community bonding around food under the guise of a nebulous notion of kampong spirit (Rut et al., 2020; Rut and Davies, 2018) is superimposed onto the prevailing commitment to a technology-fuelled, market-based economy wedded to

competitive individualism. The tensions and contradictions between elements of co-existing State-led socio-technical imaginaries that result are not addressed.

While the dominant State-led socio-technical imaginaries highlight the national approach to food systems transitions, the grassroots socio-technical imaginaries envisage a more diverse, socially equitable and sustainable food systems approach. Instead the grassroots socio-technical imaginaries increase the relevance of self-organised initiatives and everyday engagement practices in local foodscapes while manifesting its continued support for community wellbeing. Four key observations regarding grassroots socio-technical imaginaries around food sharing can be made from the fieldwork analysis: (1) that imaginaries contest the prevailing picture of technocratic food systems, by recognising the value of enrolling more diverse communities in food system transitions and elevating the role of care in communities around a myriad of neglected issues such as human wellbeing, biodiversity protection and enhancement and bio-cultural heritage; (2) That the grassroots socio-technical imaginaries around food sharing provide for more inclusive deliberation and evolution of the imaginaries themselves in their pursuit of greater community autonomy, food self-sufficiency and expanded citizens empowerment; (3) That grassroots imaginaries around food sharing include diverse citizens actively using ICT as an enabler to exchange knowledge and skills and to centre concerns on building local capacities and resources to address food sustainability challenges; and (4) That the emergence of grassroots imaginaries around food sharing is contingent upon the centrality of care - care for oneself, for the wider community and for non-human nature - redirecting attention away from the controlling and prescriptive care dynamics evident in State-led socio-technical imaginaries, particularly with respect to their adoption of kampong spirit as a motivating force across multiple socio-technical imaginaries that the State promotes.

The research has revealed that it is important to consider the way cultural meanings related to kampongs appear to be integrated in both the State-led and grassroots socio-technical imaginaries. On the one hand, the State uses kampong spirit as a symbol of community unity, tailored to address numerous sustainability implications of the nation building process, such as social cohesion or place making. For example, kampong spirit

as promoted currently by the State is a form of collective intentionality such as shared values and communal activities evoked through symbols (e.g. neighbourliness), State funding (to support social entrepreneurship) and used as expeditious way for the State to try and recalibrate outcomes of techno-economic development. On the other hand, within grassroots socio-technical imaginaries notions of historical kampongs are used much more broadly to inspire participants in food sharing to co-produce novel directions for food transitions tailored to the needs of marginalised social and ecological worlds (Arora, 2019; Puig de la Bellacasa, 2012). For example, participants in food sharing initiatives care about prevailing injustices and vulnerabilities in food systems such as unhealthy soils or the marginalisation of indigenous food knowledge. The fieldwork analysis also suggests that such evocations of kampongs can help to decommodify interpersonal relations by leading to more circular community engagements and motivate behaviour change; to challenge the prevailing free-market culture of individualism. For example, participants in food sharing engage in experiential learning by drawing on shared symbolic associations such as community self-sufficiency or eating with neighbours. Through food sharing they are exposed to forgotten culinary practices, worldviews and a plurality of meanings and values that are not visible in the State-led socio-technical imaginaries. These then become embedded in spontaneous community relations that influence citizen's desires to connect to nature, community and to live sustainable lifestyles. ICT plays an important role here as it enables local engagements to scale out (e.g. knowledge institutions, ordinary citizens, policy makers) as participants access social media for knowledge and skills sharing and use technologies as a connective tissue to reach other communities of practice (e.g. growers, rescuers, chefs).

Our research also shows that in Singapore, the creation of grassroots socio-technical imaginaries is a messy process which attends to many social realities and identities (e.g. permaculture practitioners, soil activists and herbal healers, food rescuers) and as a result enables deeper reflection on what might be a more holistic and inclusive desirable food future for Singapore. The creation and refinement processes encourage a reimagining of potential food transitions pathways through citizens' exposure to organic farming, food justice, cultural heritage, biodiversity conservation and community

economies that are not considered within the prevailing State-led socio-technical imaginaries. As such food transitions imagined and practiced by food sharers present a stark contrast with the controlling ambitions of the State in relation to nature, community and technology. This resonates with the findings of Stirling (2019, p. 1), who suggests that imaginaries of modern societies more broadly are centrally about aspirations to control, in efforts to ‘reduce complexity; standardise diversity; aggregate variabilities; integrate plurality; externalise uncertainty – and so discipline change’. While addressing the issues of sustainable food systems, our research found that grassroots socio-technical imaginaries oppose such controlling ambitions by making visible and accessible more-than-human worlds, making the diversity of citizen’s needs more tangible, and allowing for the celebration of vernacular cultures.

Furthermore, our analysis shows that citizens needs for social relatedness and cultural exchanges have been underplayed in the Intelligent Island socio-technical imaginary which privileges technology as a driver of economic growth and efficiency rather than enabler of enhanced transparency, responsiveness, and inclusivity (Rut and Davies, 2018a). So despite gains in relation to food security metrics based on the ability to pay for imports, the experiences of these achievements are unevenly felt within the diverse communities of Singapore. This has led to what Stirling (2019, p. 17) refers to as ‘fallacies and failures of control’. Beyond this, the frames used within State-led socio-technical imaginaries fail to admit more nuanced conceptions of the ways in which technologies can be used to foster relations of care between people and between people and the planet. Participants in food sharing are extending the reach of technologies, and enacting new sorts of food activism in Singapore that is dispersed amongst malleable and adaptive forms of ICT-mediated food sharing. This collaboration that links technologies with people is allowing the realisation of new organizational, participatory, and spatial practices (Rut et al., 2020; Sadowy, 2013) and in consequence widening the reach of the State-led socio-technical imaginaries by making visible stories that advance an ideal of a more democratic food transitions.

6.7 Conclusion

Empowering, enabling, and nurturing grassroots visions of sustainable food futures is necessary, if not essential, for democratic food transitions (Rut et al, 2020; Davies et al., 2019). Through the lens of socio-technical imaginaries it was possible to capture and consider diverse food transition processes and visions of desired food futures ranging from technocratic policy interventions and shared values to food sharing initiatives, their sustainability concerns and practices of care. Furthermore, the common, if differentiated, evocation of kampongs across State-led and grassroots socio-technical imaginaries could provide a useful (if potentially contentious) starting point for future dialogue between the State and grassroots communities around sustainable food futures. For example, it would allow diverse stakeholders and publics to reflect on the role of social structures and culture in sustainability transitions research and encourage reflection on how policies could be broadened to be more inclusive of citizen's voices and actions which are currently underrepresented in the State-led socio-technical imaginaries.

Our analysis points to a messy reality of multiple and co-existing socio-technical imaginaries in which diverse interpretations of care and control are present and co-exist in tension. While State-led socio-technical imaginaries in Singapore have been articulated from a policy perspective and according to the strategic needs of the City-State, the grassroots socio-technical imaginaries are emerging from 'below the seats of power, allowing new mindsets [to] break free from older, culturally stereotyped ways of knowing that keep dominant hierarchies in place (...)' (Jasanoff, 2015:41). Our results indicate the implications of these co-existing socio-technical imaginaries as potentially productive but also problematic.

At the scale of grassroots socio-technical imaginaries, co-existence is a right of citizens to make political alternatives visible by means of participation, which is considered to be a key to acquiring the necessary strength for imaginaries to be collectively held and expressed by publics. Such co-existence is therefore beneficial in opening up 'humble, reflexive, and responsible foundation for ... socio-technical transformation' (Longhurst and Chilvers, 2019, p. 973). However, in Singapore, co-existence also represents a

breeding ground for power struggles in the evolving relationship between the developmental State and independent grassroots initiatives (Rut and Davies, 2018a; Sadoway, 2013). In order to make their imaginaries tangible, grassroots in Singapore need to mobilise policy makers to be responsive to changing societal conditions (e.g. natural degradation, social inequalities, loss of cultural heritage, global shocks) which in turn reflect changes in policy priorities and project visions. However, seeking to transform State-led socio-technical imaginaries might result in either closing down of co-existence (e.g. new regulations that constrain civic action and free information such as Online Falsehoods and Manipulation Act 2019), or co-option of emancipatory advances in citizen's right to an independent political activity.

Where we glean less insight from the socio-technical imaginaries perspective is how to approach the uneven power of these imaginaries affecting the enactment of sustainable food transitions in Singapore. How might the grassroots socio-technical imaginaries, which demonstrate everyday citizens' engagements with care for people, community and non-human nature, flatten hierarchies of social, environmental, technological control and foster citizens' participation as empowered agents able to lead sustainable and innovative (food) initiatives? There is a clear need to 'follow the imaginaries' - to conduct longitudinal analysis of how co-existing socio-technical imaginaries evolve over time and map the power plays that shape that evolution.

PART THREE

CONCLUSIONS

CHAPTER SEVEN

CONCLUSIONS

7.1 Introduction

The research presented in this thesis provides an in-depth analysis of a range of food sharing practices in Singapore and explores the contribution of ICT mediated food sharing to sustainability transitions and food transitions in Singapore. The study took place in Singapore during a period of growing concern over food security and food waste management alongside a weakening sense of community, popularly known as the loss of kampong spirit. The research has examined the history and activities of food sharing initiatives, the resources required to share food related spaces, stuff and skills and knowledge, barriers and challenges to food sharing practices, the role of ICT in mediating food sharing, and the sustainability related activities that food sharing initiatives are engaged in. The research has also compared different types of food sharing initiatives in terms of their organisational form, function and governance model. The purpose of the theoretical contribution was to test the applicability, and identify benefits and limitations of sustainability transitions frameworks such as SNM and EOP in the context of food transitions in Singapore. The empirical contribution involves furthering the understanding of sustainability transitions research as it draws attention to the nature of participation and the socio-technical imaginaries that shape food transitions in Singapore. The criticism of sustainability transitions literature was addressed in the research of this study by focusing on a different substantive area of transitions (other than energy) and by using a social practice theory lens to explore the role of civil society actors and food practices in food transitions while drawing attention to neglected issues of power and politics, ethics and culture. As such, the research highlights problematic aspects of enacting transitions in political cultures that are different from western liberal democracies and suggests a more explicit analysis is needed on geographically sensitive and culturally nuanced transitions. This Chapter first addresses the research questions. This is followed by recommendation for policy makers, food sharing initiatives and future research.

7.2 Responding research questions

The overreaching goal of this research was to understand the contributions that ICT mediated food sharing initiatives make to food transitions in Singapore. The answers to the research questions are synthesised below.

Research Question 1: What is the contribution of ICT mediated food sharing to sustainability transitions and food transitions in Singapore?

Adopting a social practice frame and exploring sustainability transitions approaches, the research presented in this thesis elaborated sustainability transitions literature - in particular the neglected role of civil society actors in transitions, and their potential to transform food systems in Singapore towards more sustainable, diverse and democratic pathways. It has expanded the scope of sustainability transitions research territorially and in relation to the focus on food transitions. It has also demonstrated that Singapore's place specific characteristics (e.g. underdeveloped civil society model, highly controlled political environment, and State-led focus on technological innovations in food systems) highlight the missing attention to socio-political and ethical configurations in transitions research. It identified the four limitations of sustainability transition literature both in theory and practice:

- (1) That sustainability transitions research privileges innovations that have been emerging from technological niches which are often protected by regime actors (as discussed in the Chapter Four)
- (2) That sustainability transitions research neglects informal, relational and messy processes of participation which are difficult to grasp because of multiple stakeholders involved and their diverse motivational goals and the corresponding organisational capacities (as discussed in the Chapter Five)
- (3) That sustainability transitions research neglects practices found in alternative food activities and local community projects as deliberately distanced from the State socio-technical imaginaries directed towards ecological modernisation and food security (as discussed in the Chapter Six)

(4) That sustainability transitions research focuses mainly on innovations that are situated in the energy system, supported by democratic political leadership and enhanced by citizens utilising their political rights and civil liberties (as discussed in the Chapters Four, Five and Six)

The research has addressed these criticisms of sustainability transitions studies by focusing on the socio-political, historical and cultural context of Singapore, and broadening and deepening the literature to focus on food sharing practices and practitioners that co-exist along the food chain and across local and national scales and socio-technical imaginaries. As a country and a city, Singapore provided an interesting case study of local and national approaches to sustainability transitions in food systems, in which food sharing plays a significant role; both as a strategic State response to a loss of kampong spirit and national identity and as an everyday practice engaged in by citizens interested in participation in sustainable food production, consumption and surplus food redistribution. The conceptualisation of food sharing initiatives in this research, as a form of grassroots niche characterised by diverse organisational forms, functions and governance structures that has emerged in Singapore mainly in response to social and environmental issues, allowed further niche-regime relations in the context of food transitions to be interrogated.

This research has also shown that hierarchical relations between citizens and the State makes it more difficult for food sharing initiatives to justify the claims about the contributions they make to sustainable food systems and food transitions. The resulting research outcomes synthetized below highlight the contribution of ICT mediated food sharing to food transitions in Singapore in terms of food production and food waste management.

a. Shared food growing initiatives contribute to food production by shifting the focus from industrial and technology policies to enhance food security to community-oriented food growing and increased need for public spaces as community engagement tools and food procurement sites. Although the research presented in this thesis does not provide quantitative information on the amount of food produced by food sharing initiatives locally, the analysis of the two case studies of shared food growing initiatives, the

Collective and the Social Enterprise discussed in the Chapter Four suggests that food sharing initiatives increase local food production by engaging citizens in food growing practices in their households, community gardens and urban farms and by identifying potential resources for urban agriculture such as underutilised spaces to reduce citizens reliance on food imports. The two initiatives also integrate circular practices such as composting, water harvesting and seed sharing and engage citizens in sharing economies around food. Shared food growing initiatives involve forms of social outreach and develop organisational capabilities by considering focus on alternative food networks in support of permaculture, agricultural knowledge, and community skills (see Chapter Six). They also encourage citizens to be self-sufficient in terms of food procurement and to create local knowledge spillovers (e.g. skills sharing and collaborations) that enhance awareness of and care for local foodscapes. As such, shared food growing in Singapore has a potential to create practical alternatives for food production.

b. In the recent years, there has been a considerable emphasis on surplus food redistribution practices amongst civil society actors to counter food insecurity and food waste in Singapore, with activities variably incorporated in private and public sector, often facilitated by corporate social responsibility programs. The two surplus food redistribution collectives discussed in the Chapter Five are the key players in the prevention of food waste in Singapore via redistribution. Although different in the organisational form and the governance model adopted, the Group and the Charity enhance public participation in food waste reduction by engaging diverse publics in participatory moments in which citizens develop an active commitment, essential to restore community spirit, and participatory democracy in food waste management. As discussed in the Chapter Five, both initiatives claim to save considerable amount of edible food from different stages of food supply chain. By doing so they also address structural vulnerabilities in the food systems such as lack of infrastructure for food rescuers to store and redistribute fresh food produce, lack of legislation protecting food donors from liability for donated food, and limited public understanding of food insecurity issues in Singapore and its consequences for food donations programmes (e.g. healthy and culturally appropriate foods).

Research Question 2: What is the landscape - the form, function and governance model - of ICT mediated food sharing initiatives in Singapore?

The preliminary analysis of the SHARECITY 100 Database (Davies et al., 2017a) has examined ICT mediated food sharing initiatives in Singapore from growing food together, eating and cooking together, and rescuing and redistributing food surplus. Through the mapping methods, discussed in the Chapter Three, 52 ICT mediated food sharing initiatives were found to exist in Singapore in 2017. Furthermore, the analysis suggests that the majority of the ICT mediated food sharing initiatives in Singapore are for profit such as businesses (37%) and informal including groups and collectives (27%). Other organisational forms include non-for profit organisations such as charities (11%) and social enterprises (5%). Of the initiatives identified, only 20% use multiple organisational forms, for example, a business with a charity arm or a social enterprise that is more related to the for profit sector.

The case studies presented in this thesis are not exhaustive of the variety of ICT mediated food sharing initiatives and practices that co-exist in Singapore. However the selection of the case studies was made to offer an insight into different organisational forms, functions and governance models which are characteristic of ICT mediated food sharing in Singapore. This thesis examines differences in form, function and governance models across five ICT mediated food sharing initiatives.

As discussed in the Chapter Four, a comparison is presented between a commercially run social enterprise model focused on for-profit food production and an emergent grassroots organisation that aims to increase public awareness of food sustainability matters through activities that resemble activism in the context of Singapore, such as guerrilla gardening, seed sharing, and permaculture. The findings of the comparison suggest that informally organised food sharing initiatives in Singapore are less likely to conform to the prevailing socio-political discourses in support of State-led food policies i.e. automation of food production and they are also more inclined towards ethical practices in food system (see Chapter Six). On the contrary, more formalised food sharing initiatives, for example those that are registered with government and tax authorities such as the Social Enterprise and the Charity align their functions with the

State strategic goals such as kampong spirit which makes them more likely to ‘fit and conform’ with opportunities that incumbent regime provides i.e. access to land or tax exemption (Smith and Raven, 2012).

There are also different governance models adopted by ICT mediated food sharing initiatives which are described in this thesis. The governance model of food sharing initiatives such as the Charity and the Social Enterprise discussed in the Chapters Four and Five is characterized by the presence of board of directors, founders and employers with different work experiences and motivations having been delegated to supervise everyday activities of the initiatives such as administration, marketing, management. This model is also endowed with top-down management with a low level of spontaneous public participation, in which the public is more passively engaged, rather than actively involved in food sharing activities, thus facilitating the development of the initiatives. In contrast to the above, informally organised food sharing initiatives such as the Collective and the Group are more horizontal in nature, adaptive and responsive to the needs of participants by continually engaging participants in self-organising, reflexivity, learning and knowledge exchange. Distribution of decision making within informal food sharing initiative that occur across different organisational layers emphasises freedom and creativity to produce emergent patterns of collective governance in which ICT play a major role (also see Chapter Six).

Research Question 3: What are the strengths and limitations of the Strategic Niche Management approach for understanding food sharing and food transitions in Singapore?

While sustainability transitions research frameworks have been mostly used to perform meso level analysis, less work has explored the social milieus such as groups, communities, and initiatives in which participants, as carriers of practices, are important yet often invisible players in sustainability transitions (Shove et. al., 2012). This research has shown that Strategic Niche Management approach is helpful for the purpose of analysing how food sharing initiatives are attending to food transitions in Singapore on the example of shared visions and expectations, network formation and processes of learning. Food sharing initiatives operating informally through extended

networks of weak ties such as the Collective, or as a function of formal organisational routines such as outreach programmes as discussed on the example of the Social Enterprise, can either ‘fit and conform’ with political powers or build confidence to ‘stretch and transform’ at least some configurations of the socio-technical system (Smith and Raven, 2012). For example, by empowering civil society actors to promote social innovations as a democratic process between the State and the citizens (Smith and Raven, 2012). Furthermore, the focus on civil society actors in the analysis of SNM highlights that self-organised collectives and social initiatives are vehicles for experimentation and demonstration of networked alternative food practices. For example, the SNM analysis demonstrated that the Collective and the Social Enterprise are able to shift limitations set by commercial interests and technological know-how and engage larger audiences and broader spectrum of stakeholders in food related actions. This is in order to foster change in food practices that may invoke behaviour change by raising awareness of local food sources, healthy food choices and food communities, thereby enabling new directions in food transitions (Smith and Raven, 2012). Thus, the SNM analysis shows that while it is unlikely that food sharing initiatives would develop strategic direction to radically disrupt food regimes in Singapore, they are able to produce and share new narratives that are necessary to challenge dominant socio-technical imaginaries (see Chapter Six).

However, the research has also found that SNM approach is limiting as it does not allow deeper discussion about alternative ethics and values that the civil society actors articulate and advocate for (e.g. other than economic and technological development). It also does not encourage an unpacking of the messy, diverse, emergent and ‘unruly political alignments’ (Stirling, 2015, p. 54) that co-exist, often invisibly, in sustainability transitions and guide development of social innovations. Directly addressing the gaps in the sustainability transition literature on the role of civil society actors in change processes, the SNM analysis has demonstrated that examining niche building processes within a dominant economic growth and technology oriented contexts means that contributions from food sharing initiatives to food transitions may remain overlooked. For example, the benefits that food sharing initiatives generate, particularly around social relations, justice and care practices are often discounted by

the production oriented food security policies and the State pursuit of ecological modernisation (see Chapter Six).

Finally, the research also points to the importance of local-global interactions in the processes of strategic niche management. Food sharing niches, as small-scale, localised food sustainability experiments, have long existed as vernacular practices across geographically diverse contexts (Davies et al., 2017). Furthermore, in the aftermath of the 2007 financial crises worldwide, these localised experiments aggregated and solidified internationally (e.g. grow your own and zero waste movements) on account of social bonding, activist's networks, and intermediary actors many using ICT to disseminate knowledge, forge connections, and cross-pollinate ideas, which contributed to forming a local-global niche made of multiple local projects co-existing in diverse national contexts (Miörner and Binz, 2020; Geels and Raven, 2011). Singapore's geographical proximity to such destinations as Australia and Hong Kong in which food sharing niches have been well developed through networks of organisations, grassroots experiments, and due to favourable policy conditions (Edwards and Davies, 2018, Chan, 2016; Vu, 2016), was instrumental for key actors (e.g. founders and co-founders) in food sharing initiatives in Singapore such as the Edible Garden City and the Foodscape Collective. These key actors formed collaborative networks with their international colleagues; this happened in a number of ways: through gaining new work experiences and learning opportunities and by becoming more open to new ideas that meet a desired imaginary of sustainable lifestyles more closely. These networks represented important hubs where knowledge has been transferred between Singapore and other national context, contributing to the processes of the strategic niche building, and through the interaction with practitioners' networks of a global niche (e.g. permaculture communities and zero waste communities in Australia, urban farms in Hong Kong) the processes of scaling downwards alternative food practices into local niche contexts in Singapore was able to take place.

However, although, local-global niche exchanges were instrumental in the launch of the niche building processes in Singapore and lead to the establishment of new projects (e.g. social enterprise and community farms), it became in time problematic. The lack

of collaborative intermediation processes between the niche actors in Singapore and the local contexts, manifested by almost non-existent food activists and independent grassroots communities in a position to pressure the local power structures, solidify networks, and smooth institutionalisation of new practices led to a growing divide between commercially oriented urban farmers and those interested in natural farming methods. Seen as a discrepancy, the situation caused further impairments for the niche in the development of visions, defining expectations, and the establishment of knowledge sharing networks. This indicates that while a global niche has positive effects on the niche building processes in different geographical contexts, it also suggest that there is a naïve assumption that local-global niche experiments can successfully scale-up without paying attention or being reflexive of place-specific configurations (Binz et al., 2020). A point made in the dissertation is to acknowledge the importance of global networking structures and intermediaries (activist's networks, food practitioners groups, farming programs, workshops and conferences) which, in the case of Singapore, have not only provided an important learning opportunities for aspiring niche actors, but have also offered a platform from which citizens can voice criticism of the regime structures. The case of Singapore also suggests that there is a need to sensitise the trajectories of local-global niche relations and to reflect critically on whether the innovative models that have been developed in other national context can be reproduced without recognising deeply rooted structural imbalances resulting in particular from the democratic (or not) foundations underlying citizen's -State relations. The transfer of knowledge between democratic places of best practices and less democratic political cultures such as Singapore (e.g. absence of community-based autonomous networking environments) thus must involve a reflection on whether re-scaling global niche to locally embedded projects and ideas, where policy mechanism to enhance independent citizen's participation in policy matters is weakened, could indeed result in new strategic niches.

Research Question 4: What is the nature of participation in food sharing and food transitions in Singapore?

The research in Singapore demonstrated the need for understanding the practice of enacting transitions by looking at how diverse publics are seen increasingly important to food transitions. As discussed in this thesis, ICT mediated food sharing is multifaceted endeavour that involves individuals, groups, collectives, charities, businesses, and social enterprises in food transitions in different ways. Participants in food sharing are motivated by a range of reasons such as food sustainability concerns, particularly around food waste and food security (see Chapters Four and Five), as well as community relations, care and connection to nature and cultural heritage (see Chapter Six). This research has shown that participants in food sharing attend to food transitions by developing shared visions and expectations that bring coherence to diverse motivations for engaging with collective actions, creating networks through strategic partnerships and social collaboration with different stakeholders in food systems and testing opportunities through learning in a responsive environments with others (see Chapter Four).

Furthermore, the analysis of the EOP framework, suggests that participation in food transitions is inherently multidimensional, as it evolves with multiple elements of socio-technical systems, such as technologies, markets, user practices, cultural meanings, ethical concerns, infrastructures, and policies (Geels, 2005b; Chilvers and Longhurst, 2016). By shifting the focus from the State actors, businesses and industries to everyday citizens and by giving recognition to the existence of diverse and emergent forms of participation within and outside food regimes food sharing initiatives demonstrate that they can enact new practices that enhance more diverse participation in food waste transitions (see Chapter Five).

The research also addressed the criticism that grassroots and social innovations are too focused on humanistic and emancipatory motivations, and therefore they underplay competition and strategic calculations which are necessary to proliferate organisational impact to local, regional and global scales (Geels, 2020). The analysis of the EOP framework reveals that the socio-affective aspects of participatory action are of equal

importance to food transitions as strategic planning. It is through ties of relatedness, shared motivations, social learning and reflexivity that participants in food sharing gain confidence and nurture a sense of civil society action that helps them to overcome long standing limitation on civic activism, space and life in Singapore.

Research Question 5: What does adopting a socio-technical imaginaries analysis reveal about food sharing and food transitions in Singapore?

This research has shown that food sharing in Singapore is seen as a desirable activity particularly among citizens interested in food sustainability issues. It could also be something that the State could support if it is strategically directed towards building a cohesive and multicultural communities that nurture kampong spirit. The analysis of socio-technical imaginaries demonstrated that food sharing initiatives does not necessarily lead to a radical regime change. However participation in food sharing practices nurture changes to existing socio-technical imaginaries by making visible socially and environmentally desired food transitions.

The research has shown that food sharing initiatives enrich food transitions with cultural meanings and ethical considerations that span beyond dominant visions of food production and food waste management. As discussed in the Chapter Six, socio-technical imaginaries of the City in a Garden, Shared Values and Intelligent Island developed by the State in the process of the nation building have strengthened Singapore's economy and its reputation as a smart city but at the same time weakened sense of community and cultural belonging. ICT mediated food sharing initiatives show that multi-sited and multi-form community relations with food have a potential to foster deliberative communities in which involvement in and experience of food sharing contributes to diverse practices of care (e.g. care for nature, cultural heritage and community relations). Participants in food sharing often realise caring practices such as permaculture gardening, community support, and the preservation of cultural heritage, which reject aspirations of control over nature and society and point to the role of culture in tackling relations of power between the government and citizens. The analysis of socio-technical imaginaries suggests that food transitions in Singapore cannot be achieved solely through means of technological innovations and that it is

through engagement with each other and nature that participants produce plural responses and new imaginaries that challenge and rework dominant representation of food systems. The ICT play a significant role in the process of imagining food futures in Singapore. For example, the Collective and the Group employ ICT to enhance collective governance in which preference is given to the development of shared goals and ideas, commitment and responsibility (see Chapters Five and Six). ICT also allows participatory processes to unfold by linking citizens' needs and desires to food sustainability challenges and highlighting the necessity for political elites to balance civil liberties against the competing government interest in reinforcing control over civic associational life and freedom of speech (e.g. Online Falsehoods and Manipulation Act 2019).

On the final note, it has been shown in my ethnographic research that to achieve the goal of sustainable Smart and Intelligent Nation with empowered citizenry there is a need to ask why and how citizens might question and challenge the 'smart' discursive label. This is important especially in less democratic urban political contexts such as Singapore where directions in which smart urbanism took its development has been associated with an assumption of citizens that are engaged with and implicitly supportive of the State-led visions of urban smartness - compared with the problematic connotations of its opposite - citizens as empowered and capable of cultivating an independent political voice.

The ICT mediated food sharing case studies in this thesis provided the evidence that in the recent years (2012-2020) there has been a gradual push-back against controlling ambitions of the State in the construction of publics as smart subjects (Ho, 2017, p. 3103). This has been demonstrated in this thesis by considering how citizens began to refine their understanding of citizenship as they create discursive spaces (both on and offline) in which local voices are shared and sense of citizens' rights and responsibilities nurtured. Furthermore, as an embodiment of grassroots innovation, the ICT mediated food sharing communities and the forms of social organisations that they support, have demonstrated an ability to foster local capacity-building to address sustainability challenges from ethical perspectives rather than as

matters of national survival, coupled with a direct impact on societal wellbeing, nature conservation and cultural heritage. Consequently, this thesis has shown what goes under in the process of making smart cities, when governments prioritise smart citizenship over genuine civic participation.

7.3 Policy implication for Singapore

This research shows that food sharing initiatives involve heterogeneous groups of citizens addressing social and environmental issues with the effect of increasing participatory democracy in food systems amongst those who participate. The research has found that food sharing initiatives in Singapore offer opportunities to increase citizen's involvement in local food production and food waste management at the city level and offer opportunities for citizens to connect and collaborate and therefore strengthen the sense of community. As already discussed in the previous section, food sharing initiatives open up socio-technical imaginations for the multiplicity of alternative pathways for establishing more sustainable urban food systems and point to the inherently social nature of food transitions. Future research should consider how food sharing niches can remain relevant and impactful as well as make a significant contribution to reconfiguring the dominant regime (Davies, 2019; McKenzie and Davies, 2019).

Still, such collective endeavours to achieve a goal of sustainability transitions are in their early stages, and therefore remain largely invisible to policy makers in Singapore because of a reticence to express critical or oppositional views. In addition, the research shows that participants are struggling to access resources and political and financial support or to make their voices stronger and heard by the State. These initiatives also face regulatory restrictions that shift their activities into unregulated reaches and their impact remains unclear to policy makers and the public.

Suggestions for policy improvements from conducting this research include:

- To incorporate citizen-led activities in food growing and surplus redistribution initiatives into policy on food security [see Chapters Four and Six]
- To review the existing policy documents such as Masterplans²⁸ on access to land and public infrastructures to ensure that they can take into account food sharing practices [see Chapter Four and Six]
- To incorporate the principles of food growing into lifelong learning initiatives, educational policy and the national curriculum to increase understanding of where food comes from, native plants and seasonality, and how to grow food in Singapore [see Chapter Four and Six]
- To formulate a national law on surplus food redistribution in order to increase diverse and emergent participation in food waste management [see Chapter Five]; to introduce a law that bans food establishments from throwing away unsold food that could be redistributed to charities and interested parties [see Chapter Five]
- To offer State regulatory support to allow surplus food initiatives and informal food rescue groups to function and to be integrated in the Zero Waste Masterplans and to introduce financial incentives to encourage food recycling through composting and access to cold storage infrastructures in the city such as community fridges [see Chapter Five]

²⁸ The Master Plan (MP) is the statutory land use plan which guides Singapore's development in the medium term over the next 10 to 15 years. It is reviewed every five years and translates the broad long-term strategies of the Concept Plan into detailed plans to guide the development of land and property.

- To establish a food council in Singapore to act as a collaborative platform to integrate diverse stakeholders with links to funding and regulatory agencies for more direct input and action [see Chapters Four, Five and Six]
- To make government datasets (e.g. public land, food waste statistics) available to public and to encourage ICT mediated practices based on reusing and free distribution of datasets to promote new practices, business models, and citizens-centric services [see Chapters Four, Five and Six]

7.4 Recommendations for food sharing initiatives

Singapore's underdeveloped civil society model suggests that while support of policy makers could lead to improved operational capacity in food sharing initiatives, participants in food sharing should develop sense of confidence and trust in their own feelings and thoughts that stem from the understanding of their needs, goals and experiences. This also means shielding knowledge, skills, and resources that can be easily co-opted by formal channels of State-led community engagement (see Chapter Six). The recommendations below are for food sharing initiatives to strengthen their capacity to cultivate a grassroots culture that promotes values of community sharing and democracy.

1. Share knowledge and skills, learn from each other, and work collectively to meet requirements for sustainable food systems such as care needs of nature and communities to enhance grassroots collective capacity to counter prevailing socio-technical imaginaries focused on techno-efficiency and ecological modernisation [Chapter Six]
2. Integrate social and cultural heritage knowledge and skills (e.g. indigenous knowledge, native plants, culinary practices) into main activities of the initiatives to preserve and nurture vernacular cultures in Singapore that have been disintegrated by notions of progress and modernity. Advocate for culturally inclusive food sharing [Chapter Four and Six]

3. Document the outcomes and impacts of food sharing activities and make them available to wider audiences including schools, low income communities and policy makers in order to better demonstrate sustainability impacts [Chapter Four, Five and Six]
4. Participate in deliberative civic engagements and foster grassroots political participation channels in order to create more involvement of civil society actors in decision making processes and the implementation of national legislations [Chapters Four, Five and Six]
5. Recognise ethical issues, such as care, poverty, justice, freedom, political legitimacy and the non-human nature. Increase ethical sensitivity amongst participants in order to address structural inequalities deeply entrenched within society through State-led imaginaries that have led to including some and excluding others in food transitions in Singapore [Chapter Six]
6. Encourage intergenerational and intercultural programs, include children, elderly and integrate migrant workers in food sharing activities in order to engage, recognise and include a broader range of citizens and represent a wider range of perspectives, practices, needs and imaginings in the process of transitioning to a more sustainable and democratic food system [Chapter Six]

7.5 Recommendation for future research

The challenges of sustainable food systems are multifaceted and, as demonstrated in this thesis, occur at different levels and spatial configurations. The study of food transitions in Singapore demonstrates inherent theoretical and methodological considerations for future research to better understand the role of civil society actors in sustainability transitions in different socio-political and cultural contexts. The research has demonstrated that food sharing initiatives (although not quantified) are improving inefficiencies of urban food systems in relation to food production and food waste reduction and creating opportunities to develop more participatory food systems. To generate further empirical and theoretical understandings that can inform material

policy strategies, there is a need for participatory research that unites with actions for transforming urban food systems and goes beyond the romanticisation of food sharing movements (e.g. kampong spirit) to identify limits and barriers to food sharing practices (e.g. political, social, economic), but also to empower different stakeholders in food systems, especially young people and entrepreneurs with concepts such as food sharing and social innovations that can have a positive effect on sustainable development in cities. This could include:

1. Participatory research with policy makers and food sharing practitioners to develop synergies from various areas of knowledge, to involve civil society actors in co-designing policy and to increase the impact of research on policy making in Singapore;
2. Comparative research between Singapore and other Asian Tiger Economies (Hong Kong, Seoul, Taiwan) to explore similarities, differences, and implications of food sharing practices for food sustainability in economically advanced Southeast Asia region;
3. Qualitative and quantitative research on food insecurity in Singapore to gather information on who are the food insecure people, what are the root causes of food insecurity in Singapore and what are the barriers for food insecure to access and contribute to food sharing initiatives;
4. Qualitative research to address experiences, challenges, opportunities and changes to food sharing practices in times of shocks (e.g. COVID -19; economic crises; social unrest);
5. Qualitative research to uncover the ethical dimension (e.g. care, justice, civil liberties) and power structures in food transitions and further advance the development of conceptual focus that could enhance understanding of experimental, and bottom-up participatory processes in sustainability transitions;

6. Research that deepens the understanding of the intercultural food sharing in Singapore in respect to culturally appropriate food, and sharing between and within diverse races and culinary traditions;

7. Comparative research to assess sustainability impact of diverse food sharing initiatives through sustainability assessment tools such as SHARE IT²⁹

The research in Singapore suggests that food sharing initiatives are hotspots for social innovation, however food sharers themselves often do not recognise their potential as agents of change. Therefore the methodologies that might be useful in conducting further research with the objective to empower participants for place-specific innovations could include participatory action research, which aims to produce social change, while pursuing critical inquiry (Greenwood and Levin, 1998). Such an approach would integrate the local and national histories of food innovations by identifying national needs, local responses and community assets. The objective would be focused on generating ideas for context-specific food innovations and motivating and empowering different stakeholders, especially young people and entrepreneurs with concepts such as food sharing and social innovations to have a positive effect on sustainability transitions. Furthermore, the emerging cartographic practice of ICT mediated community food mapping could be integrated to further enhance the participatory learning, community empowerment and to foster collaboration and transparency between policy makers and grassroots citizens groups.

²⁹ SHARE IT is a sustainability assessment toolkit developed by SHARECITY to help food sharing initiatives estimate, communicate and improve their sustainability impact. Source: <https://shareit.sharecity.ie/>.

7.6 Conclusions

Overall, the research has revealed that ICT mediated food sharing in Singapore represents a diverse spectrum of practices, social relations and organisational models ranging from State-led and corporate to community organised and informal with a majority of participants driven by social and environmental motives. Food sharing initiatives discussed in this thesis attend to food transitions in different ways. For example, they recognise Singapore's high dependency on food imports and the need for alternative food practices such as community food growing. Food sharing initiatives also challenge technological focus in food waste transitions resulting in limited citizens' ability to participate in food waste management despite bottom-up interests in surplus food redistribution practices. Finally, participants in food sharing challenge socio-technical imaginaries that legitimate the State desire for modernisation and economic development while upholding citizens' freedoms to imagine and co-produce sustainable food futures. The research findings suggest that sustainability transitions cannot be identified in one setting and simply replicated in other contexts because of plurality of communities, knowledges, practices, and political orientations that point to multiple, diverse and often contested pathways to transitions. Further research on food transitions is desirable to assess the role of civil society actors in change processes beyond western liberal democracies, with an expanded focus on a neglected area of power and politics, ethics, and the role of culture in sustainability transitions research.

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APPENDIX ONE

Creative Construction: Crafting, negotiating and performing urban food sharing landscape

Creative construction: crafting, negotiating and performing urban food sharing landscapes

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Activities utilising online tools are an increasingly visible part of our everyday lives, providing new subjects, objects and relationships – essentially new landscapes – for research, as well as new conceptual and methodological challenges for researchers. In parallel, calls for collaborative interdisciplinary, even transdisciplinary, research are increasing. Yet practical guidance and critical reflection on the challenges and opportunities of conducting collaborative research online, particularly in emergent areas, is limited. In response, this paper details what we term the ‘creative construction’ involved in a collaborative project building an exploratory database of more than 4000 food sharing activities in 100 cities that utilise internet and digital technologies in some way (ICT mediated for brevity) to pursue their goals. The research was undertaken by an international team of researchers, including geographers, which utilised a combination of reflexive coding and online collaboration to develop a system for exploring the practice and performance of ICT-mediated food sharing in cities. This paper will unpack the black box of using the internet as a source of data about emergent practices and provide critical reflection on that highly negotiated and essentially handcrafted process. While the substance of the paper focuses on the under-determined realm of food sharing, a site where it is claimed that ICT is transforming practices, the issues raised have resonance far beyond the specificities of this particular endeavour. While challenging, we argue that handcrafting systems for navigating emergent online data is vital, not least to render visible the complexities and contestations around definition, categorisation and translation.

Key words: cities, collaboration, database, food sharing, online research, methodology

Introduction

The internet, mobile apps and various social media are an increasingly visible part of everyday life for many people, with internet penetration globally reaching 50 per cent in 2016.¹ The proliferation of content accessible through these mechanisms has grown exponentially and provides new subjects, objects and networks – essentially new landscapes – for research, as well as new conceptual and methodological challenges for researchers (Hine 2005). In parallel, calls for collaborative research to approach complex global meta-challenges such as food security, poverty and environmental change are increasing (Future Earth 2014). These calls envisage collaboration both within interdisciplinary and inter-institutional research teams (Cummings and Kiesler 2005), but also

collaboration between academic researchers and other actors from public, private and civil society sectors, often termed transdisciplinary research (Brandt et al. 2013). Linked to this collaborative agenda is research that seeks to co-produce knowledge with citizens, often utilising information and communication technologies (ICT) to mediate that process (Howe 2006), and referred to as crowdsourcing or citizen science (Silvertown 2009).

Such collaborative ventures offer both challenges and opportunities for researchers and participants alike (Dickinson et al. 2010; Demeritt 2005), and ‘much of what happens in the business of collaborative research is a negotiation between different perspectives and expectations’ (Macmillan and Scott 2003, 105). In this paper, we argue that challenges are intensified when collecting and mapping online data from emergent,

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diverse and culturally specific practices such as ICT-mediated food sharing. For, while technical guidance around web-scraping and data mining is emerging (see Russell 2014), much of the guidance is focused on the mechanisms of searching where terms are fixed and uncontroversial rather than where the crystallisation of concepts is ongoing. In this paper, the open and contested concept of food sharing required an artisanal, or handcrafted, process of identification, classification and comparison in order to capture its irregular and intimate qualities. We call this creative construction in contradistinction to Schumpeter's notion of 'creative destruction', which has been articulated as the 'essential fact about capitalism' (1975, 82). Creative destruction refers to an evolutionary process, albeit one often characterised by transience or abrupt transition (Abernathy 1985), whereby long-standing arrangements are deconstructed, freeing resources and revolutionising economic structures from within, 'incessantly destroying the old one, incessantly creating the new one' (Harvey 2007, 23). Instead, creative construction is used in the title of this paper to capture (a) the 'more-than-capitalist' framing of urban food sharing as a social and economic practice and (b) the essentially creative process of constructing hypotheses about the patterns and grammars that surround new activities such as ICT-mediated food sharing. This latter dimension draws on the ways in which creative construction has been used within linguistics and education more broadly to explore how mental constructs are used to produce and comprehend new phenomena (words, phrases, mathematical equations or science concepts) (Dulay and Burt 1974; Gallenstein 2003).

The following sections outline the research team's endeavours to develop a broad landscape perspective of ICT-mediated urban food sharing through the creation of a database which contains comparable data on shared food stuff, skills and spaces in 100 cities across Africa, Australasia, Asia and the Middle East, Central and South America as well as North America and Europe. The scoping study that sketched out a typology of food sharing and established key search terms is briefly delineated. This is followed by an account of the process of searching for, and then coding, ICT-mediated initiatives. Three themes for reflection are then discussed: the initial handcrafted nature of the database; the negotiated process of defining terms and translating concepts of food sharing internationally; and the performative work constructing the database conducted both during its construction and subsequently. Finally, some concluding comments are provided on the wider relevance of this process of creative construction for both ICT-mediated urban food sharing and for geographical research more widely.

Creation: ICT-mediated urban food sharing

The urban focus of this research was driven by the fact that more than half the world's population now lives in cities, with this figure expected to continue rising beyond 2050. Cities are increasingly significant sites of resource consumption; territorial nodes where goods, services and waste collide, with inhabitants consuming more than three-quarters of global natural resources and producing a similar amount of global carbon emissions (UNEP 2013). More than a billion tonnes of solid waste are produced by cities annually of which around half is organic and mostly food waste (Hoornweg and Bhada-Tata 2012). It is also the case that much of the food eaten in cities is imported from outside city boundaries, raising significant questions about the resilience and sustainability of urban food systems (Cohen and Ilieva 2015).

While the focus of this paper is on methods rather than findings (see Davies and Weymes 2017, for analysis of the database contents), attention to the issue of food sharing in cities was stimulated by claims that ICT mediation is reshaping the ways people share and that in the arena of food such technologically mediated sharing may be well placed to confront the abhorrent geographies of hunger and food waste (within and beyond cities). ICT is used to refer to diverse forms of technology from digital devices to software packages, which make it possible for people to access information and communicate globally (Unesco 2002). In this research it is the development and utilisation of websites, social media (Facebook, Twitter, Meetup) and apps in order to share skills, spaces or stuff (food itself, meals, seeds, compost, devices, utensils, tools, etc.) related to growing, preparing or eating food that dominate. These mechanisms offer possibilities to share food with wider communities, even strangers far beyond kinship food sharing that forms the very bedrock of human civilisation (Kaplan and Gurven 2005). Essentially, ICT is stretching the spaces over which food sharing can occur.

However, to date, the extant literature on activities that might fall under the umbrella of food sharing is dominated by richly detailed qualitative case studies which, while interesting, fail to provide a landscape-level picture of food sharing initiatives (Davies and Legg, forthcoming). This is problematic both from a research and practice perspective. It makes comparisons across initiatives and locations difficult and it also means that the initiatives themselves (or potential food sharing entrepreneurs) may struggle to find inspirational examples of how to address challenges around food sharing, to develop broader communities of practice and exchange knowledge. In response, the goal of the

database was to mitigate these limitations and provide a basis on which translocal learning might develop around the practice and potential of diverse food sharing initiatives to contribute to more sustainable urban food systems.

Essentially, the objectives of this paper are two-fold: (i) to throw some light into the black box of building a searchable database about emergent and hybrid online practices and (ii) to provide critical reflection on that creative process in relation to food sharing in cities. While the substance of the paper focuses on the under-determined realm of ICT-mediated food sharing, lessons learned from this process have broader relevance, especially for researchers engaged in collaborative research on other emergent and ICT-mediated practices. Such reflection is essential to render visible the complexities and contestations around the definition, categorisation and translation of emergent practices, thus performing important work in opening them up for description, discussion and debate.

Construction: building a food sharing database

Pre-search

Drawing on a scoping study conducted between 2014 and 2015 which developed a preliminary typology of food sharing (Table 1) and an initial database (see Davies and Legg, forthcoming), a core team was assembled of six international social science researchers from Ireland, Italy, Australia, the USA and Switzerland, and different disciplines – geography, anthropology, earth science and sustainability science – working closely together in one location over a period of four months in 2016. The first task was to revisit the initial categories and terminology of ICT-mediated food sharing in the light of this international interdisciplinary expertise; to foster shared understanding and common ground amongst the team.

A number of revisions to the typology were made at this stage (see Table 2). Drawing inspiration from Gibson-Graham's (2008) diverse economies framework, it was decided to deconstruct the initial 'mode of sharing' category into two categories to better distinguish between the practice of sharing (mode) and the way those sharing practices were organised. Separating mode and organisation in this way allows for a more detailed analysis of the different ways that exchanges and initiatives are governed, by local municipalities, tax authorities, food and safety regulators, as well as sharers and other stakeholders. Further, separating these fields provides for more fine-grained accounts of multimodal strategies that are adopted by some initiatives.

A small number of new categories were also developed through a reasoned discussion amongst the core team who

brought multilingual and multidisciplinary expertise to the project. This enabled the coding structure to more fully capture the nature of food sharing internationally and to reveal the diversity of food sharing activities obscured by the initial classification. For example, this included adding in a category of 'eating together' as distinct from the distribution of meals in order to distinguish intentional acts of commensality with goals of cementing (and bounding) social relations and creating conviviality (Kerner *et al.* 2015) from the provision of meals alone. Another example is the replacement of the rather amorphous illicit, illegal, unregulated (III) category of food sharing with two separate terms to distinguish the mode of sharing – collecting (e.g. foraging, gleaning, dumpster diving and food rescue) – from the organisational structure of initiatives, which themselves were expanded to explicitly identify social enterprise, co-operatives, membership associations and informal (or non-membership) organisations.

Additional ICT categories were added to reflect the increased use of interactive social media as a means of connecting, communicating and awareness raising around food sharing activities and to ensure that a range of ICT mediation was included in the study (Börjesson *et al.* 2015; Choi and Graham 2014). ICT mediation ultimately included Facebook, Twitter, Meetup, websites or apps. This range of mediation enables a fuller picture of engagement with technology of differing levels of complexity in the food sharing space. This is particularly important as many organisations are grassroots in formation and operate with limited digital literacy skills and few resources, which inevitably restrict the ability to invest in complex technology. It also counters criticisms that research on the sharing economy overemphasises venture capitalist funded, for-profit online platforms, ignoring the manifold ways in which activities are engaging with the growing range of Web 2.0 innovations (Benkler 2006; Helbing 2015).

Once the typology was refined, a list of search terms and strategies were developed. This process began with the core research team working initially with the food sharing activities with which they were most familiar and developing a list of 28 key words. The team was able to draw on their extensive language skills and those of their networks to translate these into other languages. Where this was not possible *Google Translate* was used as a rough heuristic, although the cultural specificity of terminology within the food sharing arena presents significant challenges of cultural translation (Bhabha 1994). However, this issue of cultural translation will require further exploration through deeper ethnographic analysis, as it was found that in some cases the English words 'food sharing' had been adopted by some initiatives in non-English-speaking countries. For

Table 1 Typology of food sharing

		Mode of sharing				
	What is shared	Illegal, illicit or unregulated (IU)	Gifting	Bartering	Not-for-profit	For-profit
Stuff <i>From seeds to unprocessed and processed foodstuffs including utensils, food waste or compost</i>	Sharing the foodstuff that has been 'liberated', foraged or gleaned, e.g. 510 fruits, USA	Providing foodstuff for free, e.g. FoodCloud.ie, Ireland	Swapping foodstuff, e.g. Adelaide Hills Produce Swap, Australia	Providing opportunities to offer or collect excess food on a not-for-profit basis, e.g. Foodsharing.de, Germany	Selling homecooked food that generates income beyond the costs of production, e.g. Cooksto, Greece	
Spaces <i>From shared growing spaces to shared food preparation or shared eating spaces</i>	Guerrilla gardening of public open spaces, e.g. Elephant and Castle roundabout, London, UK Identifying places where gleaning or foraging might occur, e.g. 3000 acres, Australia	Providing spaces for growing for free, e.g. The Monroe Sharing Gardens, USA	Providing spaces where food can be acquired in exchange for labour, e.g. Neighbourhood foodstores	Providing spaces for people to grow food on a not-for-profit basis, e.g. Milwaukee Urban Gardens, USA	Providing spaces for supper clubs, e.g. The Underground Supper Club, Ireland	
Skills <i>Including the sharing of knowledge and experiences around food from growing to eating and food waste disposal</i>			Providing opportunities to learn about growing food, swap seeds and produce with other gardeners near you, e.g. Grow stuff, Australia	Providing workshops around nutrition or growing, e.g. Hunger mountain co-op, Montpellier, USA	Providing opportunities for travellers to experience homecooked meals with locals, e.g. Eat With, Global	

Table 2 Revision to food sharing typology^a

Category	Scoping database	Revision	Addition
What	Seeds Crops Food products Compost Tools Preparation spaces Kitchen devices Knowledge/skills Experiences	Plants and seeds Fruits and vegetables Food products Compost Tools Land Kitchen spaces Kitchen devices Knowledge and skills Meals Other	Meat and fish Eating together
How	Illicit, illegal, unregulated (IIU) Gifting Bartering Non-profit For-profit	Collecting Gifting Bartering Selling Other	
ICT engagement	ICT		Website Twitter Facebook App
Sharing flow	Business to charity Business to individual Individual to charity Individual to individual		Charity to charity Business to business
Organisation			Non-profit Social enterprise For-profit Co-operative Association Informal Other

^aTo reflect the uncertainty around forms of food sharing activities, 'other' categories were included in the database for each of the coding sections to allow for hybrid organisations, modes and materials of exchange to be set aside during the collation phase for reflection.

example, *foodsharing.de* in Germany, *1FoodShare* in Italy, *foodsharing.pl* in Poland and *foodsharing.ch* in Switzerland all used English terminology. The reasoning behind the use of the English words in these initiatives was not explained although it could be related to the dominance of English in online environments generally or it might be used to differentiate the initiatives from existing activities that use well-established native language terminology.

Searching

Searching was conducted systematically via country-specific Google search engines, social networking sites such as Twitter and Facebook and networks of food activists (e.g. Boston Food Systems listserv, Food Surplus Entrepreneurs Network, municipal and national Community Garden databases), sharing networks (e.g. *Shareable*), solidarity economy organisations (e.g. Solidarity NYC, US

Solidarity Network) and international research networks (e.g. Community Economies Research Network). During this process the research team actively collected additional information about the food sharing activities that raised ambiguous, complex or boundary issues related to the established food sharing classifications. This was expected as the multifunctionality of food sharing initiatives had already been flagged in the scoping phase (Davies and Legg, forthcoming), but the larger research team necessitated much more face-to-face interaction to facilitate debate and clarification around whether particular initiatives were 'in' or 'out'. A second key question around boundaries related to the physical location of the food sharing activities to which the online data related. The focus of the project was explicitly focused on cities as dynamic sites of production, consumption and innovation. City systems are complex networks of political, economic and socio-spatial

processes that are both intimately local and also globally connected (Swyngedouw and Heynen 2003), but they also have porous and multi-layered boundaries. Agreeing city limits, particularly in large metropolitan cities such as London, Melbourne, Boston or New York, was challenging.

Once the research team had developed a shared lexicon and were comfortable with the coding schemes and definitions, it was possible to open up data collection for wider input. Initially, a survey was devised and circulated alongside a blog on the *Shareable* platform that explained the project and invited input from readers. Calls for suggestions of initiatives were also made through a range of other food-related lists and networks. Once filled in the forms directly populated an excel spreadsheet creating an efficient process from a technical perspective, however, it soon became clear that this format was overly complex. The procedure was simplified by providing summary details on the project requirements and a text box for contributors to detail initiatives and the ICT links so that the research team could consistently consider each suggestion and enter it into the database if eligible.

In total, 273 activities were submitted through open calls for information and 146 of these were deemed to be eligible for the database. This strategy expanded the data collection process, soliciting contributions from diverse online and place-based communities and was particularly useful in countries where English was not commonly used. It also brought the researchers into conversation with others about food sharing generally, our definition of food sharing and the limits of the research project. Through this means of crowdsourcing, the research stretched into the participatory realm, where community members were eager to take on a role of co-producers in knowledge generation (Mauser et al. 2012). Their contributions assisted the creative construction process already initiated by the research team and identified a more diverse range of activities than would have been generated by the team alone.

In parallel with the open call and the team searches, additional individuals with specific language skills were recruited to search cities where the core team were not confident that they were capturing all food sharing initiatives. In total the core team worked with ten translators (some of whom were physically situated in Dublin and others overseas) to maximise the identification of food sharing initiatives. In total 4005 initiatives were deemed eligible for coding by the core research team.

Coding

The first step for coding information from the identified activities was to trawl the 'About', 'What we do' and

'Who we are' sections of web and Facebook pages. This provided researchers with a broader perspective on the activities and insights into the key data points for the database: type of organisation, focus, year of establishment, economic, environmental and social claims, what was shared and how it was shared. Unsurprisingly, websites provided the most detailed content, with a few, such as *FoodCloud* in Dublin, even containing annual reports, organisational milestones or food sharing metrics. The extraction of information from social media websites (Facebook, Twitter and other) addressed different types of data and in some cases filled in outstanding gaps in information needed for coding. For example, by interpreting and extracting information from visually rich content – including photos and videos, as well as user-generated content or even live chats – additional information about what is being shared and how was gleaned. Extracting knowledge directly from the social media profiles of food sharing initiatives also facilitated access to parallel peer networks that those initiatives interacted with through 'following' or 'liking'. This online snowballing technique was particularly useful for developing a broad picture of the food sharing ecosystems within cities.

The following section draws out some of the key issues that were raised by the creative construction of the database process and which are likely to have resonance with other studies investigating emergent online–offline activities beyond the food sharing realm.

A reflection on creative construction

The process of building the database was an intense experience, comprising more than 5000 person hours of labour to design, search and code. Even so, the resulting database is only a snapshot of ICT-mediated food sharing in the cities studied as initiatives were constantly emerging and disappearing even over the duration of the database development process. This partiality does not affect the overarching goals of the research project, as it was on one level a means to establish, and sample from, the landscape of food sharing activities in order to refine understanding of them and to identify case study cities and activities for more in-depth, multi-sited ethnographic and netnographic analysis (Falzon 2009). However, the research team was keen for the research to have a wider impact, to give something back to the communities and initiatives being studied and to contribute to wider academic discussions around the interrelated material and cyber-worlds of city-based sharing (Agyeman and McLaren 2015). To achieve this goal web-designers were commissioned to convert the database into an open-access, online searchable tool² that will be updated, revised and extended by the research

team over a five-year period; a process resourced through the wider research project.

Particular challenges occurred in relation to the multifaceted and temporal nature of sharing activities that were frequently situated within wider food sharing webs. For example, in *Food Not Bombs* meals and eating together are shared in public spaces between volunteers in an informal initiative and strangers. But before that meal can be shared a group of volunteers needs to collect the food, then they need to prepare it somewhere often sharing cooking skills, kitchen space and appliances. The gifted meal, while the most central to the goals of the enterprise, is just one moment of sharing facilitated through *Food Not Bombs*. Capturing this dynamic and moving system in a static dataset was particularly difficult. There were challenges also around the heightened expertise within the core research team; prior knowledge of activities or organisational forms sometimes led to a reading beyond the available online images and text. In response, the team resolved only to code what they could see on websites and social media, and defer to the explicitly stated self-categorisation of organisations, for example, non-profit, co-op or social enterprise, even when it was not clear whether initiatives were formally registered as such.

In addition to these particular experiences, which might be quite specific to urban ICT-mediated food sharing, there were a suite of issues which have wider resonance for other researchers engaging in exploratory research with ICT-mediated environments. In particular around notions of: crafting; negotiating; and performing.

Crafting

Taking into consideration the under-defined and under-studied concept of food sharing, it was inevitable that the process of creating a database was going to be a handcrafted, rather than an immediately technical procedure. As well as the overwhelming amount of data made available, the process of information filtering and collaborative knowledge extraction connected both online and offline realities and materialities (Kinsley 2013). This involved peer-to-peer checking within the team and its networks as well as 'crowd-checking' which occurred when city-specific enterprise lists were circulated to the public, social networks and local experts to validate our findings and fill in any gaps from the survey. This process solicited comments, queries and additions and provided some quality control for collaborators. By building the database manually researchers were able to minimise the risk of misinterpretation, as well as foster online discourse and identify shared meaning between people, places and technology. Most particularly, close attention was paid to the socio-spatial diversity within vocabularies of food

sharing internationally, what Gluck and Lowenhaupt Tsing (2009) have called 'words in motion' in order to flag commonalities and divergences in how food sharing is described for further interrogation during subsequent ethnographic research in the field.

Negotiating

The database was collated by six core researchers, ten translators and more than 100 survey participants. While efforts were made to ensure consistent coding of food sharing activities, contributors certainly had different intuitive understandings of what counts as food sharing, thus actively constructing the shape of the landscape being identified by building on their existing mental grammars; hence the parallels with the concept of 'creative construction' within linguistics (Dulay and Burt 1974). Decisions regarding inclusion or exclusion were then negotiated between different constituents and across different sites. The 'field' for the research team, was then not only the online world, but also our shared office space, and the distributed locations of translators and survey participants. Throughout the process we had to negotiate both how to understand and how to present data in a uniform online format that nevertheless did not detract from the richness of '[t]he openness and culturally constructed nature of the social world, peppered with contradictions and complexities' (England 1994, 81). Rather than simply producing an online record, the process of creating the database represented the collaborative process of the core researchers working in a small shared space, iteratively translating each of our interpretations of activities across cultures, across language, and across personal experiences and roles. This forced the team to dissect and recalibrate understandings in order to work together to produce a comprehensive and comprehensible body of work. As such, the outcome is not only an extensive, open-access, searchable database, but also the formation of a truly collaborative team effort and transdisciplinary work.

Performing

Our research methods and outputs do more than reflect a world that already exists, they also help to perform one. Linking back to early reflections on cultural translation, which involves paying attention to the ways in which food sharing is articulated, this implies that words have the power to make worlds (Gluck and Lowenhaupt Tsing 2009). Such performativity is a feature of all research – the methods and tools we use to measure the world invariably co-produce that world – rendering some realities more legible than others (Law 2004). However, we found the performative component to be especially visible in the construction of an exploratory database on food sharing. As identified in the introduction, food

sharing in the round has rarely been counted, researched or regulated as a discrete unit. As a result, elements of food sharing are more often described within other frameworks – such as the solidarity economy, the sharing economy, the alternative food movement, the co-operative movement, the non-profit or third sector – if they are recognised at all. Constructing an exploratory database that includes the full spectrum of food sharing activities, initiatives and economies is then a bold move to draw these activities and initiatives together and examine them side by side and from an urban food system perspective (FAO 2016). The building of an exploratory database such as described in this paper, can then, in itself, be an exercise in reframing socio-economies, unsettling dominant economic narratives and revealing a multiplicity of already existing diverse practices that operate differently and offer the possibility for ‘new economic becomings’ (Gibson-Graham 2008, 619).

Conclusion

Individually, each of the food sharing initiatives may be easily dismissed as too niche, small scale, local, culturally specific, even esoteric and unproductive to reconfigure urban food systems, let alone lead transformations towards sustainability. However, combined they collectively create a robust dataset of more than 4000 initiatives across 100 cities from which a host of statements about the existence, practice and impact of multiple (including alternative and non-market) forms of exchange in the food sharing arena can be elicited. The database itself now performs a function as a platform not only on which diverse economic practices and their facts are made visible for research, but also where ICT-mediated food sharing initiatives can become visible to one another and connect. Indeed, more than 1767 users have interacted with the database in the first three months since its launch in September 2016.

Reflecting on the procedures of creating a database concerned with emergent and transformed practices has value beyond the specific field of food sharing. It throws into sharp relief important questions for scholars conducting research on other emergent translocal worlds increasingly mediated through digital technologies. This is particularly significant in the drive to undertake research that considers the multiple ways in which technical activities collate assemblages of bodies, devices, language, meanings and understandings across space and time; what Kinsley (2013) refers to as the technics of human-technology interaction.

This paper describes an attempt to conduct the kind of sensitive and nuanced interrogation of contemporary digital geographies that Kinsley (2013) calls for,

particularly by giving space to the social impact of words and the complexities of cultural translation; recognising that words travel around the globe and across time. As the collection of papers edited by Gluck and Lowenhaupt Tsing (2009) reveals, words can change the worlds in which they move, but they are also changed by them. While the words, vocabulary and even grammar around sharing and particular food sharing may not be as provocative as those around *security* or the *hijab*, words can also be used to agitate quietly for political change in ways which might less obviously destabilise and disrupt.

Given that ICT-mediated food sharing is an embryonic practice with no fixed definition or known population, the process of constructing the database was necessarily exploratory and creative. Food sharing is not a discrete empirical object; it is something that is emerging through a combination of practice and performance. While the database temporarily fixes food sharing activities, the reality is by no means a stable story. Recognising this, the work involved in creating the database was not only about collation and documentation; it also functioned as a form of outreach to, and collaboration with, sharing communities. This, we argue, is an important precursor to fieldwork that can explore the nuances and contingencies of practising food sharing across contrasting contexts internationally. The process of creative construction then does valuable work rendering visible activities which have to date not been captured collectively under existing empirical or conceptual frameworks and opening up possibilities for translocal comparisons of ICT-mediated urban food sharing.

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Notes

¹ The internet here refers to the worldwide computer network that can be accessed, for example, via a computer, mobile telephone, personal digital assistant (PDA), games machine or digital TV.

² Please see The Sharecity100 Database: <http://sharecity.ie/research/sharecity100-database/>.

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APPENDIX TWO

Making visible: Interrogating the performance of food sharing across 100 urban areas



Making visible: Interrogating the performance of food sharing across 100 urban areas



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ABSTRACT

Interpersonal sharing of food has been an omnipresent feature of human civilisation from hunter-gatherer societies to the present, both as a mechanism through which sustenance is secured and as a means to cement social relations. While the evolutionary dynamism of this food sharing is relatively well documented, critical scholarship has tended to examine contemporary food sharing practices beyond family and friends through case studies of individual initiatives. A broader view of food sharing practices is absent. In addition, there has been little examination of the role that emerging information and communication technologies (ICT) are having on food sharing, despite claims that such technologies offer transformative potential to achieve more secure, sustainable and just food systems. In response, this paper presents a novel landscape level analysis of more than 4000 ICT-mediated urban food sharing activities operating across 100 cities in six continents. Adopting conceptual insights from the intersection of social and economic practice-oriented approaches, the resulting food-sharing database progresses understanding of, and makes visible, the ways in which food (and food-related skills, stuff and spaces) is being shared across diverse urban settings. To conclude, it is argued that the database plays an important productive and performative role in mapping and comparing diverse food sharing economies. Importantly, it provides a springboard for further explanatory research to fine-tune our understanding of the evolution, governance and sustainability potential of urban food sharing.

1. Introduction

At the second meeting of the Milan Urban Food Pact in 2016, the Director General of the Food and Agriculture Organisation (FAO) José Graziano da Silva, called for cities, big and small, to help construct urban food systems that will be sustainable and resilient in the face of changing climates. Aligning with the aspirations of the Sustainable Development Goals to end hunger and create sustainable cities and communities, the Pact brings together mayors from across 130 cities to identify solutions to current and future food challenges in an increasingly urbanized world. In this quest, illustrative examples of innovative responses to local food challenges abound, including food-sharing initiatives beyond familial and household settings such as surplus food redistribution and community gardens, with urban areas emerging as living laboratories for sustainable food transition experiments. However, little is known about the cumulative nature of these urban food initiatives at a city, nation or aggregate level as large-n comparative analyses are rarely developed. This means that the full range and consequence of diverse food initiatives remain largely invisible to

city governors, urban citizens and to the growing communities of practice in the urban food arena. As a result, the overall potential of such initiatives in terms of transforming urban food systems onto more sustainable and resilient trajectories is hard to discern, the international learning from experiences is limited, and novel interventions in the foodscapes of one locale are easily dismissed as interesting but rather inconsequential niche experiments in the face of systems dominated by multinational agri-food organisations.

This problem of invisibility has already been noted by those researching grassroots sustainability innovations (Davies and Mullin, 2011; Seyfang and Smith, 2007) and diverse economies more broadly (Gibson-Graham, 2008), including diverse food economies (Cameron and Wright, 2014). However, significant challenges around ascertaining and aggregating the performance of diverse food sharing initiatives beyond one locale remain, particularly in emergent and dynamic arenas such as urban food sharing. Confronting these challenges head on, this paper reports and reflects on the findings of an experimental process of ‘making visible’ the practices and economies of urban food sharing initiatives that are utilising specific forms of ICT (information and communication technologies)

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across 100 cities, drawn from 43 countries and six continents. The focus on ICT-mediated urban food sharing emerging out of claims that we are living through a fourth industrial revolution characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres (Schwab, 2016).

Beginning with a brief summary of the meaning, history and evolution of the social practice of food sharing, this paper presents a typology of food sharing which helped define search terms for identifying and interrogating urban food sharing initiatives and subsequently the construction of a database. A reading of the database is then provided that explores the performance characteristics of food sharing practices. This includes their spatial orientation (*where* food sharing initiatives are located) and *why* they were established, *what* is being shared within them and *how* that sharing takes place. Explicitly embracing the weak theoretical stance promoted through diverse economies research (Gibson-Graham, 2008), it is argued that this descriptive process is a necessary and productive initial step in understanding the contribution food sharing makes (and might make) to broader urban foodscapes (Mikkelsen, 2011). Ultimately, this paper has two functions: (1) It presents the findings of a novel international study of ICT-mediated urban food sharing and (2) it reflects critically on the limitations of the study, outlining key research questions still to be answered and illustrating how co-ordination between multi-scalar and multi-disciplinary studies will be needed to understand how food systems in urban areas might become more resilient and ultimately more sustainable.

2. Food sharing

The sharing of food is a longstanding feature of human civilisation, both as a mechanism through which sustenance is secured and as a means to cement social relations (Kaplan and Gurven, 2005). Its evolutionary dynamism is relatively well documented at the kinship level, particularly in relation to the apparent decline of eating together at home in some western societies (Julier, 2013; Weinstein, 2005). Meanwhile, attempts to understand how, why and to what end people share food more broadly have a long lineage across archaeology, geography, psychology, anthropology and beyond. As Jaeggi and Gurven (2013: 186) note, '[f]ood sharing is a fundamental form of cooperation that ... is particularly noteworthy because of its central role in shaping human life history, social organization, and cooperative psychology'. Behavioural anthropologists in particular have concluded that while many other animals actively partake in food sharing, 'the patterning and complexity of food sharing among humans is truly unique' (Kaplan and Gurven, 2005: 1). However, the patterning and complexity of contemporary food sharing especially that occurring beyond the home and in urban, industrialised settings has received the limited attention to date. Given that such sharing has been further differentiated in recent decades through the mediating capabilities of smart and mobile information and communication technologies (ICT) that are reshaping how people connect, interact, exchange and acquire knowledge, skills, experiences, goods and services, this is an area ripe for further investigation (Hearn et al., 2014).

First, it is helpful to delineate more precisely what is considered as food sharing for the purposes of this paper. Given the manifold ways in which sharing is understood, combined with a desire to begin with a broad examination of food sharing across the urban food system, the Oxford English Dictionary definition of sharing is adapted to focus explicitly on food:

having a portion [of food] with another or others; giving a portion [of food] to others; using, occupying or enjoying food [and food related spaces to include the growing, cooking and/or eating of food] jointly; possessing an interest in food in common; or telling someone about food¹ (Oxford University Press, 2014¹ emphasis added).

This definition illustrates the social practices of *doing things together* around food, including but moving beyond simple commensality; the practice of eating or drinking together. Sharing then is not just what people do, it is a co-ordinated entity 'a temporally unfolding and spatially dispersed nexus of doings and sayings' (Schatzki, 1996) and a performance - a process of doing - through which sharing as an entity is perpetuated and potentially reshaped. Such a definition also allows attention to a wide range of things that can be shared, from the material stuff of food (e.g. unprocessed crops and seeds), to products (e.g. processed food or tools for growing and cooking) and services (e.g. systems for the provision of redistributed food), as well as capabilities (e.g. growing or cooking skills) and spaces (e.g. fields, allotments, gardens, and kitchens). It also admits, although does not prescribe, a wide variety of scales over which sharing might take place; what Agyeman et al. (2013: 2) refer to as 'territories of sharing'.

Focusing on what is shared and how it is shared provides a useful skeleton structure for demarcating realms of food sharing and this was used to develop an initial typology illustrated by Table 1, which illustrates the type of urban food sharing initiatives included in such a definition. For the formation of the database this typology was used alongside attention to organisational structures (for-profit, not-for-profit, social enterprise, cooperative, association, informal), modes of sharing (gifting, bartering, collecting and selling) and form of ICT (website, facebook, twitter, app) being used. The methods adopted for identifying such characteristics are outlined more fully in the mapping section of this paper.

2.1. Food sharing as social practice

While the benefits of adopting a practice orientation in relation to eating, cooking or growing food is relatively well-established (Davies, 2014; Warde, 2013; Delormier et al., 2009; Campbell et al., 2012; Meah, 2016), this approach has not been applied explicitly to food sharing. Yet, as outlined above, food sharing is undertaken for and with others; reshaping relations with both human and non-human entities and tangible and intangible resources (Hall and Ince, 2018; Agyeman et al., 2013). It is, as a result, replete with habits, routines, tools and technologies; essentially an archetypal practice that is both entity and performance. Food sharing embodies routinized ways "in which bodies are moved, objects are handled, subjects are treated, things are described and the world in understood" (Reckwitz, 2002: 250). It is "a 'type' of behaving and understanding that appears at different locales and at different points of time and is carried out by different body/minds" (ibid), with the performative element of food sharing practice occurring around its enactment. It is only through the performance of food sharing that the interdependencies between elements of food sharing (that is food sharing as an entity) are sustained. Individuals are the carriers of a food sharing practice which may itself evolve, with new forms of sharing appearing and others disappearing over time and across space as elements and performances are reconfigured. In essence, food sharing is a complex assemblage "of body-minds, things, knowledge, discourse, and structures carried by agents such as individuals, organizations and institutions" (Jones and Murphy, 2010: 371) and understanding it as such provides a frame for integrative analysis that can accommodate attention to the gamut of rules, tools, skills and understandings embodied within it.

Adopting a practice approach enables examination of broad social and economic processes through the consideration of the actions and meanings associated with everyday activities such as food sharing. Indeed, the approach has been mooted as a useful bridging concept between researchers primarily associated with either social or economic concerns, particularly within human geography. As documented by Jones and Murphy (2010), there are many examples of studies where practices are used to help explain phenomena within socio-spatial economies. Certainly, there is much to be drawn from the rich epistemic history of practice-oriented studies that will be relevant for analysis of

¹ On-line dictionary available at: <http://www.oed.com/>.

Table 1
An urban food sharing typology
adapted from Davies and Legge, 2018

	Mode of sharing What is shared	Collecting	Gifting	Bartering	Selling (Not-for-profit)	(For-profit)
Stuff <i>From seeds, to unprocessed and processed foodstuffs including utensils, food waste or compost</i>	Sharing food that has been ‘liberated’, foraged or gleaned, e.g. 510 fruits, USA	Providing food for free e.g. FoodCloud.ie, Ireland	Swapping food and food devices, e.g. Adelaide Hills Produce Swap, Australia	Providing affordable food on a not-for-profit basis e.g. 4th Street Food co-op, USA	Selling home cooked food that generates income beyond the costs of production e.g. Eat With, International	Selling spaces for supper clubs e.g. The Underground Supper Club, Ireland
Spaces <i>Shared growing spaces, shared food preparation or shared eating spaces</i>	Guerrilla gardening of public open space e.g. Elephant and Castle roundabout, London, UK	Providing spaces for growing for free e.g. The Monroe Sharing Gardens, USA	Providing spaces for people to grow exchanged for labour e.g. Community Shop, London	Providing spaces for people to grow for a not-for-profit basis e.g. Milwaukee Urban Gardens, USA	Providing opportunities for travellers to experience home cooked meals with nutrition or growing e.g. Hunger mountain coop, Montpellier, USA	Providing opportunities for travellers to experience home cooked meals with nutrition e.g. Eat With Global
Skills <i>The sharing of knowledge and experiences around food, from growing to eating and food waste disposal</i>	Identifying places where gleaning or foraging might occur e.g. Fallen Fruit, Los Angeles, USA	Providing skills around growing e.g. 3000 acres, Australia	Providing opportunities to learn about growing food, swap seeds and produce e.g. Grow stuff, Australia			

urban food sharing, not least the attention to cultural rituals and individual habits enshrined within Bourdieu's ideas around habitus, taste and distinction (1977) that determine (in part) what is deemed appropriate to share in different contexts, but also through attention to the rules and forms of control - or governmentality - which shapes the ways in which food sharing takes place (Foucault, 1991). This is exemplified by the mundane practices of government, for example through land use planning which dictates what types of food sharing activity can take place and where. It is also visible in the ways in which environmental health and food safety regulations shape how food can be processed, prepared and delivered for consumption (Orsi, 2012).

2.2. Food sharing practices and diverse economies

Perhaps of most relevance to the emergent phenomena of urban food sharing initiatives is the practice-oriented work emerging from diverse economies scholars (such as Gibson-Graham, 2008; Cameron and Wright, 2014) who emphasise both the intertwined messiness of livelihoods and economies, and their social, political and geographical constitution (Lee, 2006). According to Jones and Murphy (2010: 374), these studies indicate that practiced economies are far more than just sets of social relations driven by forms of structural power, “they are instead amalgams of materials, performances, structural factors, and cognitions whose particular time-space constitution is contingent on the agency of actors and is thus open to improvisation and accident”. Usefully, for research examining urban food sharing, the weak theory dimension of diverse economies research in particular promotes attention to such affective assemblages. Weak theory strives towards “mere description” and documents diverse economic practices (some desirable, others less so), without presuming the dominance of a particular economic form or system (Sedgwick, 1997). This work attends to the way stuff, spaces, and skills as well as actors (and their embodied emotions), and actants with different trajectories, may come together in tentative, inconclusive or evolving ways (Wright, 2014). Where the practice-focused dimension of diverse economies research particularly resonates with the mapping of food sharing landscapes is by recognising different forms of economic organisation and exchange - such as volunteering within food surplus redistribution or gifting food or skills to reduce waste or foster greater food security - which are commonly obscured in mainstream economic studies.

In contrast, critical attention to an emergent ICT-mediated ‘sharing economy’ has focused primarily on providing a much-needed interrogation of the impacts of venture-capital-funded, for-profit sharing platforms, particularly in the mobility and accommodation sectors (Davies et al., 2017a, 2017b; Belk, 2017; Martin, 2016; Cheng, 2016). This work has rightly highlighted the ways in which popular assumptions around the social (e.g. the view that sharing bolsters social capital) and environmental (e.g. the position that sharing reduces resource consumption) benefits of sharing are being claimed by companies who provide little in the way of concrete evidence as to whether, and to whom, such benefits accrue. Indeed, research highlights how these sharing economy platforms are in many cases simply using new technologies to extend longstanding systems of profit-maximisation (Belk, 2014), raising concerns about the ways in which the technologies of sharing may facilitate increased labour exploitation, contributing to, rather than resolving, social vulnerability through insecure working conditions under the guise of autonomy and flexibility (Bourdieu, 1998; Standing, 2011). Nonetheless, focusing only on a small number of particularly high profile cases of for-profit sharing in mobility and accommodation is problematic. It ignores the wealth of ways and sectors in which sharing is taking place, both in terms of the nature of sharing involved and the organisational models adopted to facilitate that sharing. Indeed, McLaren and Agyeman (2015) argue that the most transformative potential within urban sharing economies is unlikely to be led by commercial enterprises alone, rather by a coalescence of formal and informal behaviours particularly around shared

infrastructures and public spaces. While McLaren and Agyeman focus on the capacity of collective power rather than capital to reshape processes of urbanisation, Gibson-Graham outlines how reading economic spaces for difference rather than dominance helps to make visible the diversity of relations that co-exist alongside for-profit, monetary exchange. Elucidating the many ways in which enterprises, transactions, labour, property and finance are organised, the goal of diverse economies approaches is to unsettle the dominant economic narrative which privileges capital, markets, wages, private property and mainstream financing, by revealing a multiplicity of already existing practices that operate differently and offer the possibility for 'new economic becoming' (Gibson-Graham, 2006: 76).

This diverse economies approach is already familiar to food studies scholars, with existing research including attention to foraging (McLain et al., 2014), fisheries (St. Martin, 2007; Bresnihan, 2016), community supported agriculture (White, 2013; Wilson, 2013) and community food projects (Dixon, 2011; Traeger and Passidomo, 2012), amongst many others. The majority of these studies are however highly localised empirical analyses with the notable exception of Cameron's (2012) study of commercial international and national food retailers in Newcastle, Australia. While the rich examination of food economies through localised case studies provides interesting insights, questions have been raised about the ability of such research to inform strategic planning and policy formation and address higher order challenges (Jones and Murphy, 2010; Browne et al., 2014). In response, a few diverse economies scholars have begun to include meso-level and quantitative studies to complement the rich insights provided by studies of individual initiatives (Drake and Lawson, 2015; Wright, 2014), with similar endeavours also emerging amongst some social practice scholars (Browne et al., 2014). Following in the footsteps of these scholars and in direct response to critiques that isolated small scales studies alone will not create the necessary leverage in strategic attempts to reorient urban food systems onto more sustainable pathways, a database of ICT-mediated urban food sharing was constructed.

3. Mapping urban food sharing landscapes

As an extended reflection on the complexities and significance of constructing the database of ICT-mediated urban food sharing is published elsewhere (Davies et al., 2017a, 2017b), this section simply outlines the strategies that were developed to identify, record and classify relevant initiatives. Identification began with a scoping study that used a key word search of major internet search engines to identify ICT-mediated food sharing initiatives (Davies and Legg, 2018). The forms of ICT required for the initiative to be included in the database were: a website, a facebook page, a meet-up or twitter profile, App or platform. Including this ICT component was important for two key reasons. Conceptually, because it is the ICT component of these initiatives which has been mooted as revolutionising the practice of sharing (Botsman and Rogers, 2012) and pragmatically, because having one of these forms of ICT-mediation meant that online searches were in theory able to identify the entire population of activities even in locations dispersed around the globe. As a proof of concept phase, a scoping study was conducted in 2014–5 using only a limited number of keywords in English. Nonetheless ICT-mediated food sharing initiatives were found across 468 urban areas and in 91 countries. These numbers gave credence to undertaking a full analysis and given the calls for practice-oriented research to have greater methodological rigour and comparability (Jones and Murphy, 2010; James, 2006; Yeung, 2003), it was then decided in 2016 to conduct a thorough, multilingual search of 100 urban areas internationally. In order to maximise the potential for identifying cities with active urban food sharing five urban networks and indices were used to assist in this selection: The Sharing Cities Network; 100 Resilient Cities Network; The Milan Urban Food Policy Pact; A.T. Kearney Global Cities Index; and, the Economist Competitive Cities 2015 list. A total of 404 cities were identified through this

process. The final selection of 100 cities includes all 54 cities involved in the Sharing Cities Network in 2016 and the top ranked cities across the remaining indices (Table 2).²

Following the city selection, 28 key search terms were identified by a core team of international researchers and food sharing networks, communities and activists. Additional native speakers were recruited to conduct and cross-check searches where needed and an excel spreadsheet was created to record key characteristics (see Table 3).

In total, over a period of five months from April 2016 to August 2016, 4003 initiatives were identified and coded. Cross-checking with multiple coders and communities provided assurances of coverage and common quantitative coding methods focused on location, form, mode of sharing, organisation and impact ensured possibilities for comparative analysis. Though this approach provided an on-going dialogue between the conceptual framing of ICT-mediated food sharing and empirical observations (Downwards and Mearman, 2007; Jones and Murphy, 2010), there were limitations. One was the static nature of the data. The database presents only a snapshot of activities which are constantly evolving, with new initiatives emerging and existing ones disappearing over time. Another was the multifaceted and sometimes contested nature of urban boundaries, with diverse spatial definitions and systems of data collection being used by different organisations and cities internationally.

While the potential permutations and combinations for analysing the database are extensive,³ the following section of this paper considers four broad areas related to the performance of sharing practices that they facilitate: (i) Drivers: why food is being shared; (ii) Geographies: where sharing is occurring; (iii) Ingredients: what is being shared; and (iv) Organisation: how it is being shared.

4. The performance of urban food sharing

Initially, each initiative across the 100 urban areas was coded to record its date of establishment and its motivations and goals where these were noted on the website. Fig. 1 details the establishment date of the initiatives and indicates the rapid rise in initiatives being established after 2008 when smart, mobile digital technologies became more widely accessible, affordable and easier to use. This date also coincides with the global recession that impacted economies and societies around the globe from 2007 onwards, which has been mooted as a key stimulus to the development of sharing economies alongside technological shifts, rising environmental awareness and social anomie (Botsman and Rogers, 2012). There are initiatives with establishment dates far earlier than the availability of social media, websites and Apps. These are sharing initiatives which have incorporated ICT into their operations subsequently rather than being shaped by those technologies.

4.1. Drivers: the 'why' of sharing

The online mission statements and initiative descriptions of the enterprises were examined as a means of identifying the key drivers for the establishment of the initiatives. These were entered into the qualitative data analysis package NVivo in order to identify frequencies and clusters of keywords within initiatives descriptions of themselves and their goals. A word cloud and key word count produced from this process is detailed in Fig. 2. Excluding the word 'food' from the analysis, it is the social dimensions of food sharing that are emphasised by initiatives in their ICT profiles, with 'community', 'local', and 'people' all appearing in the top ten of most frequently used terms. Terms

² The shading on Table 2 indicates those cities who ranked in the top ten (dark grey) and bottom ten (light grey) in terms of the number of sharing initiatives.

³ Data related to location, mode and organisational form of sharing initiatives have been made open access through an interactive tool on the project website to encourage greater engagement with the material gathered. Access to the data is available from [www.sharecity.ie].

Table 2

List of 100 cities source: Davies et al. (2016). Key: Light grey = top 10 cities; ark grey = bottom 10 cities.

Region	Country	City	Activities	Ranking
Africa	Kenya	Nairobi	10	91
	South Africa	Johannesburg	23	68
	Senegal	Dakar	6	98
Asia	China	Beijing	17	81
		Shanghai	11	90
	Hong Kong	Hong Kong	40	40
	India	Bengaluru	27	59
		Chennai	14	85
		Mumbai	17	78
	Indonesia	Jakarta	16	82
	Japan	Tokyo	45	28
	Malaysia	Kuala Lumpur	45	29
	Singapore	Singapore	50	26
Philippines South Korea	Philippines	Manila	25	64
	South Korea	Seoul	42	37
		Toyama	9	93
Australasia	Australia	Adelaide	62	14
		Canberra	37	46
		Melbourne	144	3
		Sydney	108	5
	New Zealand	Christchurch	50	27
		Wellington	56	19
Central & South America	Argentina	Buenos Aires	70	9
	Brazil	Porto Alegre	4	100
		Rio de Janeiro	9	92
		Sao Paulo	24	66
	Chile	Santiago	39	41
	Colombia	Bogota	23	69
	Ecuador	Medellin	17	80
	Mexico	Quito	17	79
		Mexico City	32	54
Europe	Austria	Vienna	42	36
	Belgium	Brussels	31	56
	Czech Republic	Prague	20	73
	Denmark	Copenhagen	23	67
	UK	Birmingham	24	65
		London	201	1
	France	Paris	40	39
	Germany	Berlin	133	4
		Cologne	67	11
		Frankfurt	54	21
	Greece	Athens	15	84
		Thessaloniki	11	89
	Hungary	Bucharest	13	87
	Ireland	Dublin	45	30
	Italy	Milan	43	34
		Naples	22	71
		Rome	38	43
	Poland	Warsaw	18	77
	Portugal	Lisbon	36	50
	Russia	Moscow	13	88
	Spain	Barcelona	106	6

(continued on next page)

Table 2 (continued)

<i>Sweden</i>	Madrid	63	12
	Gothenburg	14	86
	Stockholm	26	61
<i>Switzerland</i>	Zurich	42	35
<i>The Netherlands</i>	Amsterdam	29	57
	Nijmegen	15	83
	Rotterdam	18	74
<i>Turkey</i>	Istanbul	36	48
Middle East			
<i>Qatar</i>	Doha	6	99
<i>UAE</i>	Dubai	8	95
<i>Israel</i>	Tel Aviv	18	76
North America			
<i>Canada</i>	Montreal	38	45
	Toronto	43	32
<i>United States</i>	Ann Arbor	36	49
	Asheville	39	42
	Atlanta	52	23
	Austin	62	13
	Berkeley	44	31
	Bloomington	27	60
	Boston	55	20
	Boulder	35	52
	Chicago	72	8
	Cleveland	26	62
	Dallas	31	55
	Denver	59	15
	Detroit	41	38
	Elora	9	94
	Gulfport/ Biloxi	18	75
	Hartford	21	72
	Houston	43	33
	Ithaca	23	70
	Jackson	8	96
	Long Beach	29	58
	Los Angeles	57	18
	Louisville	33	53
	Media	7	97
	New York City	185	2
	Oakland	52	24
	Philadelphia	81	7
	Pittsburgh	38	44
	Portland	51	25
	Rochester	25	63
	San Francisco	57	17
	Santa Cruz	37	47
	Seattle	53	22
	St. Louis	36	51
	Vancouver	68	10
	Washington DC	58	16
	Total: 4003		

related to sociality appear at rank 16. Despite the claims of sharing economy advocates, no explicitly economic or environmental phrases feature highly, although terms related to waste and wasting appear at number 20 in the table. Despite this online analysis of the initiatives shows that that 78%⁴ indicate economic impacts, 77% social impacts and 61% environmental impacts, while just over a third (34%) of initiatives explicitly seek all three. Few of the initiatives provided any evidence to substantiate achievement of these impacts in their online profiles however.

4.2. Geographies: the 'where' of food sharing

The number of initiatives identified in each of the 100 urban areas examined indicates a spectrum of activity, from London in the UK, which has more than 200 initiatives, to Porto Alegre in Brazil where just four initiatives were identified (see Table 2). The top 10 food sharing areas in the database by number of initiatives - London, New York, Melbourne, Berlin, Sydney, Barcelona, Philadelphia, Chicago, Buenos Aires and Vancouver - account for just under one third of all initiatives recorded (29%) across the 100 areas, while the ten food sharing areas with the fewest number of initiatives account for just 2%,

⁴ All % are rounded to the nearly whole number.

Table 3
Spreadsheet coding subcategories.

Code category	Sub-category
Location	Region; city
Name	Name of initiative
ICT	URL; Meetup; Facebook; Twitter; App;
Goals	Mission statement
What	Plans and seeds; fruits and vegetables; meat and fish; food products; compost; tools; land; kitchen spaces; kitchen devices; knowledge/skills; meals; eating together
Mode	Collecting; gifting; bartering; selling
Organisation	Non-profit; social enterprise; for-profit; cooperative; association; informal
Flow	Business to charity; business to individual; individual to charity; charity to charity; business to business; charity to individual; individual to individual
Benefits	Social; economic; environmental

suggesting a cluster of areas currently dominate the ICT mediated-urban food sharing arena. What though are the reasons for this uneven geography of ICT-mediated food sharing and what might explain the clustering of activities around a smaller number of highly active cities?

Given the lack of comprehensive and consistent data at the urban level for all the areas in the database, it is not straightforward to identify whether areas exhibit particular contextual characteristics which might explain the relative incidence of ICT-mediated food sharing. For example, while the areas with the highest number of initiatives are predominantly large populous metropolitan areas with high levels of GDP (compared to the global average) and high levels of internet penetration, if the number of initiatives is examined per capita, the ranking looks very different. In terms of number of initiatives per capita, the highest ranked urban area with a population of over one million is Cologne (31st), while London falls to a mid-table position (54th) with one food sharing initiative for just under 43,000 people.⁵

On a per-capita basis the top ten are all smaller urban areas in North America: Elora, Media, Ithaca, Santa Cruz, Asheville, Berkeley, Ann Arbor, Bloomington, Boulder and Hertford. Indeed, Elora, a community in the township of Centre Wellington in Canada ranks first in this configuration with the impressive statistic of having a food sharing initiative for every 511 people. So what makes this area a hot spot of urban food sharing? There is no obvious answer, but it is an affluent community with a longstanding commitment to food and agriculture, where the population has strong links with nearby university towns such as Waterloo or Guelph for employment and farming research. Sharing in Elora also has a charismatic champion who led the formation of Elora Community Share which provides an umbrella for food sharing initiatives and sharing beyond food and which connects with international sharing networks such as Shareable through the Sharing Cities Network.

The urban areas with the highest absolute number of initiatives tend to be highly active across the networks and indices used to select the sample (detailed in the previous section). Indeed, Melbourne, New York and Chicago appear in all the networks and indices and London appears in all except the Sharing Cities Network. Meanwhile, eight of the top ten urban areas participate in the Milan Urban Food Pact and are listed in the Sustainable City Index. While it is impossible to identify a causal relationship between participation in these international networks and a high level of ICT-mediated food sharing, what this at least suggests is that a high level of ICT-food sharing occurs most often in cities with a broadly supportive governing structure for activities which relate to food and

sustainability. The connection between areas with lots of food sharing initiatives and presence in the competitive cities and global city indices is less obvious, although six of the top ten cities do appear in both.

The ten urban areas with least food sharing activity are more diverse geographically than the leader cluster of urban areas, being located across Africa (Nairobi, Dakar), Asia (Toyama), South America (Rio de Janeiro, Porto Alegre) and the Middle East (Dubai, Doha), as well as North America (Elora, Jackson, Media). These areas, particularly the ones in North America, have far lower engagement with the international networks and indices than those at the top of table. It should be noted that all non-North American urban areas are included in either the 100 Resilient Cities Index or the Sustainable Cities Index, but only Rio de Janeiro and Nairobi are listed in the Global Cities Index and only Dubai and Doha appear in the Competitive City Index. Similarly, there is far more diversity within this cohort in relation to population, GDP and internet penetration, although figures are consistently lower across these metrics than the top ten cities particularly in relation to internet connectivity.⁶

Although insufficient comparable urban-level data exists to identify a statistically significant relationship between particular cities and the nature of their food sharing, examining the extreme ends of the sample suggests that several factors may play a role in providing a supporting infrastructure which allows urban food sharing to form more readily. This includes, most obviously, the availability and accessibility of internet connections, but also active participation or recognition in international city networks, particularly where learning can be exchanged. This may suggest that international networking supports higher levels of city-based innovation and experimentation in areas such as ICT-mediated food sharing; a feature which has been found in relation to innovation around cities and climate change (Wang, 2012; Kern and Bulkeley, 2009; Castán Broto and Bulkeley, 2013; Davies, 2005).

A final comment on the geographies of sharing relates to the capacity of ICT-mediation to scale sharing beyond the face-to-face exchanges in particular locales which have typified familial and friendship sharing and also for sharing initiatives to have a presence in more than one location. While online data provided by sharing initiatives does not indicate the scale of participation in sharing or indeed the location of those participants – and more on this later – what it does reveal is the emergence of translocal (active in more than one urban area) and even transnational (active in more than one country) sharing initiatives. At present evidence of such translocal sharing is limited, with just 5% of initiatives operating in more than one urban area listed in the database (although they may operate in other urban areas not incorporated in the sample), and around 1% of all initiatives active in more than one country. Of these transnational sharing initiatives there appear to be three main types of sharing that are being performed: sharing meals, eating together and mapping of food harvests. This split is reflected also in the structure and mode of sharing employed. A third of the transnational initiatives are for-profit and predominantly sell meals or host dinner parties often marketed at those seeking more authentic home cooking experiences when travelling or living abroad, such as Eat With Me, or Travelling Spoon. A third have no discernible organisational structure or governance code and tend to be open data mapping initiatives, such as Falling Fruit, that rely on voluntary, self-organised data collation and management which is provided for free through on-line repositories.

⁵ Focusing on the frequency of urban food sharing initiative per capita has less impact on the least active urban areas however, with the bottom ten urban areas under this configuration all also appearing in the bottom half of the original ranking. Population figures are taken from US Government Census Data for US urban areas and Eurostat for European areas. All other statistics are taken from official population data where available and verifiable sources elsewhere.

⁶ Statistics do not exist at the city level for internet penetration for the cities in the database. Country level statistics are used which is likely to be an underestimation of penetration given the density of connections in urban areas in these countries is presumed to be higher: <http://www.internetworldstats.com/south.htm>.

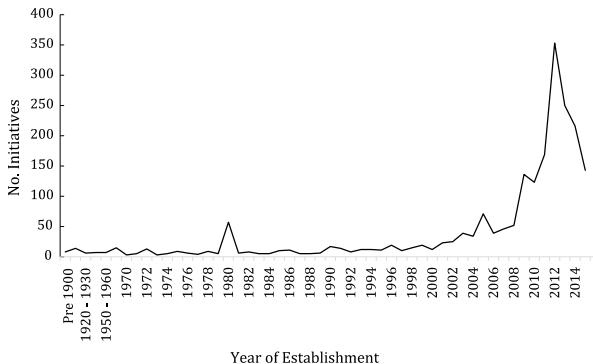


Fig. 1. (a) Year of food sharing initiative establishment. (b) Cumulative number of food sharing initiatives by year.

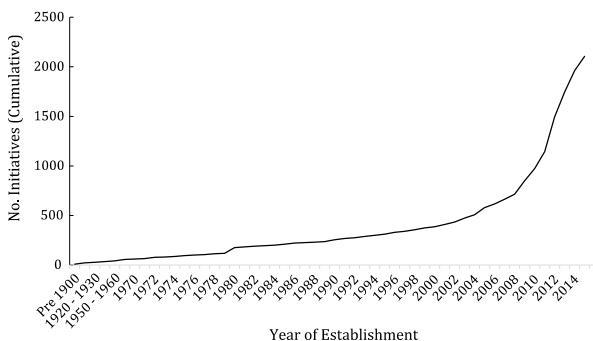


Fig. 1. (continued)

4.3. Ingredients: the 'what' of food sharing

Given the remit of the study to examine sharing practices around growing, preparing and consuming food, sub-divisions were required to order and code the various initiatives. The following categories – plants and seeds, fruits and vegetables, meat and fish, food products, compost, tools, land, kitchen space, kitchen devices, knowledge and skills, meals, and eating together – were established through a process of trial and revision (see Davies et al., 2017a, 2017b). In many cases, multiple skills, spaces and material 'stuff' are shared within a single food sharing initiative. More than two-thirds (70%) of food sharing initiatives in the database share multiple things and more than a third (35%) of initiatives share three or more things. For example, the Skip Garden and Kitchen in London provides knowledge and skills around community growing and cooking to local planners and businesses as well as involving the local resident community in food growing in its sites. Its sharing therefore involves food, land, tools, kitchen spaces and meals in addition to skills and knowledge. We term this phenomenon the multifunctionality of food sharing (Davies et al., 2017a, 2017b). Why this occurs is not directly discernible from the online material alone, but it may enable initiatives to reach wider audiences and contribute to the resilience of the initiative over time facilitating the redirection of efforts to different areas as they become more or less active or in-demand (Wilson and Dünckmann, 2010). It might also be a function of the multiple drivers behind the food sharing initiatives, for example

seeking to both reduce food waste and improve food security. Alternatively, it could be that such multifunctionality responds to the heterogeneity and interlinked nature of urban food systems within which the sharing is embedded, but such hypotheses need further ground-truthing through in-depth qualitative research with initiatives.

Examining the entire database, the most common entity shared (including all categories of foodstuff, spaces and skills) is that of knowledge and skills, with more than half of initiatives (54%) engaging in some form of sharing information-based qualities (see Table 4). This category includes knowledge about growing, as for example in the Open Farm Community in Singapore or the Motoazabu Farm in Tokyo. It also involves skills sharing in relation to food preparation, as illustrated in the activities of the Kinder Kuech in Frankfurt that focuses on teaching children how to prepare healthy meals, and the community kitchen Cozinha Popular Da Mouraria in Lisbon. Knowledge and skills sharing related to collecting, can include, for example the provision of information about how to practice urban foraging, as articulated in Lots of Food in Louisville, USA and Espigar En Madrid in Madrid, Spain. That knowledge and skills ranks highly is unsurprising as information-provision (as one form of knowledge and skills sharing) is easily disseminated via ICT mechanisms and can provide a one-way dissemination function, without necessarily requiring interaction between donor and recipient (Hendricks, 1999; David, 2017). Information, unlike fruit and vegetables, or meals, is not degradable, although the relevance and accuracy of such data may still have a limited lifespan. The perishability



Rank	Word	Frequency	Combined Words
1	food	5689	food, food', 'food, foods communal, communally, commune, communes, communicate, communicates, communicating, communication, communications, communicative, communities, communities', community, community'
2	community	3067	
3	garden	2098	garden, gardener, gardeners, gardening, gardening, gardens, gardens'
4	sharing	1823	share, share', share', shared, shares, sharing
5	locals	1481	local, locale, locales, localism, locality, localization, localize, localized, locally, locals
6	people	1438	people, peoples, peoples', peoples'
7	farm	1104	farm, farm', farmed, farming, farms, farms'
8	meal	1037	meal, meals
9	urban	941	urban
10	cooks	863	cook, cooked, cooking, cooks
11	city	801	cities, cities', city
12	grow	757	grow, growing, grows, grows'
13	home	755	home, home, homely, homes
14	group	727	group, grouped, groups
15	provide	719	provide, provided, provider, providers, provides, providing
16	socially	716	social, 'social, socials, socialization, socialize, socializing, socially, socials
17	project	651	project, projected, projects, projects'
18	kitchen	647	kitchen, 'kitchen, kitchen, kitchen', kitchens
19	producing	631	produce, produced, producer, producers, produces, producing
20	wasting	611	waste, waste#, waste', wasted, wasteful, wastefulness, wastes, wasting

Fig. 2. Keyword analysis of food sharing mission statement: Wordcloud and top 20 keywords.

Table 4

What is shared by initiatives (NB: a single initiatives can share more than one thing).

What is shared	No. initiatives	% of total initiatives
Knowledge & skills	2142	53%
Meals	1420	35%
Fruits & vegetables	1318	33%
Eating together	1050	26%
Land	928	23%
Food products	898	22%
Tools	525	13%
Plants & seeds	466	12%
Kitchen devices	303	8%
Kitchen space	291	7%
Compost	228	6%
Meat & fish	145	4%

of foodstuff has been mooted as a reason why food sharing has been slower to scale than other sharing initiatives in mobility and accommodation, where the entities being shared are much slower to degrade (Orsi, 2012). However, the apparent dominance of knowledge and skills sharing requires further unpicking for there was no publicly available data on the balance of activities within an initiative; that is the proportion of sharing within an initiative's activities that focuses on such information exchange rather than other things. If the nine food 'stuff' categories and the two 'space' categories are combined, knowledge and skills comprises only a quarter of activities across the 100 areas, while with the combined sharing of foodstuff makes up 63% of everything that is shared.

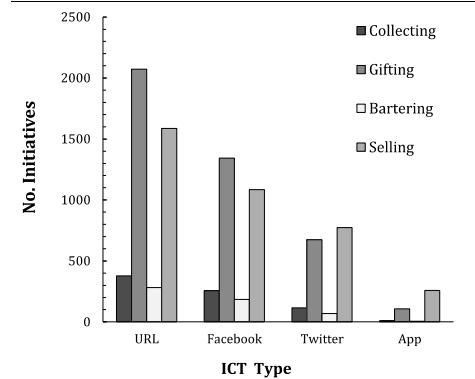
Meals are the second most common quality shared entity (35%) in the database. This is a broad category that spans for-profit pop-up supper clubs where roving chefs produce meals in temporary settings for paying customers wishing to eat with others (as in the Disappearing Dining Club in London), to people providing meals for travellers in their own homes (as in the initiative Bon Appétour which connects travellers and home cooks in more than 100 cities around the world). It also includes initiatives providing the infrastructures of emergency food relief such as soup kitchens (as in Hunger Free Colorado in the USA). The emphasis on commensality across diverse initiatives here is significant. It elevates the convivial benefits of eating meals together and re-emphasises the important sociality and relationality of food sharing (Chou, 2015). Certainly, food sharing in this way is the embodiment of a 'more-than-food' activity (Goodman, 2016).

Looking at the data regionally, there is considerable commonality around what is shared particularly when examined through the broader lens of skills, spaces and stuff. For example, while skill sharing is the lowest in the Asian based urban areas, at 20% it is only 1% lower than levels in Europe and 2% lower than North America. Meanwhile the Middle East has the largest proportion of skills sharing at 29% followed by Africa at 26%. The range in the sharing of spaces category is even narrower (from 12% to 15%), with North American urban areas experiencing the lowest incidence, followed by African, Asian, European areas (13%) with the Middle Eastern with Australian and New Zealand based urban areas having the highest percentage of space sharing at 15%. Within the food stuff category, which contains the most elements, regions range from 58% (Middle East) to 67% (Europe and North America).

While sharing in individual urban areas can vary widely, particularly when the incidence of initiatives is low, the proportional patterning amongst the categories of what is shared is remarkably consistent across the database. Examining the top 10 areas in the database, knowledge and skills are the most commonly shared entity, followed by fruit and vegetables and meals. Within the bottom 10 areas, knowledge and skills is also the leading entity shared, followed by meals, then fruit and vegetables. Within all the diversity then there does appear to be some commonality around the nature of food sharing, at least with respect to the most commonly shared skills, spaces and stuff.

Table 5a

Number of initiatives using particular forms of ICT-mediation (disaggregated by mode of sharing).



4.4. Organisation: mediation and modes of food sharing

All initiatives in the database are ICT-mediated in some form as this was a necessary feature for their inclusion. However, the database is productive in revealing the diversity of ICT-mediation both across space and in relation to different types and modes of sharing (see Table 5.). Three different classifications of ICT were used in this research: Website, Social Media (including Facebook, Twitter and Meet Up⁷) and App. These all provide online spaces where potential sharers can connect, but they also represent a spectrum of ICT in terms of resource and skill requirements (Van Deursen et al., 2014). Whilst website technologies have become much more accessible in recent years, they remain more complex systems to set up and manage than either Facebook or Twitter, with greater potential for interactive or transactional elements (such as databases or payment services) and greater requirements for maintenance of the sites, particularly around security and management. The inclusion of sharing through an App illustrates the emergence of this new – and more technologically complex - format to deliver mobile, digital services and experiences or make connections that would have been conducted previously through web pages, texting, calling or face-to-face exchanges.

It is clear that websites dominate the ICT characteristics of urban food sharing initiatives, with 89% of all initiatives using a dedicated website. Indeed, across the database, websites are used to mediate the sharing of every category of what is shared and every mode of sharing from gifting and bartering to collecting and selling. Far fewer, but still more than half, initiatives have a Facebook page (58%) and fewer still, just over a third (34%), have a Twitter account. Unsurprisingly, given the level of technical knowledge and skills required to construct them and also the investment required to build up users to drive the necessary network effects, only 9% of the initiatives had an App. While Apps form a small cohort (just 9% of all initiatives) of the overall food sharing database, they tend to garner disproportional attention in the media because of the impacts of high-profile, App-based sharing companies such as Uber and Airbnb (Davies et al., 2017a, 2017b). Yet food sharing Apps have struggled to replicate the successes of these ventures despite receiving venture capital investment, with a number of high profile initiatives such as Cookisto and Grub with Us being wound down

⁷ These particular forms of social media were used as they offer an online space for connections to be made between potential sharers.

Table 5b

ICT-mediation by region (% of initiatives in each region using particular forms of ICT-mediation).

	URL (%)	Meetup (%)	Facebook (%)	Twitter (%)	App (%)
Africa	91	15	67	42	12
Asia	84	6	73	28	15
Australia & New Zealand	86	1	68	34	4
Central & South America	81	9	73	42	12
Europe	91	4	54	35	10
North America	91	6	55	35	8
The Middle East	92	0	42	18	11

within a few years of establishment. It will be important to drill down into this category further in order to explore in more detail what kinds of initiatives are adopting this cutting edge technology in their practices, what particular challenges they face with regards to generating participation and the impact that such technologies have on the practices and performance of food sharing.

Unsurprisingly, given the higher levels of internet penetration, the bulk of the App-based sharing takes place in North America and Europe, with these regions accounting for two-thirds of all food sharing Apps. New York City is the most App-mediated food sharing area in the database with 14 initiatives, followed by Seattle on 11, with Barcelona, Berlin, Houston, and Philadelphia on 10 and Beijing, London, San Francisco and Singapore all having 8 Apps active in their environs. Only 14 areas in the database have no App-mediated food sharing initiatives. More than two-thirds (71%) of the App adopters are for-profit organisations which offer opportunities to share meals for money. Some of these, such as VizEat, VoulezVousDiner and Mealsharing, claim to be active across multiple areas internationally and seek foster convivial communal dining experiences. It is challenging to establish how active the Apps are in particular places, at least from publicly available online data, however media coverage suggests that generating the required levels of participation can be a challenge for such meal sharing initiatives (Danovich, 2016). These translocal networks sit alongside similar, but more place-based initiatives such as Wats Cooking in Chennai, which is an App seeking to connect locals via homemade cuisine. Apps are also used to connect producers to consumers, facilitating shorter food value chains and promoting local produce, as exemplified by SEND in Tokyo.

The mobile interactive technology of Apps provides an unprecedented ability to connect strangers quickly and bring together communities across large distances and as such it is particularly useful for knowledge exchange, mapping and dissemination. However, engaging with strangers in this way is the most alien form of social interaction for many people and many App-reliant enterprises can deteriorate very quickly if they fail to develop a critical mass of users. Indeed, it is suggested that a third of initial mobile App engagements last less than a minute with people being intolerant of poor user experiences (Segrist, 2015). While Apps are the most novel ICT-mediation included in the database, they are also the riskiest and the most resource intensive. These start-up costs and risk concerns may explain the predominance of monetary exchange when Apps are used for food sharing, however more than 100 Apps do gift food (28% of all App initiatives) and a handful of initiatives use Apps to facilitate collecting or bartering. For example, Byhost (City Harvest) in Copenhagen, uses its App to share knowledge about urban foraging and wild plants, while Wild Food in Houston shares information about edible plants through its App.

Examining the type of sharing employed across the 100 areas reveals that gifting is the dominant mode of sharing across the database with nearly half (49%) of initiatives using this approach. This is followed by selling (35%), which takes place in both mainstream and alternative markets such as Community Supported Agriculture and Cooperatives. In contrast to the multifunctionality around what is shared, the majority of initiatives adopt a singular form to organise their sharing activities, with only 21% of initiatives incorporating more

than one organisational structure. Where it does occur, including multiple structures within a single initiative is most commonly employed by organisations operating outside the mainstream market economy (e.g. non-profits and cooperatives), perhaps as a means to provide multiple ways to access funding and resources and to overcome legal restrictions on certain types of activities. For-profit initiatives were meanwhile least likely to adopt multiple organisational structures.

Even within this brief account of high level results from the database, it is clear that capitalist and market transactions do not dominate the food sharing landscape. While venture capital, supported selling, and for-profit food sharing platforms and Apps are present, the vast majority of transactions and enterprises found in food sharing are, to use the phraseology of diverse economies, alternative market, alternative capitalist, non-market or non-capitalist (Gibson-Graham, 2008).

5. Conclusion: insights, limitations and a research agenda for urban food sharing

This paper began with the meta-societal challenge of constructing sustainable and resilient urban food systems in the face of climate change and population growth; a challenge that requires an understanding not only of the dominant ways in which food is grown, prepared and ultimately consumed within cities, but also of the ways which are emergent or marginal but which may provide different means to achieve these goals if appropriately supported. As indicated by a growing body of small scale studies, ICT-mediated food sharing initiatives offer one such area of emergent activity ripe for exploration, but interrogation is currently hampered by a lack of international and comparable data. A fuller understanding of urban responses to unsustainable food systems requires new forms of comparative and case-study research that covers a territorially diverse range of urban environments and interventions and this paper presents the findings of an initial attempt to do just this. The database provides, for the first time, consistent analysis and identification of patterns and trends in ICT-mediated urban food sharing across diverse cities, countries and continents. In doing so it engages in a process of making food sharing visible within and beyond individual urban foodscapes; enacting what Fraser (2010) might call a process of scalecraft. It is a strategy responding directly to the international scaling of governance around the 2030 development agenda and beyond, and the need to ensure that alternative pathways to development are critically considered from the local to the global. As noted by Boyle (2002), setting problems and solutions at certain scales can make a material difference to outcomes, including the power to generate different ecological outcomes, and such scalecraft must be approached as an “active progenitor of social processes” (Smith, 1993, 101).

There are then conceptual reasons for considering the performance of social practices such as urban food sharing at scales beyond the local. There are also pragmatic reasons when seeking to inform systems of governance which routinely privilege quantitative and large-scale studies over individual qualitative cases. The intention was to use the database as a tool to first reveal, quantify and then understand the range of ICT-mediated food sharing practice across 100 diverse cities. However, there are also challenges, particularly when exploring

emergent, complex and dynamic social practices such as sharing. There are concerns, for example, that using a quantitative approach might not be ontologically or epistemologically aligned with the theories of practice (Shove, 2011) that shaped the initial conception of food sharing. Yet as Browne et al. (2014) note, it is possible to use a quantitative methodology and maintain a post-positivist perspective that uses findings in a way to enable description rather than causation (Upchurch et al., 2008). In solidarity with Browne et al. (2014), we argue that the urban food sharing database can be seen as a form of methodological pragmatism offering a different way of exploring practices that can complement rich case studies and which can build an initial extensive (if not in-depth) body of foundational data from which is will be easier to explore how and why certain practices persist and others retreat. But what exactly did the process reveal and importantly, what questions are left unanswered?

The database is highly productive; creating a picture of the why, where, what and how of contemporary food sharing. Certainly, the diverse collection of food sharing initiatives documented provide an important counter-balance to the preoccupation with a small number of high profile, for-profit enterprises which are using ICT to link up those with idling capacity and those who wish to avail of it (Davies et al., 2017a, 2017b). A deliberately weak theoretical process, constructing and populating the database has been a means of ‘attending and attuning’ to things (Stewart, 2008: 72), rather than closing down debates. In particular, it responds to the call by Jones and Murphy (2010) to supplement qualitative case studies, in all their richness, with a more quantitative landscape level picture that can facilitate comparative research and engage meta-theoretical concerns. Substantively, the database clearly does considerable work in making visible the number, location, actors, mode and multifunctionality, of food sharing activities in 100 cities around the world. Some findings are clear. ICT-mediated food sharing occurs across diverse urban areas, small and large, dense or dispersed, rich and poor, Global North and South. Urban food sharing is an international phenomenon and not confined to wealthy, self-appointed ‘smart cities’. However, while activity cannot simply be predicted by general characteristics, it does appear that participation in transnational urban networks may be an indicator of higher levels of and diversity within urban food sharing activities and will need further exploration.

The database not only provides a foundational function on which to build more in-depth and explanatory comparative scholarly analysis, it also provides the bedrock to build capabilities and networks amongst and between sharing initiatives, nascent and active food sharers and those who seek to regulate the sharing of food. As a further means to create visibility and open up the area of food sharing for conversations between stakeholders, key data from the 100 cities in the database related to the where, what and how of ICT-mediated food sharing have been converted into an open-access, interactive online database.⁸ Publicised through a project website as well as sharing and urban networks, this online database was viewed more than 2670 times by 1647 unique users from 71 countries around the world – from South Korea and Mexico to Brazil and Senegal – in the first ten months following its launch. It has also generated interaction between researchers and stakeholders about the classification of sharing initiatives and the coverage of urban areas (with requests for the research to be extended and expanded beyond the 100 urban areas). This interaction has also highlighted the dynamism of the sector with the establishment and disappearance of initiatives ongoing. One year on from the initial collection the initiatives in the database were individually rechecked and it was found that around 5% of initiatives were no longer active online. In addition, 70 enterprises have been added following recommendations. The initiatives in the database will be checked annually until 2020 with a view to conducting longitudinal analysis exploring how

initiatives which facilitate food sharing practices have changed over time. Certainly, ICT-mediated food sharing initiatives are diverse and dynamic circuits under construction (Dubois et al., 2014) rather than fixed entities. Ultimately, the database allows for more consistent and comparable analysis of how particular stuff, spaces, labour and skills around food are mobilised, appropriated, accessed, financed and distributed across space; drawing attention to the more-than-human assemblages that such initiatives embody. The ICT component in particular illustrates the extent to which actors harness technology to share food, potentially reconfiguring not only the prevailing socio-economic order, but also the technical infrastructures that support it. As Feenberg (2012: viii) has suggested, “new forms of agency have opened the way for new, mediated modes of sociality, reciprocity, participation, mobilization and resistance”. These are appearing in advance of governance frameworks that would help societies anticipate and shape the impact of those emerging technologies (Baller et al., 2016: xii).

However, the analysis of the database also revealed its limitations. Answers to key questions around what kind of people and how many of them are participating in food sharing initiatives, for example, were impossible to delineate from the publicly available data. Responding to such questions requires not only that initiatives collect and hold relevant data on those who engage with their activities, but also that they are willing to share it with a third party. Such challenging issues around limited data availability are not restricted to food sharing and preoccupy many researchers in other fields of sharing including accommodation and mobility (Davies et al., 2017a, 2017b). Recent releases of data by organisations such as Uber through their Movement website may mark an opening up of information by the big players of the for-profit sharing economy, at least rhetorically for the benefit of public planning (Etherington, 2017), but the data provided to date is limited and highly parsed. Meanwhile other large sharing economy platforms are more resistant to such transparency, even seeking to constrain access to their publicly available data by preventing web mining activities (Slee, 2016). Nonetheless, while inevitably a snapshot of food sharing in the urban areas involved, the database does provide a springboard from which patterns and assemblages can be identified and sites and spaces – material and otherwise – where people and food stuff, spaces and skills, “come together, albeit in often tentative, inconclusive or evolving ways” (Wright, 2014: 2). In this context, we concur with Cameron and Gordon (2010: 9, emphasis added) who argue that rather than focusing on what types of economies are currently dominant, attention should instead be placed onto those areas ‘which are worth growing and strengthening’. As highlighted in this paper, further research is required in order to establish the worth of these initiatives, for whom that worth is generated and the means by which worth can be rolled out. This is particularly so in terms of understanding the wider genealogies of foodscapes within which the initiatives are embedded, but also in relation to the governing context, and the scale and impacts of existing food sharing practices.

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⁸ The database can be accessed here: [www.sharecity.ie].

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APPENDIX THREE

Sharing Foodscapes: Shaping urban foodscapes through messy processes of food sharing

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Abstract

Food sharing practices, including food sharing mediated by Information and Communication Technologies (ICT), are evolving across urban foodscapes globally. Using ethnographic case studies of ICT-mediated food sharing, this chapter explores the ways in which food sharing has developed in Singapore and connects with, or diverges from, broader narratives and practices around the smart governance of food in the City-State. This chapter first reflects on the methodological messiness inherent in researching social phenomena, such as food sharing, in different political and socio-cultural contexts. It is then argued that the milieu of food sharing itself is ‘messy’ as it includes a diverse range of practices and participants that ebb and flow over time and space connected through both physical spaces and virtual platforms. The research presented in this chapter highlights community actions related to food sharing that point towards a new understanding of what it might mean to transition towards a smarter and more sustainable city.

Introduction

The concept of food sharing - defined as having a portion of food with another or others; giving a portion of food to others; using, occupying or enjoying food and food related spaces to include the growing, cooking and eating of food jointly; possessing an interest in food in common; or exchanging information about food - explored in this paper with respect to Singapore is an emerging phenomenon that is deeply entangled in contemporary urban foodscapes. Food sharing is becoming increasingly mediated by different forms of ICT tools from Google maps to social media networks. There are suggestions that this technological dimension is reshaping the way that people share food. Drawing on ethnographic research undertaken in Singapore over a period of three months, this chapter suggests that food sharing is formed and reformed within the dynamics of urban foodscapes, and through a complex of dynamic macro-meso interactions. The nature of these interactions will be explored by drawing on the concept of messy social realities developed by Law (2004) which were encountered during research conducted with the Food Collective, an informal group aiming to cultivate resilient communities through food sustainability (Food Collective, 2017).

This chapter explores food sharing through the mess of interactions that build connectivity through online and offline activities and which culminate in a vital food sharing movement driven by a plurality of entities. First, however, the methodological approach to examining the messiness of food sharing is delineated. This is followed by a discussion of food sharing practices in Singapore set within the wider foodscape of the City-State. Insights from the ethnographic case study of the Food Collective are then presented before concluding with a reflection on the opportunities for embracing messiness to better understand evolving food systems and sustainability.

Approaching food sharing

This chapter draws on ethnographic research of food sharing practices conducted in Singapore. The ethnographies represent the second level of analysis following a collaborative process of co-designing a food sharing database in 100 cities around the globe (Davies et al., 2017a; 2017b). The database provided a comprehensive overview of food sharing landscape in Singapore from which four diverse food sharing enterprises were selected for in-depth research. The Food Collective discussed in this paper was one of the selected case studies and has an informal structure, participatory usage of ICT tools, and engages in a breadth of food sharing activities such as community farming, compost swaps, seed banks, and food rescue. The research presented in this chapter adopted methods that are commonly used in ethnographic fieldwork, including a case study approach and participant observation (Willis, 2007).

In Singapore, the researcher spent a considerable amount of time observing places, people, and practices to better understanding how and why food is being shared. During the fieldwork, sixteen interviews were conducted with co-founders and participants from various activities that the Food Collective organized. In addition, the researcher participated in a range of shared activities, including harvesting, foraging, dumpster diving, cooking, eating, and organizing workshops. This led to numerous and diverse user engagements with those who share, which took place in multiple locations including the participants own homes, kitchens, and gardens.

Food sharing ethnographies in Singapore were deeply rooted in the practice of reflexivity, including conceptual, affective and ethical reflexivity. Conceptual reflexivity required openness to experimentation with the food sharing concept itself within the culturally diverse context of Singapore. The formation and circulation of ideas around the concept of food sharing varied depending on participants' age, ethnicity, gender and education. Also, the researcher needed to take a reflexive stand away from the broader conceptual vocabulary that food sharing represents in a western research context. Discourses touching on issues of food justice, food rights, and land access were sometimes unfamiliar to participants and lay outside their common understandings or experiences. In the process of collecting ethnographic data it was important to acknowledge the affective dimensions generated by the research that occurred when cultivating researcher-participants relationships. A number of circumstances confronted in the fieldwork led to a blurring of the boundaries between the 'researcher' and the 'researched' and culminated in friendship. Finally, ethical reflexivity was needed as the research began to shift towards a more collaborative approach in which the researcher became the co-organizer of events and thus in the position of influencing the understanding and practice of food sharing experienced by the community of sharers being researched. For the reasons mentioned above, keeping a fieldwork diary and dedicating time to think reflexively were an important part of the food sharing ethnographies research. Furthermore, as ICT-mediated food sharing was the unit of analysis for the research, meaning that contemporary food sharing practices use some form of ICT in their everyday activities, the researcher had to consider interactions and practices within online environments as well as real world contexts. Interacting with participants online allowed for the cultivation of new relationships through connections, communications, and observations, which ultimately deepened the understanding ICT-mediated food sharing practices.

Foodscapes and food sharing

Foodscapes are comprehensive assemblages which include nested sites of food production and consumption, systems of food commodification, sites of waste decomposition, human-nature relationships, technical infrastructures, and regulatory

frameworks (Lake et al., 2010; MacKendrick, 2014). Having malleable infrastructures, foodscapes are, above all, places where food related skills, stuff and spaces can find convergence in an interplay between formal and informal transactions, propelled in part by locally-specific norms and values. Clearly, contemporary cities are suffused with, and characterised by, multiple and co-existing foodscapes that are not just sites where food is found, but are an important locus of multiple layers of urban food environments. As suggested by King (2009:26), a foodscape can be ‘personal, social, or public, reaching from the body to the community to the nation, respectively’. The existing literature on foodscapes suggests that they can be distinguished at macro, meso and micro scales (Mikkelsen, 2011; Lake et al., 2010). Mikkelsen (2011) sees the macro scale as the overall national and societal level of interaction, the meso scale as the sub-national community and micro scale as comprised of household and domestic spaces. Suffice to say that foodscapes at macro, meso and micro scales are interconnected and offer a useful analytical tool for understanding how food related ideas and practices, spaces and people interact.

Through multi-sited field visits, participant observations, and interviews it was possible to gain in-depth insight into the food sharing practices that make up Singaporean foodscapes. Whenever the researcher was participating in potlucks, volunteering at food redistribution events or talking to governmental representatives, food sharing emerged at the intersection of macro and meso foodscapes. The macro foodscapes in Singapore were described by the food sharers as landscapes of food abundance and food commodity. Ranked 4th in the Global Food Security Index, Singapore imports 90% of food that it consumes (AVA, 2017). High levels of food imports are being justified with the narrative that Singapore is too land-scarce to produce food for even the present populace, never mind the 6.9 million people projected to live in Singapore by 2030 (The Population White Paper, 2013). However, the accuracy of the land-scarcity narrative outlined above needs unpicking, because local food production practices are undermined in the State-led food security debates despite growing farming interest from citizens, as indicated in an interview extract with an aspiring urban farmer: ‘When I was growing up I thought that, in Singapore we cannot do farming, because we don’t have enough land. But when I understood urban farming [...], I understood that we are not

land limited, we are actually people limited. We don't have knowledge and we don't have people who want to dedicate their life to this career' (Interview 1, Urban Farmer, 02.06.17).

The lack of farming knowledge and the historical State-led emphasis on imports have led to declining proportions of home-grown food within the City-State. In addition, consumers regard their macro foodscapes as abundant while cosmetic filtering of imperfect fruits and vegetables and more stringent conventions of freshness have led to avoidable food waste. Despite plans of becoming a Zero Waste Nation by 2030, the lack of institutional guidelines on food donations (and redistribution of surplus food) have left food waste problems in the hands of corporate social responsibility programs and a few charities, which are often too understaffed to handle the volumes they are being confronted with. Within this scenario, macro foodscapes in Singapore appear as productivity-driven networks of food commodities through which food sustainability is practiced as a set of strategies focused on achieving food security in land-scarce Singapore.

On the meso scale, foodscapes are formed through spontaneous actions driven by social and environmental consciousness of individuals. Food interactions and food-related ideas are traceable through messy organizational models of self-organized food networks in which standards of food practice are negotiated through relational understanding and knowledge sharing. Meso scale foodscapes are formed through passionate enthusiasts, environmentalists, and foodies who are motivated by an interest in grow-your-own movements, zero waste or simply seeking to reconnect to nature, food and each other. Participants may act as keepers of indigenous knowledge of medicinal plants, as owners of insect homesteads, as DIY food growing inventors, and as performers of forgotten food practices such as foraging, fermenting, composting, and beekeeping. Common in Singapore, meso foodscapes are bringing a more locally and socially generative dimension to the urban food systems and elevating the role that community can play in food security. In Singapore, this becomes apparent through food sharing activities, which include building permaculture gardens to demonstrate where the food comes from, volunteer-run soup kitchens that serve people who are food

insecure in public rental apartments or meal sharing platforms that promote healthy food choices through the sharing and selling of home cooked food.

Fieldwork in Singapore emphasised that food sharing is a nexus practice linking macro and meso scales and has developed through spatial, temporal, and socioeconomic practices driven by individuals, communities, institutions, businesses, and regulatory frameworks. These assemblages of interlinked practices, actors and meanings are increasingly seen as having potential to cultivate ‘smart food cities’, because they highlight the importance of social practices in innovating urban food systems (Maye, 2017). While vaguely defined in the policy documents, smart governance of food in Singapore emerged through plans to achieve greater food security by ‘working together with industry stakeholders to diversify food sources and innovate for increased local food productivity’ (Deakin et al., 2016:1). While the role of meso scale urban food movements in contributing to sustainable food systems is undefined, food sharing ethnographies revealed that community actors are in a position to soften technocratic imaginaries of smart food governance. The nature of these processes is messy with ICT playing an important role in mobilising community food ideas. In the following section messy food sharing interaction will be explored using the findings of an ethnographic case study with the Foodscape Collective.

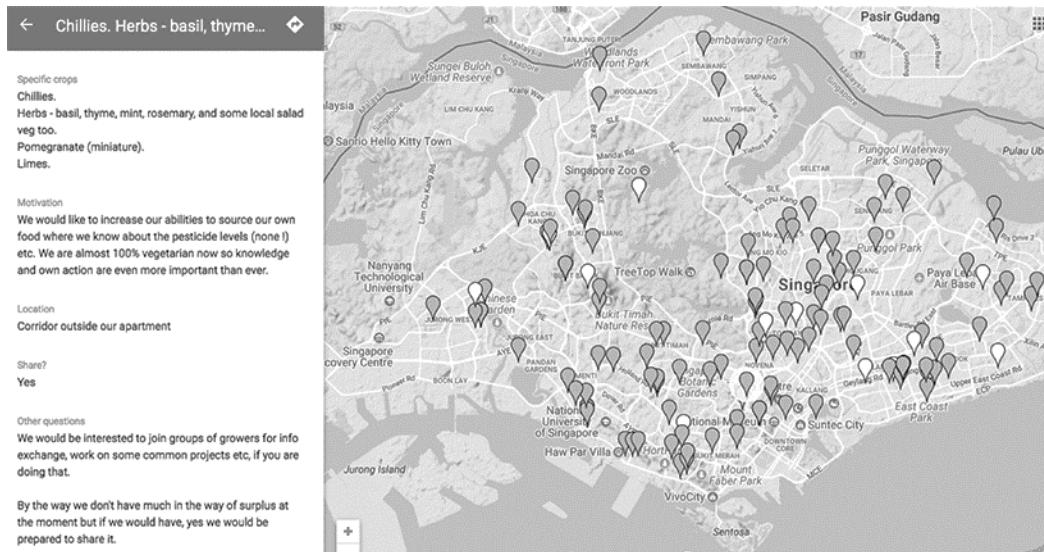
The Food Collective

The Food Collective started in the aftermath of Growell Pop Up event organized in collaboration with Edible Garden City in 2015 (Growell Pop Up, 2015). The event was attended by community groups interested in food growing, healthy eating, and food rescue and made a strong statement about the disconnect between people, food practices and nature in Singapore. Although its lifespan was just a few months, the event attracted over 2000 online followers and resulted in the creation of a number of new food groups which, like the Food Collective, have continued to connect individuals concerned about food sustainability, and exploring ways to ‘collaborate and nurture understanding by acting upon food system, that support initiatives that cultivate resilient communities’ (Food Collective, 2017). As one of the co-founders mentioned in an interview, ‘for me, Food Collective is about learning the landscape of food. It is a

platform currently for the exchange of information, raising of awareness about different stakeholders in the food value chain' (Interview 2, Food Collective, 03.08.17).

As an online community group, the Food Collective initiated food sharing initiatives that took root and grew through active participation of individuals interested in the foodscapes. This has led to various ICT-mediated collaborations such as plants swaps, compost exchanges, potlucks, workshops and exhibitions. Food sharing activities organized by Food Collective have added a certain drive to a growing urban food movement towards sustainable and social dimension of food systems from a perspective of smart citizens. As mentioned in an interview with one participant, the Food Collective organically connected dispersed communities of environmentalists in Singapore: 'I see the value of networking and people starting to get together [...] Because if you talk about environmental awareness, green activities, ten years ago in Singapore, it's probably non-existent; nobody had heard of it or even thought about it. But now it seems like there's a little spark. It's starting to glow brighter and brighter' (Interview 3, Food Collective, 18.06.17). Following the Food Collective initiative, food sharing has evolved around a range of online and offline activities. Online activities include ongoing mapping project of edible spaces and food growers in Singapore and a Facebook group known as 'Community for food sustainability and food resilience' that acts as an interface for real-world exchange for swapping and bartering food related stuff, skills and spaces, and as an advocacy platform for those interested gaining a critical perspective on current food systems in Singapore. Offline activities result from online interactions and include regular meet-ups, guided tours and workshops.

Fig.16.2: Singapore's Really Local Edible Gardens. Food Collective Crowdsourced Map



There are a number of factors that have helped the Food Collective to maintain a high profile, articulate its identity, and expand its activities by accruing a network of followers, and gaining impetus to mobilise a movement towards food sustainability in Singapore. An important factor is that the Food Collective has created a space to meet and experiment in a City-State that is not only land-scarce for farming but also civil-scarce (Lee, 2002). Civil society actors in Singapore are considered as neutered and left in the shadows (Sadoway, 2013). Laws and regulations restricting access to public space and freedom of speech and expression have increasingly become a concern of activists, artists and civil society actors in Singapore. Thus, by being connected virtually, Food Collective followers can orientate themselves and determine their role and level of interest and engagement in a particular activity or cause. They can prime themselves for meetings that take place in real space and stay informed on all developments without being physically present, as well as get motivated and motivate others towards participation and affirmative action. Importantly, they can connect with individuals and groups with similar interests, even develop new communities of interests and practice focusing on a subset of any interests encountered. By meshing online and offline interactions and activities Food Collective managed to integrate food sharing into the local milieu but also attract interested parties from the governmental

agencies such as National Environmental Agency (NEA), as mentioned in the interview with the co-founder: ‘I guess we have managed to connect from both bottom-up and top-down [...] We need to decide how we can evaluate what the regulators do and gain the regulator’s support for what we do with the connections that we already have, so that we can influence policy, if ever, be it a Good Samaritan law or any other legislation that impacts food sustainability’ (Interview 1, Food Collective, 03.08.17).

The messily arranged connective tissue that permeates online and offline spaces gives visibility to social practices performed by community groups in relation to food systems and permits engagement with forms of non-organizational collective action (Sadoway, 2013). In this sense, the Food Collective can be seen as an informational intermediary that advocates collective imaginaries of sustainable food systems from the bottom-up. Through cultivating such connectivity, a basis of engagements with macro foodscapes is formed as Food Collective develops critical perspectives on new smart food citizenship. Thus, building on the ethnographic research of food sharing in Singapore, it is important to explore not just State-led interventions framed through food security discourses but to engage with food practices on the meso scale. For the researcher, this process is messy, as it recognizes the heterogeneity of all possible associations, as well as is being co-produced with participants with diverse knowledge and experience. The Food Collective showcases this.

Conclusion

In conclusion, the concept of messiness provides an opportunity for ethnographers to identify and better understand complex social realities rooted in contemporary urban foodscapes. The use of ICT as connective technology is central to this endeavour, enabling the scaling-up and out of activities and the development of networked communities of interests and practice. It also provides a useful point of intersection with wider state narratives around smart cities and food, allowing opportunities for diverse agendas to establish common ground. In this regard, the example of the Food Collective can be seen as an archetypal case, where food sharing enables interactions between the state and community actors, with the goal of increasing the sustainability of foodscapes.

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