#digitalbiospheric

Pilot Project: Putting Food Banks Out of Business
Final Report August 2015

Working Paper for the Communities and Culture Network +

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Executive Summary

This is the final report of the pilot project 'Putting Food Banks Out of Business", funded by the EPSRC Digital Economy Communities and Culture Plus Network and Mistra Urban Futures.

The pilot project involved collaboration between the University of Salford, the Biospheric Foundation and the Social Action and Research Foundation between October 2014 – May 2015.

The project focussed on the Biospheric Foundation, a unique urban socio-ecological experiment in Blackfriars, East Salford. The Biospheric Foundation sought to deliver a whole system approach to urban farming in an area of high deprivation; design a dense environment of interconnecting systems; retrofit an old building into a centre for ecological research; and raise public awareness into health food and ecological systems in urban environments.

The pilot project asked:

1) What can we learn from the *actual* experiences of the Biospheric Foundation in relation to building community capacity and resilience in local food production, supply, distribution and waste systems?
2) How do these lessons inform our understanding of *potential* responses to food austerity and the actual and potential roles of digital transformations?

The work focussed on a retrospective and prospective analysis of the development of the Biospheric Foundation in the context of digital transformations. It also involved four community conversations with technologists, food poverty groups, residents and academics. A two-day community research jam was held to co-produce a Digital Action Plan for the Biospheric Foundation.

The Biospheric Foundation offers a potential response to food austerity. History, rootedness and engagement sit alongside novelty, innovation and risk. Through the innovative use of a building and site, the Foundation has a strong conceptual impact on recasting the urban agenda. It is pre-figurative of urbanisation processes that conceive cities as complex interdependent socio-ecological-technical systems. It reflects recognition that system change will not arise from 'a smattering of urban agriculture projects' but requires a long-term incremental process. At the same time, there are clear issues in realising the possibilities of aspirations in practice, given the challenges of community entrepreneurship and grassroots activism in 21st century cities. Community-engaged socio-ecological experimentation appears transient and impermanent in the face of economic and social pressures and the short-termism of next-big-thing urbanism.

There appears to be an unexplored and rich vein of potential research and practice around how digital transformations can help address food austerity and overcome the physical limitations of community initiatives. Ubiquitous digital transformations have affected the development of the Biospheric Foundation, both positively and negatively. Some eco-technological systems rely on digital technologies, for instance, in developing fit-for-purpose monitoring systems. Two pathways for harnessing the potential of digital transformations were identified for the Digital Action Plan: digital transmissions – for instance, through the development of a virtual online learning and educational platform and digital transections – for instance, through better connecting technology to ecology in developing complex socio-ecological systems for cities.

Contents

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1. Introduction

The need for food aid in the UK is rising (Lambie-Mumford and Dowler, 2014). Food banks have become one of the fastest growing charitable industries in the UK, bringing food poverty sharply into the public consciousness. In contrast to any UK Government formal or coordinated response, the third and voluntary sector and civil society have produced an increasing number of reports and inquiries which concur on the scale, causes and consequences of the challenge. Examples range from the local to the national, including the Greater Manchester Poverty Commission (GMPC, 2013), Below the Breadline (Cooper et al, 2014) and 'Feeding Britain' (APIIH-UK, 2014). The latter report, produced by an All Party Parliamentary Inquiry into Hunger, indicates growing concern about the issue of food austerity at national level, but does not have the status of an official government report. Instead it is civil society – with a particularly strong response from faith groups – that is leading the response. Whilst exact figures differ, all such reports indicate an exponential growth in emergency food assistance, evidenced through increasing numbers of people needing to use foodbanks. For instance, Cooper et al (2014:4) find evidence of a 54% increase in use of foodbanks in the UK between 2012-2013 and 2013-2014.

Food aid is only turned to once other solutions have been exhausted, with independent reports concluding that food banks are a *response* to not *cause* of growing demand (Cooper et al, 2014: 9). Increasingly there is agreement that the causes of the crisis are structural. Based on a review carried out for the UK Department for Environment, Food and Rural Affairs (DEFRA, 2014), Lambie-Mumford and Dowler (2014: 142) concluded that 'short-term food provision can relieve symptoms of emergency need but (necessarily, given the aims and capacity of such initiatives), does not address the underlying causes of that need'. Furthermore, food banks only help those newly hungry, as a result of welfare changes, but not the long-term hungry, whose conditions preceded the current crisis (APIIH-UK, 2014). Cooper et al (2014) focus on the complex inter-relationships between living costs, the cost of food, housing, energy, low wages, insecure contracts and the cumulative impact of social security reforms to account for the current rise in food poverty. The recent All Party Parliamentary Inquiry into Hunger in the United Kingdom (APPIH-UK, 2014) determines that recommendations to tackle the systemic causes of poverty need to cut across emergency food assistance, waste and surplus redistribution of food, gas, electricity and water, debt and high cost credit, low pay, the benefits system, tax credits and sanctions *inter alia*. Interestingly for our pilot study, access to mobiles and the internet are considered as key factors which, taken with other structural changes, are part of the web of actions required to address hunger in the UK. This report, like many others, moves the debate away from atomised and individualised responses, which overlook the material conditions of hunger in favour of diet prescriptions and nutritional guides.

Whilst such UK reports note that food prices are rising, along with the percentage of household income spent on food, structural analyses have tended to be couched strongly in relation to the UK's programme of welfare reform and the austerity measures introduced by the UK Coalition Government. Other analyses, however, have focussed on the crisis of the capitalist system, the global agri-food business and the complex 'ecologies of food power' that sustain such inequalities in the first place (Goodman, 2013). Sonnino and Spayde (2014) argue that food insecurity relates to a complex interaction of structural factors that encompass the entire ecology of the food system. The broader context of the global food system is rarely mentioned in recent reports on food poverty in Britain, but is nonetheless an important driving motivation behind many localised and 'alternative' food initiatives (Caraher and Dowler, 2014; McClintock, 2013).

Against this background, this pilot project for the CCN+ network seeks to map out the transformative potentials of and limits to digital transformations in supporting community capacity-building to address food austerity in the long-term. Hence, whilst acknowledging their critical role in emerging food assistance, the aim is to contribute to a set of debates on how to 'put food banks out of business'.

2. Aims

This pilot study, linking food austerity to digital transformations, was funded by the Engineering and Physical Sciences Research Council (EPSRC) Communities and Culture Plus network. The project was developed and delivered through existing collaborations between the University of Salford Manchester, the Biospheric Foundation and the Social Action Research Foundation. There were two aims:

- To retrospectively interrogate the Biospheric Foundation as a lens through which to examine the lessons for developing longer-term responses to food austerity in the context of digital transformations.
- To prospectively engage multiple communities in conversations and planning about how digital transformations may underpin, or indeed undermine, local capacity-building for long-term systemic change.

These aims related to our core questions:

3) What can we learn from the *actual* experiences of the Biospheric Foundation in relation to building community capacity and resilience in local food production, supply, distribution and waste systems?
4) How do these lessons inform our understanding of *potential* responses to food austerity and the actual and potential roles of digital transformations?

3. Research Design

The project was designed as a co-produced action research enquiry, bringing together academics from across different disciplines and practitioners (see for instance Watson, 2014. Polk, 2015). Beth Perry from the University of Salford had already been working with Vincent Walsh (Chief Executive of Biospheric Foundation) and Daniel Silver (Director of the Social Action Research Foundation) through previous work supported by the Greater Manchester Local Interaction Platform for Mistra Urban Futures. This enabled co-initiation of a response to the call for pilot projects from the CCN+ network. We were aware of the gap in thinking about the possibilities of digital transformations in the development of the Biospheric Foundation. Reframing and extending the work in relation to debates on digital cities and food austerity potentially offered assistance to the Biospheric Foundation and local community in their future planning. The three project partners identified a 'mutually constituted need' (May with Perry, 2011) around which the proposal was developed and submitted. Impact and dissemination was built in through identifying a process of engagement and key outputs oriented towards research and practice audiences.

The project was designed in four modules. First, a team of academics and practitioner researchers carried out a retrospective reflection on the case of the Biospheric Foundation, locating its development in the context of literatures on food austerity. This involved interdisciplinary desk-based reviews of academic and non-academic literatures to frame the relevance of debates around food austerity, urban agriculture, localised food initiatives and digital transformations in the context of our particular case. It also drew on a pre-existing dataset of interviews produced through the Mistra Urban Futures and Vincent Walsh's AHRC doctoral research.

Module 2 involved four 'community conversations' between November 2014 and January 2015, taking the form of focus groups and workshops with representatives of the academic, public/voluntary/third sector, digital and residential communities (Box 1). Each group discussion lasted for between 2-3 hours and involved an open discussion to elicit different perspectives. The actual and potential role of digital transformations in developing long-term solutions to food austerity

was discussed. Notes were taken throughout, both procedural and reflective, and the residential community conversation was recorded and transcribed.

Box 1: Schedule of Community Conversations			
Community	Venue	Date 2014-2015	Number of participants
Technology	Biospheric Foundation	25th November	5
Residential	Biospheric Foundation	2nd December	6
Academic	Salford University	9th December	8
Food groups	Broughton Trust	16th January	6

Next the insights and notes from the conversations were used to frame a 'community research jam' with 6 members of the Blackfriars neighbourhood in Salford as the basis for co-producing a Digital Action Plan for the Biospheric Foundation. Residents were paid to attend a freely structured two-day jam to consider the desirability, feasibility and impact of different digital options. The concept of the 'jam' implied an unstructured and loose space without excessive engineering of the agenda; hence it was decided that all briefings would be verbal and that the participants themselves would have the opportunity to shape how they spent their time. It was also felt that the style and content of the Digital Action Plan should not be specified in advance as this would produce a specific 'target' for the group to achieve and undermine the exploratory nature of the jam. Two participants from the previous conversations were keen to support the process and were invited to share their experiences with the residents. This light touch shaping of the jam took its legitimacy from the first residents' conversation. It was important that the balance of participants was right between the project team and community members – so the jam was led by only two of the project team (Walsh and Silver) with whom the residents had greatest familiarity.

Subsequently, notes were captured and discussed between the core project team to reflect on the outcomes and dynamics of the process. The project team members who had attended the jam felt that steering and shaping the two days was more difficult than in a traditional workshop or focus group. The 'meandering' nature of the conversations was initially hard to grasp. However, feedback on 'jamming' from community residents was extremely positive. Meeting over two days without an overly structured agenda allowed participants space to talk and explore, with the input of different external invitees. Participants welcomed the more informal and largely unstructured organisation of the jam, as they could shape the agenda and decide collectively on the important elements of a digital action plan through discussion from broad issues down to more targeted elements. People reported that it felt it was open and not like previous meetings they had been to where they might have felt intimidated. There was more ownership in the development of the action plan, and all participants wanted continued involvement in the co-production of digital transmissions and transformations to improve healthy eating in Salford and beyond. Finally, the project team synthesised the findings into a Digital Action Plan in light of the retrospective and prospective analysis of the Biospheric Foundation. Academic articles are in production drawing on the work, alongside an externally-oriented brochure outlining the Biospheric Foundation story.

The pilot project focused particularly on the nexus between food austerity, digital transformations and community capacity-building via the action-research case study of the Biospheric Foundation. Given its scale, scope and timing, this would not have been possible without drawing on a number of other previous and ongoing complementary research projects: first, research being conducted through the University of Salford's participation in Mistra Urban Futures, an international centre for sustainable cities, with partners in Sweden (Gothenburg), Kenya (Kisumu) and South Africa (Cape Town); second, doctoral funding from the Arts and Humanities Research Council to Walsh for the initial set up, implementation and proof of concept of the Biospheric Foundation itself as an action-research platform. The CCN+ call for pilot projects was an opportunity to build on this intellectual capital and concentrate new resource on discursive ('community conversations') and interactive ('community research jam') activities to connect with debates around digital transformations and food austerity.

This report extends the discussion in the Interim Report submitted in February 2015. The heart of the report focusses on key findings. *Key Findings* seeks to reposition the Biospheric Foundation in relation to food austerity and digital transformations. We outline the community conversations and community research jam and the ideas and issues generated. Finally, we present and discuss the Digital Action Plan for the Biospheric Foundation. This section is followed by a summary of issues emerging, next steps, impact and dissemination and funding. An sample 'storify' is provided at the end of the report as an Appendix to illustrate ongoing work in realising and implementing the Digital Action Plan.

4. Key Findings

4.1 The Biospheric Foundation

The Biospheric Foundation has been described as part-farm, part urban research laboratory, set in the heart of the Blackfriars district in Salford, Greater Manchester. It has met with much acclaim, partnering with Manchester International Festival (2013), receiving funding from the People's Postcode Lottery (2013) and scooping up awards such as the Green Apple, Green Champion Award (2014) or the Nick Reeves AWEinspiring Award for Arts, Water and the Environment (2014). The Biospheric Foundation was established by Vincent Walsh drawing on his experiences in the USA, Africa and Eastern Europe, through his doctoral research into complex ecological systems in urban environments. Amongst the key aims of the Biospheric Foundation were to:

1. Deliver a whole system approach to urban farming in an area of high deprivation;
2. Design a dense environment of interconnecting systems;
3. Retrofit an old building into a centre for ecological research;
4. Raise public awareness into health food and ecological systems in urban environments.

Box 1: Examples of press and media coverage	
Press article: Garden of Eden Amid Rubble	New York Times, Garden of Eden Amid Rubble
Press article: Manchester International Festival: fruit and veg sprout from industrial past	Guardian, http://www.theguardian.com/uk/the-northerner/2013/mar/01/manchester-salford-biosphere-international-festival
Press article: Siemens apprentices get hands on with the Biospheric Project	Manchester Evening News, http://www.manchestereveningnews.co.uk/business/business-news/siemens-apprentices-hand-biospheric-project-5830086
News article: Living Lab tests urban food farming	BBC News: http://www.bbc.co.uk/news/science-environment-24580716
Welcome to the Biospheric Foundation	Youtube https://www.youtube.com/watch?v=SKsbPMaDKow
The Biospheric Project	Youtube https://www.youtube.com/watch?v=_t7VICYmerI
The Biospheric Project	Youtube – North West Tonight https://www.youtube.com/watch?v=-x5gW9iX5AM
Biospheric on Twitter	@BF_CIC_UK (1569 followers)
Biospheric Foundation on Flickr	Photos https://www.flickr.com/people/biosphericfoundation/photosof/

As a result of successful positioning with multiple stakeholder groups and fuelled by high press interest, the Biospheric Foundation is a remarkable story. Within 3 years of formulating a vision, a derelict mill on the banks of the River Irwell, Salford, was transformed into a thriving agricultural space, filled with innovative sustainable food systems, from a Forest Garden to mushroom production, vermiculture to aquaponics. A partnership with Manchester International Festival (MIF) in 2013, via the 'Biospheric Project', was a central catalyst in this transformation, building on pre-existing relationships with the community, private sector companies such as Siemens, Urban Splash and Craghoppers and interactions with Salford City Council. An array of press and social media has already documented key elements of the Biospheric Foundation's story (see Box 2).

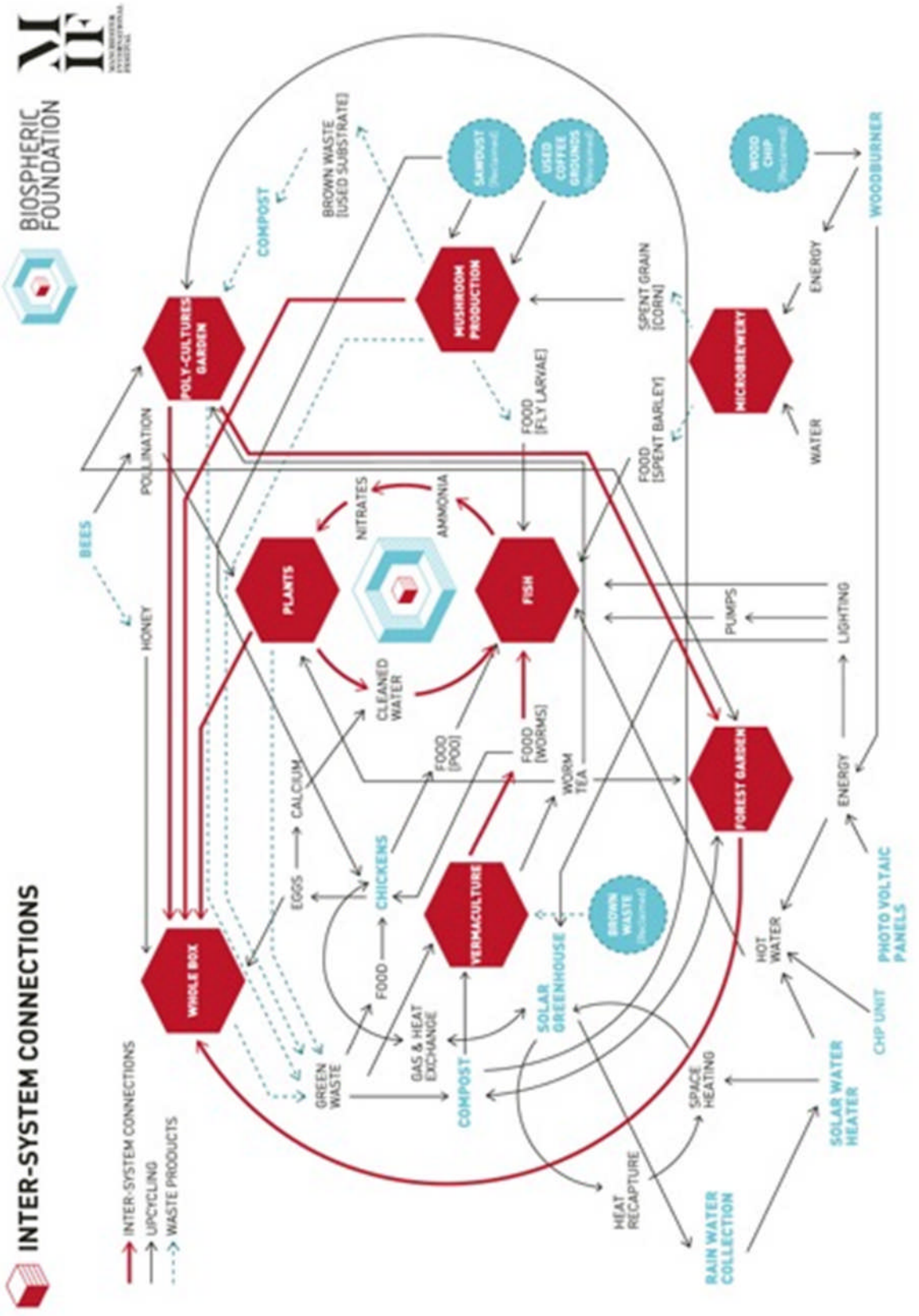

Figure 1: Inter-system connections, infographic produced for the Biospheric Project, 2013.

The primary focus of the Biospheric Foundation was to create a test bed for developing interactions between different ecological systems in an urban setting. There are four key elements of this vision: first, the development of integrated ecological systems within a single site; second, the location; third, the distribution model developed to integrate production and distribution and fourth, the community engagement strategy.

4.1.1 The Systems

A series of interconnected systems comprise the basic infrastructure of the Biospheric Foundation, and the basis of Walsh's doctoral research, which are designed to also support local organic food production in a sustainable way. These are: the agroforestry, vermiculture, aquaponics, mushroom production and the Whole Food shop. *Agroforestry* (also called Forest Gardening) is a system designed by humans mimicking structures, layers and forms seen in natural forest systems. Within the UK context agroforestry is designed across seven vertical and horizontal layers. These three-dimensional systems, unlike monoculture systems, have many outputs – such as increasing biodiversity, carbon storage and timber production. *Vermiculture* is the development of a culture of earthworms. Vermicomposting uses earthworms to break down organic material through the use of worms, bacteria, and fungi. *Aquaponics* is a system that integrates fish and plants to create a closed ecological system. *Mushroom production* was achieved by using waste coffee as a substratum to grow local organic oyster mushrooms. Finally, the Whole Food shop was developed as a hyper local food distribution hub, selling organic food produced for the system at the Biospheric Project.

As represented in Figure 1, produced collaboratively between Walsh and partners at MIF, a closed cycle was created between the systems. The green and brown waste from the shop goes into the vermiculture systems. The vermiculture system breaks down organic material and creates vermicompost for the agroforestry system and and more earthworms to be fed to the fish in the aquaponic system. The fish in the aquaponic system eat the worms as a source of food, and the waste from the fish is circulated around the Biospheric Project to a number of food growing areas. In turn the plants use the fish waste as nutrients to grow. In full production the system was designed to be capable of producing 3000 leaf crops per month to be sent to the Whole Food shop to be sold and contributing to the iteration of a new cycle.

4.1.2 Location, Location, Location

Location is a critical part of the Biospheric Foundation vision, comprising three elements: building, land and a community. After initial investigations of suitable locations, the combination necessary to realise the project was found in East Salford. Irwell House is a 100-year-old disused mill on the banks on the River Irwell, in the heart of Salford. It had been used as a printworks which used heavy industrial machinery and chemical products. The expense of maintaining the building and decline in the printworks industry led the owners to sell the building, purchased by urban property developer Urban Splash in 2000 with a view to develop it into residential space. However, the financial crash and changing economic circumstances derailed this proposal, creating an opportunity for the Biospheric Foundation to rent the top floors. The land opposite Irwell House was a disused green space adjacent to the River Irwell. The land was not managed and was overgrown with many self-seeding trees.

Before.

After.

Irwell House itself is a quintessential industrial mill in an area of relative deprivation. East Salford is characterised by multiple indicators of social and economic need. The East Salford Joint

Strategic Needs Assessment identifies most indicators above the national average, such as infant mortality, teenage conception, poor oral health, childhood obesity, long-term health conditions, alcohol, drug and smoking abuse, high fuel poverty, educational needs, high youth unemployment …the list goes on http://www.partnersinsalford.org/eastsalford-neighbourhoodprofile-i.htm. Such statistics place East Salford as one of the most deprived areas in Salford and nationally.

4.1.3 The Distribution Model

The original vision for the Biospheric Foundation was production-focussed on creating a closed loop system within the building. Over time, however, the need for a more coherent distribution model became apparent: firstly to 'complete' the system, in terms of linking supply and distribution, and providing a mechanism to explore avenues for commercialisation; secondly, as a response to embedding the Foundation in the community, alongside the increasing prevalence of food poverty debates. Since 2012 there have been two key elements to the distribution model. First, a Whole Box enterprise was launched in 2012, a fruit and vegetables delivery scheme. An independent evaluation (Corkery, 2014) found that over 85 per cent of Blackfriars Box recipients lived in neighbourhoods amongst the 10 per cent most deprived nationally. Then, alongside the partnership with Manchester International Festival, a whole foods store was opened up in 2013, 78 Steps, located on the ground floor of a block of flats exactly 78 steps from the Biospheric Foundation. The shop provided a platform for direct engagement around the issues of food austerity, through a suite of community engagement activities.

4.1.4 Community Engagement

Through partnerships and funding with external organisations, namely Manchester International Festival and People's Postcode Lottery, a suite of community engagement and learning opportunities have been developed, including volunteering (over 180 in total), recipe cards, public tours and workshops, themed activity days and corporate events. The Whole Box was distributed to local residents, schools and restaurants along with recipe cards promoting healthy eating. An independent evaluation concluded that the programme had been very successful in delivering across a range of outcomes (Corkery, 2014). In the second phase of engagement, 114 people took part in public tours and 142 participated in workshops as part of the Manchester Science Festival; a further 324 people took part in the project's Urban Activities programme and 150 WholeBox containing locally-sourced produce and recipes were distributed to local residents and via the distribution of 2,000 recipe cards to local residents. Engagement sessions were also delivered with six local schools involving 526 children and 87 staff members and parents, across communities typically characterised as having poor diets with little pre-existing knowledge of how to prepare nutritional food. Participants learnt about growing systems, propagation and cultivation; soil preparation and composting; foraging and harvesting; food preparation, conservation and preservation. They developed a wide range of skills: in making jams, syrups and chutneys; growing mushrooms on paperback books and logs; building simple aquaponics systems; making wormeries and tending a forest garden.

4.2 Positioning the Biospheric Foundation: A Retrospective

4.2.1 A Systemic Response to Food Austerity?

The Biospheric Foundation was conceived in part as a response to increasing issues over food poverty in the city, but also as an attempt to eradicate these issues - through building local capacity for a systemic approach to food production, supply, distribution, waste and diet in an inner city area. Whilst the primary motivation of Walsh's doctoral research was to create an integrated action-research platform through which practical insights into complex and interdependent ecological systems would be gained, location was a critical consideration. The experiment was grounded in sets of debates about interconnected systems, the relationship between the 'technos' and the 'bios' and the need for more adaptive, resilient and transformative approaches to urban agriculture. However, the desire to locate such an experiment where it was needed most was equally important. Through the

forest garden, encouraging local food production and giving residents the chance to get involved in social enterprises such as the wholefood store, the Biospheric Foundation trialled a proactive and approach to tackling issues of food austerity that provides insights into the potential and challenges of longer-term responses.

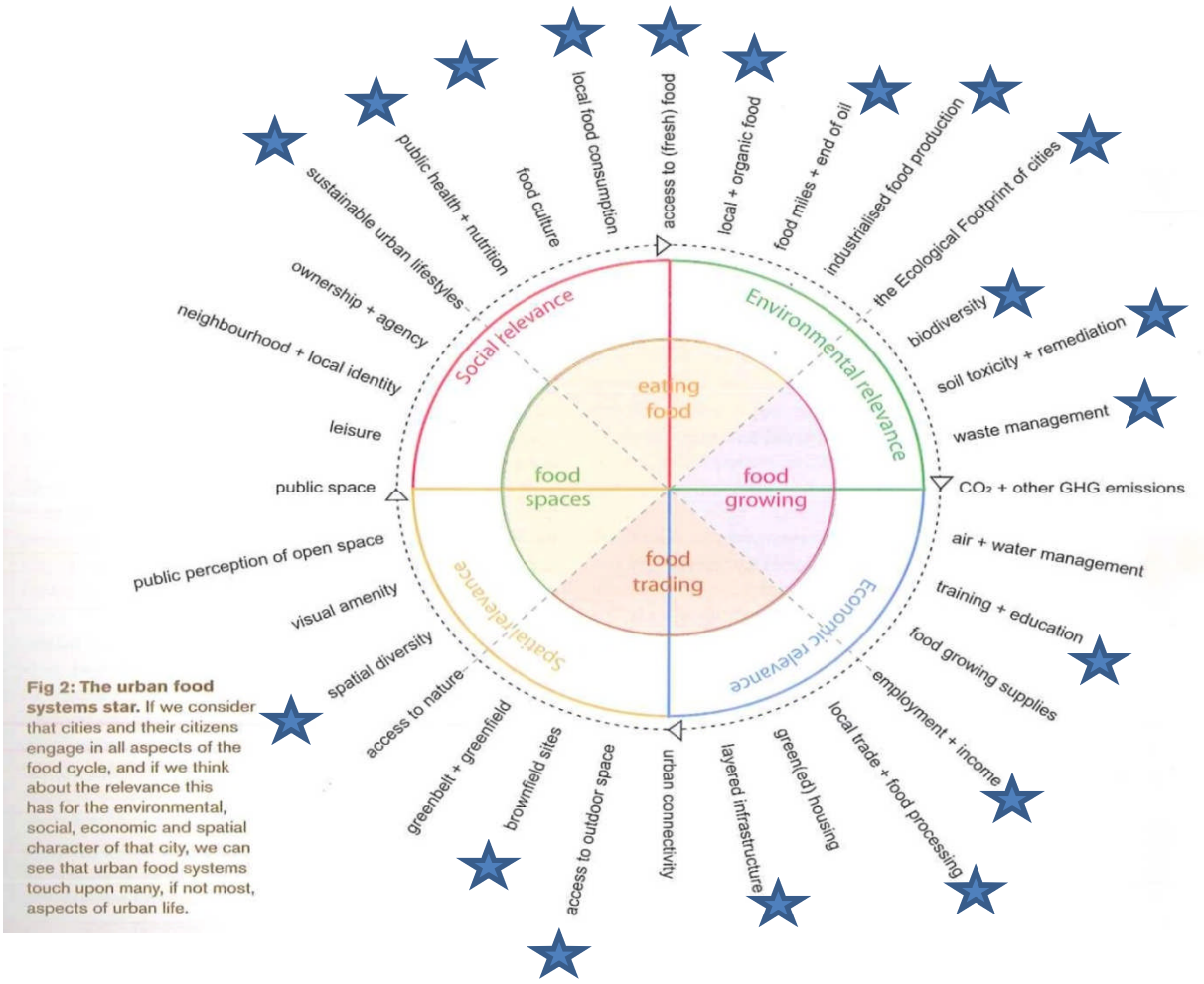

Figure 2 – Bohn and Viljoen (2014): The Urban Food System Star, adapted to indicate areas relevant to the Biospheric Foundation. In Bohn and Viljoen 2014 p.9.

Dowler and Lambie-Mumford (2014) note that policy levers to address food aid across Whitehall and parliamentary boundaries are not joined up, challenging the possibilities for a holistic approach. It is only at the local level that such approaches are possible. Initiatives such as the Biospheric Foundation needs to be understood in the context of localised responses to developing urban food systems. Drawing on Bohn and Viljoen's (2014) urban food star (see Figure 2), the Biospheric Foundation's activities are environmentally and socially relevant, cutting across eating food, food growing, food spaces and food trading. This points also to the growing discussions concerning local food policies. Morgan (2013: 1) notes the increasing role of planning in fashioning a 'new and more sustainable food system, one that is better aligned with societal goals of public health, ecological integrity and social justice'.

Whilst food banks are an immediate response to the issue of hunger in Britain, they have been critiqued for filling the gap in state provision without responding to the bigger issues. Recent reports including the Greater Manchester Poverty Commission (2013), Below the Breadline (Cooper et al,

2014) and 'Feeding Britain' (APIIH-UK, 2014) concur that an individualistic approach tends to predominate. In contrast the Biospheric Foundation's approach is important in not looking at diet as individual choice, but 'relating choice to access and structural determinants, such as spatial access and cultural capacities' (Caraher and Dowler, 2014). They argue that the 'rebranding' of food poverty work as healthy eating, obesity prevention and sustainability results in underinvestment and runs the risk that initiatives rooted in self-help may exacerbate the problems of those who are food poor.

Importantly, whilst food banks deal with immediate issues of access to emergency food aid, attention is now turning to the 'right to food', which requires an emphasis on affordability, availability and access (Dowler and O'Connor, 2012). In this respect, the Biospheric Foundation's location is not incidental. In selecting a location for the action-research ecological experiment, Walsh undertook a mapping of available places to purchase fresh food. This revealed a significant lack of local places at which fresh food, such as fruit and vegetables, could be purchased. This is consistent with research that has suggested that healthy foods can be more expensive and more difficult to obtain in areas of deprivation, which may have an effect on the levels of poor nutrition in areas of low-income (Cummins & Macintyre, 2002). 67 places were found within Blackfriars at which food lacking in high nutritional value could be purchased, with no access to a diverse range of food products. The mapping revealed little pre-existing access or choice to buy healthy food in the heart of the community, indicative of Wrigley's (2002) so-called 'food deserts'. Critically, in tackling issues of access, availability and food quality, the Biospheric Foundation has sought to test out how more resilient food systems could be created (Ardianto et al, 2014) comprising both food security (ensuring food production and consumption in an affordable manner) and food quality (achieving nutritional balance). In the process, initiatives were also trialled to change local food cultures; indeed, engaging with food *as* culture was one of the premises behind the partnership between Walsh and the Manchester International Festival, which led to the Director of the Festival, Alex Poots, declaring the collaboration 'one of the most important commissions we've ever created' (Biospheric Project Brochure, 2013).

The Biospheric Foundation experience to date aligns with the increasingly articulated need to move away from the 'sticking plaster' of food banks towards longer term approaches. The Greater Manchester Poverty Commission, for example, was established in 2013 to identify the key components of poverty within the sub-region and identify practical solutions that could improve the lives of residents in poverty. The Commission, initiated by Greater Manchester politicians and with support from a broad range of stakeholders, gathered personal testimonies around people's experiences and meanings of poverty. From these testimonies, food poverty emerged as a key theme. The report (GMPC, 2013: 9) concluded the need for a coordinated and sustainable approach, including social enterprise models that divert food waste and bulk buying noting that 'such models should provide training opportunities and educational sessions *regarding utilising food, sustainability and eating on a budget*' (original italics). A second recommendation related to addressing the issue of 'fresh food deserts' (ibid, 9) and to test the viability of expanding the delivery of fresh fruit and vegetables to food deserts using a social enterprise model. In both cases, the Biospheric Foundation's Whole Box model, integrated with the suite of community engagement activities, presents one approach to delivering on these recommendations. Similarly, whilst the All Parliamentary Inquiry into Hunger only reported in 2014 (APPIH-UK, 2014), the Biospheric Foundation had been engaged in proof of concept experiments which prefigured their recommendations, for instance, through demonstrating a closed loop system linking production and consumption (p.22), exemplifying practice from which local authorities can learn (p.23) and piloting engagement schemes to introduce greater resilience in terms of cooking, parenting and budgeting (p.29).

More fundamentally, locally-grounded projects such as the Biospheric Foundation provide a starting point for greater 'horizontal cooperation', a catalyst to 'encourage local action to meet local needs by using local knowledge and partnerships' (ibid). Unlike some alternative food initiatives (AFIs) which have been criticised for their 'exclusionary' practices which constitute a 'middle class niche' (Caraher and Dowler, 2014), the Biospheric Foundation actively sought to engage with the needs of poorer households and communities. In part this is due to the background and biography of

Walsh himself, growing up in Wythenshawe, South Manchester, with low levels of food literacy and subsequently self-funding a tour of U.S. cities and urban agriculture initiatives in East Africa and Europe. Like some AFIs, Biospheric Foundation was not set up directly to tackle immediate food poverty; but unlike others, the intended benefits were to be felt beyond a bounded and niche community of 'locavores'.

Whilst highly successful in establishing the proof of concept of the Biospheric Foundation approach, the longer-term issues relate to the sustainability of the model. The challenges in this respect relate to the inter-relationship between governance, purpose, finance and location. The speed and scope of the Biospheric Project exceeded expectations and rapidly came to outstrip capacity. With a small governance team and set of volunteers, the Biospheric Foundation quickly positioned itself with multiple epistemic communities and communities of practice. Partnerships with key city-regional organisations, as well as patronage and sponsorship, played a key role in the rapid transformation of the building in the 3 year period. Whilst this had the beneficial effect of attracting project funding, capital costs were not met, despite the huge expenditures associated with retrofitting and maintaining Irwell House.

Like many AFIs, commercial viability is a key challenge. The diversity of the Biospheric Foundation's systems was one safeguard designed to create organisational resilience, with the governance of the Foundation itself mimicking the way in which the systems had been modelled. One example is the potential for up-scaling mushroom production to supply commercial venues, particularly gastronome restaurants, as a potential way to cross-subsidise other aspects of the business. However, as the initial excitement of partners to invest in the 'new' appears to be fading, longer-term systemic commitments have not been forthcoming. This speaks to the fickleness of next-big-thing-urbanism, a hallmark of the entrepreneurial city, and perpetuates a project-mentality. Capacity-building within communities is postponed in favour of basking in the reflected glory of outsourced risk and innovation. Funders are happy to fund projects; but not core costs, regardless of how worthy the vision. For projects such as the Biospheric Foundation, this creates a tension between economic and social values and outcomes in the project. In trying to develop a socially-just but commercially sustainable model, compromises have needed to be made. The independent evaluation of the Whole Box model concluded that the boxes had reached local people and that many had tried new foods for the first time, yet recipients have not transitioned into more regular shop customers. Whilst the Whole Food shop did not start as a way to address the cultural preferences of the middle classes, local footfall has proved insufficient in the long-term. The customer base would be depleted without the patronage of those coming into the area to buy organic food, whilst some local people have continued to stay away.

In this, the Biospheric Foundation is not uncommon. Caraher and Dowler (2014) note that socially-oriented food projects are rarely commercially viable without direct state and other sources of financial support; similarly, Connelly et al (2011: 318) note that 'social justice does not fit well with business plans or development proformas.' McClintock concurs that the challenge is to prioritise use value over exchange value and that 'only if the production of fresh and healthy food is viewed as a public good – and access to it a right – rather than simply a commodity made available via the logic of the market, will cities set space aside for urban agriculture (2013: 166)'. Given these dilemmas in navigating use and exchange values in urban agriculture, it is unsurprising that there are critics of whether AFIs are alternatives or are in fact propping up existing systems. McClintock (2013: 148) argues that there are inherent contradictions in urban agriculture and that initiatives are often both 'interstitial and subversive' insofar as they attempt to subvert commodity forms by seeing food as a public good, but also, albeit inadvertently, fill gaps left by the rolling back of the social security net. Hence for McClintock: 'urban agriculture, in its many forms, is not radical *or* neoliberal, but may exemplify *both* a form of actually existing neoliberalism *and* a simultaneous radical counter-movement arising in dialectical tension' (2013: 148). This in turn is part of a broader set of debates on whether localism itself is a progressive or regressive phenomenon (Featherstone et al, 2012).

The Biospheric Foundation can be seen as an urban socio-ecological experiment. It is urban, insofar as it is located in an area of regeneration whose history dates back to Engels' classic slum and involves the transformation of the built environment of the city. It is anchored in ongoing and complex processes of urbanisation, particularly around food austerity and access to fresh food, with a commitment to community engagement. The Biospheric Foundation vision and approach recasts urban ecological systems through demonstrating in practice the interdependence between different systems (vermiculture, aquaponics, forest gardens etc). In these combinations it can be seen as part of an ongoing wave of urban experimentalism (May and Perry 2016; Evans et al 2016) as it seeks to extend the frontiers of research and practice through developing new systems in a closed environment, in which outcomes are unknown and learning takes place in real-time.

To this extent, the Biospheric Foundation offers a potential response to food austerity. History, rootedness and engagement sit alongside novelty, innovation and risk. Through the innovative use of a building and site, the Foundation has a strong conceptual impact on recasting the urban agenda and is, to this extent, part of a transformative food politics (Levkoe, 2011). It is pre-figurative of urbanisation processes that conceive cities as complex interdependent socio-ecological-technical systems, recognising that system change will not arise from 'a smattering of urban agriculture projects' but a long-term incremental process. At the same time, there are clear issues in realising the possibilities of aspirations in practice, given the challenges of community entrepreneurship and grassroots activism in 21st century cities. Like many AFIs, funding, commercial viability, a reliance on voluntary labour, the challenge in scaling up have all been common issues. So too are the issues around navigating and negotiating urban power relations and partnerships and working with entrenched interests across different sectors. Institutional survival and limited capacity to deliver mean, as Caraher and Dowler argue (2014), that such initiatives can seldom move from responsive mode in addressing long-term food problems. Despite imaginative and creative responses to structural social and spatial inequalities prefiguring future possibilities, as manifest in the Biospheric Foundation, community-engaged socio-ecological experimentation appears transient and impermanent in the face of economic and social pressures and the short-termism of next-big-thing urbanism.

4.2.2 The Context of Digital Transformations

There are two windows through which to understand the role of digital technologies in shaping the development of the Biospheric Foundation: *ubiquitous digital transformations* and the *development of specific digitally-enabled eco-technologies*.

The first window relates to the speed and scale of urban transformations, in part, catalysed by an increasingly networked and digital society. In just 3 years, headline-making milestones were reached, amongst them: the retrofitting of the industrial mill through four interconnected systems; the positioning of the Biospheric Foundation with different sectors and communities; creation of the 78 Steps shop and the development of a funding partnership, including Manchester International Festival, to deliver aspects of the programme. Such milestones would not have been possible without the context of ubiquitous and taken-for-granted digital technologies which underpin modern societies. The speed and ease of communication, through email, social media and mobile technologies, allowed Walsh to connect with multiple interests in a short timeframe and access decision-makers at senior levels within organisations. Distributed knowledge networks from Totnes to the US were deployed to access knowledge for socio-ecological experimentation. Examples include the initiation of contact with Urban Splash in order to secure the building; another includes the establishment of an academic-practice network to harness knowledge and secure technologies to deliver the action-research platform. As Walsh notes "I couldn't have set this up face-to-face…without the internet it wouldn't have been done in that timescale". Digital tools, including the website and twitter, were part of the standard repertoire of resources and techniques to develop and deliver the project. Moreover digital design and careful branding, drawing on Walsh's own background in motion graphics, were important representations of a fundable proposition to prospective investors: "You can tell from the website that it is professional and high-end…sponsors don't want to pay for a website that looks crap…we have to

look right". Ubiquitous and taken-for-granted digital technologies were central in enabling the development and delivery of the Foundation, drawing on an intensely networked set of partnerships and careful positioning in webs of social and commercial contacts. This hyperconnectivity is core to the Biospheric Foundation's meteoric prominence. Online and social media have contributed to establishing its profile and credibility.

There is, however, another side to these positive effects of a digitally connected world. Insecure funding streams and limited resources for core costs resulted in an extremely skeletal governance structure, with a small core, few paid staff and a reliance on volunteers. Despite this tiny core and delivery capacity, digital transformations served to enable exponential growth of the Foundation, before the organisational structures and processes had had time to mature. Connectivity becomes a problem when it amplifies the image and reputation of small-scale projects, resulting in high demands and expectations despite limited capacity to deliver. To this extent, the Biospheric Foundation is a victim of its own success: "We look massive, the connections went mad, we grew too quickly and the funding carpet was cut too soon….the time and space that is built into non-digital ways of working simply wasn't there". This suggests that digital technologies can result in the premature circulation of ideas and possibilities in the search for the new urban experiment or innovation in an increasingly delivery-oriented world. The rapid development of the project meant that insufficient time was given to establishing a robust and sustainable governance and financial model.

The second window onto these issues relates to the relationship between ecology and technology in urban environments. The Biospheric Foundation was originally conceived as a ten-year vision to link the 'technos' and the 'bios' together in urban environments. Walsh notes how ecologies and technologies have often been used in combinations to create closed systems, often in space travel, but how this is now increasingly manifest in urban environments (see also Marvin and Hodson 2016): "it's all based on natural metabolisms…technology is the thing that is being integrated into ecological systems…our tech is becoming more ecological…that is why it is possible to create closed systems". The systems of the Biospheric Foundation are not new in their isolated parts; what is new is the recombination of ecological technologies in a particular building and the positioning, density and interconnectivity between systems. Some of the nodes between these systems are specifically digitally-enabled. A key example is the aquaponics system which requires both the 'technos' and the 'bios': "there is the hardware (the architecture, the digital monitoring systems) and the software (the fish and nutrients etc)". The speed and scale of the development of the Biospheric Foundation has however had unintended consequences in this respect: "we had to put stuff in when we knew it wasn't completely right…we had an unchangeable deadline". This resulted in the installation of an industrial monitoring system from Siemens which was not fit for purpose for a grassroots project, raising questions over the transferability of technology into community contexts.

Notably absent in the development of the Biospheric Foundation to date is any specific consideration of how digital transformations might address issues of food austerity. This is however an embryonic area. On the one hand, our reviews of the academic literature in relation to urban agriculture, human geography, planning and food poverty revealed little reference to date to the actual or potential role of digital technologies in addressing food austerity. However, at the same time, many of the recommendations of recent reports emphasise the distributed and fragmented nature of local food initiatives, the need to network food banks, the desire to scale up and embed approaches which work well. Whilst not explicitly addressed, there is untapped potential here to consider how digital technologies can build the kinds of networks and platforms for shared learning that are invoked.

There appears also to be disciplinary differences in orientation. Whilst literatures on urban agriculture appear relatively 'digital technology blind', technologists are beginning to link information and management systems to questions of food security, resilience and culture. This includes small studies on the use of twitter to enhance food resilience (Ardiano et al, 2014); on social media and mobile technologies in augmenting sustainable urban food systems (Hearn et al, 2014); on technologies for food image sharing (Choi et al, 2011) or online social networks such as Foodmunity (Gross et al, 2011). The potential of human-computer interactions (Lyle et al, 2013), mobile

technologies or social media in addressing these issues is starting to be examined. Similarly, academic studies appear to be behind the curve of innovations emerging in practice – see for example http://www.theguardian.com/sustainable-business/free-food-sharing-leftovers-surplus-local-popular. Examples include casserole clubs, food sharing apps or virtual farms (see Box 3). Geographically, initial indications are that the European continent and North America are ahead of the UK in exploring the potential of digital technologies to address this critical challenge.

Box 3: First hits and inspirations? Digital transformations and food austerity	
Description	**Link**
LEAF Virtual Farm Walk	http://www.virtualfarmwalk.org/
Leftover swapping app: enables individuals to photo, upload and give away their leftover food.	http://leftoverswap.com/ See also TED talk at http://leftoverswap.com/benefits.html
FoodCloud App: facilitates the safe donation of surplus food from businesses to charities in their local area who can redistribute it to those who are struggling to feed themselves and others	http://www.bitcni.org.uk/what-we-do/planet/resources-and-links/foodcloud-whats-it-all-about/
Virtual tours of green buildings linked to urban agriculture potential (U.S.)	http://virtuallygreen.com/
Casserole Club: helps people share extra portions of home-cooked food with others in their area who are not always able to cook for themselves	https://www.casseroleclub.com/ https://www.facebook.com/CasseroleClub
CropMobster Community Exchange: leveraging social media and "instant alerts" to spread word about local food excess and surplus from any food supplier in the food chain	http://sfbay.cropmobster.com/how-it-works/
Shareable movement: looking at all kinds of physical and virtual ways of developing more sharing society	http://www.shareable.net/blog/the-cooking-eating-and-business-of-shared-food http://www.shareable.net/blog/open-sauce-source-for-the-food-revolution
FoodCowboy in Washington DC, using mobile technology to address hunger and waste	http://foodcowboy.com/

4.3 Re-Positioning the Biospheric Foundation: A Prospective?

4.3.1 Community Conversations

Whilst focus groups imply a clear question around which participants can contribute their thoughts, the pilot project wanted to explore the various dimensions and perspectives on a broad agenda in order to identify emergent commonalities and themes emerging. Hence, in parallel with the retrospective case study analysis, four 'conversations' were held with different communities of interest around the broad themes of food austerity and digital transformations. These conversations were with Residents, Academics, Food Poverty Stakeholders and Residents.

The order in which these conversations took place was unplanned and dependent on availability. The first conversation was with the Technologists. They engaged with the terms of reference of the discussion and suggested areas for potential enquiry. However, their main interest was in realising the Digital Action Plan once it had been co-produced with members of the community. The discussion was solution-oriented and participants positioned their value in visioning and brainstorming concrete ways to realise specific plans. The high level of interest in working with the Biospheric Foundation meant that many technologists agreed to meet again at the end of the process.

The Residents spent time discussing local issues relating to food austerity, including the relationships between cost, quality and nutrition, access to food and availability, time to shop and the quantity/quality debate. Education as a central theme emerging from this conversation, although some academic analyses are beginning to challenge the idea that poor communities have no understanding of nutrition, 'calling into question the wisdom of policymakers who promote nutritional education as opposed to addressing lack of access to high-quality food sources' (Rose, 2010. See also Crotty and Germov, 2004). The challenge for the residents was how to find ways to reach people that relate to their everyday movements, for instance, in lifts, gyms or doctors surgeries. A distinctive strand of the discussion compared with the other groups related to multiculturalism and food cultures, for instance focussing on the nutritional value and cultural norms associated with different eating practices (cows/insects). Food choices were seen as being bound up not only with class, but with cultural and social identities and affected by material conditions.

Box 4: Ideas generated in the conversations				
Idea	**A**	**T**	**R**	**P**
Data generated could be displayed, such as the levels that check on the nutrients, and could be used on websites and as a public interface to connect with schools. Digital screen on BF showing key information and saying what is available in the shop.		x	x	
An allotment network, using digital technology to donate food into a food bank network; distributing left over produce; a digitally enabled produce exchange.	X	x		x
Using existing software, such as Tinder or Grindr to connect those in need with those who have food; redeploying commercial systems, i.e. technological systems used in supermarkets to manage customer relations.	X	x		
Developing BF as an education platform, communications, recipe cards, advocacy, influence, reach, mapping future scenarios, visualisation (i.e. what happens when you eat a carrot), gaming, virtual networks, Viral Vinny, youtube, online cooking classes, augmented storytelling, m-technology, vertical farming 'Sim City', 3 dimensional BF, digital roadshow, filming the journey of a single molecule, filming growing, sharing on Facebook/social media, blogging.	X	x	x	x
Cooperative bulk buying group as a complementary / different model for 78 steps.			x	
Investigate alternative food distribution and sale approaches, for instance, company shops, community shops, club cards	X			
Predictive analytics: mapping demand, need and supply.	X			
Community kitchens.	X			
Community food cultures, sharing stories, mapping local spaces, deploying social media, sharing food cultures across different ethnic groups.	X		x	
Signposting and information exchange; broader self-posting networks, youtube channels, what's cooking Salford; digital exercises, pictures of people in the community.			x	
Pop up markets, temporary farmers markets.			x	

The Academic conversation focussed on a critical analysis of underpinning assumptions, for instance, highlighting questions of access to technology, the role of qualitative and quantitative data and the dangers of a 'paternalistic' attitude to educational mantras as a fix for food austerity. Much of the discussion echoed debates referenced earlier in this report, in terms of the need to locate food austerity within broader social-structural transformations and global and cultural dynamics. Excessive expectations of technological developments to 'fix' complex urban issues were to be avoided; whilst a general orientation to redeploying existing technology and applying this to new problems was a common theme.

The Food Poverty group was interested in questions of improving the quality of emergency food assistance through connecting growing projects with social need, for instance, through allotment – food bank partnerships. The important of locality and human interaction was a strong theme, given the relationship between food, culture and social relationships. A strong difference between the Technologists and the other three groups was the extent to which faith was placed in the potential of digital technologies in providing 'magic solutions'. Nonetheless a wide variety of different digital technologies were discussed in the group, including the internet, big data, commercial logistics systems, social media, YouTube/twitter, open data and particularly mobile technologies. Notwithstanding difficulties and differences in immediately grasping the meanings implied in 'digital transformations', the conversations produced a range of options that participants felt were important and worthwhile in setting a research-practice agenda around food austerity and digital transformations. These are summarised in Box 4.

4.3.2 The Community Research Jam

Although the Biospheric Foundation had engaged with the residential community in Blackfriars and the surrounding area in the early stages of its development, the speed and intensity of navigating urban politics and partnerships had meant that the extent of engagement was difficult to maintain. The community research jam therefore offered an opportunity for re-engagement between the Biospheric Foundation and residents. Two participants from the previous conversations gave their time to offer perspectives on different possibilities: one low-tech and one high-tech. Laura Ager, a post-graduate student, spoke about her experiences of setting up a food buying cooperative using social media in her local community. Professor Terrence Fernando, Director of the ThinkLab in the School of the Built Environment, University of Salford, helped the group explore the possibilities of virtualisation. The logic for their engagement built on the initial conversation that had taken place with the residential community (see Box 4).

The discussion started through clarifying the value of the Biospheric Foundation to the local community. Overall, the importance of the Foundation in debates on food austerity was seen to be high but indirect. For the participants, it was not about providing emergency food for people in need, but making systemic interventions to improve the quality and availability of health food in local areas and nutrition. The focus of the jam then focussed on how digital transformations could support these outcomes. Digital technologies were seen to be valuable in facilitating the capture of the legacy of the Foundation and using it as an educational platform to reach wider audiences. Indeed, this was the only theme that connected across all four community conversations that were held. The main audiences discussed at the jam were the scientific community, building on the experiences of the action-research platform and the local residential community. Each was seen to require different approaches and layers of engagement. Working with children and young people was suggested as a potential approach – using pester power to influence parents – to harnessing the learning from the Biospheric Foundation. The group felt that showing people how the food system works and illustrating understanding and connection with food production systems could help inspire people, as well as illustrating ways to take this forward in practice.

The complexity of the Biospheric Foundation model was also a consideration in developing appropriate learning tools – each part of the system is different in terms of its constituent parts and how these connect together. The 'scientific' nature of the name was seen as a potential barrier to community understanding and engagement, suggesting different ways of positioning concepts and ideas for different audiences. Previously Walsh had expressed reluctance to position his work in relation to 'food', as his work addressed complex ecological-technological systems in an urban environment. The danger is that a narrow 'food' lens produces a single object rather than systemic view in cities. In communicating with policy-makers this is undoubtedly true and could reinforce an issue-specific rather than integrated mentality. However, in communicating with residents, the process confirmed the value of 'food' as a gateway into more relational thinking. As Silver noted in reflection:

"It's food that is the hook, everyone has a relationship with food. It is just how it is communicated. This actually opened it up more". A critical question is how to enable multiple conversations with different audiences using appropriate vernaculars, how to simplify without losing complexity and interconnectedness and enabling people to think relationally.

Box 5: Actions emerging from the Community Research Jam			
Action	**Details**	**Participants**	**Feasibility/Timeframe/Reach/Impact**
Food Cooperative	Using model developed by Laura Ager to develop closed organic wholefood bulk-buying for cooperative members, working through social media to have wholesale prices	Residents/ Biospheric Foundation esp. wholefoods shop	Highly feasible, dependent on committed individual/s to coordinate and deliver. Could be developed quickly. Small reach as works best with self-selecting group (around 10 people). Potential medium impact in making organic food more affordable, but likely to attract those that have already developed such food habits.
Recipes	Upload people's favourite healthy recipes on to the Biospheric Foundation website; develop other ones; recognise and respect inter-cultural differences in food cultures	Residents/ Biospheric Foundation / local community and cultural organisations / IT support	High feasibility, level of coordination and organisation required to start, manage and identify participants, purpose and dissemination strategy. May require digital upskilling for participants to take ownership of an open platform. Recipes would be freely available on internet/social media but this does not address issues of digital exclusion or reaching to new communities. Shaping initial participation and embedding in a long-term process more likely to have impact.
Videos/film	Producing films about different elements of the Biospheric Foundation connecting them to a wider story.	Biospheric Foundation / Residents / Technologists and other participants to give perspectives	Highly feasibility in a short timeframe and relatively cheap; potential broad audiences and high reach across global-local and different communities. For maximum effect, would require some active work in storyboarding and ensuring communication of complex concepts works. Technological expertise needed for high quality products that are visually impressive.
Virtual learning platform, through a 3D model and game	A virtual learning platform to disseminate and engage people in the Biospheric Foundation; to include a 3D model and game, as well as embed elements of above	Biospheric Foundation/ University of Salford / ThinkLab / Residents / Technologists / Food and Community Organisations in 3rd Sector	Feasible but requires investment in R&D and prototyping, as well as strong co-creation process to ensure highest impact. Most expensive but longest term potential gain and relevance for different groups.

Within a set of general discussions, broken up by perspectives from Ager and Fernando, four potential actions were discussed as dimensions of a broader educational platform: an online food cooperative, online food recipes, video stories and a 3D virtual model/game (Box 5). Each had different levels of complexity at the level of design, technology and feasibility. The online food cooperative, using social media to bring together a bulk buying group, was seen as low-tech and highly feasible. Discussion focussed easily on how this could be implemented and by the second day, progress had already been initiated to put this into practice. Online recipes were also an easy win although it was felt this had the least potential impact. The group discussed the need to reach new communities who were digitally or socially excluded and that the value of online education was only in association with a longer-term campaign. Videos were also discussed as highly feasible, allowing communication in different styles and vernaculars to multiple audiences. The group suggested a number of criteria: that the videos are instructive, informative and fun and that they spark curiosity. Topics could explain the different stages of growing and how the systems fit together, as well as the health benefits of eating nutritional food. Animations and short videos, linked to a broader narrative, were suggested and the possibility of involving young people was also favoured. In the long-term ongoing filming could capture changes in real-time and the speeded up to show change over time.

Overall these first three actions were low tech ways of using known digital tools to extend and share the learning from the Biospheric Foundation. The fourth action – developing a 3D model and interactive game – generated the most enthusiasm but was felt to be the hardest to achieve. It was also felt to have the most impact in sharing learning, was highly interactive and would connect across scientific, policy, residential and technological communities. The community researchers enjoyed jamming on this topic – coming up with many different ideas. These included having educational tasks that people could complete, helping people appreciate where food comes from and understanding the flow and process of food production. The conversation around a game in which users could interact with the model and see real-life consequences of their actions generated a lot of enthusiasm: “they wanted a game, you know, if you don’t feed the worms then the fish will die...we had fun with that”. A real opportunity for co-production and collaborative working was seen in this idea. The community researchers felt it important to consult with teachers and that there was real audience for learning tools for school-children as well as students in further and higher education. Importantly, it was felt that an interactive online environment could take users from simple to complex understandings. The 3D virtual educational and learning platform was also felt to be able to incorporate two of the three previous actions – recipes and videos.

4.3.3 The Digital Action Plan

The Digital Action Plan draws together the different modules of the pilot project. This includes the actions identified through the conversations and community research jam, but importantly sets these in the context of the broader lessons learnt from the retrospective analysis of the Biospheric Foundation. There are therefore two pathways identified in the action plan in relation to food austerity and digital transformations.

Pathway 1: Digital Transmissions

A clear need and opportunity was identified to creatively use digital technologies to tell the story of the Biospheric Foundation to a wider audience as a basis for sharing knowledge on how socio-ecological experiments can transform different urban contexts. The main manifestation of this aspiration was to create a 3D virtual urban farm and use this as a mechanism to embed knowledge exchange about the individual systems and wider story and significance. A suite of interactive user and stakeholder oriented digital tools would be included, such as serious gaming, apps or learning packages for different audiences. Building on this 3D virtual learning platform, research participants felt that the reach and potential for the Biospheric Foundation to change the discourse and practice around food austerity within broader urban socio-ecological systems could be amplified. In this,

whilst not addressing the root causes of hunger, there is alignment with the recommendations of 'Feeding Britain' to 'function as a centre of knowledge and excellence by implementing best practice food models and training local food entrepreneurs' (APIIH-UK, 2014:46).

Pathway 2: Digital Eco-Technological Transections

The pilot project made visible the relevance of digital technologies in achieving closed ecological systems in urban environments. For Walsh the retrospective analysis centred the inter-dependence between ecologies and technologies, a vision encapsulated in a poster developed (see Appendix 1). In parallel with this pilot project, Walsh has been developing and repositioning his vision around a network of 50 hyperlocal ecological projects delivered in 5 years in urban environments (see Figure 2). Centrally a key aspect is the role of technology in delivering this aspiration. This requires working at the transection of ecology and technology and considering how digital technologies can play an enabling role. The development of the concept of 'Massive Change' events to crowdsource technological knowledge to support socio-ecological urban projects is a key part of the action plan (see Appendix 2).

Taking the First Steps (see also Section 7, Impact)

Progress has already started on implementing this plan. This includes the following:

- Initiation of the food cooperative by residents of Blackfriars
- Launch event for Massive Change events to bring technologists and ecologists together to create and deliver ecological projects (see Storify, Appendix 3)
- Discussions leading to initial bid for follow-on funding to develop prototype of 3D model as basic architecture for virtual learning platform

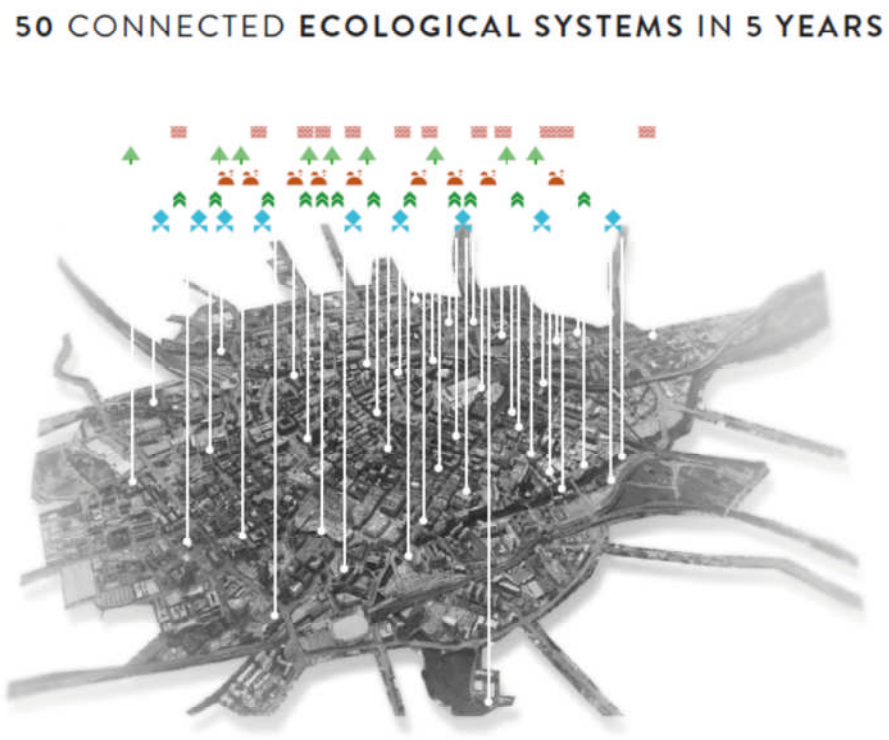

Figure 3: 5 Year Vision

5. Key Issues Arising

This pilot project has generated a high level of activity, engagement and impact through strategically targeting the EPSRC CCN+ funding to build on previous and ongoing collaborations and add value to the network. A number of issues have been discussed and analysed in the Key Findings section of this report which are brought to light through the single case study of the Biospheric Foundation.

5 are worthy of summarising and highlighting here in relation to the specific intent of the CCN+:

1. Whilst digital technologies are deeply embedded in how urban environments work, they are often taken for granted. The ubiquity of digital technologies, along with the speed, scale and hyperconnectivity produced, has both positive and negative implications for the development of grassroots projects.
2. The pilot project suggests that digital technologies could challenge elite, locavore gastronomic practices, but this possibility is predicated on high levels of digital literacy and access.
3. Low tech solutions are often overlooked. Examples include the establishment of a physical wholefood shop with high overheads compared with a self-managed community online cooperative and the importation of over-engineered industrial monitoring systems into inappropriate building stock.
4. Consideration of how digital technologies can address food austerity appears to be relatively weak in relation to debates on urban agriculture and socio-ecological urban systems.
5. Two key opportunities to address this, developed through the Biospheric Foundation, are for digital transmission and digital eco-technological transection. In particular a virtual learning and community engagement platform, co-developed between different communities of interest.

6. Next Steps

A summary of the research, suitable for different groups, is in production and will also be made available online and disseminated via websites and social media. The next step is then to secure funding and resources to deliver the Digital Action Plan as well as continue with a formative research and learning evaluation of the development of the Biospheric Foundation's vision. It is intended that a workshop will be held in 2016 to continue to progress and deliver research and practice in this area.

7. Impact

The impact of this pilot project was built in as the primary intended outcome (the Digital Action Plan). Concrete progress and existing impacts have already been noted above in Section 4.3.3. It is important to note other less tangible impacts of the project:

- Individual learning: reflection on the strengths and limitations of the approach to date. In particular the possibility that an online food bulk-buying network for organic foods at wholesale prices may have been a better distribution model than the physical shop.
- Capacity-building networks: the project created new networks and communities, particularly between the Biospheric Foundation and urban technologists, as well as re-engaging between the Foundation and residential community.
- Conceptual impact: building on previous funded work by Mistra Urban Futures, contribution to rethinking and re-energising the vision and mission behind the Biospheric Foundation

8. Dissemination

Like impact dissemination was inbuilt to the pilot project. In total over 30 people were engaged from across different sectors. Here we list additional existing and forthcoming dissemination activities (Box 6):

Box 6: Dissemination		
Activity/output	**Description**	**Details**
Twitter	Creation of hashtag #digitalbiospheric	
CCN+ Annual Meeting	Presentation of initial results	December 2014
Video	Project mentioned in University of Salford video on Smart Cities	https://www.youtube.com/watch?v=EUyqJdHj0jk Starts 2:21
Poster	Produced for dissemination to +100 technologists	See Appendix 1
Massive Change Event	Launch of new vision and process for crowdsourcing ecology and technology	Held on 1 May 2015; See Appendix 2 and 3
Book chapter	Working title: "The janus face of urban socio-ecological experimentation: engagement, enterprise and endurance"	Accepted as part of edited volume on 'Transience and Permanence in Urban Development' (Henneberry et al, Wiley)
Articles	Working titles: "Digital transformations and food austerity: transmissions and transections"/ "Pay to stay: delivering on the promise of local food"	In preparation for submission to Journal of Urban Technology and Environment and Planning A
Biospheric Brochure	Summary of Biospheric story and learning lessons	In production; available Autumn 2015

9. Funding

This pilot project would not have been possible without two prior studies: an AHRC doctoral studentship (Walsh) and a partnership between the Biospheric Foundation and Mistra Urban Futures through the Greater Manchester Local Interaction Platform.

Additional funding of £5,000 was also provided by Mistra Urban Futures / University of Salford

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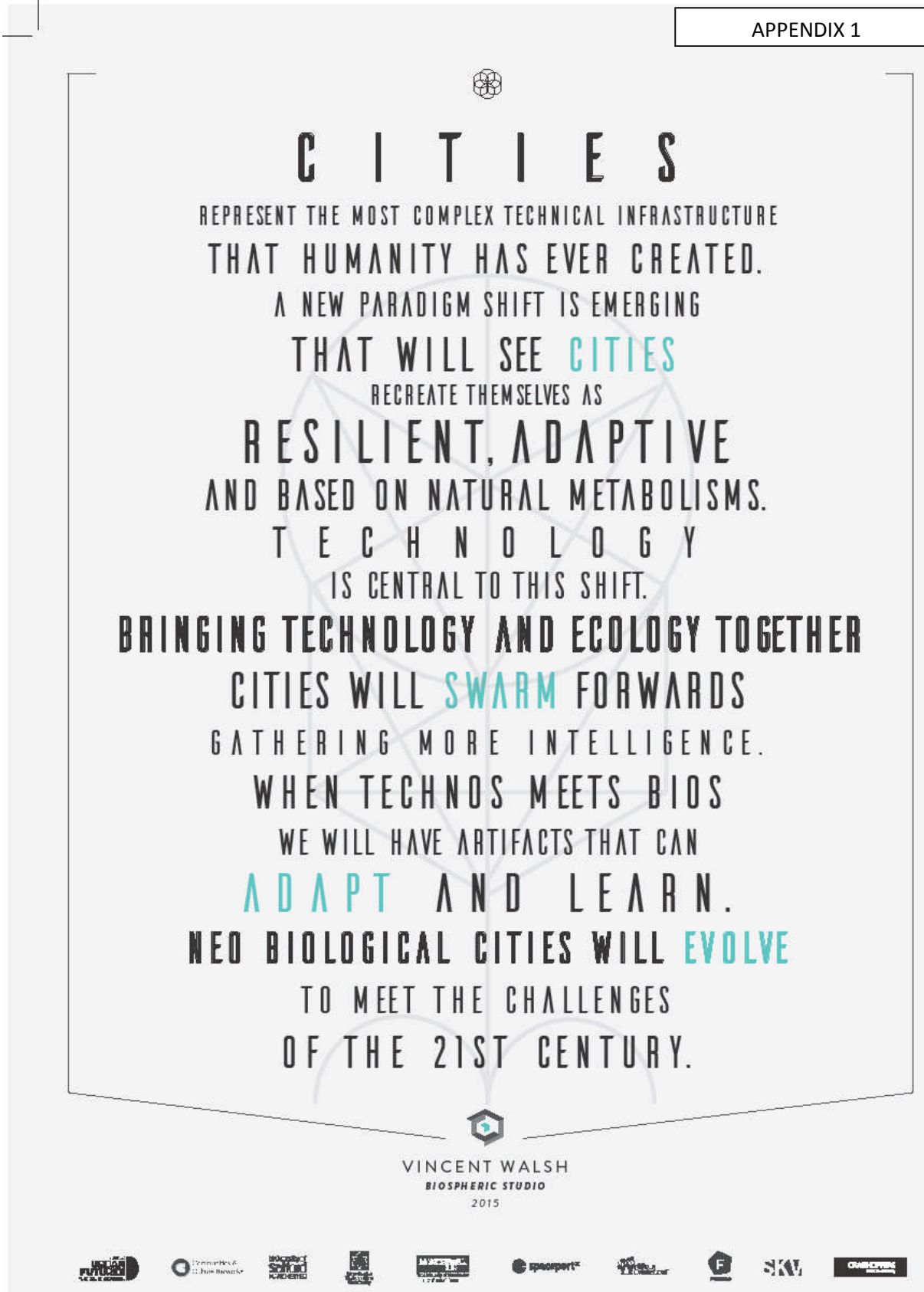
11. Appendices

APPENDIX 1



MASSIVE CHANGE:

Rethinking local food systems: integrating the biosphere & technosphere

Vincent Walsh, Founder of Biospheric Foundation and Co-Director of the Biospheric Studio, invites you and your guest to the first event of the MCR Massive Change series.

Biospheric Foundation will announce its second major project, the Biospheric Studio. The Biospheric Studio will set out its five-year vision (2015-2020) to develop fifty hyper-local, interconnected, ecologically minded projects across the North West. With four live projects already in full swing, the studio has no time to waste in creating the right network of technologists to support the array of projects in the coming months

FRIDAY 1 MAY
18.00 - 21.00

SPACEPORT X
24/26 Lever Street
Manchester, M1 1DZ

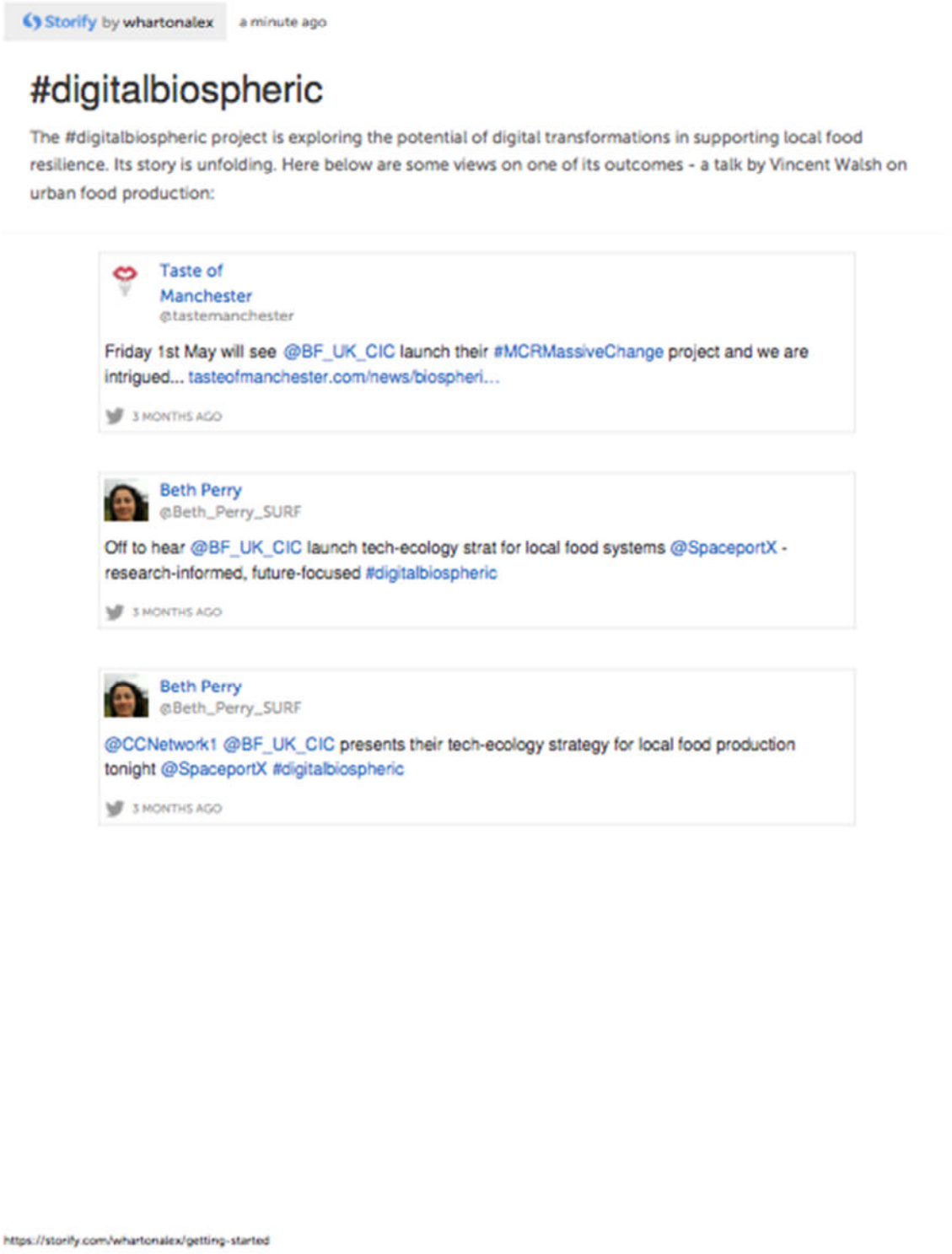
Format
18:00 Reception
18:30 Presentation by Vincent Walsh
19:00 Panel Discussion
21:00 Finish

Panel
Professor Terrence Fernando: Urban Visualisation
Professor Vikas Shah: Economist
Dr David Haley: Deep Ecologist
Philip Laszkowicz: Technologist

BIOSPHERIC FOUNDATION

This events series is generously supported by Manchester Museum, Manchester Metropolitan University, University of Salford, Craghoppers, The Social Action & Research Foundation and SKV Communications.

Collaborators:


Storify by whartonalex
a minute ago
#digitalbiospheric
The #digitalbiospheric project is exploring the potential of digital transformations in supporting local food resilience. Its story is unfolding. Here below are some views on one of its outcomes - a talk by Vincent Walsh on urban food production:
Taste of Manchester
@tastemanchester
Friday 1st May will see @BF_UK_CIC launch their #MCRMassiveChange project and we are intrigued... tasteofmanchester.com/news/biospheri...
3 MONTHS AGO
Beth Perry
@Beth_Perry_SURF
Off to hear @BF_UK_CIC launch tech-ecology strat for local food systems @SpaceportX - research-informed, future-focused #digitalbiospheric
3 MONTHS AGO
Beth Perry
@Beth_Perry_SURF
@CCNetwork1 @BF_UK_CIC presents their tech-ecology strategy for local food production tonight @SpaceportX #digitalbiospheric
3 MONTHS AGO
https://storify.com/whartonalex/getting-started

Standing room only for @BF_UK_CIC #digitalbiospheric event on tech-ecology interface @MistraUrbanFut @CCNetwork1 pic.twitter.com/wrDUasjzCL

BETH PERRY @BETH_PERRY_SURF · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

.@SpaceportX to hear from @BF_UK_CIC about plans to connect ecology and technology in the city #digitalbiospheric pic.twitter.com/KFGjMIwzVN

DAN SILVER @DANSILVERSARF · 3 MONTHS AGO

Dan Silver
@DanSilverSARF

Vincent Walsh @BF_UK_CIC talking tonight about how to connect technology & ecology for more sustainable cities #digitalbiospheric #MCRTOP5

3 MONTHS AGO

https://storify.com/whartonalex/getting-started

We're here at @SpaceportX ready for @BF_UK_CIC #digitalbiospheric pic.twitter.com/MKu3jLYZcq

VIKAS SHAH @MRVIKAS · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

Inspirational talk by Vincent of @BF_UK_CIC at @SpaceportX #digitalbiospheric pic.twitter.com/qhfWt78QV4

VIKAS SHAH @MRVIKAS · 3 MONTHS AGO

Vikas Shah
@MrVikas

Learn more about the amazing #digitalbiospheric work of @BF_UK_CIC at biosphericfoundation.com @SpaceportX

3 MONTHS AGO

https://storify.com/whartonalex/getting-started

"we're more connected to fungi than we are to plants." - Vincent Walsh of @BF_UK_CIC #digitalbiospheric @SpaceportX pic.twitter.com/1voNM65CYv

VIKAS SHAH @MRVIKAS · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

@Biospheric Vinny on his next big project: #UrbanMushroom Farming: Brilliant innovative upcycling & #foodproduction pic.twitter.com/GY7Q38mpwN

SUST FOOD ALLIANCE @GTRMSUSTFOOD · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

@BF_UK_CIC has a full house to talk about the future of food production in urban areas #digitalbiospheric pic.twitter.com/XxVIGM33FQ

DAN SILVER @DANSILVERSARF · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

"I don't want a utopia, I want a protopia..." - Vincent - @BF_UK_CIC #digitalbiospheric pic.twitter.com/0VQtOJWDMI

VIKAS SHAH @MRVIKAS · 3 MONTHS AGO

Dan Silver
@DanSilverSARF

Dr David Haley: There is no hierarchy of academic disciplines, it is about the question at hand #digitalbiospheric @BF_UK_CIC

3 MONTHS AGO

Vikas Shah
@MrVikas

#digitalbiospheric - incredible event @Gabiskandar @BF_UK_CIC @SpaceportX @DrinkaboutMCR @siilime

3 MONTHS AGO

https://storify.com/whartonalex/getting-started

I don't mind that Vincent @BF_UK_CIC has the world in his hands, he's changing it for the better #digitalbiospheric pic.twitter.com/FPyjuhclPe

VIKAS SHAH @MRVIKAS · 3 MONTHS AGO

https://storify.com/whartonalex/getting-started

"Revolution is happening through local food production." Dr David Haley @ the inspiring #digitalbiospheric @BF_UK_CIC pic.twitter.com/g0dwWTYvKk

METMUNCH @METMUNCH · 3 MONTHS AGO

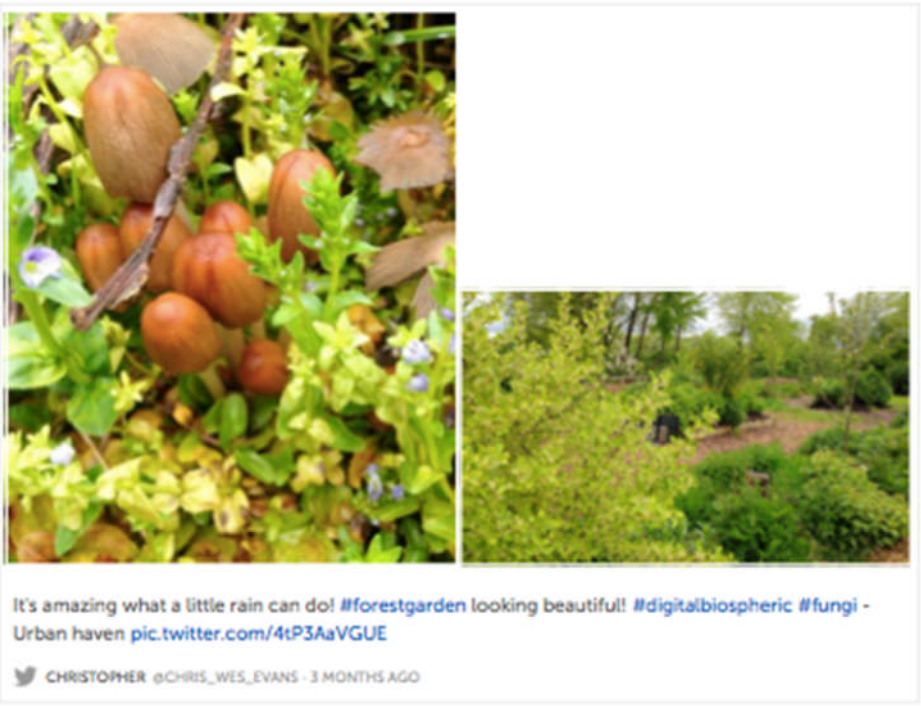
Mcr Food&Drink Fest
@MFDF15

So many things happening! We're collaborating with @BF_UK_CIC to bring urban farming to Albert square. Hello Mushroom Burgers. #biospheric

3 MONTHS AGO

And elsewhere:

https://storify.com/whartonalex/getting-started



It's amazing what a little rain can do! #forestgarden looking beautiful! #digitalbiospheric #fungi - Urban haven pic.twitter.com/4tP3AaVGUE

CHRISTOPHER @CHRIS_WES_EVANS · 3 MONTHS AGO

Biospheric
@BF_UK_CIC

Biospherics: New science, Envis by Vladimir Vernadsky (1920's) #digitalbiospheric @Beth_Perry_SURF @SimplyDoug1987 @MrVikas @youseftaktak

3 MONTHS AGO

https://storify.com/whartonalex/getting-started