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Community currencies and the quantification of social value in the digital economy

Working paper

Community Currencies and the Quantification of Social Value in the Digital Economy

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Abstract

Given the large investments in superfast broadband by the UK government and private broadband providers needed for reaching the outlying areas of the UK, an analysis of possible channels and modes of revenue generation towards the recovery of these investments was performed. This paper focuses on the question of whether societal value and market value can be connected directly. Rather than interpreting this connection as the commodification of social network statistics and user profiles, however, the paper addresses the question: can market value be 'colonised' by social value(s)? The tentative answer is encouraging. Adopting a perspective based on a combination of economic anthropology, political economy, and institutional economics, the paper compares the Local Exchange and Trading Systems (LETS) and the Wirtshaftsring (WIR) system and proposes that the latter seems to scale better than the former because its SME membership has required the WIR economic circle to develop a considerable 'institutional infrastructure' which, in turn, is better able to integrate these different forms of value within the same unit of account, store of value, and medium of exchange. In fact, unlike reputational currencies and other similar phenomena, the chief purpose of the WIR is not to mediate non-market-based modes of peer production, but to support trade. It therefore seems promising as the basis of an 'open source' form of e-currency for the digital economy.

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1. INTRODUCTION[1]

The UK government and private broadband providers such as BT and Virgin Media are making large investments to reach the outlying areas of the UK, which at the time of this writing are underserved in terms of broadband coverage and speed. As part of an analysis of possible channels and modes of revenue generation towards the recovery of these investments, this paper looks at the question of whether societal value and market value could be connected directly. Thus, the superfast broadband debate served as a trigger for a more in-depth examination of this difficult question that ranges over several theoretical and applied social science concepts. The tentative answer reached is encouraging, in particular if a particular type of community currency (CC) is used. The discussion that leads to this conclusion is fairly involved, for two reasons. First, it is challenging to bring together incommensurate forms of value. Second, this effort necessarily leads to an examination of the nature of money, which opens a broader and deeper set of questions.

The commodification of the social dimension, which we are seeing in the prevalent business models of Web 2.0 phenomena, is part of the first set of problems. Such commodification can be seen as a consequence of a process of objectification of what should in principle be difficult to objectify: friendship and the subjective perception of online experience. Rather than the symptom of a losing battle with a rampant form of neoliberal individualism, I view this more simply as a consequence of the limitations of our cognitive processes. It is relatively easy to treat money as a transparent measuring stick for quantifying the value of a given object: in this mode, money is just a number that represents the value of the object. If a similar quantification is attempted for valuing a social relationship, in most cases the same measuring stick does not work. Therefore, the tendency is to divide the problem into impersonal dimensions of friendship such as network statistics or user profiles, which can be objectified and commodified, and the personal dimension of social relationships, which remain strictly non-market-based.

Therefore, in this paper I necessarily address the controversy surrounding the separation between 'economic value' and 'social value', and the causal links between them. For example, in the neoclassical economics view a society of utility-maximising rational agents will implicitly maximise also their social welfare, in spite of the fact that according to Marshall's definition of wealth 'it excludes [man's] personal friendships, in so far as they have no direct business value' (Marshall, 1920[1890]: II.II.11). By contrast, from the economic anthropology perspective social value is treated as another form of economic value, a view which then makes it easier to explain and justify an institutional structure to uphold the whole.

Regarding the second reason, this paper starts from the observation that a good part of the difficulty in addressing the separation between social and economic forms of value stems from the difficulty in thinking about the nature of money. A similar difficulty is encountered whenever an analytical tool is turned on itself. For example, the development of an argument in language as a method of analysis becomes significantly more challenging when the object of the analysis is language itself than when it is some other topic – for example the environmentally responsible management of salmon fisheries. Similarly, when attempting to assess the merits of money as a measure of value, we are not sure what measuring stick to use. The easiest way out is to objectify money itself and treat it as a commodity in currency markets. But this does not resolve the valuation of non-market-based modes of production, which remains out of reach.

This conundrum is the main theoretical motivation for this paper. The main finding is that by (re)building the concept of money on concepts rooted in the social sphere not only does it become easier to 'understand' money, but an effective way of linking the social and the economic forms of value obtains, even though they remain largely incommensurate.

In the next section I begin with some general considerations from political economy on different forms of value. Having felt for many years that CCs[2] provide a very interesting empirical basis for some theorising in

[1] This paper is based on a study commissioned by Convergys Smart Revenue Solutions from LSE Enterprise to investigate the costs and benefits associated with the deployment of superfast broadband in the UK (Dini et al., 2012).

this direction, in Section 3 I provide a summary of the main CC concepts and some historical background on this form of money, focusing on the Local Exchange and Trading Systems (LETS) and the Wirtshaftsring (WIR) system. In Section 4 I introduce economic anthropology as a framework that provides useful categories for analysing different forms of CCs. Combining the economic anthropology perspective with political economy and institutional economics, in Section 5 I arrive at the surprising conclusion that CCs such as the WIR appear to embody, formalise, and mediate social value as easily as market value. Rather than the commodification of social value, therefore, a first step towards the solution to the conundrum appears to depend on the "humanising" of market value. Therefore, these insights could make a contribution, to be explored in future work, towards the development of a socio-economic framework for the digital economy that can account for Benkler's non-market-based peer production in online spaces (Benkler, 2006).

2. CONCEPTS AND DEFINITIONS FROM POLITICAL ECONOMY

In policy discussions it is common to speak of three groups of stakeholders: government, business and citizens.[3] The opinions held within each group of stakeholders, about broadband investments as well as everything else, are far from homogeneous. In particular, while there is a common understanding of the costs to some extent, the understanding of the benefits varies, because parts of the benefits are not generally 'commodified' (in other words, quantified in monetary terms according to their market value). A sufficiently granular classification of the stakeholder viewpoints for our purposes distinguishes between monetary value and non-monetary value, or, in other words, between the economy of the market, and the economy outside the market. Thus 'the economy' becomes based on a broad definition of value that goes beyond quantified and commodified market exchanges.[4] In Section 4 I develop the implications further, and in Section 5 I examine business and institutional models based on this wider conception of the economy, within which CCs might be used in quantifiable exchanges.

Figure 1 shows a possible schematic or 'value map' of this wider conception of the economy. The concepts and items shown in the figure are only examples, and their placement is to some extent a subjective preference. For example, there is not really a market for buying and selling parts of countries (except in a few historical cases such as the sale of the Louisiana Territory to the United States by France), but Gross Domestic Product (GDP) can be regarded as the total of a country's market economy, or in any case an approximation thereof. Tax is also related to the market economy, although indirectly. Both concepts relate to a specific understanding of value that is expressible in units of currency.

In the left column of the diagram are shown concepts whose value is not easily expressed in terms of currency, although for some of them their cost can be approximated in this way. The point here, for example about education, is that the value to a nation of its educational system is hard to measure but vastly greater each year than its education budget. In the business layer the interpretation of the concepts on the market side is straightforward. On the left are all the 'soft' concepts that are responsible for how a company is perceived by its employees and/or by its customers. Only a part of this kind of value is translatable into a monetary value for company valuation.[5] A similar description applies to the lowest, individual layer in the figure. In

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[2] Community currencies are similar to and sometimes can be interchanged with 'alternative currencies', 'parallel currencies', 'complementary currencies', and 'local currencies'. We also use the term 'virtual currency' in certain contexts, as that is the more usual term among online communities, such as participants in games and virtual worlds.

[3] Lumping together large companies like BT with small software start-ups is motivated by recognising that businesses share essential traits regardless of their size, and these traits are fundamentally different from the traits of the government and of the citizen.

[4] This view of the economy is associated with the field of economic anthropology, e.g. Gudeman (2001), and its origins are generally ascribed to Polanyi (2001[1944]). See also New Economics Foundation (2010).

[5] There are companies that have created a huge human capital, but that are not necessarily valued highly on the market. For example, since its founding in 1938 HP was regarded as having a very good company culture, 'the HP Way' (Burrows, 2004), in the sense of Kaplan and Norton's balanced scorecard (1991), but its current valuation is more dependent on how the hi-tech sector is doing, how the printer market is doing, and so forth (see for example Dolan (2011)).

general, the distinction between the left column and the right column is one of degree: social relationships can affect monetary transactions when, for example, an open source programmer trades on her reputation to obtain employment or promotion.

The two columns in the figure can also be understood in terms of the use value/exchange value dichotomy. Although the concepts of use value and exchange value were first proposed by Aristotle, Adam Smith came up with this telling explanation: 'Some things, like water, have high use value but low exchange value, whereas other things, such as diamonds, have low use value but high exchange value' (Smith, 1776, cited in Gudeman, 2001: 15). A less extreme juxtaposition is explained by Jackson:

> *Use value* describes the value of a thing which only has value when used. That value is realised in the process of consumption. On the other hand, goods which are not consumed in the direct course of human reproduction can be exchanged for other goods which might, in turn, have a direct use value. Such goods have an *exchange value*: they become a *commodity*. In this way exchange values are described as being relations between use values. (Jackson, 1997; citing Marx in Harvey (1973)) [Emphasis in original]

These definitions suggest that the use value and exchange value labels shown in Figure 1 should be seen more as probabilities than mutually exclusive categories.

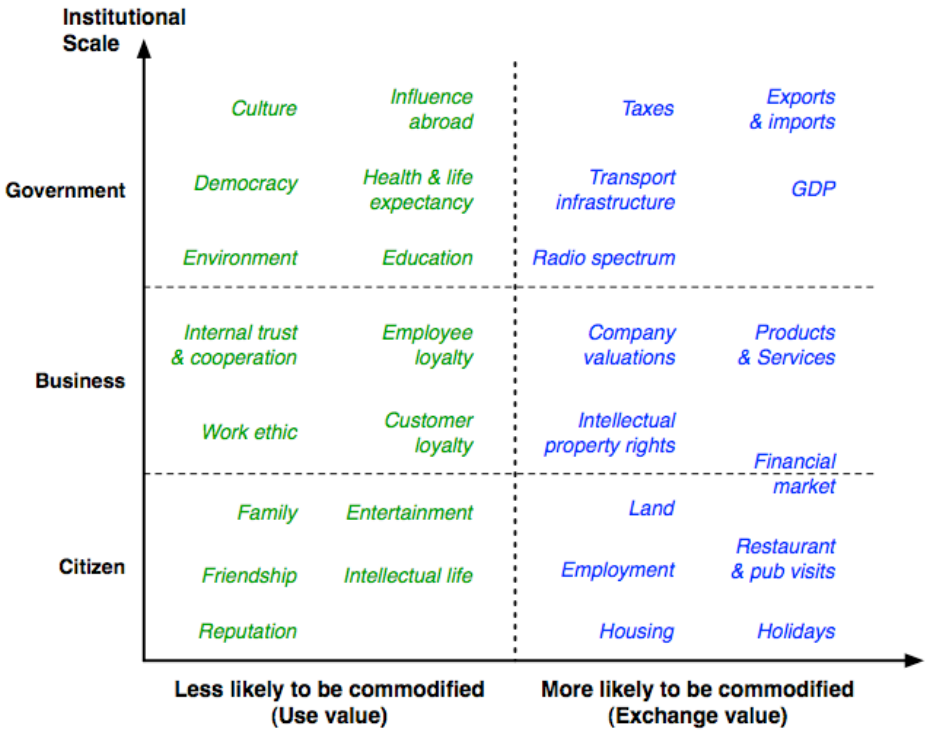

Figure 1: A possible map of stakeholder concerns and types of socio-economic value

The distinctions between the principal interests and value systems of the stakeholders in Figure 1 are reflected in the social sciences, which provide different approaches to identifying and defining value for different stakeholders. For example:

- The interest of a government tends to be articulated in a macroeconomic analysis of value in the market economy. However, other matters can come to the fore, particularly in special situations, such as (in the UK) the looting in 2011, wars or elections.
- The interest of a business is better characterised by a microeconomic analysis aiming to maximise individual company utility.
- The interest of a citizen may be characterised by noting that an individual value system is influenced strongly both by society and culture (as in subjectivist sociological theories) and by cost and usefulness (as in functionalist/objectivist theories). From a different angle, behavioural economic studies add to our understanding of how people make decisions.

Even with these different perspectives, the landscape of the value map is more complicated than Figure 1 depicts. First, other kinds of value exist beyond use value and exchange value. Family, religions, friendships, romantic relationships, and so forth have many other kinds of value. In this paper I am interested more specifically in *economic* value, which we could define as being concerned ultimately with the sustenance of the individual and of society.[6] Where the boundaries of such a value system should be drawn is the issue at stake. Rather than relying solely on the well-established economic theory of public, private, excludable, and rivalrous goods, I cast the net wider to the field of economic anthropology, which sees economic systems as resulting ultimately from cultural processes.

The Perception of the Wider Economy

Most economists see markets as emergent from voluntary exchange. This reflects to a large extent the empirical record, but does not exclude other forms of economic exchange. In addition, it does not imply that in a state of nature 'man' will have a 'propensity to barter, truck and exchange one thing for another' (Smith, 2007[1776]: 9), to the exclusion of other forms of behaviour or motivation. Already in 1944 Polanyi characterised this view as 'out of date', and boldly developed the point as follows:

> But the same bias which made Adam Smith's generation view primeval man as bent on barter and truck induced their successors to disavow all interest in early man, as he was now known *not* to have indulged in those laudable passions. The tradition of the classical economists, who attempted to base the law of the market on the alleged propensities of man in the state of nature, was replaced by an abandonment of all interest in the culture of the "uncivilized" man as irrelevant to an understanding of the problems of our age. Such an attitude of subjectivism in regard to earlier civilizations should make no appeal to the scientific mind. … For if one conclusion stands out more clearly than another from the recent study of early societies, it is the changelessness of man as a social being. His natural endowments reappear with a remarkable constancy in societies of all times and places; and the necessary preconditions of the survival of human society appear to be immutably the same. The outstanding discovery of recent historical and anthropological research is that man's economy, as a rule, is submerged in his social relationships. He does not act so as to safeguard his individual interest in the possession of material goods; he acts so as to safeguard his social standing, his social claims, his social assets. He values material goods only insofar as they serve this end. (Polanyi, 2001[1944]: 47) [Emphasis in original]

The case here is starkly overstated, but it serves to clarify the point.[7] Polanyi integrates also concerns for physical sustenance with this perspective, but as it would take us too far afield to explain this in any detail I refer the reader to the original source, and note that in the information society the above points are increasingly borne out by Web 2.0 phenomena. If we take the most extreme interpretation of 'free market' as one whose establishment only requires transactional contracts, it is easy to rebut that, in fact, market activity requires a basis of reliable credit and payment mechanisms, regulatory and conflict-resolution institutions, robust infrastructural and logistical support, and so forth. In other words, a healthy economy requires a fair amount of structure beyond the market mechanisms that implement transactional contracts. Whereas the financial system and the technological infrastructure are relatively easy to recognise, a host of societal structures and institutions become harder to see the more they depend on who we are and how we behave, because we tend to take them for granted and to forget the role that they play in the wider economy. For this reason they require a more careful analysis and discussion.

For example, we tend to take for granted a minimum level of accountability in our elected politicians, and tend to forget that in many other countries such accountability is still part of a utopian dream, far into the future. But the impact of the concept of accountability on business and on the economy in general is palpable in the UK, and it is a very positive impact. It is not at the centre of daily discussions because it is so much a part of the culture that it is both invisible and obvious. And yet, it is the basis of trust, whose effects on society at large, well beyond market transactions, are deep and far-reaching.

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[6] The first line in the Wikipedia definition of 'Value (economics)' is, 'An economic value is the worth of a good or service as determined by the market' (http://en.wikipedia.org/wiki/Economic_value) .

[7] A recent Economic Focus column in *The Economist* cites the report of Kuziemko et al. (2011), whose behavioural economic study of people near the bottom of the income distribution suggests that they care more that they should not be overtaken by those beneath them than that they themselves should rise.

The perception of the UK economy and society, therefore, is paradoxical:[8] on the one hand the UK has some of the strongest democratic institutions in the world and a distinguished cultural tradition, which permeate all three institutional layers of description; on the other hand, the effects on the economy of such non-commodifiable elements of the social fabric (some of which appear on the left of Figure 1) are not generally accounted for beyond the vague notion of 'societal values' or the acknowledgement of their indirect influence on quality of life.[9] But the neoclassical perspective cannot be summarily dismissed:

> Political Economy or Economics is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing. Thus it is on the one side a study of wealth; and on the other, and more important side, a part of the study of man. (Marshall, 1890[1920]: I.I.1)

More specifically, as stated above in the neoclassical view a society of utility-maximising rational agents will implicitly maximise also their social welfare. Thus, although the existence and direction of a causal link between (neoclassical) economic value and social welfare is very much up for debate, we still need to tread carefully.

The Emphasis for the Information Society

Enlarging the discussion beyond traditional understandings of the monetary value of products and services to be traded on the market is especially important for the information society. As examples of its relevance:

- As is evident from the growing trend in illegal downloads of content and as discussed in some detail by the Hargreaves report (2011), the Intellectual Property Rights (IPR) landscape is changing, in the UK and in the rest of the world. As Benkler (2006) explains, the emergence and growth of immaterial goods and digital content is challenging established notions of private property and the increase in available bandwidth is amplifying the problem. The government is taking these trends seriously, but the current inability to connect value generated outside the market to business cases and, more generally, to the country's GDP creates a constraint for policy that is very difficult to ignore.
- The pervasiveness of open source software and, especially, the integration of its development with market-based business models has established that also in the West the non-market part of the economy is not just an academic abstraction. Speaking about the marketing power of 'free' goods, Chris Anderson remarks, 'The "Linux ecosystem" is a $30 billion industry … we have essentially created an economy as big as a good-sized country around the price of $0.00' (Anderson, 2009: 3).

Therefore, the challenge in a discussion of the costs and benefits of superfast broadband is to develop a framework through which different kinds of value to different stakeholders can not only be *recognised* but also *related*. This is challenging because such 'exchange rate mechanisms' between different kinds of value are still far from being fully understood, let alone formalised and implemented. A possible example of how this might be done will be discussed in more detail in Section 5.

This paper aims to develop a conceptual framework that can aid the assessment of the costs and benefits of the superfast broadband rollout based on a fuller accounting of both that is compatible with market understandings but that, at the same time, goes beyond strictly monetary investment and return on investment. This paper thereby aims to make a small contribution towards a concept of the digital economy that is suitable for the 21st Century.

[8] See Mansell (2012) for an in-depth discussion of paradox in information society and knowledge economy debates.
[9] See also an interesting article in the *Irish Times* that further elaborates on this concept (Molloy, 2011) as it applies to Ireland during the recent economic crisis.

Money and the Social Construction of the Wider Economy[10]

Ontological questions about the economy, i.e. questions that address what the economy is made and is not made of, are usefully complemented by epistemological questions about the processes through which the economy comes to be – or is 'constructed'. Because the communication processes and the memory mechanisms through which a shared memory and routinised behaviour are formalised are fundamentally social, economic action cannot help but be experienced through the social sphere. For this reason I find the perspective of institutional economics particularly helpful, for example the work of Hodgson (1988). Although in his more recent work Hodgson has made important contributions to a dynamic and evolutionary perspective on 'open' economic systems, here I need only invoke some of the more modest root concepts of institutional economics; for example, 'the term "socio-economic system" is used to emphasize the fact that the economy is inseparable from a host of social and political institutions in society at large' (Hodgson, 1988: 15); where an 'institution' is defined 'as a social organization which, through the operation of tradition, custom or legal constraint, tends to create durable and routinized patterns of behaviour' (Hodgson, 1988: 10).

It is at the boundary between social action and economic action, and between social values and economic values, that we find one of our most puzzling social constructions: money. Money can be treated as a language, a symbol of group identity, a measure of self-worth, an abstract quantifier of value, a measure of trust or commitment, and many other things. Therefore, a study of the nature of money could be a viable strategy for approaching the theoretical conundrum stated in the Introduction. However, since it would be too difficult to do justice to the enormous literature on money, in any language, I opted to treat the experiences of a few CCs as a base of empirical facts that I analyse from the point of view of economic anthropology, political economy, and institutional economics. Because, among various possible forms of money, CCs appear to come closest to the social dimension whilst retaining an immediate relevance to the market dimension, they seemed like a particularly suitable entry point for investigating the incommensurability – or otherwise – between social value and economic value. To this we now turn.

3. COMMUNITY CURRENCIES

Questioning Assumptions

The view explored in this paper attempts to balance utilitarian/functionalist thinking with some critical analysis of the possibilities. The starting point is to put in question some of the assumptions we normally take for granted; for example,

- Is money as we know it the best instrument for supporting economic growth? Can we define money in social as well as in economic terms?
- What is the relationship between social value and economic (market) value? How do we define them?

CCs can be seen as part of a 'hands-on' and empirical methodology to study these kinds of questions. Although local currencies have existed since time immemorial in all human cultures, the concept of and motivation for the modern CC phenomenon can be traced to Robert Owen in England in the 1820s (Schroeder et al., 2011; Polanyi, 2001[1944]). In describing Owenism, Polanyi says:

[10] "To say of something that it is socially constructed is to emphasize its dependence on contingent aspects of our social selves. It is to say: This thing could not have existed had we not built it; and we need not have built it at all, at least not in its present form. Had we been a different kind of society, had we had different needs, values, or interests, we might well have built a different kind of thing, or built this one differently. The inevitable contrast is with a naturally existing object, something that exists independently of us and which we did not have a hand in shaping. There are certainly many things, and facts about them, that are socially constructed in the sense specified by this core idea: money, citizenship and newspapers, for example. None of these things could have existed without society; and each of them could have been constructed differently had we so chosen." (Boghossian, 2001)

> Cooperative societies were founded, mainly engaged in retail to their members. These were not, of course, regular consumers' cooperatives, but rather stores backed by enthusiasts determined to devote the profits of the venture to the furtherance of Owenite plans, preferably to the establishment of Villages of Cooperation. … At the heart of the Exchange or Bazaar there was reliance on the complementary nature of the crafts; by providing for one another's needs, artisans would emancipate themselves, it was thought, from the ups and downs of the market; this was, later, accompanied by the use of labor notes which had a considerable circulation. Such a device might seem fantastic today [i.e. in 1944]; but in Owen's time the character not only of wage labor, but also of banknotes, was still unexplored. (Polanyi, 2001[1944]: 176)

The socialist overtones that transpire from this description are not coincidental. As Polanyi explains, Owenism can be seen as the 'fount of modern socialism' (Polanyi, 2001[1944]: 178), and '… practically, it was the beginning of the modern trade union movement' (Polanyi, 2001[1944]: 176).[11]

Another important reference for many CC initiatives and commentators is Silvio Gesell's concept of perishable money, or 'demurrage', by which money should deteriorate in a manner similar to the commodities it is used to buy (Gesell, 1934[1906]). Such an effect, according to Gesell, would induce anyone who had money to spend it as quickly as possible, before it lost value. Some form of this concept has been implemented in some CC systems, for instance the WIR (to be discussed more fully below) in the initial period 1934-1948 (Studer, 1998). Of course, inflation has a similar effect, although usually not by design.

Another reason CCs are theoretically interesting is that a similar concept was proposed by none other than Friedrich Hayek (1976), one of the inspirational figures for Thatcherism, Reaganism, and neoliberalism in general, in an attempt to address the then vexing problem of inflation. As an initial and more concrete step Hayek proposed that

> the countries of the Common Market … mutually bind themselves by formal treaty not to place any obstacles in the way of the free dealing throughout their territories in one another's currencies (including gold coins) or of a similar free exercise of the banking business by any institution legally established in any of their territories. (Hayek, 1976: 23)

As a generalisation of this idea and 'more far-reaching scheme',

> [i]f we are to contemplate abolishing the exclusive use within each national territory of a single national currency issued by the government, and to admit on equal footing the currencies issued by other governments, the question at once arises whether it would not be equally desirable to do away altogether with the monopoly of government supplying money and to allow private enterprise to supply the public with other media of exchange it may prefer. (Hayek, 1976: 26)

Here is a 'market solution' if ever there was one. As will be discussed in the next section, the market has much to gain from a closer integration with the social dimension. Further, currencies serve important social functions in addition to the economic. For example, the establishment of the Euro (which, ironically, Hayek warned against as a move in the wrong direction) can be seen as another element of the drive towards creating a united Europe, quite apart from the economic implications. Although Hayek's proposal seems interesting and provocative from a technical and structural point of view, it seems risky to rely on competition alone in the case of multiple 'private-sector' currencies. In fact, such a purely market-based solution arguably would require a higher and more uniform level of democratic maturity across Europe than can be observed currently. For example, especially in the presence of the current sovereign debt crisis, the political, social and cultural processes of unification appear to lag the establishment of the Euro by a few decades, at least. In other words, whether or not the establishment of the Euro was a good idea on technical grounds, it seems that the economic and democratic culture of Europe is not even ready for a single currency, let alone a free market of anybody's competing currencies, suggesting that Hayek's proposal might have been made long before its time.

[11] Robert Owen was born in 1771, 47 years before Karl Marx.

Be that as it may, from these references it seems that there is an intriguing 'structural' appeal in the concept of multiple currencies that transcends party-politics viewpoints. At the same time, I side with Polanyi in arguing that the political and economic dimensions of society should be closely integrated. By this I do not mean to advocate, necessarily, top-down intervention of the government in the market. Rather, the point already stated in Section 2 that the market is much less 'free' than it might superficially appear could be extended into a more general postulate that the more 'free' a market is the more democratically mature must its participants be, if the objective is to achieve sustainable economic growth. Various institutional forms could then be seen as meso-scale 'buffers' between the ideal of the globalising free market and the individual. Whether such institutions (should) safeguard the cultural and democratic dimensions of society, or not, then becomes a normative question that can be addressed through the political process. In any case, a very interesting property of CCs in this regard is that without a suitable accountability and governance framework they simply do not work. Hence, from the point of view of social science they could be seen as useful 'laboratories for institutional learning' that enable some level of experimentation of new ideas in a relatively protected environment. Thus, this paper explores the potential relevance of CCs with two specific longer-term research objectives in mind:

1. A study of the structural effects of different currencies and their possible relevance to economic dynamics, in the tradition of 'value-free', objectivist, rationalist, and system-oriented scientific enquiry. This approach is more focused on relatively abstract global system properties at the expense of the role and perceptions of the individual.
2. What kind of governance framework can provide a level of institutional stability for CC systems that can enable them to scale up to levels of greater microeconomic, if not macroeconomic, relevance? This approach follows a political economy tradition in which an analysis of individual interests takes precedence over system understandings. At the same time, such an analysis of interests can benefit from an analysis of the underlying value system and, therefore, from an integration with the economic anthropology viewpoint.

In the next section I provide a quick summary of some of the basic concepts and types of CCs, as a backdrop to a more in-depth discussion of the LETS and WIR systems. Although the WIR predates LETS, the latter is slightly easier to understand and for this reason it is discussed first.

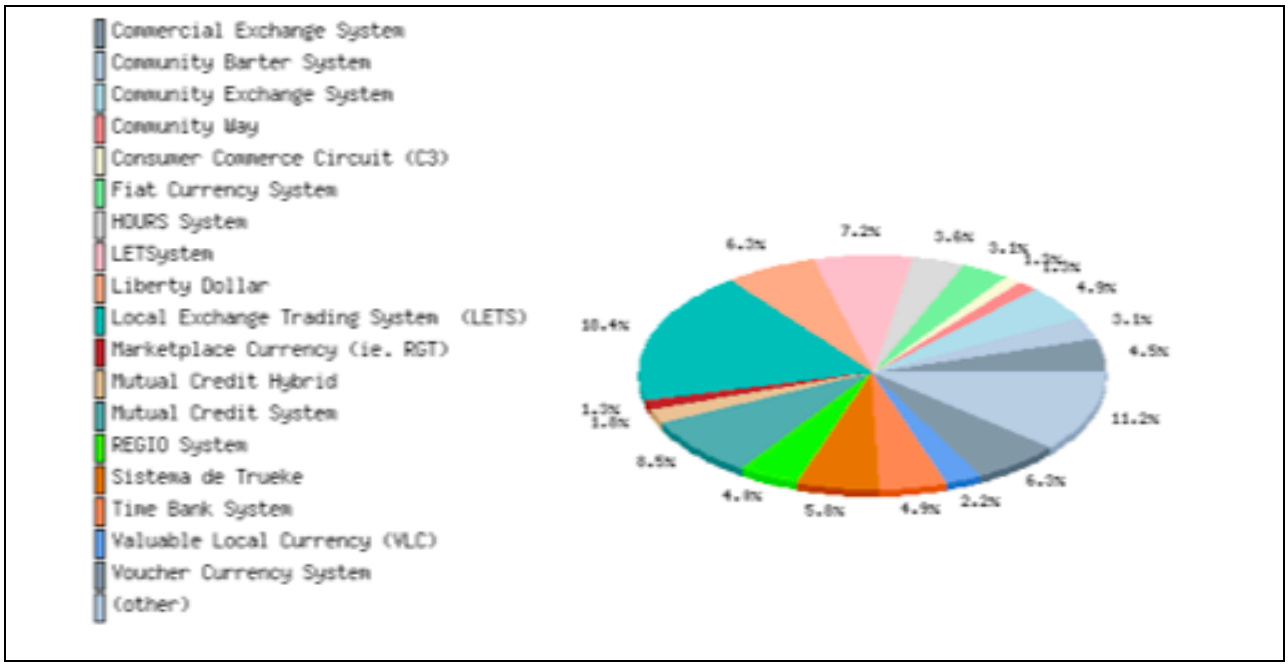
CC Basics

The number of references on CCs is very large and growing. Their potentially important role in the current economic/debt/credit crisis is acknowledged by a range of recent publications (for example, *The Economist*, 2011; Boyle, 2011). As discussed in Breitstein and Dini (2011), CCs are local currencies that complement a national currency, usually with the intent to stimulate a local economy, particularly in tough economic times. Accordingly, in response to the recent recession, more CCs have arisen in the United States (Kadet, 2010). This highlights the ability of socially constructed concepts and practices to provide solutions to economic problems, a phenomenon that is more visible at local level. CCs can be designed to fit the needs and requirements of specific communities. Thus, the Linden Dollar in Second Life has very different characteristics from the Ithaca Hours currency used in Ithaca, NY. Although an exchange rate (fixed or floating) between a CC and the national currency has been set up in many cases, the dependence of the CC on a local and socially embedded dimension implies that it is not suitable for long-range, impersonal transactions. More to the point, outside the community within which it was defined a CC has no meaning and no value. Because remuneration in a CC is taxable, its adoption requires a system of accounting that, in turn, requires high levels of transparency, accountability and trust in the community. Most, although not all, CCs do not accrue any interest (the Swiss WIR being a notable exception[12]). Therefore, their role as a medium of economic exchange with no intrinsic value is visible to everyone: the individual derives a greater utility from spending his/her savings in the local CC than from holding on to it.

[12] See http://www.wir.ch (only in German, French and Italian). See http://projects.exeter.ac.uk/RDavies/arian/wir.html for a short summary of the WIR and the evolution that led to the adoption of interest in 1952.

I am speaking about 'economic exchange' and 'utility', so what is so different from the market? A possible answer is that CCs tend to mediate *use value* rather than *exchange value*. As discussed by Schraven (2000), from an economics point of view money has three main functions: unit of account, store of value, and medium of exchange. CCs that do not accrue interest (the majority) can be seen as a form of money for which the store of value function is minimised, leaving the other two functions more or less the same. The store of value function is still present, but an important consequence of the absence of interest is that there is a smaller incentive to commodify CCs *themselves*. In addition, due to their geographically limited validity, they tend to mediate small-scale exchanges. The local CC is used to pay someone who walks my dog or mows my lawn, not to buy the latest sports car. It can also be used to purchase goods and services from local businesses. The usual model is for the goods or services to be sold for a combination of national and CC, the exact proportion being variable and usually up to the local business or retailer to decide. Normally, participating businesses tend to be local businesses trading in basic goods rather than national chains or retailers of expensive goods, but this is by no means a fixed rule.

These properties taken together could be taken to support the claim that CCs tend to mediate use value rather than exchange value. However, it is fairly well recognised in the literature that 'The membership … does not correspond even closely to the average population and transactions are often not economically but ideologically motivated' (Schraven, 2000). In other words, the apparent lack of market speculation and profit-seeking in the great majority of CC implementations could be a reflection more of self-selected behaviour by the members on ideological grounds than of the structural properties of the medium itself. Therefore, such a conclusion seems premature, although worth a second look once we have developed the concepts a bit further.



Source: CCRC, www.complementarycurrency.org

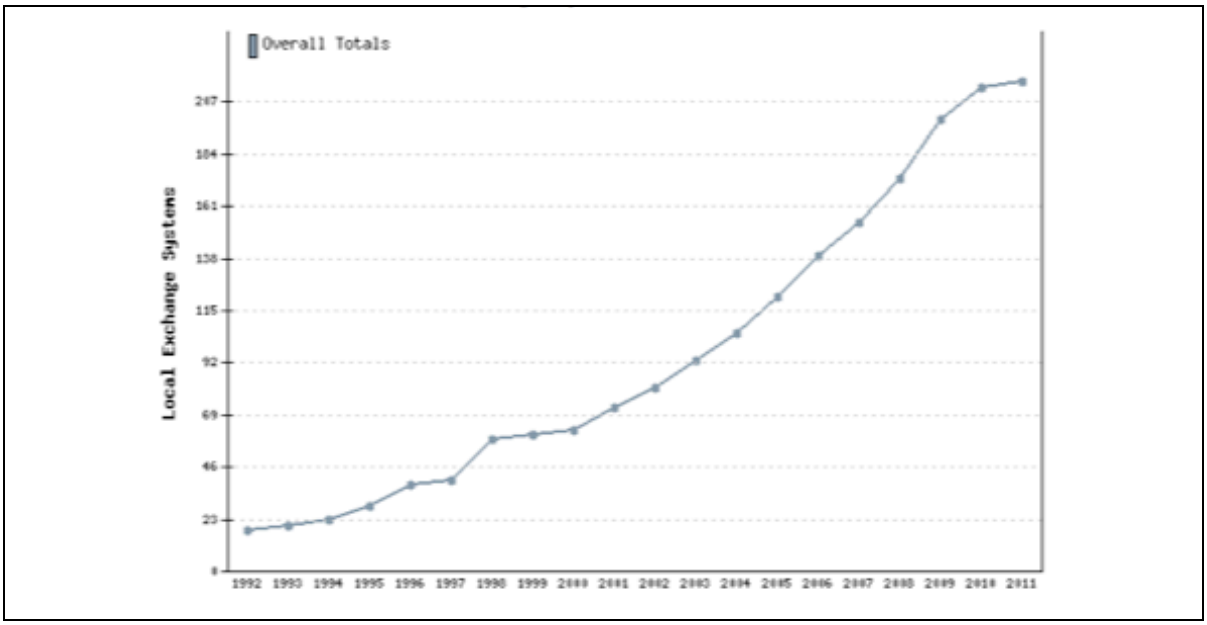
Figure 2: Different types of CC and relative distribution of implementations of each

In terms of turnover, the economic impact of CCs is extremely small when compared with any country's GDP. We can get a rough idea of what it might be by extrapolating from the data contained in the Complementary Currencies Resource Center (CCRC) website,[13] a database that publishes only data that has been voluntarily provided by CC initiatives around the world that have registered with it. Currently there are only 224 CC members registered (called 'Local Exchange Systems' on this website), spanning about 15 or

[13] http://www.complementarycurrency.org/ccDatabase/les_public.html

20 types of CC, as shown in Figure 2. As stated by the curator of the database, an approximate estimate for the total number of implementations is 'at least 1,500 systems, with an estimated maximum of 3,500 at present' (DeMeulenaere, 2011).

The growth of CC registrations to the database over the past 20 years is shown in Figure 3. As the total volume of trade for the 224 registered systems in 2010 is approximately US$107m,[14] a linear extrapolation for 1500 systems would be about US$700m. This is only a small fraction, for example, of the UK GDP: £440m/£1.5tr = 0.3%. The contribution of the UK CC implementations would be even smaller of course. Thus, it would appear that in their current form CC systems are not likely to be an important part of any country's overall economy.



Source: CCRC, www.complementarycurrency.org

Figure 3: Growth of CC systems worldwide since 1992 (indicative only, see text)

The size of the WIR system is also small in GDP terms, but is in a different class from all other CCs. The WIR is not one of the systems registered with the CCRC database, so it is not included in the numbers above. Data on WIR is not easy to find and it is usually not in English. Table 1 gives a sense of WIR turnover over the past 50 years and Figure 4 shows a graph of the ratio of WIR turnover to Swiss GDP. The numbers are still small, relative to the national economy of an average European country, but larger than all the other CC systems combined. This fact suggests that the WIR system may have microeconomic relevance, especially if multiple WIR-like systems were to be adopted in different countries, even if its macroeconomic impact is not large. Further, since it is implemented electronically, it is mostly subscribed to by small and medium-sized enterprises (SMEs), and it has evolved into a significant banking business in its own right, it seems of potential relevance to strengthen the economies of outlying areas of the UK, especially if used in conjunction with superfast broadband. Before discussing WIR in more depth, I first describe LETS.

[14] DeMeulenaere (2011) warns that this number is only approximate because not every CC system contributing to the database updates its figures regularly.

Table 1: Comparison of WIR turnover and Swiss GDP[15]			
Year	***WIR Turnover (CHWb)***	***Swiss GDP (CHFb)[16]***	***WIR/CHF GDP (%)***
1964[17]	0.1	15	0.67
1980	0.25	110	0.23
1991	2.0	240	0.83
1993[18]	2.5	250	1.00
1997[19]	2.1	280	0.75
2005	3.0	370	0.81
2007[20]	3.2	420	0.76

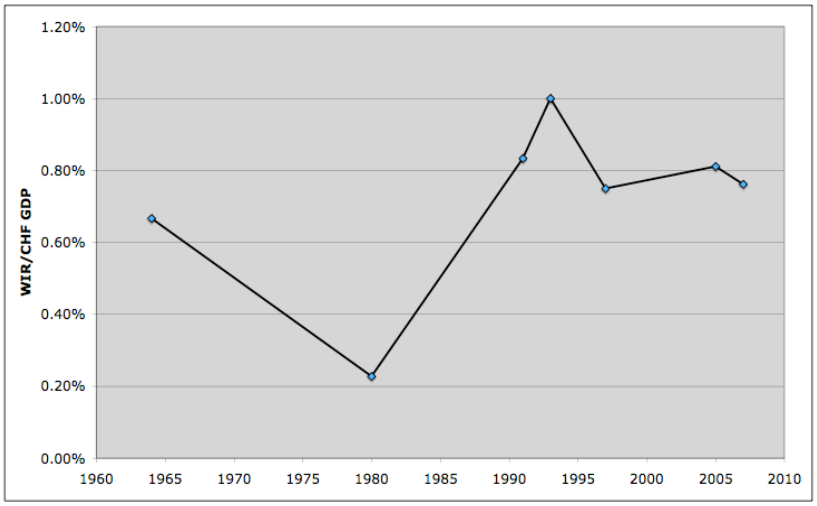


Figure 4: WIR turnover expressed as percent of Swiss GDP

Local Exchange Trading System (LETS)

Following somewhat different criteria from the CCRC database, Schroeder et al. (2011) mention 32 different types of CCs, for a total of 685 CC implementations worldwide, of which LETS systems represent 22%. Longhurst and Seyfang (2011) have edited a collection of articles by recognised authorities in CC systems that discuss critically and in depth many CC aspects of current interest, including a classification of types in terms of 'generations' of CC systems. For the purposes of this discussion, however, it is sufficient to follow Solomon (1996), who points out that CCs can be implemented in two structurally very different ways, the LETS system and the Ithaca HOURS system. Each approach can be subdivided further into more variations that depend on the specific choices and preferences of the community that designed it. In this section I focus more on the LETS model because it forms a basis for the discussion of the WIR.

LETS stands for Local Exchange Trading System.[21] When some years ago I met Michael Linton, who invented the LETS system, he explained that the idea of LETS came to him during an economic slump in Canada in the early 80s. He was living on Vancouver Island at the time, and noticed that the economic depression was accompanied by an absence of cash on the island. He posited that if someone arrived with a

[15] In 2004 the WIR was assigned its own symbol 'CHW' by the British Standards Institution and with the approval of the World Bank. CHF and CHW cannot be exchanged for each other but for accounting purposes 1 CHW = 1 CHF.
[16] http://data.worldbank.org/data-catalog/world-development-indicators?cid=GPD_WDI
[17] 1964, 1980, 1991, 2005: http://www.wir.ch/index.cfm?CBD9201D3DBB11D6B9950001020761E5
[18] 1993, 1997: http://www.qoin.com/achtergronden/barter-exchange-trade-mutual-credit-wir-irta-nate.html
[19] (Studer, 1998: 36)
[20] 2007: http://www.help.ch/newsflashartikel.cfm?art=News&key=232588&parm=detail
[21] Solomon gives the acronym as 'Local Employment and Trading System'. As explained by Croall (1997), this was the original meaning of the acronym, which was subsequently changed to Local Exchange Trading System. See http://www.openmoney.org/ or http://www.letslinkuk.net/index.htm for more on LETS.

suitcase full of banknotes and started spending, within a few weeks all that cash would disappear, usually carted off to banks in the state capital.

A LETS system strikes at the heart of the problem of the diffusion of currency away from the periphery and towards the centre with a Gordian knot-like solution, i.e. by defining the total net amount of CC in a given community as exactly zero at all times (see Figure 5). Someone who sells a product or service is credited with a positive (credit) balance of so-many units of CC, whereas whoever buys that product or service acquires a negative (debit) balance of the same amount. Both changes in position are (usually) effected electronically, so that in most LETS implementations no physical currency actually exchanges hands. In most LETS implementations, likewise, interest does not apply and the exchange with the national currency is not allowed, so the only way to change one's positive or negative balance is to buy or sell, respectively, some other product or service, locally. Crucially, one does not need to be in possession of a CC in order to make a purchase: his or her balance simply goes negative by the price of the item or service, the provider's balance simultaneously going positive by the same amount. In reality, in LETS systems usually the participating shops tend to accumulate large positive balances that then they may have difficulty in spending, as shown in Figure 6.

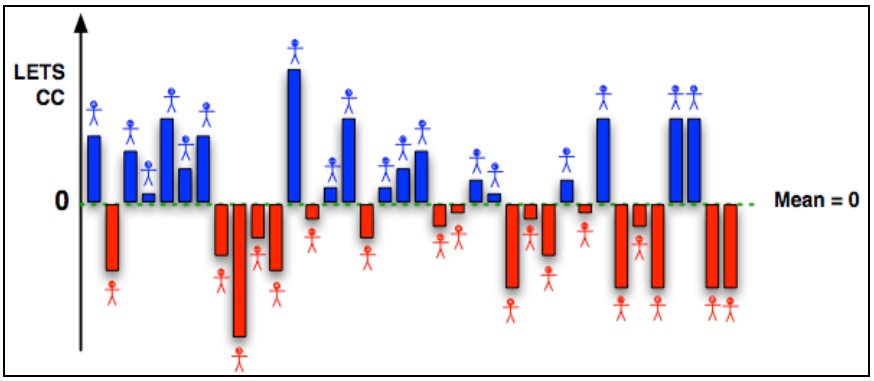


Figure 5: Idealised distribution of CC balances at one point in time within a given community using the LETS system

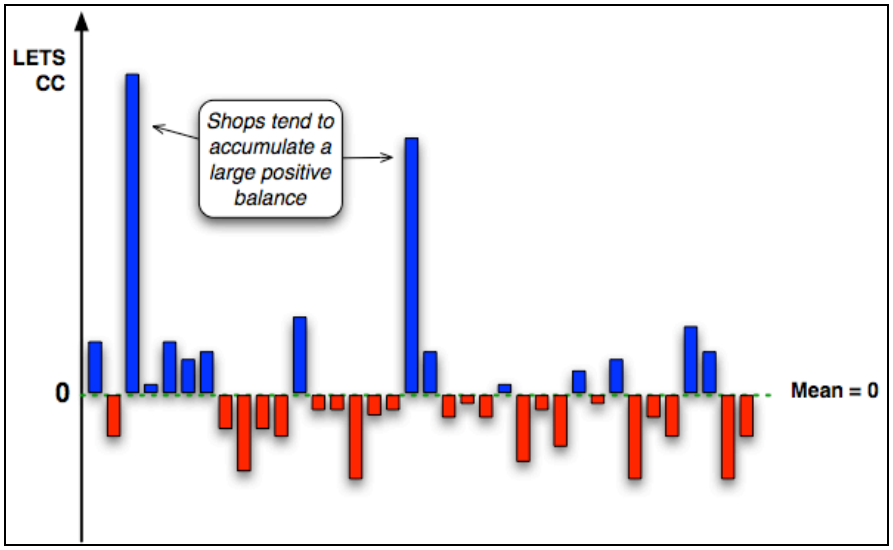


Figure 6: More typical distribution of CC balances within a given community using the LETS system

There are some well-known problems with the LETS system, such as the fact that it does not scale very well since it benefits from and even depends on personal acquaintance, social ties, and trust between the

members.[22] For example, the community extends a high level of trust to the individual purchaser in the hope that he or she will provide some other service or product back to the community in order to eliminate his or her negative balance. This property of the LETS system is also one of its greatest weaknesses since it leaves the community open to opportunistic free-riding behaviour, for example by someone who accumulates a very large negative balance and then disappears. This problem is exacerbated as the membership grows in size. As discussed by Jackson (1997), another related common problem is the tendency for a large majority of members to accrue a positive balance (Figure 7). This can be caused by weak accounting practices, but it is in any case an unstable rather than self-correcting process, since as the number of people with positive balances increases the number of people willing to sell services decreases since everyone wants to buy in order to lower their balances.

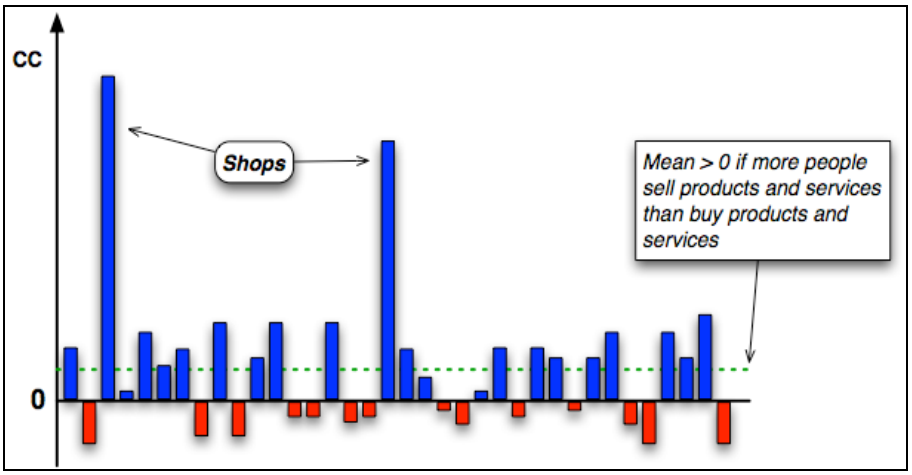


Figure 7: The problem of over-accumulation

Schraven (2000) provides a fairly thorough comparison between LETS CC and national currency, which is partly reproduced in Table 2. The conclusion, also stated by Jackson (1997), is that LETS CC is in fact a form of money, rather than a magical way of creating something out of nothing, as some of the more enthusiastic promotional literature sometimes seems to imply. Therefore, standard economic and accounting measures should be taken to ensure that its use remains sustainable and the overall system solvent.

The other main type of CC is a physical currency whose definition follows more familiar criteria, such as being pegged to, and therefore being redeemable and exchangeable with, the national currency or a basket of commodities. An example of such a CC is the Brixton Pound.[23] Unlike the LETS system, with a physical CC there is no membership, the CC is usable by anyone who is willing to accept it, although usually this means that person lives or works within the geographical boundaries of the community.

Table 2: Comparison of economic functions of money and LETS CC

Money	***LETS***
• Unit of account • Store of value • Medium of exchange • Centralised supply of currency • Interest, hence commodifiable	• Transaction management • Credit • Market matching • Store of value • Local, distributed supply of currency since currency is "created" at the moment of purchase • No interest, hence not easily commodifiable

Source: Schraven (2000), with my additions

[22] In general, a small volume is not necessarily a problem if it serves the needs of the local community, but it is a shortcoming in the context of my exploration of how to generate market ROI from CCs.
[23] See http://brixtonpound.org/

Figure 8 shows a simplified schematic of a possible circulation model for a physical CC, which can also be implemented in electronic form. The figure depicts the bootstrap situation as well as the interactions later on. When the system is bootstrapped an initial amount of CC is either freely distributed to individuals or exchanged by them for national currency. Later on the need to purchase CC notes or electronic tokens decreases since the participants can simply earn the CC through interactions with community members. These interactions could involve, for example, small jobs like painting a door or the sale of used items. People can also use CC to purchase goods at participating shops. All purchases involve some fraction of CC and national currency that ranges from 0% to 100%. The shops, in turn, have a choice whether to exchange the CC they accumulate in the till for Sterling, or to spend it themselves since they are community members like anyone else. Finally, anyone can still interact with the wider market economy in the normal way through wages or purchases.

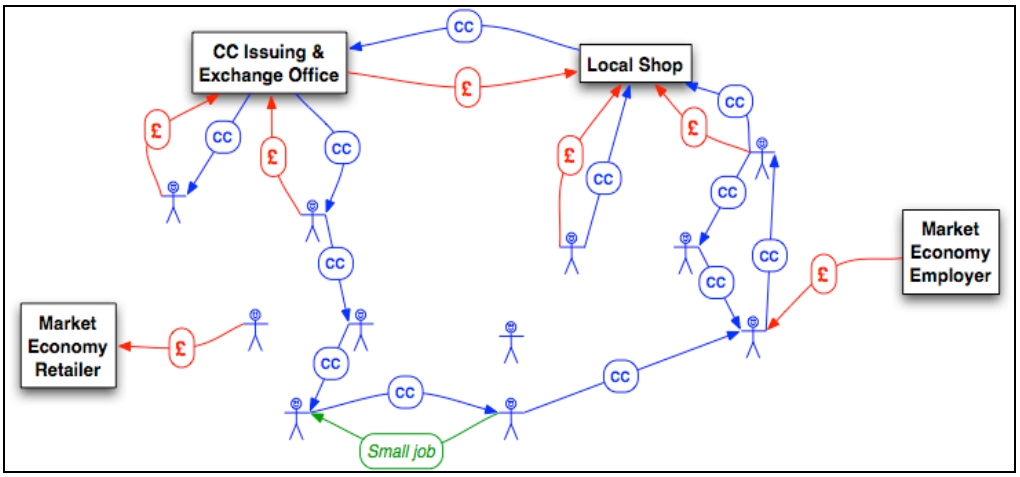


Figure 8: Simplified schematic of the flow of a physical CC

Import Substitution

Let us look next at the claim that CCs stimulate the local economies in which they are adopted, as this is potentially of significant interest to the superfast broadband debate. One way in which this phenomenon can be explained is through the presence of national retail chains and banks that offer their products and services locally but are likely to obtain greater returns from investing the corresponding revenue they accrue in other ventures or in other, richer regions than in the depressed town or island in question. As discussed, most CC systems aim to offset this phenomenon by creating a currency that is valid only locally and, therefore, cannot 'disappear'. By remaining local, it binds the local community through a tighter set of economic interdependencies or a greater number of economic transactions, which translate into a quantifiably greater local economic activity. Although one could argue that the global number of transactions in the overall economy, on average, has not changed, the device of a CC does affect the spatial or geographical distribution of economic activity, keeping more of it local. It is for this reason that CCs are said to 'stimulate' the local economy. Although the increase in local economy turnover happens at the cost of a fractionally lower efficiency of the overall economy, one could argue that this cost is much smaller than the benefits to the former. Schraven (2000) explains this effect in a slightly different way:

> 'The principal economic objective of a LETS is to facilitate "import substitution" in its locality in order to promote a local economy that is less reliant on external sources of goods, service and money' (Pacione, 1999: 68). In this capacity LETS is supposed to play the role of alleviating welfare implications of external shocks exacerbated by globalisation (Pacione, 1997). An economist might note that this "benefit" really stems from "trade diverting" not "trade creating", i.e. re-dividing the pie, not increasing its size. That is true, however, that merely means that such systems may not be desirable from an overall efficiency point of view but can still be desirable for a small group. However, where such arguments may have some merit for small corporate bargaining groups, they are less promising for LETS. As soon as LETS grows to levels sufficiently large to

> facilitate a shield against globalisation through import substitution the individual incentives become very small. (Schraven, 2000)

In other words, the phenomenon of trade substitution is real, but it appears to decrease in relative importance as the community becomes larger. Equally interesting is the fact that the phenomenon of import substitution for stimulating a local economy decreases in importance as the state of the overall national economy improves (Krohn and Snyder, 2008).

Schraven elaborates further:

> It is straightforward to construct a case where a convenient medium of exchange, such as the national currency, is drained from the local economy due to a trade deficit with the rest of the national economy. … Establishing a means of exchanging these non-tradables, of which the store of value is only redeemable locally, prevents all purchasing power to be transferred to more successful regions. This however, is not necessarily trade diverting but can be trade creating, because it facilitates exchange of non-tradables. … The essence of the problem is not that there is no money but that the *store of value* and *medium of exchange* functions of money are in conflict. (Schraven, 2000) [Emphasis in original]

In other words, the trade deficit drains the local community of the value stored in the national currency; but, by so doing, it also deprives the local community of a medium of exchange. At the very least, therefore, using a CC is a way to reinstate the latter without making unreasonable claims about the former. However, the point that CCs can facilitate the exchange of non-tradables is significant, since this is not just a diversion from one part of the economy to another, but a net contribution that would have remained unquantified otherwise. The fact that such a contribution is very small, does not change the theoretical interest of the phenomenon.

CCs as an Economic Phenomenon 'Far from Equilibrium'

The effect of a CC can also be understood from the point of view of General Equilibrium Theory. Whether a local consumer interacts with a local business or a national chain (such as a supermarket chain), a sizable proportion of the revenue flow arising from local trade is likely to be channelled to the banking system. Local businesses deposit their proceeds from sales and services in banks, and supermarkets use the time-lag between income from sales and the payment of their suppliers (usually 3 months) to generate an investment income from the former. In other words, a significant part of the revenue generated through local economic activity is managed by non-local agents who reinvest it into whatever they believe will generate the most profit for them. Unsurprisingly, this is seldom within the community from which the revenue comes.

If the same agents agree to participate in the use of a CC within a given locality, then a portion of their revenue will be in the CC rather than in the national currency. Whoever holds the CC revenue, regardless of whether it is a local business or a national chain, will need to find ways to spend it again within the community, perhaps in the form of wages, rather than depositing it in its bank account.[24] Therefore, as we have already discussed a greater proportion of revenue will continue to circulate within the community instead of migrating to some other form of investment selected by the central office of the bank or the national chain.

If, for the sake of argument, we take the unhindered and spontaneous flow of revenue in the absence of a CC to correspond to the tendency to approach Pareto-efficient (or Walrasian) competitive equilibrium, the effect of a CC could be criticised as causing a distortion of the 'free' market. However, it is well-known that Pareto-efficient competitive equilibrium does not necessarily correspond to the most equitable distribution of wealth or utility. It is partly for this reason that a fair amount of intervention, for example through taxation policy, has become routine. Short of that, various forms of constraints (e.g. supply-side constraints) can also cause distortions and are dealt with in the models through suitable mathematical techniques. In other words, a CC could be formalised as another constraint under which a particular objective function can be optimised.

[24] It is of course also possible to create a special CC account managed by a bank, as discussed by Solomon (1996).

So what is the difference from redistributive tax policy? In the public perception, it is the difference between hand-outs to a depressed region that come from a different, 'rich' region and the evolution towards economic self-sufficiency of the former. Thus, whereas under very idealised conditions the final GDP numbers could be argued to end up being the same, the different paths followed make all the difference in terms of fostering mutual respect between different parts of the country and self-respect within the poorer region, national cohesion, community identity, greater enfranchisement, and so forth.

This argument seems to hold better with a LETS-type CC than with a physical CC pegged to the national currency or to a basked of commodities, since in the latter case the exchange rates allow some of the locally held value to 'leak' back into the centre through various market mechanisms. In any case, from a theoretical point of view this property of CCs is extremely interesting because it amounts to holding the economic system 'far from equilibrium', to use Ilya Prigogine's famous phrase (Nicolis and Prigogine, 1977) – even if the extent of present CC implementations is not in fact likely to cause a very large deviation from equilibrium in macroeconomic terms.

As our understanding of complex systems increases, we are gradually becoming better able to understand and control phenomena that up to now have been only the province of unfathomable biological systems. The sophistication of our distributed software infrastructure and distributed computing power is making it increasingly possible to imagine a financial 'nervous system' that can be tuned to maximise economic growth through the optimisation of dynamic phenomena that might go beyond the (relatively) simple approach to equilibrium.

One of the provocative research questions that I formulate in this paper, therefore, is whether the introduction of CCs in the digital economy can begin to offer the conditions for such a more sophisticated economic dynamic, given their hybrid properties half-way between the social dimension and the market. This question addresses the first research objectives stated at the beginning of the section. In order to begin addressing the second, it is useful to develop a more comprehensive critique.

Further Critique of Community Currencies[25]

The establishment of a CC is far from trivial. The following are some considerations that would deserve to be addressed with some care. Some apply to physical CCs, others also to LETS systems.

- The issue of the currency must be conducted by some authority. This is because it has to be 'issued' in a controlled way to prevent opportunistic issuance which would obligate all accepting the CC to provide goods and services in exchange for that currency. If control is not exercised, opportunism is likely to arise.
- The scope of acceptance – only those willing to accept a CC need accept it in payment (as compared to national currencies which typically operate under a 'legal tender' rule which extinguishes an 'obligation to pay' once legal tender has changed hands and therefore makes sales binding). Effectively, exchanges not made in legal tender remain 'unresolved' in law. Closure or resolution of exchanges in 'community currency' is not likely to be legally enforceable and therefore would require other means of dispute resolution.
- Although originators of a CC may have the intention to limit the scope to some other definition than 'those willing to accept in exchange' there is no practical means of enforcing such a restriction.
- Although the originators of a CC may intend transparency and taxability, the enforcement of these provisions is only as good as the related institutions. Barter is a prevalent method for tax evasion, and CC could be used for the same purpose. For this reason some governments are not strong supporters of CCs.

[25] This section has benefited from comments by Ed Steinmueller, SPRU – Science and Technology Policy Research Unit, University of Sussex.

- There is no logical reason why 'community currency' would not give rise to interest. Interest is a social construct arising from the willingness of a party to accept deposits in order to lend the depositors' funds to others with the knowledge that not all depositors will ask for their funds back simultaneously. The Swiss WIR, in fact, has been accruing interest since 1952; the change was made to make it more compatible with the market and credit environment in which the participating SMEs (for whose specific support the WIR was created in the 1930s) were operating.
- There is no logical reason to believe that a 'community currency' defined without a fixed commodity base (e.g. based upon precious metal reserves or some basket of commodities) would not give rise to currency markets. The exchange value between the store of value represented by the CC and actual goods and services is subject to fluctuation (a primary source of which is the prospect of an expanding issuance of CC). Markets in currency exist to bear the risk of these fluctuations. Commodity-based CCs also support such currency markets, but they are equivalent to commodity futures markets. Establishing a rate of exchange between community and other currencies only hastens the development of currency markets. Whether or not these dynamics can be regulated or perhaps 'modulated' is not clear and warrants further study

I now turn to the most successful CC system to date, which has addressed some of the points indicated above.

The Swiss WIR

WIR stands for Wirtschaftsring, German for 'economic circle', but also means 'we' in German, emphasising the community aspects of the currency. WIR refers to the club or network as well as to the currency itself, which is nominally held at the same value as the Swiss Franc (CHF) to simplify accounting. As explained by Lietaer (2001), the unit of account is the CHF, whereas the medium of exchange is the WIR or CHW. WIR was founded in 1934, as a result of the money scarcity caused by the Great Depression in Switzerland (Studer, 1998). It can be seen as a multilateral corporate barter exchange system, or as 'a centralized credit system for multilateral exchange, [or as] an informationally *centralized* exchange network' (Stodder, 2009; emphasis in original). A comparison with the almost universal reliance on the trade credit mechanism is also helpful.

It is possible that LETS was partly inspired by WIR, since the two systems share several features. They are both members-only networks. WIR utilises a negative balance system that is similar to LETS but different in important respects, and for small negative balances relating to the use of the currency itself no interest is charged by WIR to its members. The three main differences are

- WIR is mainy a B2B currency that was created specifically for SMEs, to make it easier for them to obtain credit especially in economic recessions.
- Whereas in LETS a member's negative balance is a debt towards the community, in WIR it is a debt towards the central credit clearing house, which since 2004 is called WIR Bank.
- In addition to allowing members to acquire a negative balance when making a purchase, thereby 'creating' currency in a manner very similar to LETS, with the seller in the trade acquiring a correspoding positive balance, WIR also allows members to take out large and long-term loans, as large as house mortgages, for which interest (in CHF) is charged and collateral requested.

When a member company requests a certain amount of credit in order to effect a purchase from another member, the WIR Bank issues what amounts to a short-term and interest-free loan, which is accounted for as a negative balance for the purchaser and a positive balance for the seller, just as in LETS. The actual mechanism is a credit note (nowadays an electronic transaction) that is sent to the central WIR Bank by the seller. The bank then updates the balances of the members and charges 1% of the purchase price to the seller, which the seller must pay in Swiss Francs (Studer, 1998), generating an income stream for the bank. Stodder (2009) found that WIR exhibits a 'deeply acyclical' behaviour with respect to national money supply. In other words, in periods of recession when there is less national currency around WIR turnover increases. This insulating effect is believed to be one of the reasons for the stability of the Swiss economy (Stodder, 2009).

Because the WIR system operates in a manner that is in some respects similar to a bank, it also follows careful credit checks on companies petitioning to join. These checks were instituted in 1940, as part of a reorganisation that brought WIR under Swiss banking law, after the early version of the network came close to collapsing due to absence of collateral associated with large negative balances. In the early years WIR also applied demurrage, which was abandoned in 1948. Interest on large loans started being charged in 1952. Finally, in 1973 WIR credit discounting was prohibited, meaning that WIR credits could no longer be exchanged for Swiss Francs, because it seemed to lead to a devaluation of the WIR as a currency. This is another feature that is similar to LETS credits. As claimed by Studer (1998), the structural characteristics of the WIR system combined with the flexibility of the members and supporters to adjust the properties and the rules over time enabled WIR to last so long.

Estimates of the size of WIR vary somewhat. In 1993, there were 77,000 business members or 17% of all Swiss businesses. In 2000 this number had grown to 85,000 or 20% of Swiss businesses.[26] According to Stodder (2009), in 2003 WIR had approximately 77,000 SME and household members. In any case, these numbers represent a significant portion of the Swiss private sector. Using 1993 numbers, Studer estimates an average acceptance rate of WIR credits of 40%. Thus, the 1993 WIR turnover of CHW 2.5b corresponds to a turnover in Swiss Francs of CHF 5.25b. He then sums up the economic contributions of WIR in terms of four categories of turnover:

1. Turnover that would have taken place in the same amount even in the absence of the WIR institution (i.e., WIR sales seen as mere substitution for lost cash sales);
2. Turnover based on domestic rather than foreign transactions, owing to the purely Swiss nature of the WIR (i.e. WIR members' purchase of Swiss goods and services instead of imports);
3. Turnover based on 'buy-local' solidarity considerations that promote purchasing from small and medium-sized Swiss firms as opposed to large corporate sources;
4. Turnover stemming exclusively from the cash-free barter character of the WIR credit clearing system, i.e. that would never have occurred without WIR (Studer, 1998: 36)

Although it is not possible to know the relative magnitudes of these four categories, Studer believes they can all be assumed to provide an important contribution, implying that they may be of similar magnitude. 2 and 3 are forms of import substitution, whereas 4 is a net increase in GDP. Finally, Lietaer summarises the reasons WIR members give for using it as:

- It is a very cost-effective way of doing business: commission on sales is limited to 0.6% on deals completed in WIR [in contrast with Studer who says it is 1%];
- It gives access to a pre-screened and loyal client base; credit is much cheaper than in national currency;
- Other services are provided (direct-mail, publicity among members, publications, etc.);
- It offers a buffer against exterior shock, such as a sudden increase in the national currency interest rate, or other economic disasters;
- It is a way for small businesses to gain some of the advantages to which otherwise only big businesses have access. (Lietaer, 2001)

Use Value and Exchange Value Revisited in an Institutional Context

The points I have discussed so far in this paper highlight the need to integrate CC implementations with a fairly complex mix of policy, regulation, legal and enforcement provisions, and accounting mechanisms. This corresponds to the empirical evidence, as for example discussed by Croall (1997), suggesting that CCs require a significant level of institutional support in order to continue operating. If CC systems can indeed scale up as the WIR has done, then some of the theoretical questions formulated in this section acquire a greater potential practical relevance. Like most CCs, WIR has taken steps to de-emphasise the store of value function of their currency. In other words, the WIR is less commodified than national currencies, although

[26] http://www.qoin.com/achtergronden/barter-exchange-trade-mutual-credit-wir-irta-nate.html

more than the LETS system. This seems to have strengthened the social and institutional awareness of the members whilst maintaining the system more compatible with the market economy.

Another point we can extract from the foregoing is that at different scales the character of successful currency systems appears to change, suggesting that different scales come with different requirements. LETS systems do not appear to scale well. The WIR system, which does and whose upper size limit has not actually been tested since it has always been confined only to Switzerland, has properties that are closer to a national currency. At the smaller scales of LETS systems, shared perceptions of use value and exchange value seem to converge, and profit and accumulation are pointless.[27] Here the social dimension is very visible and dominates the economic. At the larger scale of WIR, some of the social relationships remain, but the size of the system requires a level of accountability, governance, and discipline that, in turn, enable it to support and mediate market exchanges of significant magnitude. The transition between the pre-1940 WIR, which was much closer to a LETS system, and the post-1940 WIR, which accepted to come under Swiss banking law, is that the enforcement of discipline (for example in credit checks on prospective members) increased the perception of its trustworthiness, which motivated a significant capitalisation by its members; this, in turn, enabled the size of the transactions and the loans supported by the WIR association to grow in size.

In other words, because WIR issues low-interest loans and does not solely perform a credit clearing function, its internal workings are subject to Swiss banking law, which has probably contributed significantly to its institutional stability over its 70+ year history. The balance between bottom-up governance of the WIR by the members and the top-down regulation by Swiss banking law is reflected by its balance sheet. As explained by Studer (1998: 34), at the end of 1997 the difference between the WIR and mortgage assets and the interest-free WIR liabilities (i.e. the circulating WIR currency) was about CHF 41m. Studer explains that this positive balance is the result of the greater number of services the WIR Bank performed for than it received from its members during its long history. If the business were to be shut down, this sum would become net holdings in Swiss Francs and would cover entirely the company capital, therefore serving as security. Although at the beginning the WIR was set up as a non-profit association, subsequent capitalisation drives brought it to issue interest to its shareholders, in 1997, at a rate of approximately 7% (Studer, 1998: 35). However, it has remained private, with the ownership structure of a cooperative, keeping the drive for profit at a level that balances a reasonable return for its shareholders with the long-term stability and low-risk of its operations. Thus, also in the economic dimension the WIR strikes a healthy balance between the two extremes of the absence of profit of the LETS system and profit-seeking commercial banks – whose distinction from investment banks was becoming increasingly blurred until the 2007-08 banking crisis (Breitstein and Dini, 2011).

All this suggests that the relationship between use value and exchange value is affected differently at different scales by choice of exchange form and, as discussed by Jackson (1997), by social and cultural norms. In any case, the WIR system seems to come out well ahead of other CC alternatives as a candidate for capitalising on the social dimension to strengthen the market.

The first part of this paper has now provided some evidence that there is much to be gained from striking a balance between the social and the economic dimensions of society, and has offered an institutional example of why this might be the case and of how this might be achieved in practical terms. The scale of the WIR is relevant to the outlying areas of the UK which will be receiving superfast broadband, but so far the discussion has been limited only to the material economy. Thus, the next step is to see whether a similar balance might apply between the information society and the knowledge economy, where we find a growing importance of non-market modes of production. This suggests that, before we can attempt to map the WIR experience to the digital economy, we should take a closer look at the latter. I do this again from a starting point in the material economy, by pursuing a perspective that can rationalise broader conceptions of value within the same economic framework. The next section makes an attempt in this direction, whereas the final section then returns to a discussion of CCs.

[27] As discussed above, over-accumulation of CC capital is actually a problem the hinders the effectiveness of the currency.

4. BROADER CONCEPTIONS OF VALUE

Posing the Problem

Benkler's work, in particular his *Wealth of Networks* book (Benkler, 2006), is a broad and insightful critique and commentary on how the information society characterised by the Internet is finding its bearings in the presence of the market-based incumbents of the knowledge economy, especially in the area of cultural production. After pointing out a shift that has been on-going for about 100 years towards an economy centred on information production, and that has greatly been accelerated by the Internet, Benkler argues convincingly for the growing importance of non-market modes of production:

> What characterizes the networked information economy is that decentralized individual action – specifically, new and important cooperative and coordinate action carried out through radically distributed, nonmarket mechanisms that do not depend on proprietary strategies – plays a much greater role than it did, or could have, in the industrial information economy. (Benkler, 2006: 3)

And has some negative things to say about the market view of information:

> Even as opulence increases in the wealthier economies – as information and innovation offer longer and healthier lives that are enriched by better access to information, knowledge, and culture – in many places, life expectancy is decreasing, morbidity is increasing, and illiteracy remains rampant. Some, although by no means all, of this global injustice is due to the fact that we have come to rely ever-more exclusively on proprietary business models of the industrial economy to provide some of the most basic information components of human development. (Benkler, 2006: 14)

However, his view ultimately balances market and non-market action:

> This is not to say that property is in some sense inherently bad. Property, together with contract, is the core institutional component of markets, and a core institutional element of liberal societies. … Commons are another core institutional component of freedom of action in free societies, but they are structured to enable action that is not based on exclusive control over the resources necessary for action. … Each institutional framework – property and commons – allows for a certain freedom of action and a certain degree of predictability of access to resources. Their complementary coexistence and relative salience as institutional frameworks for action determine the relative reach of the market and the domain of nonmarket action, both individual and social, in the resources they govern and the activities that depend on access to those resources. (Benkler, 2006: 24)

Since Benkler's background is law, in his book he then makes general suggestions that are relevant to political and regulatory perspectives, in the interest of protecting individual liberal-democratic freedoms. His work focuses on highlighting the freedoms of individuals in the informational public sphere, on how such freedoms affect the abilities of individuals to provide and receive information outside the market, and on what the government might do about the encroachment of the market on these freedoms and abilities. In other words, Benkler is concerned with building a protective wall to enable the new modes of production enabled by the Internet to flourish.

In his analysis Benkler stops short of defining a new concept of economy. He says value is being created outside the market but then does not provide a 'place' where such value can flow, other than the social and the cultural, by default. Whereas from the point of view of national policy this ought to be sufficient, in the context of a discussion on superfast broadband private-sector investors in Internet infrastructure may be left wondering how they are going to recoup their investments other than by feeling good about its philanthropic effects. The lack of a straightfoward answer to this apparently simple question motivates us to extend the scope of the search, in this and the next section. Benkler seems to keep the categories 'social', 'cultural', and 'economic' separate and does not attempt the development of a unifying framework, although he provides many tantalising examples of productive interactions across these domains. In this section and the next I suggest that such a deeper level of integration may bring us closer to unlocking the very significant amounts of value generated by the new Internet-enabled phenomena. Whether we can then translate it into a more productive and measurable interaction with the market economy is an additional, and more difficult, question that this paper aims to make a positive contribution towards.

Extending the Economy beyond the Market

The considerations discussed around the value map (Figure 1) are compatible with a trend to look beyond the market that has become more popular in recent years, especially with environmental concerns and the recent financial crisis.[28] The motivations for extending the scope of the concept of 'economy' beyond the market are various, ranging from political ideology to business innovation, but what could arguably be regarded as the most important motivation remains rather subtle and difficult to understand because it challenges the preconception 'Economy = Market' that has by now become deeply ingrained in the collective consciousness.

In other words, as long as we identify the economy with the market, most of the effort at policy level will, understandably, continue to focus on making the market work. The role of the social dimension will therefore remain unclear: as an output of the economy, the social dimension *ought* to benefit from the market, at least in times of boom, but as an input to the economy it is widely recognised to be essential to business and economic health[29] whilst remaining incommensurate with it. This places societal concerns in a subordinate and confusing position relative to the economy: dependent on it whilst at the same time important for it but unable to contribute to GDP in a direct and quantifiable way.

The amount of work on the quantification and the economics of non-monetary incentives is significant. Especially in business environments innovative thinking has had positive effects on the interaction between the private enterprise and society. Over the past 30 years, corporate social responsibility has gradually turned from spin and marketing strategy to good business. Yet, in the middle of this positive transformation, the average layperson's understanding of matters economic has remained rather shallow. In democratic societies this leads to a problem in that politicians need to pose and address economic problems in terms their electorate can understand. There is a disparity between the outlook of the most innovative enterprises and community initiatives, on the one hand, and of government economic policy, on the other.[30] With the increasing political awareness of individual citizens brought by the Internet, the need for accountability on the part of the same politicians, especially in times of economic crisis, has also increased. This has led, for example in the rhetoric used by most American presidents as they prepare for re-election campaigns, to a tendency to avoid more complex 'academic' discussions and to keep as much as possible to an 'objective' and quantifiable characterisation of the problems and the solutions. If we couple these effects with the political polarisation brought about by 70 years of Left-Right rhetoric in often sterile political debates, during the 20th Century, it is small wonder that 'market speak' predominates in public debates about the economy.

I suggest that in order to reach a more productive debate around superfast broadband the *language* of economics needs to be extended, as a starting point. By affording equal legitimacy to understandings of the economy that have until recently been excluded, the field of economic action is expanded. The result could be a safer passage towards 21st-Century societal goals and government promises that neoclassical market thinking, by itself, seems increasingly inadequate to fulfil at both national and international levels. Ironically, rather than a rejection of the market concept, such a Polanyi-style transformation is well-placed to lead to a *different* kind of market in which the economic and social spheres are more tightly and more visibly integrated and interdependent.

The discussion in the present paper is interested in particular in how socio-economic growth and transformation can be mediated and modulated by information and communication technologies (ICTs), and in particular by superfast broadband. Policy makers at all levels in the UK and internationally place great emphasis on the role of ICTs and in particular broadband, for stimulating economic growth (as in UN (2010a) and UN (2010b), for example). However,

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[28] For instance, see 'The Great Transition' (New Economics Foundation, 2010), OECD's Better Life Initiative (http://www.oecdbetterlifeindex.org), or Molloy (2011).

[29] See for example Granovetter (1986) or Polanyi (2001[1944]).

[30] The role of private financial institutions such as investment banks is likely to make matters even more difficult, but taking that into account in this discussion would take us too far away from the focus of the paper.

> [l]ittle attention is given to evaluating what a configuration of market and voluntary activity in the media and communication sector is likely to enable people to accomplish in their lives, much less to the economic resources and other capabilities they need in order to benefit from their access to ICTs and digital information. (Mansell, 2012)

The other factors Mansell refers to are at least as important as the role of broadband. Accordingly, I introduce a broader conception of the economy that can better account for the role of the concepts on the left of Figure 1, and I then examine how these may be affected by superfast broadband. The first challenge is to provide an economic system framework that can encompass all of Figure 1. The second challenge is to fill in the framework for the digital economy.

Economy as Domains of Value

An extension of systemic economic relationships beyond the market has been developed within the field of economic anthropology, for example as discussed by Gudeman (2001). Economic anthropologists study the forms of value creation and exchange that characterise different human cultures, including the Western. All economies strike a balance of market or commodity-based production and exchange and non-market and commons-based production, sharing, and exchange. But Gudeman proposes a more granular classification of value domains which, importantly, is also dependent on scale: (1) base or commons, (2) social relationships, (3) accumulation or capital, and (4) trade or market. The first two are prevalent at smaller scales and are closely associated with community, whereas the latter two tend to involve longer-distance interactions and are more impersonal. However, the domain of accumulation is equally important for community and for the market.

The dependence of the value domains on scale is well captured by Figure 9, which shows a schematic after Gudeman's own graphic of how a local economy based on use-value relationships can interface to a wider market economy that can span and connect multiple communities. The diagram shows a rather intricate interdependence between different parts of the economy, of which the market is emphatically only a part and in which the value of social relationships can be recognised to have a central role. In such an economic framework the market exchange of commodities coexists alongside other economic mechanisms such as the sharing of public goods, barter, gifting, and reciprocity. The figure also implies that different mechanisms are operating at different scales and in different institutional contexts.

To begin understanding this figure it helps to note that 'the base in a system of social value is the counterpart of capital in a system of commercial value' (Gudeman, 2001: 33). Unlike commercial capital which is usually measured with a common metric, i.e. money, the values in the base are measured in many different ways that depend on the type of base and the type of community. However, the function of base and capital to 'store' savings that, for example, can be accessed in hard times is analogous. The figure shows the domain of accumulation as belonging to the scale of community because Gudeman's perspective emphasises the real economy rather than the economy of financial markets. The fact that his object of study has predominantly been the village community in various 'developing' countries probably also influences this interpretation, although of course for an anthropologist a corporation is a community too.[31]

But the reason for using Gudeman's ideas is not to provide the ultimate model for a Western industrial or post-industrial economy, so the fact that it may not be complete is not at issue in this discussion. Rather, our two-fold objective is (1) to show the greater expressiveness of a model that involves domains of value beyond the market; and (2) to show how economic anthropology has been able to uncover interdependencies between different value domains that hint at the possibility of connecting all of them into a single, stable, and self-regulating system. The ironic inference from the latter point is that the ideal of the 'self-regulating

[31] Another shortcoming of this diagram is that it does not address the labour market explicitly. This is not surprising since it was developed mainly through the ethnography and analysis of agrarian economies. Regardless of whether we choose to think of labour as Marx's 'surplus value' or as Polanyi's 'fictitious commodity', labour is arguably the most important 'glue' or 'currency' that connects and strengthens the interdependencies between all four domains. This seems all the more so in 'post-industrial' service and knowledge economies.

market' might have been based on a valid intuition all along, but appears to have suffered from a limited understanding of the complexity and subtlety of the concept of economy, which in most cases has been – and continues to be – reduced to the market.

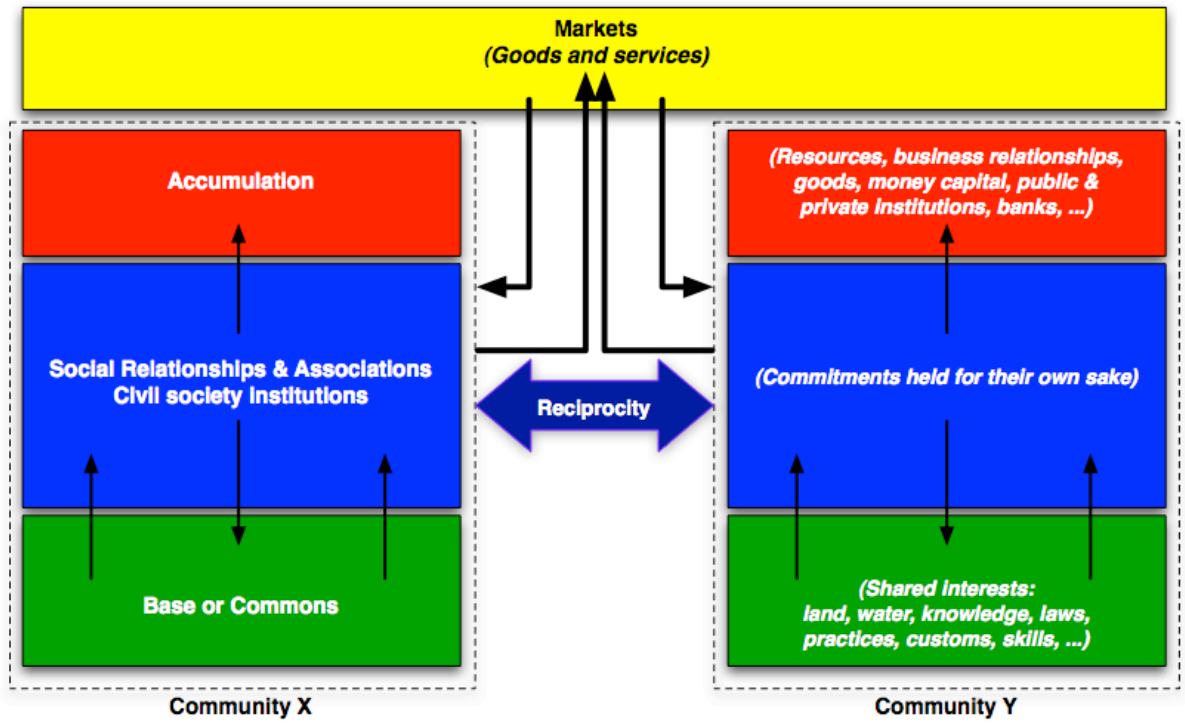

Figure 9: The four domains of value in economic anthropology (based on Gudeman, 2001)

Gudeman's ideas are only one way of representing the extension of the economy beyond the market.[32] We might choose instead to concentrate just on the facts, familiar to us from our everyday lives, that there are other values and other transactions besides those found in the market and that there are other communities and other scales of operation besides those formalised as the nation state and the workplace.

Although Gudeman's book is far from addressing every aspect of modern economies, it suggests a way to see our social and cultural dimensions through an economics lens. The relevance to the present discussion of such a unifying view lies in providing an example of crossing boundaries between disciplinary perspectives that have mostly been considered to be incommensurate. By legitimising additional domains outside the market as integral parts of the economy, the latter is enlarged; and by showing how different domains of value can work together local economies are more likely to discover new sources of sustainability. In the remainder of this section I will therefore explain Gudeman's more complex conception of economy emphasising its systemic properties, and will end with a section on how such a model might map to the digital economy. Building on this discussion, Section 5 will then propose some ideas that aim at connecting the four domains of value in the digital economy, addressing specifically the challenge of their incommensurability.

Gudeman's Four Domains of Value in More Detail

Table 3 provides a summary of the four domains and of their constitutive and interaction characteristics.

[32] For instance, the emphasis on the role of communities with social norms is found also in institutional economic studies.

Table 3: Summary of the four domains of value		
Value Domain *(Scale)*	***Description***	***Types of Interactions***
Base or Commons *(Community)*	The base or commons can be different things depending on the economic system of choice or the definition of community. For example, for a family it is the house, the land the family owns, the baby pictures, the kitchen utensils. The base can also be made up of things that a family unit, for example, needs to survive, such as the products of subsistence farming, which are generally different from 'cash crops'. For a village, it could be the common pasture, i.e. the proper 'Commons' of old. In general, the shared interests: lasting resources such as land and water and ideational constructs such as knowledge, technology, laws, practices, skills, and customs. Also, cultural agreements and beliefs that provide a structure of the other three domains. All these are unpriced and add up to community identity.	Sharing, gifting, bartering, saving, & economising, take place within a community. Reciprocity, meaning the exchange or extension of the base, takes place between communities.
Social relationships *(Community)*	Social relationships and commitments are maintained for their own sake (although they can also become instrumentalised for economic, business, or political ends). The generalisation and applicability of this idea to civil society associations can be seen as a symptom of a given society's ability to uphold its 'social contract'. This is generally dependent on a minimum level of trust and, in turn, can then reinforce the reciprocal trust within a community. Reputation and social standing are values that belong to this domain. Social relationships mediate the transfer of materials and services.	Reciprocity, obligations, caring, trust, respect, commitments
Accumula-tion *(Community & Global)*	Accumulation contains all forms of capital (money, material, social, cultural, intellectual) but also memory-based traditions and customs. From a systems theory point of view (Von Bertalanffy, 2003[1928]), such a generalised concept of capital in social science[33] can be understood more as a 'potential', such as the future purchasing potential of money, or as a memory, which manifests itself in the accumulation of traditions and social, economic, and political institutions. Accumulated value is held, invested, consumed, and displayed. Sustained and justified by economic power, social obligations, and ideologies. In capitalist economies private property provides the fundamental rationale for accumulation.	Arises through profit, rents, interest, tithes, monopolies, arbitrage, and innovation
Market *(Global)*	Goods and services are traded in the market by individuals or groups, for production or consumption. The market generally operates at the largest scale. It tends to be globalising, impersonal, and relatively easy to formalise into contract law and quantifiable transactions through the use of money as a medium of exchange. Participants are individuals, corporations, partnerships, households, families, kin groups, etc.	Money-based exchange, but also barter, commodifica-tion

Source: Gudeman (2001) with my modifications

As a final visualisation effort, Figure 10 shows how the concepts of Figure 1 could be mapped to Gudeman's value domains. The mapping is far from straightforward because it is partly subjective and because several of the items straddle multiple domains, such as employment (Market and Social Relationships), friendship (Social Relationships and Social Capital), or democratic values (which emerge through social processes to create the foundations of democratic society). Land is shown in red because it refers to land ownership by individuals, which is normally considered a form of capital. The same concept at the level of the country would need to include the National Trust, and would therefore also be tinted in green. In the middle layer, finally, Land should probably be tinted in red and yellow.

The motivation for working with the value domains in spite of these difficulties when they are applied to the UK economy and society is that they provide a way of thinking and rationale that makes it possible to give the more socially and culturally-oriented kinds of value a primary role in the economy, thereby enlarging the

[33] For the sake of clarity, economics is one of the social sciences, although in the business and technical literature social science is often identified more narrowly with sociology and political science. Other disciplines that stand with at least one foot in social science are social psychology, media and communications, law, anthropology, geography, history, organisation science, management, etc.

latter and improving economic sustainability. An example of how this might be achieved is discussed in Section 5.

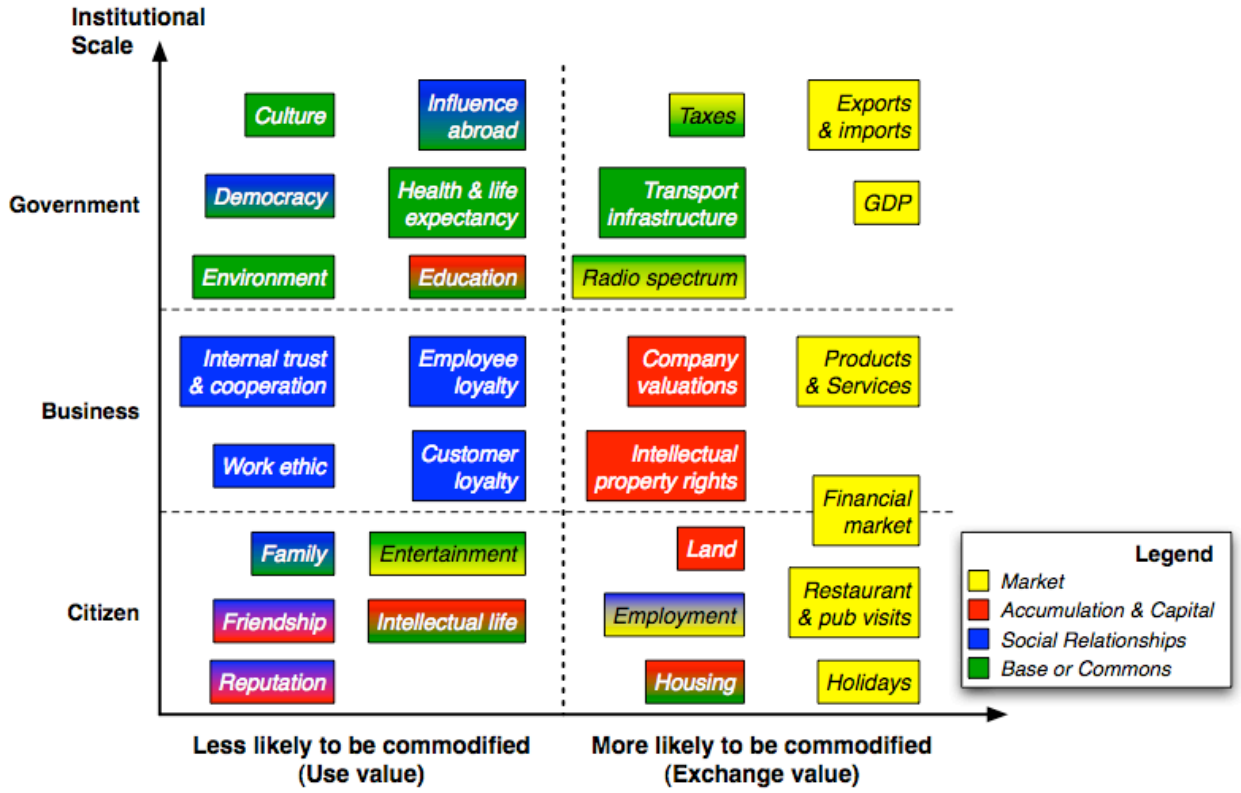

Figure 10: Gudeman's value domains mapped to the value map

The Four Domains in the Digital Economy

In the online or digital economy there are many forms of value that can also be organised according to the same classification. These categories and what they contain are not nearly as stable as what Gudeman found in agricultural economies hundreds or thousands of years old. For example, the types of content and the means by which it is created and shared or exchanged are continually shifting, in response to technological, social, and economic innovation. The concepts shown in Table 4, therefore, are only a representative sample of the possibilities. Another challenge in filling in this table is that the concept of private vs. public good is slippery in online spaces. For example, it is not entirely clear whether the pictures that are uploaded to one's Facebook page belong to the holder of the account or to Facebook. And yet, whatever the fine print might say, those photos are contributing to the base of the holder's community or social network. In other words, legal definitions of private property that extend over indefinite time-scales might not be immediately relevant to the formation and dynamics of online communities over time-scales of weeks or months.

The role that subsistence farming plays in the base of an agricultural community can be compared with, in the digital economy, psychological well-being, which is also strongly dependent on social standing, recognition, and acceptance. The fact that different crops are used for the base and the market might translate into what we do with different kinds of photographs. For example, the pictures from the latest party or family gathering are shared and exchanged free of charge within one's Facebook community or social network. However, the same person might be a freelance photographer who sells her (different) photos to a newspaper in a market transaction.

Table 4: Example of the four domains of value in the digital economy		
Value Domain *(Scale)*	**Description**	**Types of Interactions**
Base or Commons *(Virtual community)*	Tacit knowledge, open knowledge, public databases, Wikipedia, YouTube content, Facebook data	Knowledge sharing
Social relationships *(Virtual community)*	Facebook communities and other social networks, discussion forums, Twitter, e-mail	Friendship, kinship, gossip, personal politics, community building
Accumulation *(Virtual community & Global)*	Intellectual property, patent portfolios, copyright, number of LinkedIn links, social capital, online content, Second Life property, search engines (as they assist in knowledge construction through data retrieval)	Produced through innovation, artificial creation of scarcity (e.g. enforcement of copyright for online publications), artificial creation of desire, as well as standard accumulation of profit
Market *(Global)*	B2B/B2C services, information/knowledge services, retail	Online payment, subscription, advertising

The Perspective of Economic Anthropology

The tendency in the 20th Century, during what we could call the golden age of neoclassical economics (in the West!), has been to describe, analyse and quantify the four domains of value using concepts and tools that apply to the market domain. The result has been a widespread perception that everything can find an instantiation in a market or as a market. This perception was of course strongly influenced by the classical economics ideal of the self-regulating market, which was dominant in the West in the 19th Century. Policies of privatisation, which have been dominant in the West since 1980 and through the influence of the IMF, have had a major impact also on the rest of the world and are a natural consequence of this interpretation of economy.[34] While it is certainly true that any of the materials or interactions in any of the four domains can be referred to in monetary terms, in most cases this results in a perception that some of the original value has been lost – hence the common figure of speech 'to reduce' something to a market transaction. Using monetary quantification is like characterising an object through its shadow: while the shape of the shadow does contain useful information about the object, much information is lost, such as its depth and colour.

This perceived loss of value is more accurately described as a translation from one form of value into another. For example, a family experiencing economic difficulties may be forced to sell off the family silver. The value to that family of its silver may be enormous, for example through its associations with many prior generations. The value of that silver in GBP is a 'projection' of a huge emotional/historical value onto a few hundred (or thousand) pounds. The two categories of value are incommensurate in the sense that one cannot measure the subjective value of a family heirloom in the national currency. To that family it is 'priceless'. Yet such a translation is possible if one has no choice but accept the 'reduction' to market/exchange value. By contrast, an artistic creation might not have a great deal of value for the artist or his/her family but, depending on who the artist is, its market value could be enormous.

The fact that the exchange between the forms of value often leads to loss strengthens the claim that some of the four domains of value are more commensurate than others[35] and that, therefore, it is wiser to maintain their individual structure and rules than to reduce everything to the same 'currency'. A prime example where two domains (base and market) have been connected without sacrificing the value metrics of either, and which is largely responsible for bringing this issue to the fore, is Open Source. The Open Source phenomenon spans all four domains (i.e. also social relationships and accumulation), but in its more recent manifestations the remarkable fact is that it appears to have been able to reconcile the commons and the market.[36]

Switching perspective, rather than attempting to reduce everything to the market, economic anthropology places *humans* at the foundation of the wider conception of economy shown in Figure 9. In effect, the

[34] The merits and demerits of the privatisation deserve a more in-depth discussion than I can afford to explore in this paper.
[35] For example money capital, which belongs to the domain of accumulation, is commensurate with the market domain.
[36] Berdou (2011) provides an in-depth discussion of the latest trends in open source organisations and business models.

'exchange mechanism' between the four domains becomes the subjective and necessarily variable human perception of value. Although this might seem too arbitrary to make sense, the whole concept of the market is based on a similar idea, that is, the exchange value of a commodity is necessarily a subjective assessment which reflects differences in perception of its use value by different people/agents.

Based on the discussion of the previous section we might tentatively conclude that in the different domains of value the relationship between use value and exchange value changes. In the commons and social relationships domains, perceptions of use value tend to be shared by actors or participants, thereby making, by definition, exchange value coincide with use value. In the market and accumulation domains differences in perceptions of use value are much more likely. Such differences, similarly, give rise to exchange value, which becomes analogous to a potential difference and driver of the market seen as a dynamic process.

Gudeman does not go as far as providing a normative 'system design' for how the economy should actually function. His work, however, provides us with inspiration for attempting to connect the domains as they apply to the digital economy, for example using a CC similar to the WIR to connect its non-profit-oriented parts to its profit-oriented parts through the same currency. Alternatively, Gudeman's framework can help us analyse the experience of the cooperative banks (on the continent) and of the building societies (in the UK) over the past couple of centuries quite apart from the use of any CC. I turn to these questions in the next section.

5. BALANCING THE MARKET WITH THE SOCIAL CONSTRUCTION OF ECONOMIC IDENTITY

A Historical View on New Forms of Business Models

The insights provided by economic anthropology may most easily be expressed in terms of new business models. In reality this is not such an original idea, since new business models that point in this direction have been emerging for a while under the more modest label of 'innovation': Crowdsourcing and Open Innovation are familiar examples, in addition to the open source models whereby a group of companies collaborate freely to the development and maintenance of an open source toolkit (e.g. GStreamer) or platform (e.g. Plone Content Management System (CMS)), whilst competing with each other by developing and offering their own proprietary services and applications that utilise the same toolkit or platform. In other words, the integration of the social dimension in a business activity is not a new idea. As we saw in the preceding section, economic anthropology enables us to talk about it as another form of economic value, rather than a form of social value. The problem, however, is that these two forms of value remain largely incommensurate. In this section I develop the idea that CCs provide a 'return loop' from the market back to the base, tightening the feedback between all four domains and in part serving as an 'exchange mechanism' between the four kinds of economic value.

In the history of credit-granting communities over the past three centuries, what makes the WIR system unusual is the use of its own currency. The fact that WIR has gradually morphed into a bank, however, highlights its similarity with a much larger phenomenon, the cooperative bank. The cooperative bank is another example of an institution in which the social and commercial dimensions are closely interdependent. Regardless of their legal and ownership structure, i.e. regardless of whether they are owned by their members or by external shareholders, for cooperative banks profit-making is not a central objective:

> European cooperative banks, in order to increase their efficiency and ability to operate, have continued to adapt to legal, technological, and market changes and to rely on a locality-based business model. This is a model in which the capital holdings of the bank are "patient", i.e. they are not expected to generate the maximum possible investment profit in the shortest possible time. Further, as an expression of "democratic" bank governance, such model becomes an instrument for achieving significant economic and social results for the whole community, through close and lasting relationships with all the stakeholders. (Fratta Pasini, 2005 [translated from Euro-English by the author], quoted in Marchetti and Sabetta, 2010).

In the UK[37] a similar phenomenon took the form of building societies, which originated in the North of England and the Midlands in the 18th Century in order to support the house-building of their members. While at first these were 'terminating' building societies, which would dissolve once all of their members had succeeded in building their house, by the 19th Century permanent building societies became common. By accepting new members as old members completed their building projects, over time these became increasingly similar to commercial banks. However, since they did not have to pay dividends to shareholders they could offer lower interest rates on loans and mortgages, which partly explains the longevity of the phenomenon.[38]

The jointly owned cooperative bank or building society exemplifies an interaction between Gudeman's domains whereby the **base** (pooled land or property collateral) and the **social relationships** that define a particular community of members work together to support **capitalisation** and/or **market activity**. By creating credit for their members at a lower cost, these cooperatives or societies provide a protected time-window in which the members are given a chance to overcome a temporary cashflow shortfall or to build through labour the capital that will repay the debt. Where in an economic model based only on the market this benefit comes at the cost of a (relatively higher) interest on the loan, the joint ownership model can afford lower interest rates because this benefit is repaid with a 'social' currency, for instance in the form of solidarity, upholding of community values, and so forth. Figure 11 illustrates the idea graphically for an agricultural cooperative bank and a building society.

The Social Construction of Economic Identity

It is useful to summarise briefly the basic fiscal policy mechanism used by a nation's central bank. In times of recession, when money is scarce, the central bank (CB, i.e. the Bank of England in the UK, the Federal Reserve in the USA, or the European Central Bank in the Euro zone) generally lowers the prime rate in order to encourage more spending and therefore greater circulation of cash. Once the prime rate is close to zero, as it is currently in the UK, the CB has to resort to 'quantitative easing' (QE) operations, for example buying government bonds (debt) on the bond market.[39] The CB stores the bond certificates in its vault and effects corresponding transfers of money into the bank accounts of the bond sellers. However, these are not proper 'transfers', in the sense that normal citizens or consumers experience. In other words, when, for example, £100m due to the sale of a certain number of bonds appear in the bank account of the bond trader, an equal amount does *not* disappear from the CB account, *because there was nothing there to begin with*. In other words, the £100m have been 'created' out of thin air by the CB. Similarly, in times of over-inflation, the CB may decide to withdraw money from circulation. It does so by selling the bonds it holds on the bond market. When the bond traders send their cheques to the CB the money 'disappears'. It is clear that in its ability to control this mechanism the CB wields immense power, which is probably the main reason why the creation of money is a state monopoly. Or is it? Interestingly, on a much smaller scale the WIR Bank has exactly the same power:

> The unique ability of the WIR Bank to provide new payment media via the granting of credit and the simultaneous creation of WIR money has occasionally given rise to the criticism that the WIR Bank represents an incalculable disruptive factor for the Swiss National Bank's fiscal policy, since it is the only Swiss institution aside from the National Bank able to create money. (Studer, 1998: 44)

[37] This paragraph summarises a few points that are explained in more detail by Stefanelli (2010), a work which is complemented by Devine's thorough discussion of smaller cooperative banks in the UK (Devine, 2006[1908]).

[38] The fact that many building societies such as Halifax, Abbey (now part of Santander), etc have now 'demutualised', i.e. they have chosen to abandon the member-based ownership model in favour of shares-based public ownership like any other company listed on the stock market, belongs to a wider discussion of the merits and demerits of privatisation. Quite apart from the wisdom, in many cases, of privatising government-owned concerns, in my opinion demutualisation and privatisation are two different concepts that should have been kept separate but that appear to have been conflated to a significant extent.

[39] See http://www.bankofengland.co.uk/monetarypolicy/assetpurchases.htm for more details.

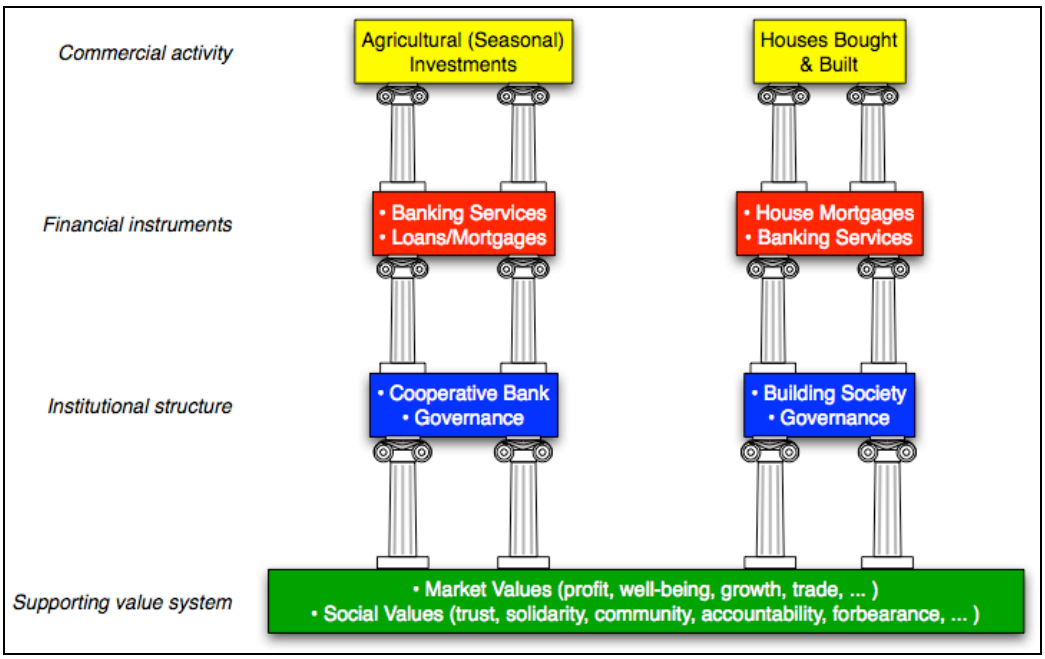

Figure 11: The roles of the base and social relationships in supporting capitalisation and the market

Although Studer goes on to explain why such concerns are unfounded, our interest here is not in the mechanics or the politics of fiscal policy. Rather, it is in the role that the creation of money plays at the heart of the interaction between the four economic domains of value, which might be argued as follows. Over time, the members of the WIR community have become increasingly aware that the WIR enables them to formalise the trust they hold for each other in a manner that is visible to society at large, quantifiable, and economically enabling. The ability to transform trust (credit) into a 'tangible' currency (even though the WIR is actually an electronic currency) that they control completely has deep implications on what we might call the 'social construction of economic identity'.

Although it is the WIR Bank that extends credit, and therefore trust, to a petitioning member, the potential harm a rogue member could do to the economic circle as a whole implies that each member feels some level of accountability to the WIR economic community and, similarly, extends their own trust to that community. Taking on a measure of risk is a form of personal investment that the members are willing to make for the success of the WIR. With this personal investment and responsibility comes a feeling of 'ownership'. Since the combination of trust, responsibility, accountability, and solidarity is formalised in their financial system as 'credit' and implemented as 'WIR', it follows that the sense of ownership that comes with these principles is projected onto the currency. Since this process is repeated countless times both in the context of WIR Bank governance as well as routine market transactions, it becomes an experience shared by all the members, which is communicated through language, balance sheets, and other 'cultural' signs. This is more or less the definition of 'social construction', as explained in an earlier footnote. The localisation of the Euro coins into the different countries of the Euro zone is a clear example of the importance money has always had for reflecting and reinforcing national identity. The case of the WIR or, in fact, of any CC, is one of enablement and empowerement of a given community, which feels better able to take charge of its own *economic* destiny through the creation, ownership, and control of its own currency. Hence the concept of social construction of economic identity.

Figure 12 shows how an 'eCC' modelled on the WIR can be seen as a 'fountain-like' feedback or return from the market and capital domains back to the base and social relationships precisely through this community/economic identity construction process. The importance for the domain of capital comes from the large loans and mortgages that this kind of CC system also enables and mediates.

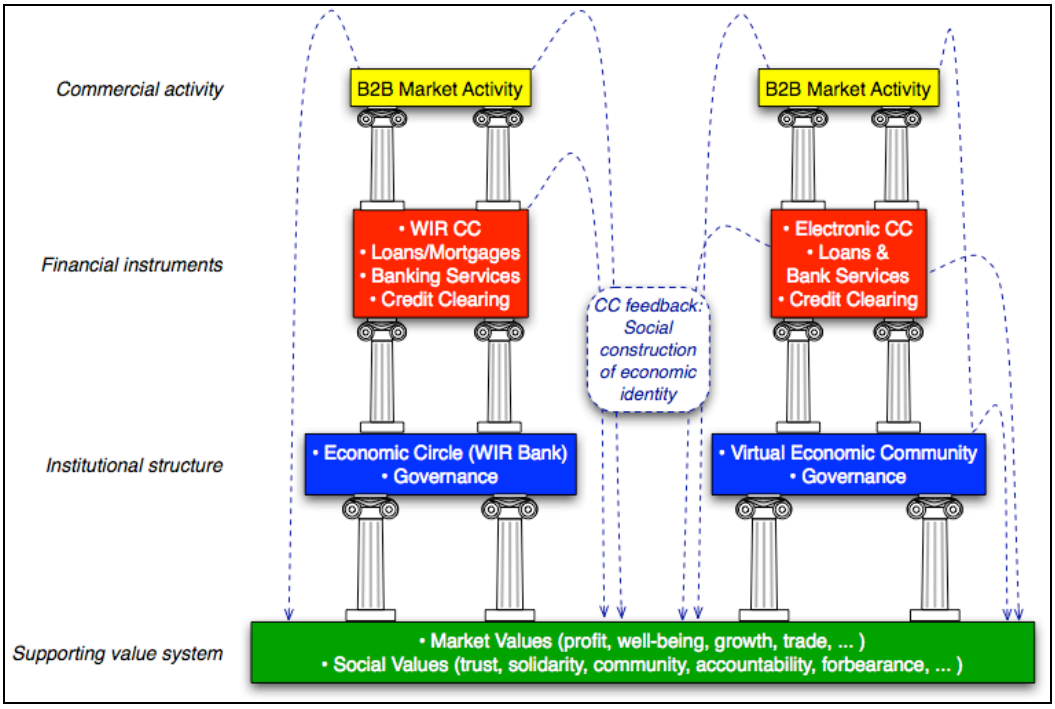

Figure 12: Feedback from the market and capital to the base due to the WIR and a WIR-like eCC

This discussion brings us to an interesting realisation. In the case of cooperative banks and building societies the intangible social values are 'exchanged' mainly at the institutional level, within the domains of social relationships and the base. Thus, although they support the market and capital domains, they are not in turn supported by them beyond standard financial enablements. By contrast, in communities with a currency such as the WIR the CC is able to mediate the exchange of these values in addition to capital and commodities in trade. It is in this sense that a CC such as the WIR is able, to some extent, to connect Gudeman's otherwise incommensurate value domains.

Outdoor Museum for Smartphones in the Midlands

I discuss another example that uses a local and physical CC and that shows how the four domains of economy can be integrated in innovative ways and through reliance on broadband. I first describe the project and then map its constituent parts to the four value domains.

Q-Archive (Rathbone and Palmer, 2011)

The project Q-Archive aims to research, test, and demonstrate a new way to disseminate existing cultural repositories more widely by delivering such content, on-demand, at the point of interest, and in a user-friendly way via smart phones and QR codes. The project consists in establishing how to adapt the 'front end' technology of QR codes and mobile devices, and how to organise and manage the 'back end' of content authoring, preparation and management: both in the technical and in the social science aspects of networking volunteer communities. Q-Archive will show a low-cost way of opening up the vast treasure of knowledge and information locked away in various forms of public repositories, archives and collections by facilitating and coordinating existing experts and volunteers as content managers for mobile media. Our specific pilot project is based on the historical and archaeological archives of the County of Leicestershire and their existing pool of active experts and volunteers. Q-Archive is meant to become a commercial cloud-based service during the course of the project. The target market is any collection, museum, or cultural visitor attraction with information assets that could be presented via the user's own mobile media during their visit.

The broadcast media have demonstrated time and again through popular programme-making the widespread interest in historical, archaeological and genealogical studies, and the natural sciences if they are presented in the right way. An Ofcom report (2011b) shows that 30% of the adult population now have smart phones. Yet currently, the public may pass by historically important buildings, walk around an ancient monument, or picnic at a site of scientific interest, without any availability of cultural information that they may find fascinating or educational because of their location at that moment in time. QR Codes are a kind of 'square bar code' used in Japan since 1994 for tracking manufactured

goods. Their use is now rapidly growing in Western countries, as a method for consumers to respond electronically to advertisements in magazines or posters. Our users will use their smart phones or tablet PCs to read a printed "QR tag" at their location, which is the only location-based infrastructure required. The code will automatically take the user to location-specific content, for example a web-based guided tour with informative text, historical pictures, images of archaeological artifacts, or graphical reconstructions. With superfast broadband it would be possible to access also spoken commentary and video.

The user thus comes equipped with their own highly sophisticated delivery infrastructure. The cultural partner has only to assemble the content, and to convert content, such as the guided walks and illustrated talks, that are already undertaken for small groups by their experts and volunteers, into an appropriate format for mobile media. Much content is available digitally, or could be easily digitised using existing volunteers. The CMS used for this project will also contain tools for social networking and community building, acting as a facilitation mechanism for volunteer groups. The work of content origination and management can thus be distributed among a network of experts, staff, volunteers, and even visitors inputting their observations and knowledge (oral history). We will use a free open source community-maintained CMS which will facilitate the easy adoption of the system by similar organisations, either by copying Q-Archive or subscribing to it as a service. The production of the master images for the QR tags will be an integral and automatic part of the content generation process.

The project involves two sample installations: Visitors to Borough Hill, the site of an iron age hill fort, but a place where there is very little cultural information, will be able to have a guided walk, read about the site, see graphical reconstructions, look at photographs of recent archaeological digs and their finds, take part in a treasure hunt or similar challenges. Visitors to the historic centre of Melton Mowbray, who come generally for its famous pork pies and markets, will be able to start a guided tour of the town centre from any one of several places. The tour will look at its architecture, social history, archaeology, and natural history, and take in the museum which has several local history themes.

Table 5 shows how the elements of the Q-Archive project fit quite naturally with Gudeman's domains of value. It includes also possible mechanisms of economic exchange.

Table 5: Mapping the Q-Archive project to Gudeman's value domains

Value Domain	*Relevance to Q-Archive*	*Currency and/or Interaction Mechanisms*
Base	• Cultural repositories, historical & archaeological archives and collections • Open source CMS • (Superfast) Broadband IP infrastructure • Web stack of languages and standards (including the QR codes) • Social networking platform running next to CMS	• Public investment • Spoken word • Information and knowledge • Community currency
Social Relationships	• Network of Experts and Volunteers interacting with each other as they transform cultural content (Base) into digital information and knowledge assets (Accumulation) • Experts and Volunteers interacting with Visitors • Community of Experts and Volunteers providing feedback to Technology Partner • Network of Software Developers maintaining CMS	• Community currency to recognise time and effort
Accumulation/ Capital	• Cultural and social capital within the existing pool of Experts, Volunteers • Digital information and knowledge assets • Widespread ownership of sophisticated mobile information infrastructure (smartphones) • Oral history inputs from Visitors • Wider community creation across all stakeholders (Cultural Partner, Volunteers, Technology Partner, Visitors, Software Developers) • Higher quality of touristic experience for Visitors • Profit for the Technology Partner • Regional economic growth from tourism • Community currency system as a local institution	• Information assets • Knowledge assets • Cultural assets • GBP
Market	• Commercial cloud-based service offered by leading Technology Partner to Cultural Partner • Technology Partner developing and maintaining delivery channels	• GBP

Figure 13 attempts to show how the introduction of a CC of the kind of Ithaca HOURS or Brixton Pounds supported by a broadband infrastructure facilitates the operationalisation of the Q-Archive example in a manner that is consistent with Gudeman's domains of value. It is not clear whether *superfast* broadband makes a big difference in this example, but it is not hard to imagine analogous scenarios built around online gaming, for example, that are more likely benefit from superfast broadband.

This example also serves to show how a CC system that has such strong local ties, although important for the local economy, is likely to remain a small-scale phenomenon. A WIR-like B2B system based on an eCC, by contrast, can grow more easily by supporting 'Virtual Economic Communities' (VECs) that connect SMEs in outlying areas of the UK to the rest of the world.

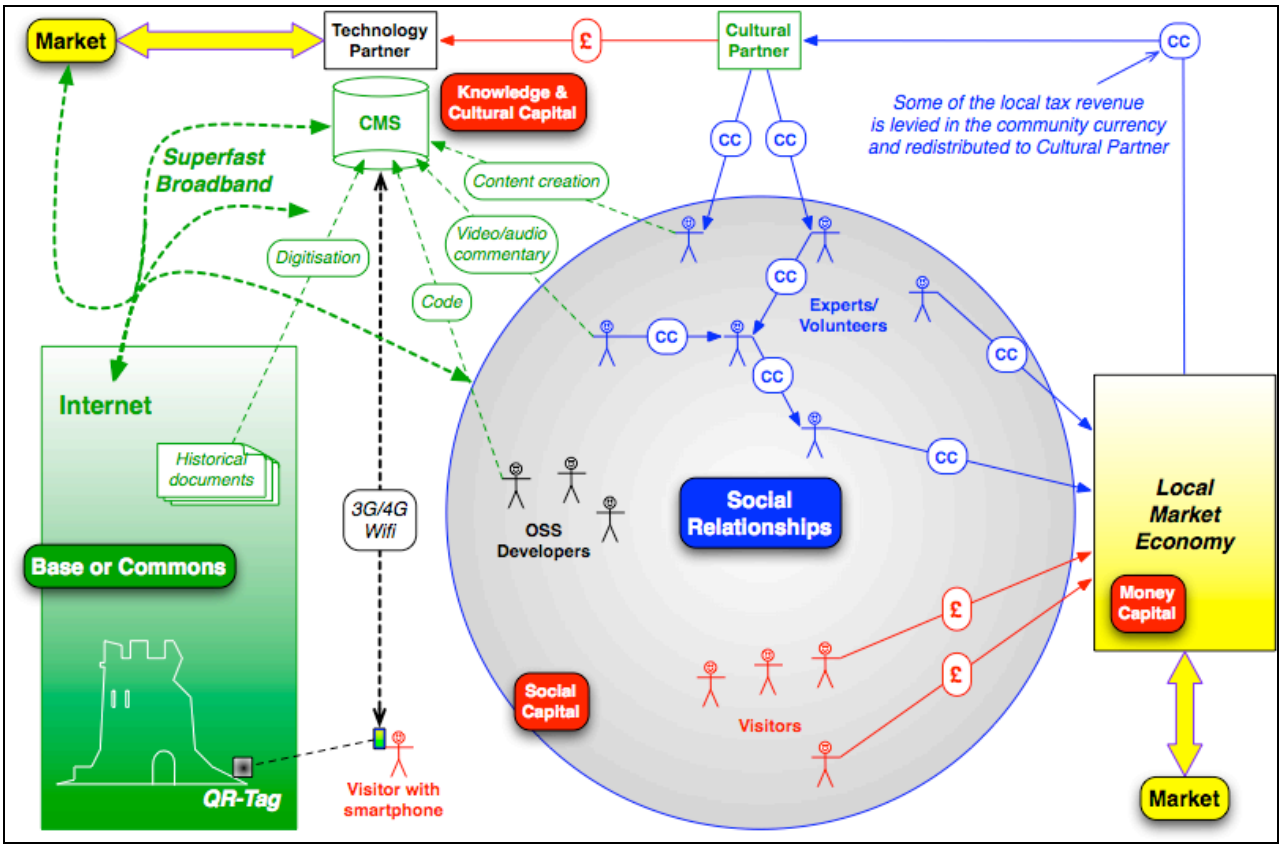

Figure 13: Possible integration of a community currency with the broadband-enabled value domains for the Q-Archive example (Dotted lines indicate data flows, solid lines indicate currency flows, block arrows indicate interactions)

6. CONCLUSION

The example just discussed is consistent with an attempt to quantify social value. Whereas this appears to be possible if one relies on a currency that emphasises use value over commodification and exchange value, the limited scale of most CC systems makes it difficult to imagine how such an approach could lead to monetisation in the (globalised) market domain. This perception is made even stronger in the digital economy by the growing and unstoppable tide towards free content. Whereas cooperative banks have for a long time provided a model for scaling up economic activity in adverse credit conditions by relying on social relationships and a well-recognised base, the WIR has gone a step further by making the *currency itself* a part of the base. In other words, the WIR exemplifies what we might call 'Open Source Money'. Therefore, it seems worthwhile to explore further whether the many and growing online phenomena built around social networks, open knowledge, and free content could amplify the reach and turnover of a currency that depends

on a self-governing community for its existence but that, at the same time, can provide noticeable economic advantages to that community in the context of trade – advantages that otherwise can only be accrued through the economies of scale of more traditional institutional forms. The radical ultimate implication of this line of argument is the break-up of the state monopoly on the supply of money.

The proposal that follows, therefore, is based on a shift in perspective. Rather than focusing on online social networks and free content creation as the locus of socio-economic activity that could be commodified, the model proposed is based on bringing the base and social relationships into the sphere of what is normally regarded as market-based activity. The claim here is that this can only make business sense if a WIR-like system is adopted. Further, it leaves open the question of what *more* could be done if the social value and the products of peer production embodied in the free content flowing around the Web were to be connected more closely with the 'financial base' so constructed. In essence, the overall argument is meant to amplify the 'entrainment' of economic activity by social interactions more than current ways of doing things are able to do. That this happens is very clear and quantifiable through the dual payment of any one good or service in a CC and a national currency, in particular the fourth component mentioned by Studer in Section 3, even if WIR grew out of an initiative that was meant first and foremost to facilitate trade.

The challenge in mapping a WIR-like approach to the digital economy is to connect users and companies in geographically remote areas to the economic activity 'at the centre' by leveraging the Internet and, in particular, superfast broadband. The experience of WIR is to complement market interactions with an institutional context that involves shared ownership of the banking infrastructure, i.e. a base or commons, and an open governance framework that relies to a significant extent on social relationships. The proposal here is to set up a similar credit-clearing system aimed at B2B interactions and based on a similar cooperative structure that, crucially, involves the infrastructure investors and/or operators only *indirectly*. Specifically, a possible approach could be for private investors such as Virgin Media or BT to create their own 'WIR-like' systems, each with its own currency. The fact that Virgin Money has already been established is an interesting and ironic coincidence. Here, by contrast, I am arguing that it would be advisable for the parent companies to participate in such systems through spin-offs that could engage in cooperative-style ventures with other companies. This is what is meant by 'indirectly'. Each venture would be a different economic circle, i.e. there would be one for Virgin, one for BT, and so forth.[40]

The initial membership of these economic circles would be open to companies from the areas of the UK in which superfast broadband investments are being made, but it could expand to companies in other parts of the UK and the world. Prerequisites would be the passing of credit checks similar to those performed on WIR applicants, and an upper bound on size, thereby favouring SMEs. Each 'ecosystem' of companies would gradually develop the characteristics of a community. There would be an incentive to trade with each other, as in the WIR, but no obligation. So, participation would mainly make it easier to obtain credit and, as in the WIR, possibly also a certain level of match-making between supply and demand. Trades would be performed in both the 'local' currency and the national currency, as for the WIR. For trades between companies residing in countries with different national currencies, only the portion of the payment in national currency need incur exchange fees; the portion in the CC is immune to such costs, providing an additional incentive for joining and participating.

Member companies could switch circle but could not join more than one at a time, thereby providing a degree of competition between different communities and, indirectly, currencies (echoing some aspects of Hayek's proposal). The role of the infrastructure providers would be as equals as far as the governance framework of each circle is concerned, since they would be participating through their (SME) spin-offs, but they would be free to name the currency something that reflects their brand name. Each circle would have the structure of a joint-ownership cooperative, like the WIR. The goods being traded could be anything but, since all transactions would be mediated by the superfast broadband network, knowledge-based and content-oriented businesses would probably be in a privileged position to innovate their business models by

[40] A possible drawback in participating in one of these economic communities from the point of view of competition is the risk of lock-in to a particular provider. This would require careful thought and probably some regulatory intervention, for instance to decouple the provision of communication and media services from the provision of credit services and the membership in a given economic community.

leveraging the social networking, free content, and bandwidth-dependent value-added components of their businesses.

The spin-offs would in essence end up playing the role of the WIR Bank, becoming something close to 'non-profit' banks. Therefore, it would be advisable for the spin-offs to set up local branches in the various regions where the infrastructure investments are made in order to interact with local stakeholders through direct contact. It would be advisable to hire local people for such offices, thereby signalling that the investment is not just being made in the technology. The parent company would not, therefore, derive a profit directly from such a banking business. They would accrue profits indirectly, through the greater economic activity facilitated, fostered, and supported by their spin-offs and mediated by their networks. They would have a strong incentive to 'play fair', be 'good citizens', and make each economic circle a success in order to increase the social capital of their brand name. The long-term goal of this approach is to facilitate the interactions between the different domains in an enlarged, more inclusive, and more participatory multi-scale economic culture.

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REFERENCES

Anderson, C (2009). *Free: The Future of a Radical Price*, Random House.

Benkler, Y (2004). Sharing nicely: on sharable goods and the emergence of sharing as a modality of economic production, *Yale Law Journal*, 114, 273–358.

Benkler, Y (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven: Yale University Press.

Berdou, E (2011). *Organization in Open Source Communities: At the Crossroads of the Gift and Market Economies*, New York: Routledge.

Boghossian, PA (2001). What is social construction? *Times Literary Supplement*, 23 February 2001. http://as.nyu.edu/docs/IO/1153/socialconstruction.pdf.

Breitstein, L and Dini, P (2011). A Social Constructivist Analysis of the 2007 Banking Crisis: Building Trust and Transparency through Community Currencies, *Journal of Banking Regulation*, Vol 13, pp 36-62, http://www.palgrave-journals.com/jbr/journal/v13/n1/abs/jbr201116a.html

Burrows, P (2004). Hewlett & Packard: Architects Of The Info Age, *Business Week*, 29 March 2004. http://www.businessweek.com/magazine/content/04_13/b3876054.htm.

Croall, J (1997). *LETS Act Locally: The Growth of Local Exchange Trading Systems*, London: Calouste Gulbenkian Foundation.

DeMeulenaere, S (2011). Private communication.

Devine, H C (2006[1908]). *People's Co-operative Banks*, Elibron Classics.

Dini, P, Milne C and Milne R (2012). Costs and Benefits of Superfast Broadband in the UK, Convergys Corporation. http://www.convergys.com/smartrevenue/lse/

Dolan, A (2011). Lowest Tech Valuation Resulted with HP's Poor Cloud Performance. Financial Feed. http://www.financialfeed.net/lowest-tech-valuation-resulted-with-hp's-poor-cloud-performance/852668/.

Economist, The (2011). Beware of falling masonry, Briefing: The euro, 26 November, pp 85-87.

Fratta Pasini, C (2005). Co-operative values and local development in Europe, European Association of Cooperative Banks Convention, 1 December, Brussels.

Gesell, S (1934[1906]). *The Natural Economic Order*, San Antonio, Texas: The Free Economy Publishing Company.

Goodrich, C, Ed. (1967). *The Government and the Economy, 1783-1861*, Indianapolis: Bobbs-Merrill Company.

Granovetter, M (1985). Economic Action and Social Structure: The Problem of Embeddedness, *The American Journal of Sociology*, 91(3):481-510.

Gudeman, S (2001). *The Anthropology of Economy*, Blackwell.

Hargreaves, I (2011). Digital Opportunity: a Review of Intellectual Property and Growth. Intellectual Property Office. http://www.ipo.gov.uk/ipreview-finalreport.pdf.

Harvey, D (1973). *Social Justice in the City*, London: Edward Arnold.

Hayek, FA (1976). *Denationalisation of Money*, London: Institute of Economic Affairs.

Hodgson, G (1988). *Economics and Institutions*, Cambridge: Polity Press.
Jackson, M (1997). The Problem of Over-Accumulation: Examining and Theorising the Structural Form of LETS. *International Journal of Community Currency Research*, Vol 1. http://www.ijccr.net/IJCCR/1997_(1)_files/IJCCR%20Vol%201%20%281997%29%202%20Jackson.pdf.
Kadet, A (2010). Struggling towns printing their own cash. Smart Money. http://articles.moneycentral.msn.com/Banking/BetterBanking/struggling-towns-printing-their-own-cash.aspx.
Kaplan, RS and Norton DP (1991). The Balanced Scorecard – Measures that Drive Performance, *Harvard Business Review*, Jan-Feb, 71-79.
Kay, R (1994). *LETS and the Foundations of a New Money System*. Web booklet available at http://www.gmlets.u-net.com/explore/found/index.html
Krohn, GA and Snyder, AM (2008). An Economic Analysis of Contemporary Local Currencies in the United States, *International Journal of Community Currency Research*, Vol 12: 53-68.
Kuziemko, I, Buell, R, Reich, T and Norton, M (2011). Last Place Aversion: Evidence and Redistributive Implications, NBER working paper 17234, July. Cited in *The Economist*, 13 August 2011, p. 63, http://www.economist.com/node/21525851.
Lietaer, BA (2001). *The Future of Money*, London: Century.
Longhurst, N and Seyfang, G, Editors (2011). Complementary Currencies: State of the Art, Special Issue of the *International Journal of Community Currency Research*, Vol 15 (D).
Mansell, R (2012). *Imagining the Internet: Communication, Innovation, and Governance*, Oxford University Press. In press.
Marchetti, P and Sabetta, A (2010). The Cooperative Banking System in France, in Boscia, V, Carretta, A and Schwizer, P (Eds.), *Cooperative Banking in Europe: Case Studies*, Basingstoke: Palgrave Macmillan.
Marshall, A (1920[1890]). *Principles of Economics*, 8th Edition, London: Macmillan and Co. Available at http://www.econlib.org/library/Marshall/marP.html.
Molloy, E (2011). Our national wealth far outweighs fool's gold, *Irish Times*, 5 March 2011, http://www.irishtimes.com/newspaper/opinion/2011/0305/1224291373414.html.
New Economics Foundation (2010). The Great Transition. http://www.neweconomics.org/sites/neweconomics.org/files/Great_Transition_0.pdf.
Nicolis, G and Prigogine, I (1977). *Self-Organization in Nonequilibrium Systems*, New York: Wiley.
Pacione, M (1997). Local Exchange Trading Systems as a Response to the Globalisation of Capitalism, *Urban Studies*, Vol 34: 1179-1199.
Pacione, M (1999). The Other Side of the Coin: Local Currency as a Response to the Globalization of Capital, *Regional Studies*, Vol 33: 63-72.
Pénard, T, and Poussing, N (2010). Internet Use and Social Capital: The Strength of Virtual Ties. *Journal of Economic Issues*, 44(3) 569-596. http://perso.univ-rennes1.fr/thierry.penard/biblio/PenardPoussingSocialCapital.pdf.
Polanyi, K (2001[1944]). *The Great Transformation: the Political and Economic Origins of Our Time*, Boston: Beacon Press.
Rathbone, N and Palmer, P (2011). Private communication.
Schraven, J (2000). The Economics of Local Exchange and Trading Systems: a Theoretical Perspective. *International Journal of Community Currency Research*, Vol 4. http://www.ijccr.net/IJCCR/2000_(4)_files/IJCCR%20Vol%204%20%282000%29%205%20Schraven.pdf.
Schroeder, RFH, Miyazaki, Y and Fare, M (2011). Community Currency Research: An Analysis of the Literature. *International Journal of Community Currency Research*, Vol 15 (A): 31-41. http://www.ijccr.net/IJCCR/2011_(15)_files/IJCCR%202011%20Schroeder.pdf.
Smith, A (2007[1776]). *An Inquiry into the Nature and Causes of The Wealth of Nations*, Petersfield: Harriman House Publishing.
Solomon, LD (1996). *Rethinking Our Centralized Monetary System: The Case for a System of Local Currencies*, Westport, Connecticut: Praeger.
Stefanelli, V (2010). The Peculiarity of the UK Case: Mutual Building Societies, in Boscia, V, Carretta, A and Schwizer, P (Eds.), *Cooperative Banking in Europe: Case Studies*, Basingstoke: Palgrave Macmillan.
Stodder, B (2009). Complementary credit networks and macroeconomic stability: Switzerland's Wirtschaftsring, *Journal of Economic Behavior & Organization*, 72(1): 79-95.
Studer, T (1998). *WIR and the Swiss National Economy*, Basel: WIR Bank.
Thaler, RH (1999). Mental Accounting Matters. *Journal of Behavioral Decision Making*, 12(3) 183-206. http://faculty.chicagobooth.edu/richard.thaler/research/pdf/MentalAccounting.pdf.
UN (2010a). The Global Partnership for Development at a Critical Juncture: Millennium Development Goal 8: MDG Gap Task Force Report 2010. United Nations. http://www.un.org/millenniumgoals/pdf/10-43282_MDG_2010%20(E)%20WEBv2.pdf.
UN (2010b). The Millennium Development Goals Report 2010. United Nations. http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low res 20100615 -.pdf
Von Bertalanffy, L (2003[1928]). *General System Theory*, Braziller.