What Influences Community Currency Growth and Spread? Understanding Grassroots Innovations for Sustainability

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work in progress - comments welcome - please do not circulate - thank you.

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Abstract

Community action for sustainability is an often-overlooked, yet potentially promising site of socio-technical innovation. In this paper we test the applicability of niche theories of innovation diffusion to 'grassroots innovations', by examining 12 community currency niches to identify the determinants of diffusion success.

These 'grassroots innovations' are formed in response to unsustainable mainstream systems, and aim to build and promote alternative systems of provision to enable more sustainable forms of production and consumption. We adopt a co-evolutionary understanding of socio-technical innovation which conceives of radical niches as being potential sources of new ideas and solutions; the sustainability transitions literature has examined the role of such niches in contributing to systemic change and strategic niche management has sought to codify the conditions required for niches to successfully diffuse their ideas and practices into wider society. Until now, however, civil society niches have not been systematically studied in the literature, and the implications of their very different characteristics to that normally considered (top-down, market-focussed, technology-based) have not been adequately explored.

We study the field of community currencies such as LETS, time banks and local currencies: parallel systems of exchange, designed to operate alongside mainstream money, meeting additional sustainability needs. From an international study of twelve successful systems, we analyse across the set of cases to identify the types of niche activities, contextual factors, and socio-technological characteristics of the innovation itself, which are most strongly associated with successful diffusion. We highlight where niche theory successfully explains the patterns of diffusion evident, and where additional or confounding factors appear to be at play. We reflect on how well the niche literature accomodates the realities of regime-crossing, social movement-based initiatives, and how niche theories might be adapted to better fit civil-society innovations. In so doing, we develop a model of grassroots innovation niche diffusion which builds on existing work and tailors it to this specific context. We conclude with a series of theoretically-informed recommendations for practitioners and policymakers to support the development and potential of grassroots innovations, and discuss the implications for further research.

1 Introduction

The aim of this paper is to contribute to a better understanding of how innovative solutions for sustainability developed in community-led civil society settings can be harnessed and diffused more widely. Community action for sustainability is an often-overlooked, yet potentially promising site of socio-technical innovation. These 'grassroots innovations' are formed in response to unsustainable mainstream systems, and aim to build and promote alternative systems of provision to enable more sustainable forms of production and consumption. We adopt a co-evolutionary understanding of socio-technical innovation which conceives of radical niches as being potential sources of new ideas and solutions; the sustainability transitions literature has examined the role of such niches in contributing to systemic change and strategic niche management has sought to codify the conditions required for niches to successfully diffuse their ideas and practices into wider society. Until now, however, civil society niches have not been systematically studied in the literature, and the implications of their very different characteristics to that normally considered (top-down, market-focussed, technology-based) have not been adequately explored.

In this paper we empirically test the applicability of these concepts to civil society-based niches, in order to develop a model of grassroots innovation niche diffusion. We study the field of community currencies such as LETS, time banks and local currencies: parallel systems of exchange, designed to operate alongside mainstream money, meeting additional sustainability needs. From an international study of twelve successful systems, we analyse across the set of cases to identify the types of niche activities, contextual factors, and socio-technological characteristics of the innovation itself, which are most strongly associated with successful diffusion. We highlight where niche theory successfully explains the patterns of diffusion evident, and where additional or confounding factors appear to be at play. We reflect on how well the niche literature accommodates the realities of regime-crossing, social movement-based initiatives, and how SNM might be adapted to better fit civil-society innovations. In so doing, we aim to develop a model of grassroots innovation niche diffusion which builds on existing work and tailors it to this specific context. We conclude with a series of theoretically-informed recommendations for practitioners and policymakers to support the development and potential of grassroots innovations, and discuss the implications for further research.

The paper proceeds as follows: section 2 introduces the theoretical framework employed here, namely sustainability transitions, strategic niche management and grassroots innovations, concluding with a brief introduction to community currencies. In section 3 we describe our methodology and the metrics we developed for the cross-case investigation, and section 4 presents our findings, seeking to identify the predictor factors, activities or contexts which are most strongly linked to diffusion success across our twelve cases. Section 5 offers some reflections and discussion of a theory of grassroots innovation diffusion in light of the findings, and we conclude in section 6 with suggestions for policy and practice arising from this study, and further research.

2 Theoretical context: Sustainability Transitions and Radical Green Niches

Over the last two decades a growing field of research has sought to understand the processes that can lead to the transition of the socio-technical systems which underpin the every-day activities of advanced industrial societies, such as the provision of food, energy and transport, towards more sustainable trajectories. The term 'socio-technical' indicates that these systems consist not only of technological infrastructure, but also of social institutions and knowledge (s), and that these two aspects co-evolve. A *transition* can be understood as fundamental shift in a given socio-technical system, reflecting significant changes across a range of different domains: technological, political, institutional, cultural etc. Such a shift is required, it is argued, because incumbent systems are 'locked in' to unsustainable technological trajectories which are difficult to alter (Sanne 2002). This lock-in is underpinned by by a set of dominant structures, institutions, and practices characterized in the literature as a 'regime' (Verbong and Loorbach 2012). A transition can therefore be understood as a shift from one stabilised regime to another. The sustainability transitions field addresses the challenge of understanding and potentially influencing such transitions (Smith et al 2010).

Scholarly understanding of socio-technical transitions has been deepened through the development of a number of different conceptual tools and approaches (van de Bergh et al 2011). One common thread across many of these is a focus on 'niches' as the loci of promising socio-technical innovation which remains in a putative or marginal state. Niches can be understood as 'spaces which shield experimental projects with radical innovations from too harsh selection pressures from incumbent regimes' (Raven 2012, 126). A multi-level perspective (MLP) on socio-technical systems has become one of the most influential approaches in seeking to theorise and explain the dynamic relationships between innovative radical niches and incumbent regimes (i.e. dominant systems) (Geels, 2002; Smith et al 2010). It incorporates a third analytical 'level' - the *landscape* - of broader, longer term change which can apply pressure to incumbent regimes and create opportunities for niche innovations to break through, diffuse widely, and potentially influence or even displace the regime. These three levels can be understood as a nested hierarchy of varying degrees of stability or structuration, with the niche the least stable and the landscape the most (Geels 2002). Historical studies, adopting an MLP framework, have described how the accumulation and consolidation of niche experiments, combined with unfolding dynamics within regimes and the landscape can, over time, lead to niches scaling up and replacing incumbent regimes (Geels 2002; 2004)

The MLP built on earlier work within the sustainability transitions field, including the ideas of Strategic Niche Management (SNM). It was this work which explicitly stressed the importance of intentionally-created technological niches as a necessary pre-requisite for the protection of innovations which were developmental (Kemp et al 1998). Consequently, SNM is particularly focused on the factors which support the successful development of niches. In a recent discussion of the SNM approach Raven (2012) outlines six particular features of the literature. The first three are key niche-building processes identified in early SNM studies (Kemp et al

1998). SNM scholars have shown that niche development is supported when visions and expectations are shared by a growing number of actors; when they are robust, tangible and specific (Raven 2012). Building networks is necessary to establish a constituency behind the innovation which provides resources, and engages and enrolls other stakeholders in the niche development process (Schot and Geels 2008). Finally, shared learning helps the niche to grow when it occurs on two levels: first-order learning asks "are we doing things right?", whereas second-order learning asks "are we doing the right things?" (Raven 2012). The latter is also known as 'double loop' learning which involves a radical change in the framing of the innovation or the problems which it addresses (Brown and Vergragt 2008). Early SNM therefore suggested that these three internal processes - learning, shared visions and networking - were a necessary (but not sufficient) condition for the successful scaling-up of socio-technical niches. Niche growth would occur when robust niche performance was combined with a good level of compatibility with existing regimes and evidence of further development potential (Smith 2006).

However, within early SNM work there was a lack of clarity over what exactly constituted a niche: a single project or a cluster? Thus, Raven's (2012) fourth key feature of the SNM literature is the analytical distinction between local experiments and a more abstract 'global' niche level. This separation was first articulated by Geels and Raven (2006) who argue that the global niche is an emerging institutional field (or 'proto-regime') where a number of knowledge aggregation activities occur:

> standardisation, codification, model building, formulation of best practice, etc. Also circulation of knowledge and actors is important, to enable comparison between local practices and formulation of generic lessons: conferences, workshops, technical journals, proceedings, newsletters play a role too.

(Geels and Raven 2006, 378)

Niches therefore comprise intermediary organisations and actors, which serve as 'global carriers' of best practice, standards, institutionalized learning, and other resources such as networking and lobbying, which are informed by, and in turn inform the concrete projects (experiments) on the ground (Geels and Raven, 2006).

Fifth, the role of the regime and landscape dynamics in niche development are critical in developing successful niches, both from the initial prompt to experiment, and from regime destabilisation offering opportunities for niche solutions to be more widely adopted (Hoogma et al 2002; Raven 2005; Smith et al 2005). The interaction between niche, regime and landscape is a feature of many of the historical case studies that have operationalized the Multi-Level Perspective (e.g. Geels 2005; 2006; 2007):

> Niche innovations in an embryonic state do not pose a threat to the regime. At some point, external landscape developments may create pressure on the regime and create windows of opportunity for transitions. (Geels and Schot, 2010, 54)

Landscape pressures or regime 'crises' can be a necessary precursor for a niche innovation to have a substantive impact on the incumbent regime. Therefore whilst the three internal niche processes rare considered necessary but not sufficient processes for niche growth, it is interactions between regime and landscape dynamics, local experimentation and global niche-building that explain how niches become coherent and powerful, or fail to establish themselves (Raven 2012).

The sixth important dimension of SNM is niche protection, and somewhat surprisingly, it has been under-explored. Smith and Raven (2012) address this neglect of niche protection within the literature and develop a three-fold conceptual framework for understanding the protective functions of niches: shielding, nurturing and empowerment. Shielding involves holding off pressure from the selection environment (regime); nurturing supports the development of path-breaking innovation through the internal niche-development processes described above; and empowerment can either make niche innovations competitive within an unchanged selection environment (the niche will 'fit and conform' to the regime) or will change the environment (the regime will 'stretch and transform' to accommodate the niche innovation).

In sum, Raven (2012) outlines five stages of niche development:

1. Regime and landscape dynamics inform experimentation through the creation of new expectations and social networks;
2. Emerging local networks experiment with novel socio-technical configurations and learn how to make them work within a specific context;
3. Participants exchange knowledge with other actors and lessons get translated into more generic rules that become applicable across different locations;
4. The emerging institutional field becomes a useful resource for subsequent experiments in new locations;
5. When sustained sufficiently over time, such cycles result in a stable institutional field which may start to influence prevailing regimes, or become a viable competing socio-technical practice.

Influential niches are able to diffuse their innovative ideas and practices through three routes: scaling-up (individual projects recruit more participants and grow in scale), replication (projects multiply) and translation (niche ideas are taken up and applied in regime contexts - either adapted - 'fit and conform' - or changing the regime to accommodate the niche - 'stretch and transform') (Seyfang, 2009; Smith and Raven, 2012). This literature therefore predicts that niches which exhibit the key internal niche-development processes, and which experience favourable external conditions in regimes and landscapes, ought to be able to diffuse their innovative solutions into wider society, influencing or even displacing their relevant regimes.

Grassroots Innovations

The SNM field has primarily addressed market-based innovations in technological systems, and there has been relatively little work to date examining how useful and applicable these theories might be to the development of radical innovations emerging from civil society - namely *grassroots innovations*. These are defined as:

> innovative networks of activists and organisations that lead bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to the greening of mainstream business, grassroots initiatives tend to operate in civil society arenas and involve committed activists who experiment with social innovations as well as using greener technologies and techniques (Seyfang and Smith, 2007: 585).

By extending niche innovation analyses into civil society contexts, Seyfang and Smith (2007) argue that community action is a promising but neglected site of systems-changing innovation for sustainability. They set out a number of ways in which grassroots innovations differ from conventional market-based innovation: they are driven by ideological commitment rather than profit seeking; the protected space is created by values and culture (as opposed to subsidies); they tend to involve communal ownership structures; they also tend to operate in the social economy rather than the market place, often relying on voluntary labour, grants or mutual exchange. These alternative *systems of provision* are intended to meet social needs in a way that differs significantly from the dominant regime, whilst also facilitating the expression of green values and cultural preferences (Seyfang 2009).

A nascent literature has begun to explore the nature of grassroots innovations and the conditions under which they emerge (e.g Hielscher et al, 2013; Seyfang and Haxeltine, 2012; Longhurst 2012; Witkamp et al, 2010; Smith, 2007; Seyfang, 2009; Georg, 1999; Verheul and Vergragt 1995; Hess, 2007; Avelino and Kunze, 2009). Despite the growing body of work which contributes to understanding grassroots innovations, there has still been little exploration of the processes of niche formation and growth in this civil society context, nor on the ways in which niches might seek to gain wider influence on regimes (Smith, 2007, Longhurst 2012, Hielscher et al, 2012, Seyfang and Longhurst 2013b are rare exceptions). A critical question is how grassroots niches can diffuse their innovative socio-technical practices and influence incumbent regimes, and how applicable are the predictions of SNM for civil society-led innovations, displaying quite distinct characteristics. This paper therefore seeks to address this knowledge deficit by asking: how well does SNM explain the development of civil society-led grassroots innovation niches? What can the theory tell us that might inform more successful diffusion? and what does the empirical case suggest about the ways in which grassroots innovations are different to market-based innovations, and where does theory need to attend to these distinctions?

3 Community currencies as grassroots innovations

Community currencies are parallel exchange mechanisms that are designed to exist alongside conventional money, meeting needs for exchange unmet by conventional money. Throughout history there have been many examples of such parallel currencies, from the Labour Notes of Victorian Utopian Socialist Robert Owen, to the stamp scrip of the Depression era. The most recent wave of community currencies began with some isolated experiments in the 1970s and followed with the diffusion of key 'types' since the mid 1980s (Seyfang and Longhurst, 2013b). Some of these use local currency notes to trade goods and services between individuals, others use electronic accounting systems and have brokers matching needs with offers of help, and still others are supported by local government or NGOs as tools to promote recycling or public transport. Many of the more recent currency models are intended to contribute towards achieving sustainable development, through the delivery of a range of different social, economic and environmental objectives (Seyfang and Longhurst, 2013a). This current wave is therefore more diverse in the range of types and aims than the historical examples, which tended to be only focused on economic objectives. These recent experiments have emerged principally from civil society; consequently they are interesting contemporary examples of grassroots innovations that are attempting to develop new socio-technical systems from the bottom up.

Previous analysis of the community currency field has identified a simple fourfold typology that distinguishes between different types (See Seyfang and Longhurst, 2013a for a more detailed elaboration of these models):

- **Local Currencies:** Paper-based currencies (exchangeable for national currency) that circulate within a specific locality;
- **Mutual Exchange:** Currencies that are created by a group of users as a form of mutual credit, and are issued through the act of exchange;
- **Service Credits:** Time-based currencies that are used to reward participation in neighbourly activity and build social capital;
- **Barter markets:** These allow participants to exchange goods and services at a specific event/site without use of mainstream money.

This earlier work has identified not only how these currency models travel between countries and evolve across space and time, but also that the internal niche development processes, discussed above, occur at multiple, nested, levels (ibid). Whilst recognizing the significance of these multiple levels in understanding of the development of the wider community currency niche, this previous analysis also indicated that the *national level* was where the most significant niche development processes were occurring. Thus, the present study examines a sample of twelve diverse national community currency niches, to investigate the extent to which SNM's niche development processes are occurring, and to explore the extent to which this correlates with diffusion success.

4 Methodology

An international scoping exercise identified 39 successful national community currency niches - defined as having at least five constituent projects within a country - around the world (Seyfang and Longhurst, 2013a). This identified that Europe had the greatest number of successful currency niches (19), followed by North America (9). From these, we identified those with sufficient data available to allow further exploration, and selected twelve for investigation of the factors contributing to their successful diffusion. This set of national cases was purposively sampled for diversity of currency types and geography, as well as maturity. Table 1 shows the spread of cases selected for diversity, and Table 2 provides a summary overview of the twelve cases and some of their key features.

Table 1: Case study diversity

spread of cases table	Local Currency	Mutual Exchange	Service Credit	Barter Market
Europe	UK Transition Germany Regiogeld France SOL	UK LETS France SEL Austria Tauschkreis	UK Time Banks Spain Banco del Tiempo	
North America			US Time Banks	Canada Troc tes Trucs
South America	Brazil Community Banks (age)			Argentina Trueque

Table 2: Summary of Community Currency Niches

	Country	Date of Origin	Who instigated?	Objectives	Currency type	Mechanism	Regime
RegioGeld	Germany / Austria	2001	Civil society.	Regional economic development	Local Currency	Voucher system. Some Euro backed. Electronic cards in some systems.	Monetary system
Brazilian Community Banks	Brazil	1998	Community based neighbourhood organisation.	Generating employment and income. Solidarity economics.	Local Currency	Paper currency issued by community banks for local exchange	Mainstream economy
Transition	UK	2007	Civil society - in Transition Towns movement.	Build economic resilience / economic localisation	Local Currency	Paper currency circulates among individuals and biusinesses, mobile phone currency trialled	Monetary system
SOL	France	2006	Academic working group	To support social, ecological and economic change within local communities	Local Currency	3 models incorporated into a smart card. Loyalty scheme; time based; and voucher. New paper based model.	Consumer society
Tauschkreis	Austria	1996	Civil Society.	Mutual self-help but with an economic focus.	Mutual Exchange	Time based exchange using CYCLOS platform in most cases.	Mainstream economy
SEL	France	1994	Civil society.	Facilitating conviviality and social exchange. Also a political dimension.	Mutual Exchange	??	Mainstream economy
LETS	UK	1985	Civil society. New Economics workshop introduced idea	Community based mutual aid.	Mutual Exchange	Directory lists offers and wants, members organise trades themselves. Virtual currency cheques issued as payment, accounts held centrally.	Mainstream economy
Red de Trueque	Argentina	1995	Civil society. Instigated by green NGO PAR.	Tackle unemployment and encourage people to become prosumers.	Barter Market	Paper notes used to exchange in market places.	Mainstream economy
Trocs tes Trucs	Canada	2006	Civil society. New World Institute workshop	Facilitate reuse of goods and strong social dimension.	Barter market using virtual tokens.	Exchange at market places using virtual points based system.	Consumer society
Bancos del Tiempo	Spain	1998	NGO, Funded by EU.	Strong focus on social solidarity and community building	Service Credit	Broker coordinates exchanges, accounts held centrally, time-based unit of value	Consumer society
US Time Banks	USA	1985	Edgar Cahn invented the Time Dollar model in the mid-1980s.	strengthening communities through reciprocity. Co-production	Service Credit	Broker coordinates exchanges, accounts held centrally, time-based unit of value	Consumer society
UK Time Banks	UK	1998	Civil society / NGO. Imported US time dollars model.	Build social capital; value reciprocity and mutual aid; co-production	Service Credit	Broker coordinates exchanges, accounts held centrally, time-based unit of value	Consumer society

Each national case study was investigated using a mixed-method approach: reviewing previous literature and research on the case including grey literature; documentary analysis of the currency project's own publications and website; elite interviews with national spokespeople or leading figures within the case who had a good overview of the national situation for that case; and reviews of relevant policy developments in that country. Translators were used where necessary to access the less-well-studied non-Anglophone cases. Analysis followed standard qualitative techniques, using theoretically-informed coding schemes, while being open to unexpected factors becoming salient in the investigation of what contributes to niche diffusion. Case study dossiers averaging 9,500 words were complied and as the volume of source material available varied dramatically across cases, the resultant dossiers varied from over 14,500 words (the longest-running case) to under 4,000 words (the most recently-established case).

An analytical framework was developed to allow comparison between the cases. This involved drawing on the rich case study material to derive metrics for two key variables *niche activity* and *diffusion success*. The quantification of niche activity was based on a scoring system which related to the three main dimensions of niche activity under consideration: learning, networking and shared expectations. Each of these had a number of sub-indicators (see table 3). Aggregated, these provided a score for each dimension of niche activity, as well as a composite total niche activity score which measures the amount of aggregated niche activity over the lifetime of the case's existence, rather than at a specific point in time.

Table 3: Metrics of niche activity

TABLE 3	0	1	2	3
LEARNING				
Resources for new projects	No / No evidence	Yes resources such as handbooks, user guides, software are easily available to those who are setting up new projects.		
Types of learning		One point per type of learning: evaluations which can be observed: academic research; tacit learning' project evaluations.		
Consolidation of learning	No / No evidence	Evidence of learning consolidation: E.g. learning gathered from projects and then re-disseminated in a new format.		
Second order	No / No evidence	Yes, evidence of second order learning. I.e. attempts to shift the perception of users.		
Training	No / No evidence	Yes, training provided to new projects		
INTERNAL NETWORKS				
Multiple networks	No / No evidence	More than one network exists seeking to support the development of the currency type.		
National conference	No / No evidence	Yes national conference held on a regular basis which bring together activists and other interested stakeholders.		
Internal networking		1 per type of networking: Regular email communication; active regional networks; specific web platform.		
EXTERNAL NETWORKS				
National body	No / No evidence	A national body exists which represents and co-ordinates the currency model.		
Other imp intermediaries	No / No evidence	Yes other intermediaries exist who are involved in the development of the currency type.		
Networking externally	No / No evidence	Currency activists actively networking with non-civil society actors e.g. governmental or businesses		
EXPECTATIONS				
Managing expectations externally?	No - evidence of disagreement or disappointment amongst external actors.	Yes - expectations appear to be met amongst external actors.		
Managing expectations internally?	Divergent - clear disagreement amongst key actors	Mostly coherent - Appears to be significant agreement between niche actors	Coherent - No evidence of disagreement amongst niche actors	
Consistency	Low - significant variation in the types of project	Medium - projects mostly similar but with some slight differences	High - projects are very similar	
Accreditation	No / No evidence: Projects can be set up by anyone without authorisation	Yes - formal accreditation or authorisation needed to set up project.		
Values	No - No evidence of shared values	Shared values exist and are promoted amongst projects		
Website	No website	Low quality website - out of date or poor presentation.	Medium quality website. Reasonable quality and mostly up to date	High quality website - up to date and well presented

A similar process was used to develop a metric for 'diffusion success'. Here, a three-fold ranking system was developed for each of the three diffusion routes: replication, scaling up and translation (see Table 4 below). The figure used for replication was our best estimate for the total number of active systems at the point data collection stopped, which is, as far as we know, their peak. Two exceptions are the Argentinian Trueque and UK LETS, with cut-off dates of 2001 and 2000 respectively when the data suggested that they were at their peak number of projects. Whilst their subsequent declines are interesting from a theoretical perspective, the purpose of this particular paper, and the underlying analysis, is to explore the conditions supporting niche diffusion, and so these are not delved into here.

Table 4: Metrics of diffusion success

table 4	0	1	2	3
Scaling (size of largest known project)	N/A	1 - 200	201 - 1000	1000+
Replication (no of projects)	N/A	1 - 200	21 - 100	100+
Translation	None	Yes but not widespread	Yes and widespread in many contexts	

A score for scaling up was derived from an assessment of the number of users of the largest known scheme. There was no data for two cases (Banco del Tiempo and Brazilian Community Banks), which were therefore given the lowest score in that category, as there was no evidence that any system had scaled beyond this. Translation is the most difficult diffusion process to quantify, but a score was derived based on an assessment of the extent and nature of translation as evidenced in the data. For example, 'none' would mean no evidence of the model translating into a new context; 'yes but not widespread' indicates limited examples of translation, perhaps one or two examples; 'yes and widespread in many contexts' was applied where there was clear evidence that the model had translated in multiple contexts.

We also coded the cases according to a number of other relevant factors: external policy context; the attitude of the case to the state and whether they were involved in lobbying for supportive change; what for the national network takes, and whether they are pro-active in establishing new projects or not (see table 5). These dimensions of activity allow us to categorize the cases according to more factors and search for potential relevant patterns in the data, when examining the causal factors for diffusion. We undertook a great many exploratory analyses, seeking patterns in the data and sub-dividing the cases according to these various factors. We present here only the key findings and what we consider to be the most important analyses.

Table 5: Metrics for other factors

Table 5				
Policy / legal context	Unhelpful: policy is deliberately unsupportive	Benign neglect: Policy is neither supportive nor unsupportive	Mixed: Some evidence of localised policy support	Supportive: Policy support from the national level
Lobbying	No evidence of lobbying	Yes, evidence of lobbying of policy makers in order to gain support for the initiative.		
Attitude to state	Distance: Explicit desire to not engage with the state	Neutral: Not explicitly opposed to to the state but not engaging in any significant way	Engaged: Evidence of concerted effort to engage with state actors	
Format of national body	Member: Leadership constituted of member projects	Representative: Leadership is not entirely composed of member projects		
Actively setting up new project	Reactive: Support given to new projects on a reactive basis	Supportive: Intermediaries actively encouraging the establishment of new projects	Directive: New projects being directly established by Intermediaries	

5 Findings: which factors contribute to niche diffusion?

The scoring and totals for each case are shown in Table 6 below. The level of niche activity varied between 9 and 23, with a mean of 15. Overall, scoring for diffusion success varied between 2 and 8, averaging 4.75. We begin by testing the central prediction of the niche theories. The literature predicts that niches which carry out the key activities of learning, networking and shared visions, will be more effective (in the right contexts) at diffusing their innovations more widely. We test this empirically by correlating scores for niche activity and diffusion success across our 12 cases (see Figure 1).

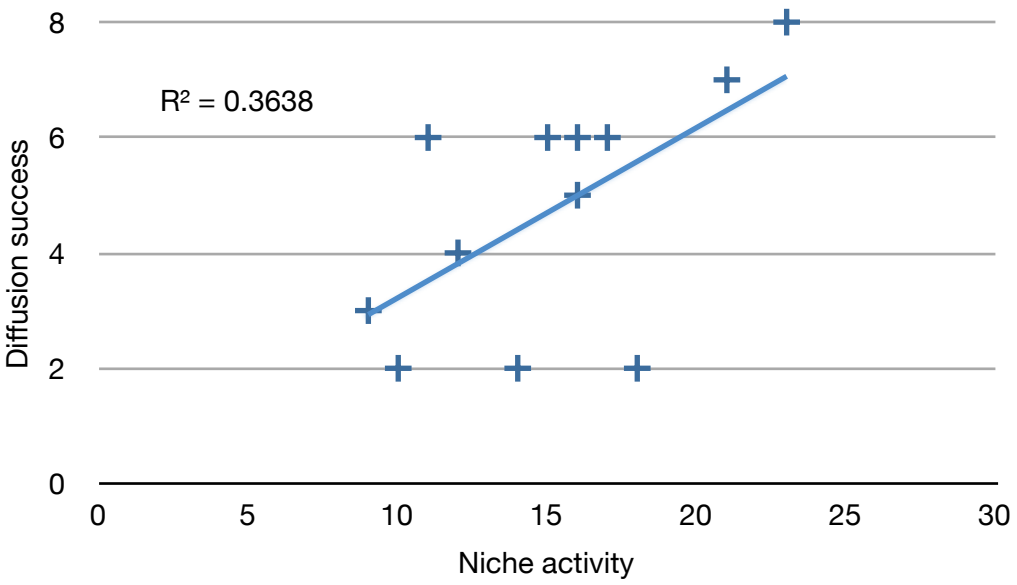

Figure 1: Plotting diffusion success against niche activity

We find a correlation between the two (R^2 = 0.36), indicating that the two phenomena are linked. Looking more closely, there are two significant outliers (highlighted): Troc Tes Trucs and Brazilian Community Banks. Both have relatively high scores for niche activity but low diffusion scores, but these are the only two cases which exhibited a 'managed replication' process (see below) which *increases* the niche activity score whilst simultaneously reducing potential diffusion. Furthermore, there is a lack of data about scaling of Brazilian Community Banks (therefore diffusion success score may be underestimated). If one accepts that these two cases are somewhat anomalous, and they are excluded from the overall correlation, then there is a much higher R^2 value (0.73), indicating a strong correlation and confirming the theoretical prediction. It is important to note that this is not a causal relationship, however. Indeed the theory suggests that there is an iterative relationship between niche-building activities and the diffusion of new projects, with each supporting each other (Schot and Geels 2008). Nevertheless it is striking that the empirical data supports the theory in this instance.

Table 6: Niche Activity and Diffusion scores

	R-GELD	ATK	SOL	RDT	SEL	UK LETS	SPAIN BDT	US TB	UK TB	BCB	UKT	TTT
NICHE ACTIVITIES												
LEARNING	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Resources for new projects	1	0	1	1	1	1	1	1	1	1	1	1
Types of learning	2	1	1	2	2	2	1	3	3	2	1	1
Consolidation of learning	0	0	0	0	0	1	0	1	1	0	0	0
Second order	1	1	0	1	1	1	0	1	1	1	1	1
Training	0	0	0	1	0	1	1	1	1	1	0	1
Sub-total	**4**	**2**	**2**	**5**	**4**	**6**	**3**	**7**	**7**	**5**	**3**	**4**
INTERNAL NETWORKS												
Multiple networks	0	0	0	1	1	1	0	1	1	0	0	0
National conference	1	1	1	1	1	1	1	1	1	1	0	0
Internal networking	1	1	0	2	1	2	1	3	2	1	1	0
Sub-total	**2**	**2**	**1**	**4**	**3**	**4**	**2**	**5**	**4**	**2**	**1**	**0**
EXTERNAL NETWORKS												
National body	1	1	1	1	1	1	0	1	1	1	0	1
Other imp intermediaries	0	1	0	1	1	1	1	1	1	1	1	0
Networking externally	1	1	0	1	0	1	1	1	1	1	1	1
Sub-total	**2**	**3**	**1**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**2**
EXPECTATIONS												
Managing expectations externally?	1	1	0	1	1	0	1	1	1	1	0	1
Managing expectations internally?	1	1	1	0	2	1	2	2	1	2	2	1
Consistency	1	2	1	0	1	1	1	1	1	2	2	2
Accreditation	0	0	0	0	0	0	0	0	0	1	0	1
Values	1	0	0	1	0	0	0	1	1	0	0	1
Website	3	1	3	2	3	2	0	3	3	2	0	2
Sub-total	**7**	**5**	**5**	**4**	**7**	**4**	**4**	**8**	**7**	**8**	**4**	**8**
TOTAL NICHE ACTIVITY	**15**	**12**	**9**	**16**	**16**	**17**	**11**	**23**	**21**	**18**	**10**	**14**
DIFFUSION SUCCESS												
Scaling	3	2	2	3	2	2	1	3	2	1	1	1
Replication	2	2	1	3	3	3	3	3	3	1	1	1
Translation	1	0	0	0	0	1	2	2	2	0	0	0
TOTAL DIFFUSION SUCCESS	**6**	**4**	**3**	**6**	**5**	**6**	**6**	**8**	**7**	**2**	**2**	**2**

Examining the data in more detail, we can identify which specific aspects of niche activities were most closely related to diffusion success. The R^2 correlation is strongest for Internal networking (0.72), followed by Learning (0.37), with a weak score for External networking (0.16) and no correlation at all with Expectations (0.00). This finding counters the proposition that niche activities are all equally important in contributing to diffusion - there is good evidence here that for grassroots innovations, networking *between* projects is far more significant than the other types of activity, and we discuss below why this might be the case.

There also appears to be an link between who established the projects, and their diffusion success. The mean diffusion score for activist-established systems is 5.1 compared to 3.5 for the NGO-led projects. This may be because the activist-led currencies are less managed than NGO-led projects (even where there is a pro-active attitude to replication) and are also able to draw on the energy of supporters and volunteers who drive diffusion.

Whilst this test provides a useful overview of the overall correlation it does have limitations. Perhaps the most significant is that those cases with the highest aggregate diffusion score are those which diffuse through all three routes of replication, scaling and translation. Whilst this clearly does display 'diffusion success' it does not follow that a given innovation *has* to follow all three routes. However, a case which followed only one of the routes but did so exceptionally well, would score lower in the overall diffusion success metric. We therefore go on to examine the factors contributing to diffusion success along each of the three routes in turn. Figure 2 shows graphical representations of this data plotted into a matrix (with niche activity scores ranked and then simplified into 'high, medium and low' categories comprising 4 cases each), for each diffusion route. The following sections discuss each in detail.

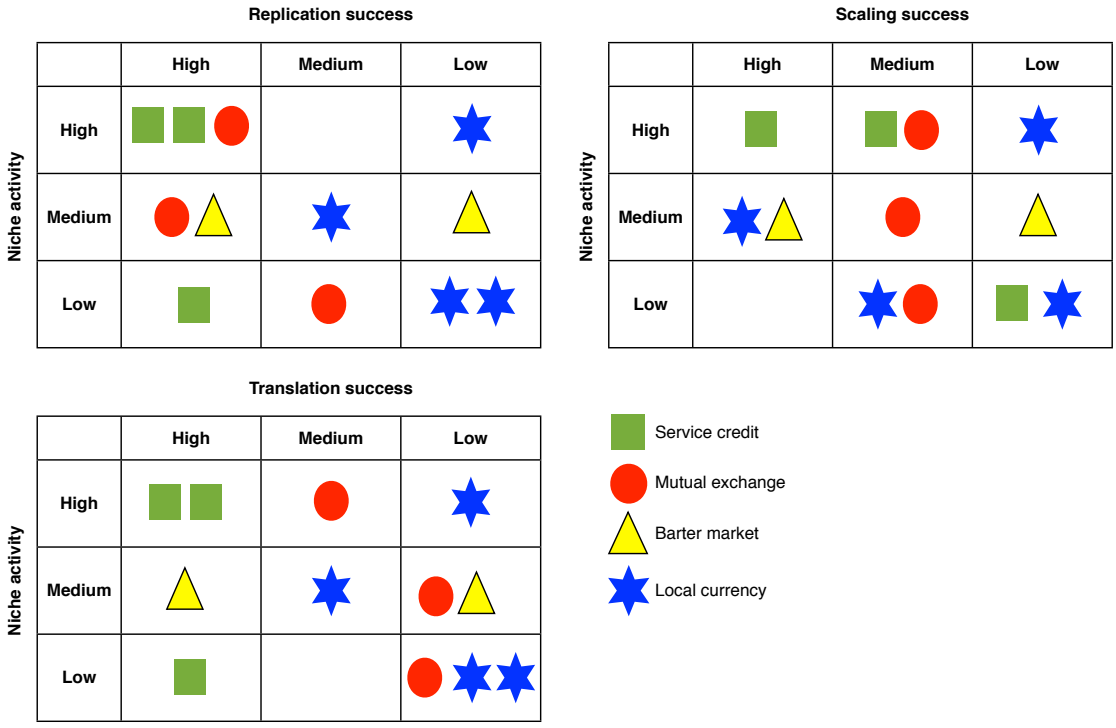

Figure 2: Matrix showing replication trajectory versus niche activity, by currency type

5.1 Replication

The matrix of replication success versus niche activity (Figure 2) reveals that half the cases demonstrated a high degree of diffusion via this route - it is indeed the most prominent of the three routes to diffusion among our cases. It is also striking that 5 of the 12 cases are situated at either extreme of the spectrum, i.e. high niche activity and high replication, or alternatively low niche activity and low replication. This confirms the predictions of niche theory: that more niche activity will lead to a greater proliferation of projects, and that the opposite is also true. The niche activity we found does indeed involve many activities which make replication easier, such as training, developing helpful resources and national conferences.

However, the distribution of cases across the matrix indicates that it is not a straightforward relationship. It is possible to have high levels of replication *without* extensive niche activity and *vice versa*. The reasons for this may be found in examining the different types of currency in each case, which are shown in Figure 2. Firstly, none of the Local Currencies had achieved the high levels of replication, whereas the Service Credits had all done so and the Mutual Exchanges all displayed medium or high replication success. On the other hand, the high replication success is not necessarily underpinned by high degrees of niche activity - niche activities may support replication, but are not a pre-requisite.

Possible reasons for the replication success split between Local Currencies and other types relate to the nature of the projects (and the innovations) themselves. The first is that the Mutual Exchanges and Service Credits are relatively 'low-tech' (being analogous to volunteering-rewards or gift vouchers, and requiring only a computer to set up) when compared to the Local Currencies (which emulate conventional money and adopt more professional additional technology and payment systems). Secondly, Local Currencies require a wider range of participants in order to function well, such as businesses and local government. This involves significant recruitment effort and negotiation to manage the expectations of all parties (Longhurst 2012). In contrast, it is possible to set up Mutual Exchanges and Service Credits amongst a small group of citizens, on a much smaller scale, making the replication of these models much more straightforward and accessible.

Examining the trajectories of the cases over time in terms of replication, we found several different replication patterns in evidence. Figure 3 illustrates that niche diffusion by replication is not a straightforward linear process. Linearity can be observed in some cases (e.g. early stages) but there can be different rates of growth at different points in a case's lifetime, for example the acceleration experienced by the three different models of Service Credit. A pattern of peak and decline has been experienced by a number of systems but most significantly by the Argentinian Trueque. There is no doubt that this was the most widespread of the community currency types under consideration and is almost certainly the most diffused contemporary community currency, particularly in terms of replication and scaling. However, it also suffered a catastrophic collapse in confidence and subsequent fall in numbers from which it has never recovered. Some mutual exchange systems have shown a similar fall

in numbers over a period of time, but also a subsequent resurgence, such as the French SEL, described in Figure 3 as 'peak and recovery'. Finally, a few national types appear to have reached a stable plateau. In the case of the Austrian Tauschkreis this appears to be a consequence of the unusual regional structure described above, which has reduced the need for new systems to proliferate. In the case of Regiogeld it is more a consequence of a slowdown in the rate of new systems emerging. Thus this national type appears to have reached a point of consolidation. However, in this case it is more likely that the total number of systems is kept constant by the fact that the number of new projects emerging roughly equates those that are closing. In other words, there is an underlying 'churn' of projects coming in and out of existence which is not really captured by linear representations of total system numbers over time. Indeed, this churn is likely to be a feature of many of the different national types, and it is the net difference which gives the overall trajectory. For example, in the case of US Timebanks, Lasker et al (2011) found that in their 2010 survey of projects 54.5 had been established in the last two years and a further 31.5 between 2005 and 2008. Both the churn of the projects, and the variability of the replication trajectories point to the non-linearity of replication as a route to niche growth and diffusion.

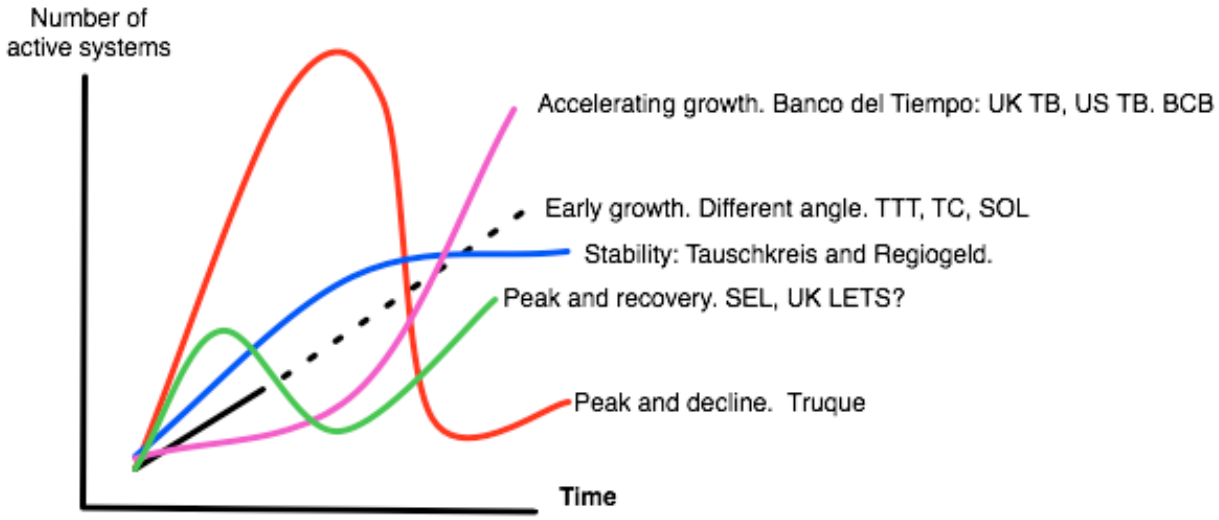

Figure 3: Trajectories of replication of currency cases [need to identify them by type?]

One interesting trend is the sub-set of accelerating growth which has been experienced by the three Service Credit models since 2008 which has been driven by a more grassroots diffusion of time banks, particularly in the US and UK (the data is less clear in Spain). Collom et al (2012) describe three different models of time bank: Standalone, community based; Embedded with open membership; and, Embedded with closed membership. The wider literature on niche innovation diffusion proposes that, over time, there will be a shift from more civil society-based activity towards translation and the adoption of the innovation by more established and mainstream actors. However, the recent growth appears to be in the more community-based models, i.e. moving *away* from mainstreaming. This suggests that the trajectory varies not only in terms of the rate of growth but also the direction. Indeed, it is

conceivable that currency models can grow in more than one 'direction' simultaneously, particularly those, such as Service Credits, which seem to be adept at translation (see below). Quite what has driven this apparent upsurge in Service Credit systems is not clear. There is evidence of this being a response to the global economic problems that have been encountered since 2008, and also of links with social movements experimenting with time banking as part of their 'strategic repertoire'.

Finally, with respect to replication, another notable distinction amongst cases was the different modes of replication. Such modes reflect the different ways in which projects spread. Broadly speaking, three different modes could be identified. *Reactive* projects are established without any permission or instigation; there may be a national body but it tends to be constituted by projects and exists to offer mutual support. *Proactive* replication sees a national body, or other intermediaries, actively working to set up new projects; whilst projects can still be established by activists without permission, there are also actors working specifically to seed new initiatives. Finally, *managed* replication indicates only those given permission can establish new projects; there is a contractual or accreditation process that must be negotiated in order to set up a new project. Figure 4 shows the replication success for these three different modes of diffusion. Not surprisingly, managed replication is the slowest, reflecting as it does a concerted effort to control the process. Contrastingly, reactive and proactive seem to be equally successful suggesting that whilst these reflect different kinds of niche process, both are able to support high levels of replication.

	Replication		
	3	2	1
Reactive	3	2	1
Proactive	3		1
Managed			2

Figure 4: Different diffusion types

5.2 Scaling

Scaling of community currencies involves the expansion of projects to engage more participants or users. The data does not suggest that a very strong relationship between niche activity and scaling success (see Figure 2), and few patterns are evident when examining the different currency types' scaling performance. Perhaps the only one of note is that Mutual Exchanges are the only type where there is no example of a national case reaching the largest scale, indicating this particular type does not scale up as easily as the others, and there are several possible reasons why: the Mutual Exchange model is based on personal transactions and reciprocity, so such projects may fail to grow beyond the point where members feel a sense of community with other members. In addition, it has been seen that the currency usage can dwindle as social capital amongst participants increases and members exchange with

each other informally without the need for a medium of exchange. This clearly problematises the process of measuring the 'success' of currencies.

However, the data indicates that success in project upscaling can be better explained by a combination of other factors. These might both be 'internal' to the project itself but also relate to the 'external' context in which the initiative is operating. In the case of those systems that have scaled up it seems that the success is often predicated on the alignment of a number of different internal and external factors. Our cases indicate that the most significant strength of successful projects was having sufficient resource. As social economy initiatives, it can be difficult for community currencies to develop business models that provide a regular stream of income. However, the largest projects did have have a stable resource base: some such as the Chiemgauer - the largest German Regiogeld system - have started to generate income and have both volunteer and paid staff; others, such as the Talente Tauschkreiss Voralburg part-pay their volunteers in the currency; the largest time banks are of the 'institutional' variety, benefiting from the resources of both the host organisation, and their existing clientele. In terms of weaknesses, the most common problem was getting people to use the currency. This was reported across nearly all the twelve cases and therefore appears to be a fairly universal problem in the community currency field. The main reasons for this are that community currencies are radical innovations of which users might be wary and require reassurance that it can meet their needs (Longhurst 2012), and that it does indeed need to meet their needs so as to fulfil expectations of performance that have been generated among users.

External factors play a significant role in determining the extent of currency diffusion by scaling. The wider socio-cultural context of the project was identified as the most significant external success factor. For example, the largest UK LETS schemes were found in areas where there was a high density of green, post-materialist middle class members (Williams 1995; Aldridge and Patterson 2002). Similarly the Chiemgauer's success is at least partly due to its Bavarian context where local civic pride is a strong motivating factor driving usage (Thiel 2011). The biggest external threat to project success was related to political issues, comprising three aspects: the difficulty of working with public authorities, which activists can find slow and frustrating; electoral and funding cycles rendering legitimacy and supportive measures vulnerable to change; and legal issues which can arise as most operate in legal grey areas, ignored by authorities due to a perceived irrelevance, but this can leave the threat of future punitive action hanging in the air. There are few examples of positive legislative steps to support the development of currencies (the autonomous community of Galicia in North Western Spain is an example, although support from the state was revoked following a change in government).

In summary, scaling does not appear to have much link with niche activity at a national level, and instead appears to relate to a combination of project-level internal and external factors. However, in most of our national cases there are only one or two very large projects and many smaller ones. For example the Chiemgaur dwarfs all other German Regiogeld systems and

there are very few others that have reached any kind of critical mass. This raises questions about how easy it is to both replicate *and* scale currency systems.

5.3 Translation

For a currency to successfully diffuse by translation it requires the currency model (or elements of it) to be adopted by new actors, in new contexts. Overall translation is the least common of the three diffusion types and Figure 2 shows that for half of our twelve cases there was no evidence of any translation occurring at all. In addition, the clustering of cases in the top-left and bottom-right of the matrix again suggests a correlation between niche activity and translation success. Service Credits are clearly the most successful at diffusion by translation, as the model can be adapted to a range of contexts by various actors - this is a function of the innovation itself. In this respect Service Credits seem to be the most flexible, whereas most Local Currencies and Mutual Exchanges show no translation diffusion at all.

The ability of a currency niche innovation to be translated into mainstream settings appears to be connected to the regime which the currency is trying to influence or change. Identifying the relevant regime for each currency type was, in some cases, difficult. In many cases currencies are seeking *complementarity* - i.e. they are not seeking to 'overthrow' or 'displace' an incumbent regime but are instead trying to build parallel forms of infrastructure, or seed reformist change within the current regime. Nevertheless by identifying the problem the currencies are responding, we identify three different regimes which the currencies address (see Tables 2 and).

Table 7: Community Currency 'regimes'

	Monetary system	Mainstream economy	Consumer society
Guiding principles	Promote efficient exchange	Support livelihood through formal employment. However fails to do this in favelas	Treats people as individuals. Focus on efficient allocation of resources and risk management. Cost minimization.
Technologies	mostly electronic with small proportion of paper and coinage.	?	?
Industrial structures	Monetary creation is controlled by banks / government. Public / private structure.	Formal employment in firms operating in markets	Privitisation of public services. Delivery by NGOs or gaps in provision
User relations and markets	Money is invisible in transactions. Generally seen as value free / neutral. National / international markets	Workers earn money through employment. Markets are national	Focus on individual consumers both in public and private sectors. Expensive costs to some forms of social provision (e.g. healthcare / elderly care). Private insurance.
Policies and regulation	Banks lightly regulated. Monetary policy infrastructure	Employment law, benefits law, tax law etc.	Focus on individual consumers both in public and private sectors.
Knowledge	Neo-classical economics / neoliberalism	Mainstream economics. Capitalist theory.	Neo-liberal - market logic informs structure of public services.
Culture		Competitive labour markets.	One way - producer >>> consumer.

The *monetary system* is the narrowest of the three regimes we identified, and two Local Currencies specifically address this regime: those that are most explicitly attempting to create alternative forms of local money. Here, the innovation itself is intended as a substitute for conventional money which it is argued by activists, is dysfunctional, and the innovation represents an attempt to build a explicitly better monetary system. A second set of currencies (various types but including all the Mutual Exchanges) are trying to change the *economy*. These systems are informed by the above monetary critique, but do not suppose to provide a substitute general purpose money for use in everyday transactions; instead, they are trying to create new forms of special-purpose money or micro-economy, whereby exchange takes place under different rules and by which participants can construct their livelihoods at least partly outside the 'mainstream' economy. The third regime is that of *society*, and here the objective is to challenge the structures and values of consumer society itself, and all Service Credits subscribe to this broader ambition. Again there is an economic element to this, in particular the way in which these currencies value non-market activities. However, the overall ambition stretches beyond supporting what is sometimes called the 'core economy' to stimulate a wider change in society towards reciprocity, non-materialism and an appreciation of value outside the market.

Within the literature on sustainability transitions it is broadly accepted that regimes are 'nested', and the same argument could be applied in this case. For example, the monetary regime is part of the economic regime which in turn is part of consumer society. Thus the monetary projects, if successful, will have an impact on both the economy and wider society and this may be desired and intended by the protagonists behind the project. However, the immediate intention is to provide an alternative to mainstream money, and this narrower application prevents the translation into new contexts. In contrast, the Service Credits attempt to provide a tool that is flexible enough to be applied in health, education, justice, environmental, social, cultural, institutional, community and business contexts and can thereby influence society in general. Here adaptability is built in, and so translation is much easier to achieve into multiple different regimes simultaneously.

In all three cases, there are questions as to how well the regime concept fits with these particular examples. Within the strategic niche management literature. the regime is often defined as the selection environment for new innovations, where alignments and interdependencies create path dependency and lock-in (Smith and Raven 2012). Whilst the exact definition of a regime varies across the literature, it is commonly understood that the regime is underpinned by an industrial structure and that the market acts as a selection environment (see table 7). In the case of novel grassroots innovations it is not so clear whether such categories are quite as relevant or applicable. Nevertheless, we can conclude that while niche activity appears to have some relevance for predicting translation success, it is these other factors which have greater influence.

Regime context

The preceding analysis has suggested instances where regime destabilization influences currency diffusion, for example the recent upswing in Service Credits as a response to economic austerity. Perhaps the best example of this is the Argentinian Trueque barter markets which was the most successful example of currency diffusion in terms of absolute numbers of users between 1995 and 2001. Exact numbers of users and 'nodos' (the name given to the barter markets) are unknowable, but several sources suggest that in excess of 300 nodes were in operation with perhaps between 2.5 and 6 million users (Primavera 2010, Gomez 2008). This rapid expansion and diffusion success is at least in part due to to regime destabilization, if the wider economy itself can be characterised as a regime. The period from 1976 - 1991 saw an expansion of national debt and high inflation, followed by wage freezes and a reduction in state expenditure leading to severe unemployment. The Trueque was created in this context (Powell 2002). During its early years the economic conditions slightly improved, but a new crisis erupted in 1999. At the core of this crisis was a revaluation in the Dollar stimulated by wider turmoil in Latin American economies. The damage that this did to the competitiveness of the Argentinian economy caused a rapid expansion in unemployment and poverty as well as political turmoil.

The Barter Markets expanded rapidly, with some support from both regional and central government. The middle classes were hit hardest by the economic crisis and were the core users of the currency (Powell 2002). There was also a widespread familiarity with the idea of alternative forms of money: many regional governments had a history of issuing their own bonds and currency and continued to do so during the 1999 - 2002 crisis (Pearson 2003). Both these factors facilitated the growth of the Trueque. However, there were two competing factions who had very different views on the nature of the currency - competing visions or expectations in niche terms. The founders PAR *(Programa de Autosuficenacia Regional* (Regional Self-sufficiency programme) saw the currency as a self-help tool to assist the unemployed. Their initial model grew into the *Red Global de Trueque (*RGT). Another faction *Red de Trueque Solidario* (RTS) saw the currency as a tool with which to build an alternative solidarity economy, outside capitalism. For a few years the two groups worked in collaboration, building an national network structure and working together on internal procedures, but growing tensions led to a split in 2000. Apart from ideology, one of the key tension points between the RGT and the RGT was the method of diffusion. RTS preferred a slow group-based method, where new members were taught the values of the Trueque movement. PAR felt that this was inadequate for dealing with the crisis and in 1999 introduced a franchise model where start-up kits could be be purchased for $2. These packs facilitated the rapid expansion of the model but opponents argued that they were inflationary. When, in 2002, the barter markets suffered a significant loss of confidence following a critical television documentary, it seems likely that the uncontrolled franchise model was at least one of the causes.

In addition to regime destabilization, it is also pertinent to examine the impact on niche activity and diffusion, of the policy context the currency operates within. We classified policy contexts as either 'supportive' (referring to explicit governmental support) or 'unsupportive' (for instance where there was evidence either of hostility or simply ignorance). For both scores, a supportive policy context was associated with higher scores. For each metric, the score for cases in a supportive policy context was 1.35 times higher than the corresponding score in an unsupportive policy context. [Diffusion success 5.4 compared to 4.0; Niche activity 17.8 compared to 13.3). This indicates that policy support can lead to a vibrant niche forming (e.g. through a flow of resources that supports niche development activities) which converts to greater diffusion success, confirming the predictions of the niche theories.

6 Conclusions

This paper aims to identify the determining factors of grassroots innovation niche diffusion, so as to better understand how to harness the creative forces driving innovative solutions for sustainability in civil society. It assesses to what extent strategic niche management theories explain the empirical evidence of a set of twelve community currency niches and their diffusion experiences.

We find some evidence of correlation between cases conducting the 'key processes' of niche development activity as identified in the literature, and innovation diffusion. In particular, internal networking is the niche activity most strongly linked to diffusion success. In contrast, learning and expectation-management appear to be relatively unimportant, and in fact many cases have diffused widely with little evidence of consolidated and shared formal learning. The diffusion routes most widely followed with these particular cases is replication, and this is potentially an outcome of the nature of the grassroots innovations themselves, being primarily low-tech, and designed to be empowering and accessible to civil society groups wanting to experiment. Different currency types displayed varying diffusion successes, and some of this difference could be explained by the characteristics of those innovative models. There was also a non-linear and varying set of trajectories for diffusion, suggesting that the linear progression of niche formation identified in the literature is over-simplified for this type of innovation where peaks, troughs, recoveries, crashes and stability are all in evidence as the niches respond to internal and in particular, external opportunities and threats in their wider environments.

In addition to these internal niche processes, we also uncovered strong evidence that wider regime and socio-political contexts were also significant in determining diffusion success. In particular, favourable policy contexts, and regime destabilisations were positively linked to wider diffusion, again confirming the niche literature. But again, the nature of grassroots innovations raise additional issues which demand attention. The complex multi-regime systems which many of these currencies address go beyond the simple single-technology-single-regime frameworks of much of the niche literature. Most of these niches do not intend

to replace the regime, but rather to influence it, or sit alongside it. And some of the 'regimes' are perhaps more like landscapes (i.e. consumer culture as a whole), raising questions about the extent to which the regime and landscape can be analytically separated (Hess 2013). This particular example of grassroots innovation suggests that further theoretical work is required to fully account for the complexity of diffusion patterns which are encountered in such cases.

* conclusions relating to policy, research and practice to be added *

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