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D-CENT

Decentralised Citizens ENgagement Technologies

Specific Targeted Research Project
Collective Awareness Platforms

D3.4 Field Research and User Requirements Digital social currency pilots

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This report is currently awaiting approval from the EC and cannot be not considered to be a final version.

Content

Executive summary

D3.4 provides a background for building *a framework for implementing and federating digital complementary currency experiences, and for improving their social benefits.* Enabling communities to manage exchange using alternative digital social currencies as new tools for growing a civic sharing economy, including a strong role for interoperable digital social currencies remains the principal goal. As stated in the D-CENT Dow, *"a primary objective of the pilot is to offer resilient exchange systems for actively engaged users of the D-CENT platform and others in the social economy and civil society, strongly linked to democratic decision making, and remains linked to local production and distribution to avoid accumulation"* (DoW, p.5).

Different monetary forms complementary to official currencies have recently emerged in Europe in response to the impact of the current financial crisis on the credit system and, moreover, the civil society. They have been variously labelled as social, local, alternative monies. However the meaning of these currencies remains to be discussed. On the one hand, the new monies have been promoted as innovative tools for socio-territorial policies, with a focus on localist, anti-globalist or anti-capitalistic values (Pacione, 1997, 1999, 2011). On the other hand, the emphasis on the value of monies as instruments of alternative territorial development runs the risk of overshadowing issues concerning the specific features of currency projects. Complementary currencies represent forms of endogenous creation of money in relation to the emergence of social needs based on local and knowledge-intensive economies founded on the collective services of the Welfare State. However, this raises the question of coordinating the circulation and scaling of alternative currencies with different levels of governance.

What is needed is a more accurate reflection on the institutional implications of different types of currencies, in particular, concerning the liability of those who hold them to earn or to pay an interest. Moreover our principle aim is to support the design of a federation of complementary currencies that avoids localism and support both domestic and foreign exchanges between alternative forms of cooperative organisations.

In Part I of this document, we will first present a discussion about the comparison between the liquidity principle and the clearing principle, followed by a brief presentation of the most well known attempts at proposing a taxonomy of complementary currencies. We will then develop a theoretical analysis of specific complementary currencies based on a **Local Clearing Union** that includes not only businesses but also individuals and communities. This type of complementary monetary circuit is coherent with the key features that emerge from the case studies we present here (WIR, Sonantes, Sardex, Solviolette). Our theoretical framework is represented by the so-called monetary theory of production (Graziani 2003). Embracing the contribution by Caiani, Fumagalli and Lucarelli (2014), we try to sketch out some guidelines in order to formalise different kinds of monetary circuits. In particular, we argue for the need to provide two reformulations of the traditional schemes developed in the context of the monetary circuit theory (Graziani, 2003) in order to address the role of the State Sector and the new and more pervasive role played by financial markets. We will also show that a local complementary currency may be conceived as a new channel of money creation that presupposes a re-definition of local economic strategies. To do this we propose a simple model of pure credit economy with complementary currency in a stock flow consistent (SFC) framework (Godley and Lavoie 2007). As many eminent scholars have argued, some puzzles in the monetary theory of production arise because of accounting inconsistency; once we close a monetary circuit with SFC, these inconsistencies disappear. The exercise proposed here shows that a well-designed complementary currency (for instance a Local Clearing Union) represents a useful tool both to sustain businesses and to finance local welfare services. What the model is not able to show is the relevance of inclusive democracy to support the social consensus formation. The point is at the core of the case studies included in section 3.2.

In Part 2 of this document we will introduce the main tenets of Virtual Currency Schemes and, drawing on lessons learned from the complementary currency case studies in Part 1, we will outline the D-CENT Digital Social Currency experiments: developing and piloting a **Bitcoin for the common good**. This will be followed by a description of the process (section 5), outlining the Lean-inception sessions, held in Iceland, Spain and Finland in the first three months of 2014, through which lead-user groups have been identified and main problems and hypotheses developed around their contexts and use-cases. Introducing each pilot stakeholders and user requirements (section 6) we then present the initial findings drawn from these sessions and the subsequent analyses. Three additional use-cases have been added after keen interest was shown by potential stakeholders in Italy and the UK and additional pilots were deemed feasible and beneficial to the project overall. Although the nature of the project is iterative, research on the democratization of digital payment technologies will highlight the concrete situations and difficulties of adaptation of the conventional money system to the novel business models emerging on the social market place of the D-CENT platform. Participatory monetary policy by users of the alternative and complementary currency systems piloted in D-CENT will be a critical feature of the Social Blockchain. It will be tested in Reykjavik and Helsinki Town Halls or Eurocat/Intercanvis, respectively within their specific social-economic ecosystems.

Through user interviews a set of hypotheses are outlined for the identified lead-users in the pilot contexts. From these hypotheses, common trends of needs and problems emerged, forming the basis for three lean-canvases, outlining in more detail the case for developing these three trends for the design phase in T4.4. The main trends have been clustered under these three headings: ***municipal currencies*; *socially controlled commercial credit circuits*; *reward systems*.** These will be developed further through an iterative process with the lead-users from each pilot. As the research presented in Part 2 shows, design choices need to be informed at the grass-root level, rather than prescribing a design prospectively. Indeed, a municipal currency can be designed with an architecture that resembles clearing mechanisms and circulated as a reward for civic engagements, but will not create an environment for bottom-up innovation without ongoing users' engagement. Pilot and use cases communities will prototype tools that will place an emphasis on structural cooperation and positive social impact through co-design of currency and payment systems.

The final Section presents the **Ecology of Money** that will be developed in the D-CENT Digital Social Currency pilots, outlining the argument for diversity and federation of currencies as a safeguard to economic volatility. Drawing some preliminary conclusions from Part 1 and Part 2 the final section outlines how these lessons and cases will inform the technical design of the D-CENT money ecology.
Design efforts will begin from the scientific evidences of the parallel behaviour that both natural ecosystems and artificial complex-flow system share when confronted with the problem of sustainability. In natural systems, there is an optimal level of efficiency (i.e. streamlining), and resilience (i.e. diversity and interconnectivity) for sustainability and systemic endurance. The notion of *Blockchain*[1] implies the rethinking of the landscape of currencies and payments, at a structural level. The re-compilation of the Bitcoin client in more meaningful coding languages, (i.e. http://libbitcoin.dyne.org/), the specialisation of modules to add to the Blockchain, and new crypto-currency protocols are the first research and development efforts to advance this technology that is grounded on distributed cooperation. As a result, when several thousands of people decide to engage with the issue of credit control and distribution management, money becomes not only a medium of exchange, but also the most versatile instrument for engaging in economic life, thus linking participation and the design of new monetary circuits.

[1] https://en.bitcoin.it/wiki/Block_chain

PART1

1. Principle of clearing vs. principle of liquidity[2]

The current crisis is not simply a liquidity crisis, but, more radically, the crisis of liquidity itself. Liquidity is the name for a relationship of interchangeability between money and assets on financial markets. It involves the reduction of both money and credit to a commodity, and the dissolution of the relationship between debtor and creditor.

Liquidity is the cause both of the unsustainable growth of financial markets in the past decades and of the present intolerable credit squeeze.

However, the unsustainability of liquidity-based finance does not imply the unsustainability of finance as such, but of finance organised in terms of financial markets.

As Fantacci (2010) stressed, the issue is addressed by Keynes in Chapter 17 of the *General Theory*, on 'The Essential Properties of Interest and Money', where he sets out 'to enquire wherein the peculiarity of money lies as distinct from other assets' in order to identify the source of the money rate of interest. Keynes identifies the superior liquidity of money as its main distinguishing feature in the following terms:

> the power of disposal over an asset during a period may offer a potential convenience or security, which is not equal for assets of different kinds, though the assets themselves are of equal initial value ... The amount (measured in terms of itself) which [people] are willing to pay for the potential convenience or security given by this power of disposal ... , we shall call its liquidity-premium. (Keynes 1936, p. 226)

According to Keynes's definition, not only money but all assets have a power of disposal, a certain degree of liquidity: 'capital equipment will differ from one another [...] in the rapidity with which the wealth embodied in them can become "liquid", in the sense of producing output, the proceeds of which can be re-embodied if desired in quite a different form' (Keynes 1936, p. 240). In the light of this passage, as Fantacci (2010, 85-86) writes "what distinguishes money is its having the highest degree of liquidity, compared to all other assets and commodities, since it can be transformed immediately into any form of wealth, whereas other assets need first to be 'liquidated' and, in the process of being liquidated, may result in a loss for their holders."

Liquidity, even prior to being a specific monetary function, is a concept that arises from the need to rapidly exchange securities in which people have invested their savings. As Orléan (1999, 31-32) affirms:

> The objective is to transform what amounts to a personal wager on future dividends into immediate wealth here and now. To this end, it is necessary to transform individual, subjective evaluations into a price everyone can accept. Put another way, liquidity requires the production of reference value that tells all financiers the price at which the security can be exchanged. The social structure which permits the attainment of such results is the market: the financial market organises the confrontation between personal opinions of investors in such a way as to produce a collective judgement that has the status of a reference value. The figure that emerges in this

[2] Stefano Lucarelli

> manner has the nature of a consensus that crystallises the agreement of the financial community. Announced publicly, it has the value of a norm: it is the price at which the market agrees to sell and buy the security in question, at a certain moment. That is how the security is made liquid. The financial market, because it institutes collective opinion as the reference norm, produces an evaluation of the security unanimously recognised by the financial community.

In the history of capitalism deep financial crises give rise to a situation in which money is not spent and debts are not paid. When uncertainty prevails, money is sought after and withheld to the preference of all else. It is not merely a change in the behaviour of economic agents, it depends rather on a peculiar form of monetary institutions: in capitalism money is established as a store of value. Economic historians teach that unlike the other two functions of money (unit of account and means of payment), the store of value is not a permanent and general feature of all monetary systems, but a distinctive feature of capitalism (Keynes 1923; Boyer-Xambeaum Deleplace and Gillard 1994; Ingham 2004; Amato and Fantacci 2012). In this perspective, it is of the utmost importance to try to evaluate the scope and impact of financial reforms intended to strip from money the character of liquidity, and hence from finance the character of a market, rebuilding finance on the basis of an alternative economic principle. The name of this alternative principle is *clearing*. Alternative monetary and financial institutions can be conceived to ensure that money is systematically spent and that debts are systematically paid. The clearing principle has to do with the establishment of a measure for the exchanges and for the payment of debts that is not in its turn an object of exchange, and with the restoration of a balanced relationship between debtor and creditor. The model of Clearing Union proposed by Keynes to design a new international monetary system for the postwar world, remains the main reference for any institutional arrangement aimed at facilitating a balanced trade. Keynes conceives a system where there is no means of payment at all, and money is a pure unit of account. To settle international transactions, each country holds an account with the Clearing Union. Such an institution would be an international bank whose goal would be the clearance of trade between states. The accounts are denominated in an international currency, the bancor, i.e. a pure bank money, existing only in the accounts of the Clearing Union. However, there is a feature that differentiates the bancor from bank money: the former is not redeemable in any form of legal tender. Each state has an initial balance of zero bancor. The Clearing Union provides overdraft facilities to each country in proportion to the volume of its foreign trade. In exchange for its goods and services, the exporting country receives a credit in bancor that it can spend in any other country. Symmetrically, a deficit country can repay its debt by exporting to any other country. The bancor account may be seen as an entitlement to commodities and services; instead it cannot be intended as an entitlement to money. For this reason – as Amato and Fantacci (2009) stressed –the bancor may qualify as non-capitalist money. Another distinctive feature of Keynes' plan is important: the Clearing Union imposes charges not only on negative, but also on positive balances:

> a country finding itself in a creditor position against the rest of the world as a whole should enter into an obligation to dispose of this credit balance and not to allow it meanwhile to exercise a contractionist pressure against the world economy and, by repercussion, against the economy of the creditor country itself. This would give us, and all others, the great assistance of multilateral clearing. (Keynes 1941, 47)

There is no merit in being creditor within the Clearing Union. A sort of interest rate is paid not only by debtors, but also by creditors. Hoarding is discouraged. The possibility of having a positive bancor balance allows a creditor state to sell more than it would otherwise be able to. Symmetrically, the possibility of having a negative bancor balance, allows a debtor country to buy more that it could otherwise obtain. The symmetric distribution of charges between creditors and debtors helps all countries' balances to converge towards zero. In this situation, which may be considered to be in equilibrium, all debts are paid and all money is spent.

Clearing systems have been adopted not only for international, but also for local trade. In this case, the local currency acts as a pure unit of account used to denominate and to compensate debts and credits within businesses. Not all local currencies are based on the principle of clearing. A part of them take the form of fiat money.

In the following paragraphs we will analyse different complementary value and currency systems implemented at local level, by testing if and how they are based on the principle of clearing.

1.1 Attempts to propose a taxonomy of complementary currencies: A review[3]

It is notable that there are now new monetary innovations working in over 5,000 communities around the world to face a diverse array of economic and social issues: among others credit crunch, education, elderly care and unemployment (Lietaer and Dunne 2013).

Local clearing systems are based on the use of a local currency. Before the establishment of the metal standard in Europe and elsewhere 'there were large quantities of private metal tokens in common use, against which the governments made constant war with little success' (Innes 1913). Recent research has produced further evidence of the fact that monetary systems prior to the gold standard were characterized by the coexistence of multiple currencies, public and private (Fantacci 2005; Kuroda 2008; Amato and Fantacci 2013). Different exchange circuits were served by different currencies built on different principles (see Blanc 2000). "Unofficial" currencies have many names: *complementary*, *parallel*, *targeted*, *local*, *social*, *mutual help* and *cooperative* or *community* currencies. They are all significant qualifications that may describe different features of these social institutions. They are *complementary* (and *parallel*) because they do not substitute official money, but circulate besides it, responding to specific purposes (in this sense they may be called *targeted*). They may be called *local*, as they usually circulate in a limited territory and respond to the peculiar needs of a given community. Hence they satisfy certain social needs, by providing the purchasing power that is necessary to engage in productive activities, to create employment, and to buy goods and services. They are also called *mutual help* currencies, since they may be used to finance non-profit organisations. They may finally be called *cooperative* (or *community*), because they may represent the labour and the social cooperation of the members of the community.

The 2010 - 2012 research project led by Gill Seyfang at UEA and funded by the Leverhulme Trust investigated grassroots innovations for sustainability, with a specific focus on complementary currencies[4]. The project compared local community-led exchange systems that exist alongside mainstream money and the community currencies that are designed to counterweight scarcity by promoting exchanges founded on cooperation or collaboration. In the first set scholars listed the following experiences (Seyfang and Longhurst 2012):

1. German Regio regional money aims to boost local economic development;
2. the UK and US Time Banks strengthening social networks and community cohesion by promoting reciprocal volunteering;

[3] Stefano Lucarelli
[4] The research is based on the approach developed in Seyfang (2006, 2002, 2000).

3. a new wave of 'Transition Currencies' to promote local resilience;

4. the Dutch NU-Spaarpas incentivises sustainable consumption patterns through a green 'loyalty card'.

Despite their intrinsic benefits and potential, the research group led by Gill Seyfang considered the above cases of complementary currencies "small and marginal" and affirmed that "little is known about the processes and contexts necessary for mainstreaming them."[5] It is relevant that other researchers stressed the importance of "the emergence of new information and communication technologies" to promote the local projects that use "open source money" or "collaborative money". Local currencies are seen as a "community-building tool". This means that "communities may range from solidarity economies in slums and vulnerable social areas, to game players, to collectors or charity donors; spread throughout the entire world as digital networks promote new forms of community life" [6].

An ideal type of currency scheme is proposed by the research group on Complementary Currency Systems at the Erasmus University of Rotterdam (2013). The Rotterdam group describes the result of several currencies using the following categories:

1. Currencies with social objectives;

2. Currencies with economic objectives;

3. Digital money systems.

Money systems with social objectives (e.g. Time Bank) aim to intensify underlying relations within a community, increase self-esteem, offer a perspective and development reciprocity within a community. They work in domains where the regular currency can't be found and try to encourage participating in the informal economy.

Monetary systems with economic objectives (LETS - Barter networks - C3 - Regional currencies) aim to stimulate the local economy, strengthen the position of small and medium sized companies relative to large multinationals, support local regions in absorbing global or national shocks, diminish leakages from poor to richer by realising extra liquidity in underprivileged regions and increase economic diversity.

Digital money systems (electronic & virtual money: SMS money systems - Online payment platforms - Peer-to-peer money systems - Conditioned money) have their own logic; they mainly support economic goals[7].

A recent State of the Art on complementary currencies may be read in the Special Issue edited by Noel Longhurst and Gill Seyfang (2011) of the *International Journal of Community Currency Research* (www.ijccr.net). Here Blanc (2011) proposed a distinction between three sorts of projects that, according to him, constitute the very root of currency systems of any kind:

1. a territorial project, primarily centred on a geopolitical space;

[5] See the brief note by Seyfang on http://grassrootsinnovations.org/2012/03/25/complementary-currencies-for-sustainability/ (last accessed date 25.5.2014).
[6] See on this point Humana and Schwartz' notes on http://www.publicsphereproject.org/node/745 (last accessed date 25.5.2014).
[7] See also the report by Slater (2011), where the author stresses a cultural divide between commercial barter software, which helps businesses exchange spare capacity within law, and other kind of free open source projects.

2. a community project, primarily centred on a pre-existing or an ad hoc community;

3. an economic project, primarily centred on production and market exchange activities.

Following this approach three ideal types of currency schemes may be defined: (1) local currencies (territorial projects), (2) community currencies (community projects) and (3) complementary currencies (economic projects). Below we reproduce the taxonomy proposed by Blanc (Table 1).

Nature of projects	Space considered	Purpose	Guiding principle	Denomination (English / Spanish / French)
"CCs"				
Territorial	Geopolitical space (territory politically defined)	Defining, protecting and strengthening a territory	Redistribution or political control	Local currencies / Monedas locales / Monnaies locales
Community	Social space (pre-existing or ad hoc community)	Defining, protecting and strengthening a community	Reciprocity	Community currencies / Monedas sociales / Monnaies sociales
Economic	Economic space (production and exchange)	Protecting, stimulating or orientating the economy	Market	Complementary currencies / Monedas complementarias / Monnaies complémentaires
Outside "CCs"				
Territorial	Sovereign space	Sovereignty	Redistribution or political control	National currencies / monedas nacionales / monnaies nationales
Economic	Clients of a for-profit organization	Profit	Purchasing power capture	For-profit currencies / Monedas para lucro / Monnaies à but lucratif

Table 1.

Blanc stated that "the ideal types of *community*, *complementary* and *local* currencies let the possibility of combinations able to analyse concrete forms of non-national and not-for-profit currencies". He also stressed the fact that for-profit currencies are of another nature than community currencies. The taxonomy he proposed draws up an ideal-type built around a democratic participation principle organised around non-profit organisations, grassroots organisations or informal groupings of persons.

Again, we find the idea that complementary currencies cannot be considered as a static tool, but they must be considered as specific institutions that should evolve, by preserving inclusive democracy.

2. A general introduction on Monetary Circuit[8]

In this section we will develop a theoretical analysis of a specific complementary currency based on a Local Clearing Union, which includes not only businesses but also individuals and community sector. Following this approach we will focus on two fundamental features of a complementary currency able to promote new forms of community life:

1. the presence of the clearing principle
2. the ability to satisfy social needs

Our theoretical framework is represented by the so-called monetary theory of production, or theory of monetary circuit (Graziani 2003).

The monetary circuit conceives of the capitalist economy as a monetary economy of production[9]. This immediately raises the problem of explaining how money is created and introduced into the system. In modern economies, money is created by the banking sector which grants credit to firms in order to set up the production process and to finance investment. Hence, the function of selecting firms' investment projects played by the banking sector and its decision about the overall amount of credit to grant in each period, is crucial to determine the final equilibrium of the system. As a consequence the amount of money – in particular of credit money – not only concurs to determine the level of output produced in each period, but also affects the distribution of income since economic agents have different access to credit money, according to the social class they belong to. Certainly, money is never neutral.

In the traditional version of the monetary circuit scheme (Graziani, 1984),[10] three classes (bankers, capitalists, and workers) and two productive sectors (of consumption and investment goods) are considered.

In each period the circuit opens with the injection by the banking sector, under the form of credit, of the means of payments used by capitalists to buy the means of production and anticipate wages. Credit money is endogenous as it enters the economic process as a consequence of entrepreneurial demand. When the demand for credit coming from firms increases, banks accommodate it by creating new means of payment. However, the dependence of money supply on demand for credit is not passive since it depends on the monetary policy and the section and rationing criteria in force in the banking sector.

[8] Stefano Lucarelli

[9] The theory of monetary circuit is an approach of capitalism in terms of monetary production economy. Its genesis goes back to Karl Marx and conceives money as the *primum movens* of capitalist production of commodities. In his drafts on the *General theory*, Keynes himself had made a distinction between the logic of market production based on C-M-C and the logic of capitalist production based on M-C-M' where increased money goes back to the hands of the capitalist after being spent in consumption or investment goods. This vision which is also the basis of the principle of effective demand has been systematised and formalised from the 1970s onwards by the theory of the monetary circuit which puts to the fore the motor role of credit money. It has developed itself through two main currents: the first is Keynesian and Post-Keynesian-inspired (Schmitt, Parguez, Poulon, Lavoie); the second asserts its Marxian identity (Graziani, Messori, Bellofiore). An historical analysis of this approach can be found in Graziani (1994) and Realfonzo (2006).

[10] Outside of Italy the circuit theory has attracted particular interest especially in France, where it was developed by three main groups of scholars: the so-called Dijon school, headed by Bernard Schmitt (Rossi 2006); the group headed by Alain Parguez, strictly connected to French-Canadian authors; the group of Bordeaux, mostly active during the Eighties, geared around the figure of François Poulon.

The second logical phase of the monetary circuit is represented by the production process that firms undertake after having used the anticipated money to hire labour and buy productive factors. This highlights two important features of the Monetary Circuit approach: i) the adoption of the classical concept of capital as a "monetary advance", allowing the production process to start, which in turn gives rise to the well-known result that loans make deposits; ii) the inequality among economic agents, stemming from the functional distinction between those who are allowed to access credit and those who are not. This discrimination reflects the functional class stratification of capitalist society and establishes the monopoly of managers and entrepreneurs on the key decisions regarding the management of firms, and the subordinated role of wage earners.

The monetary circuit then closes with the sale of products on the market and the repayment of loans to the banking sector. For the monetary circuit to restart, at this final stage firms must be able to not only pay off the loans granted by banks, but also the interests accrued over the period[11]. Although this can happen by chance, there are no automatic endogenous mechanisms ensuring that all the necessary conditions are met.

In addition to selling their goods, firms can also try to recover liquidity by issuing equities (e.g. stocks and bonds). Notice however that the costs related to the issuing of securities do not necessarily represent a true expenditure for the firms sector taken as a whole. Indeed, the liquidity paid in the form of interests or dividends constitutes an income for the holders of securities, and thus – at least partially – it comes back to firms as purchases of consumer goods or subscriptions of new securities issued by enterprises. In the extreme case, this income effect does not induce any increase in the demand for liquid balance (i.e. bank deposits) and consequently firms are allowed to pay any desired level of interests on the securities they issue. Therefore, this seems to suggest that the fundamental constraint to firms' activity is related to the monetary conditions established by the banking sector.

It is possible to shed light on the sequential structure of the monetary circuit approach by referring to the following scheme (Figure 1). In this context, we consider a closed economy with no state sector and in which the corporate sector is assumed without distinguishing between consumption and investment goods:[12]

1. Banks lend money to firms (initial finance);
2. Firms pay wages to their employees (purchasing of labour services) and produce those goods which workers will consume;
3. Workers purchase the goods produced by firms;
4. Firms issue equities to attract workers' savings;
5. Firms can pay back their debt to the banks.

[11] Here, we do not want to enter in the "paradox of monetary profits" problem. However, for the sake of completeness, it is appropriate to briefly summarise this issue: even assuming that wage earners spend all their income, the maximum amount of money that firms, taken as a whole, can earn at the end of each period is necessary equal to the initial amount of credit granted by the banking sector. This raises the problem of the monetary realisation of interests and profits. This theoretical drawback has been originally identified by Augusto Graziani in the early 1980s. For a more detailed discussion see Realfonzo (2006), and Fumagalli & Lucarelli (2008), and moreover Zezza (2004, 2012).

[12] Figure 1 represents a slight revision of the scheme originally proposed by Realfonzo (2006, p. 107).

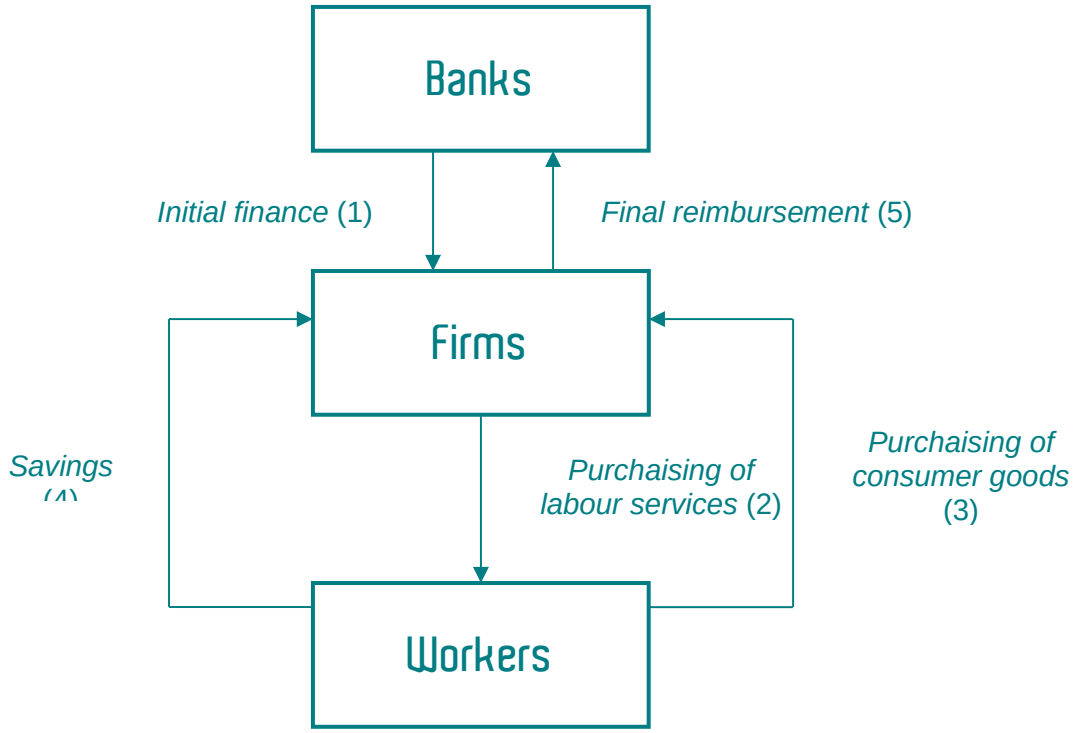

Figure 1.

If we add to the scheme the state sector (not considering taxes for the sake of explanatory simplicity), we have a situation in which the system can benefit from an additional quantity of money through the monetisation of public debt. This helps in overcoming some difficulties that can emerge within the circuit (e.g. those due to a decrease in the demand of goods and/or to a hoarding of savings). In fact, in the figure below (Figure 2), public debt serves as a financial cover for public works, so that workers' monetary resources increase. As a consequence, both the consumption of goods and the savings utilised to purchase equities can increase. This is a typical situation in the Fordist-Taylorist paradigm, which can be sequentially rendered as follows:

1. Banks lend money to firms (initial finance);
2. Firms pay wages to their employees (purchasing of labour services) and produce those goods which workers will consume;
3. Workers only partially buy the goods produced by firms;
4. Firms issue equities to attract workers' savings, but such attraction is not sufficient;
5. Firms cannot entirely pay back their debt to the banks;
6. The state issues Treasury bonds which are purchased by the Central Bank (for the sake of simplicity, our scheme considers the Central Bank as internal to the banking system);
7. The state pays wages to workers employed in public works;

8. The workers purchase the previously unsold goods produced by firms;
9. Workers' savings are utilized to purchase equities issued by firms;
10. Firms can eventually pay back their debt to the banks.

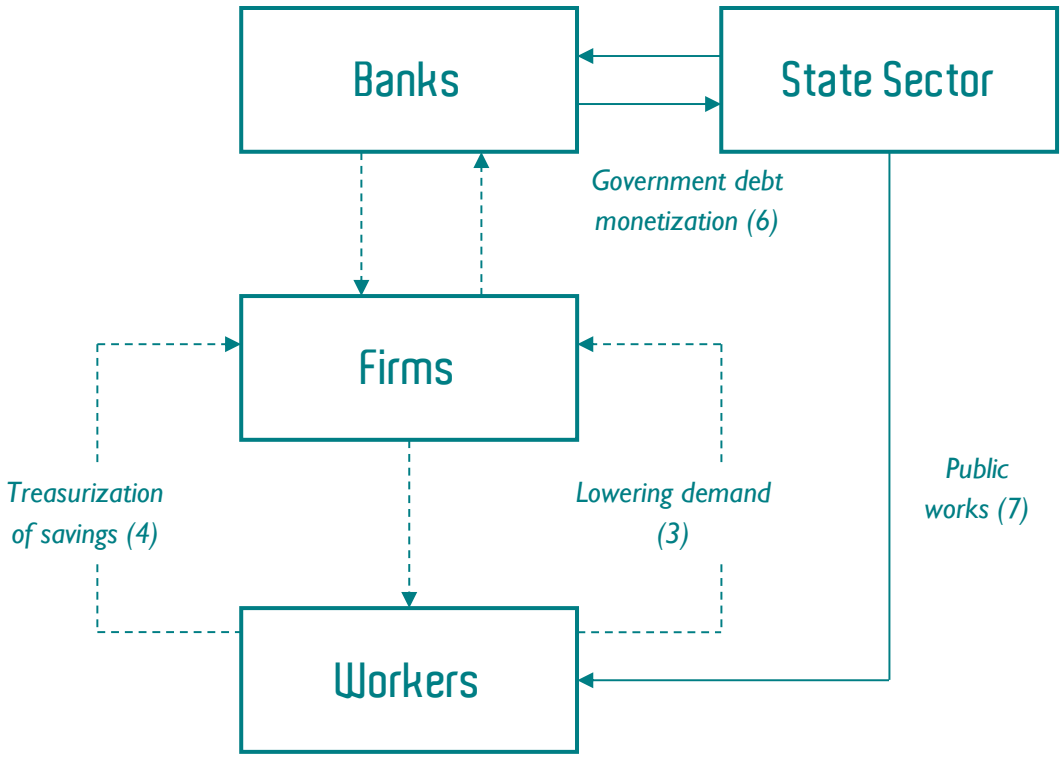

Figure 2.

2.1 Financial market in the traditional circuit scheme

Financial markets - in the traditional circuit framework - are relevant only in the closure of the monetary circuit, allowing for the recovery of liquidity not collected through the sale of goods. Hence, financial markets could simply not operate if money were not previously injected through the credit market by the banking sector, the only body that is able to "create money ex-nihilo".

In the Circuitist perspective, the financialisation process and the increasing weight of finance cannot be explained as a mere consequence of a supposed fall in entrepreneurial spirit, or a shift in agents' preferences and risk aversion. On the contrary, according to the Circuitists the tendency to privilege

financial placements over productive investments must be explained by making reference to the evolution of the balance sheets structure of firms and banks. Indeed, for finance to increase its weight as compared to production, according to Graziani (2003), two additional "structural" conditions are needed:

> a) "A first condition is the presence of firms having earned profits not only in kind (which would only be a case of self-financed investment) but in the form of money. […] A considerable increase in financial activity to the detriment of real production can only take place in the presence of disequilibria in the balance sheets of single agents: for instance when whole groups of firms suffer conspicuous losses while other groups earn corresponding profits; or in the presence of a considerable government deficit. […] A typical case of such disequilibria is the case of government deficit creating corresponding profits in the private sector.
>
> b) A second condition is also necessary, namely that agents in debt towards the banks be prepared to obtain loans from agents endowed with liquid holdings, thus replacing bank debt by debt towards other agents. This can easily happen when the government tries to finance its own deficit by issuing new securities. The same can happen whenever a credit squeeze occurs and firms having financial problems, and unable to get the required amount of credit from a bank, try to take advantage of liquidity holdings existing in the non-banking sector. It is, after all, a well-known consequence of a credit squeeze that a reduction in the money stock, or in its rate of growth, gives rise to an increase in the velocity of circulation." (Graziani 2003: 157-158).

The increasing weight of the financial sector was thus explained as a by-product of a high government deficit coupled with a credit squeeze.

2.2 Sketching out new schemes for a financialised economy of production

The analysis of the paradigmatic mechanisms underlying the M&A activity financed through leveraged loans, seem to suggest the necessity of revising the traditional schemes of the monetary circuit in light of the more pervasive role played by financial markets, in particular in the opening and closure phases of the circuit (Fumagalli and Lucarelli 2011).

A first set of general considerations regards the injection channels of money that we find at the opening of the finance-led monetary circuit. Since the 1990s, in particular since the emergence of the 'Internet Convention'[13], financial markets have started to play a key role in creating virtual money, by now

[13] In the second half of the 1990s, the idea of a digitalised society became a convention, i.e. a collective belief essential for studying financial markets. A convention determines more than just the definition of a 'scenario of reference'. As Orléan (2008: 325-329) wrote: "*At the most basic level, the financial convention can be simply defined as a shared way of interpreting future economic developments. One example of this would be the 'New Economy convention' [called by another authors 'internet convention' (Marazzi 2008; Fumagalli and Lucarelli 2011)], according to which the future of the economy lay essentially in the diffusion of the new information and communication technologies (ICT). At the end of the 1990s, the belief was that with the appearance of ICT, the economy was entering a new era of productivity marked by the end of traditional cycles. [...] in the case of the "New Economy convention", faced with the difficulty of accounting for stock market prices solely on the criterion of profits, as most 'dot.com' businesses were loss-making, a new basis for making estimates appeared, in the form of "value per user". So the potential number of subscribers, visitors or customers was adopted as the strategic variable, supposed to enable the level of value creation to be assessed.*"

completely dematerialised-digitalised and subjected to the evolution of conventional and trust mechanisms on financial markets. In the new context, the monetary policy appeared to be more and more dependent on the dynamics of financial markets, and it was mainly addressed to support the creation of positive capital gains, recognised as a new engine of economic growth[14]. At the same time, the institutional channels for money creation seem to have become less important than in the past as an active policy tool, while also the public injection of money through deficit spending policies has been strongly reduced. Public sector deficits seem to have played a subordinate role of accommodating the dynamics on stock exchange prices.

Let's assume, for the sake of simplicity, we are in a closed economy. In the opening phase of the monetary circuit we now have a new channel of money creation, in addition to the credit channel: the financial market. Indeed, as suggested by Marazzi (2008), shares can be conceived as an embryonic partial form of currency, even if they are not accepted as a universal instrument of exchange, that is, they still cannot be used to purchase consumer goods[15].

A second aspect regards the increasing relevance of M&As carried out in the form of LBOs (Leveraged Buyouts). This type of activity reflects a radical change in the determinants of the demand for bank credit by non-financial corporations, no longer justified by the need for financing of production and real investment, but rather geared towards supporting the values for shareholders. In the United States, for a long time, productive and technological investments of the enterprises listed on the stock exchange (capital expenditure) have been financed by 98% internal resources, such as undistributed profits, whereas bank loans are asked to realize M&As and stocks buybacks (and in some cases even to pay dividends and interests).

Non-financial firms thus go into debt with the banking sector in order to realize LBOs. The purpose of such operation is to take possession of the technologies and know-how of the acquired firms that would otherwise be difficult to achieve in the short term. The buyer is interested in these resources not only *per se*, but inasmuch as they entail an increase in the stock value of the enterprise itself, as stock prices reflect the conventional value of firms' intangibles, as we pointed out in the section dedicated to the new economy. In a context of effervescence of financial markets, as the one experienced during the internet convention or the 2003-2007 period, the sharp increase in stocks' value, while reducing the leverage ratio (computed as the debt-to-equity ratio) of the acquired firms, allows to pay off (after capital gains are realised in the second IPO) the debts previously contracted from the banking system. The realisation of capital gains is the condition for creating such a virtuous circle, thus requiring a continuous inflow of liquidity to financial markets.

A second group of considerations regards the closure of the circuit. Consumption and the demand regime are directly affected by financialisation. In order to avoid a demand crisis in the long-lasting

[14] If we look at the Fed balance sheet, we can observe that the direct creation of money reached the minimum level in the 2007 just before the crisis: total assets were about 880 billion $ (6,2% of total USA Gross National Product), of which about 90% were Treasury Securities and only 10% was ascribable to the creation of private credit money. This fact seems to confirm the progressive shrinking of the Fed's role in creating money. At the end of 2008, the Fed's total assets reached the level of 2,109 billion $ (14,8% of USA GNP), 48% represented by credit money creation (1,001 billion $).

[15] Already in 1999, Orlèan had pointed out that the question of whether this form would achieve maturity was fundamental since this would have constituted a radical change in the principle of sovereignty. Indeed, under a qualitative analysis profile, the relative movement of the monetary creation space from the sphere of the central bank to the sphere of financial markets involves a change in the very nature of sovereignty. When bank liquidity creation is prominent, the sovereignty of the nation State is affirmed. When, instead, financial liquidity creation is the priority, it is the sovereignty of the current financial convention, which is affirmed.

context of wage deflation, two interdependent conditions are required: the first one is represented by households' easy access to credit, the second is to compensate income losses with the wealth effect stimulated by capital gains. These two aspect are interrelated since the credit money injected by granting loans to over-indebted households ultimately results in more liquidity supplied on financial markets, feeding stocks prices. On the other hand, the extension of capitalists' and high income workers' consumption financed through inflating assets allows the rise of a sort of financial multiplier of real economy, acting as a perverse and highly unstable reformulation of the deficit spending multiplier characterising the Fordist and Keynesian period[16]. Indeed, as the distribution of financial assets amongst the population is significantly distortive and uneven, and given that the operation of this financial multiplier ultimately rests on an increasing polarisation of income and wealth in order to sustain financial assets value, the reproduction conditions of the circuit are necessarily unstable in the medium term. Necessarily, the final result is an ever-growing debt by households, which dramatically increases their risk of insolvency.

It is possible to shed light on the sequential structure of the new monetary circuit approach by referring to the following scheme (Figure 3).

1. Banks lend money to firms (initial finance);

2. During the 'Internet Convention' firms also use private equity funds (especially venture capital funds) to increase the flow of investment. Those monetary flows utilised to pay workers' wages (purchasing of labour services) – and to produce goods these workers will consume – become less decisive;

3. A part of non-financial firms go into debt with the banking sector in order to realize LBOs. Such operations presuppose a relationship between non-financial firms and financial markets;

4. Capital gains pay off the debts previously accrued from the banking system, and possibly amasses profits to be returned or to be used as self-funding. Capital gains facilitate a new access to bank loans by developing strategies for the financing of investment in innovative activities or for M&As;

5. Wage earners allocate their income for either consumption or saving;

6. To avoid a crisis of effective demand, wage deregulation is compensated for by the wealth effect reflected in the overall financial returns. If the wealth effects generated by capital gains fail to be spread, the increased access to credit is used to sustain consumption. The final result may be an increase in the risk of debt insolvency;

7. Banks enter the financial markets by placing derivatives and other financial instruments.

[16] Over the 1992-2001 period, the USA experienced the most extensive and longest growth ever seen in the history of capitalism (110 moths) - three months longer than the one registered in Kennedy's time. The average annual growth rate has been between 3.5% and 4%, virtually twofold higher than the European one. On the threshold of the year 2000, 60% of American families had invested their savings in the stock exchange through shares directly owned or purchased through pension funds and common investment funds. In 1989 the percentage was not higher than 30%.

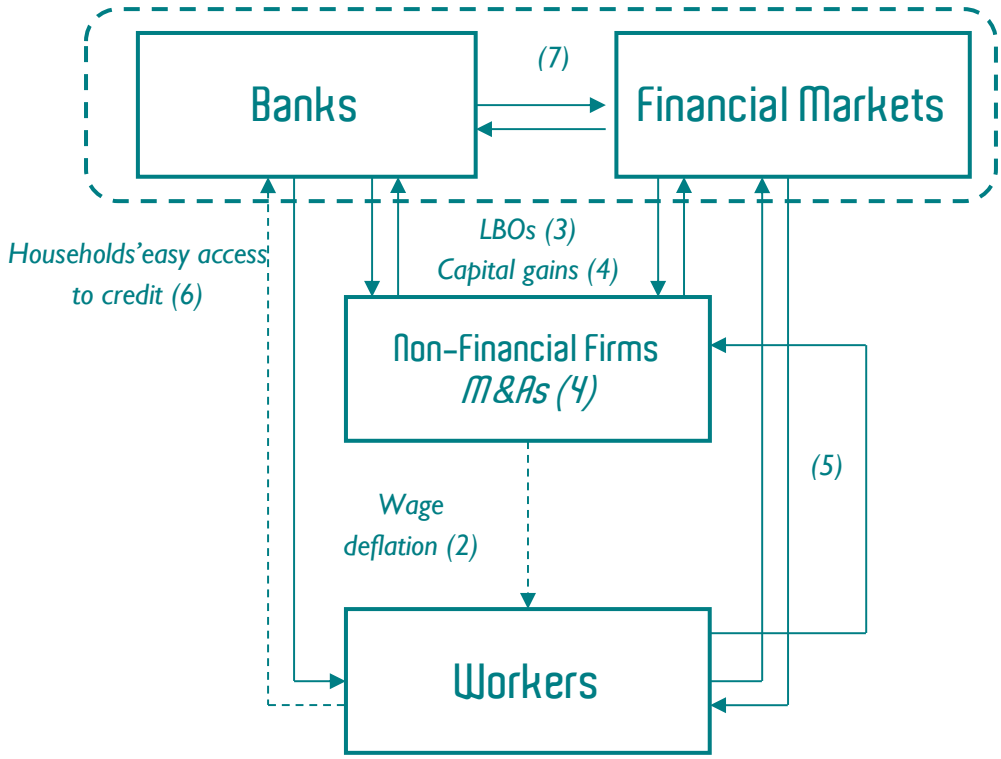

Figure 3.

The specific roles of finance are characterised by three macroeconomic channels:

1. the rise of asset prices leads to the rise of financial returns, and also to the increase of household financial income. Then, consumption is stimulated and demand increases.
2. the rise of asset prices may stimulate investments. However – given the technological specialisation that characterises an economic system – real investments can be constrained, because the volume of real investments is always compared with the volume of financial returns.
3. increases in consumption and investment induce the total demand to rise, and this could cause the profits also to rise.

These macroeconomic channels can be regulated by corporate governance: firms raise their dividends and tend to have a management that raises stock prices because of the increased influence of the stock markets (Boyer, 2004).

These macroeconomic channels are unstable for the following reasons:

1. the source of growth is the rise of asset market prices, but asset price inflation is not permanent and is itself unstable.

2. both the domestic financial market and also international markets affect the domestic economy. Therefore, any instability of the domestic and international financial markets can directly affect the whole macroeconomy.

3. Financial income is polarised just as well as wage income. This means that even if the asset markets grow dynamically, the growth of consumption demand based on financial income would be small.

Globalisation exerts an influence on both the financial market channel and state finance channel. With regard to the financial market channel, foreign investors actively enter and trade. The state finance channel is also affected by foreign investors, and this phenomenon could occasionally lead to the severe problem of sovereign debt. Consequently increasing difficulties affect the typical monetary circuit in the Fordist-Taylorist paradigm (Fig. 2).

Following the Circuitist perspective, a local complementary currency may be conceived as a new channel of money creation that presupposes a re-definition of the local economic strategies. To show the point, in the following section we will introduce in the monetary circuit a specific complementary currency: i.e. a complementary system of exchange of goods and services between businesses (B2B), which also includes individuals and community sector (a sphere of social activity undertaken by organisations that are not for profit and non-governmental). Following Amato and Fantacci's project (2004), let us call "Libra" this kind of complementary monetary circuit. We will use a stock-flow consistent (SFC) approach (Godley and Lavoie 2007). Indeed, as Zezza (2004, 2011) sustained, SFC approach can provide additional rigour to monetary circuit's analysis.

2.3 A simple model of pure credit economy

Let us consider the simplest possible model of the theory of monetary circuit, namely that of a single production period, where a single good is produced, in a pure credit economy with no government. The ex-post flow accounting for a simple consistent model is reported in Table 2. Following Stone (1966), monetary payments from a sector are recorded in a column, while rows record receipts.

	Firm	Household	Banks	Capital account	Total
Firms		C		I	S
Households	W		W_b (r*D)		Y_h
Banks	r*L				Y_b
Capital account	P	ΔV	P_b		Sav
Total	S	Y_h	Y_b	I	

Table 2.

Comparing the second row and column in Table 2, households budget constraint is now given by

$$W+W_b=C+\Delta V \qquad (1)$$

Where W is the wage bill, W_b is an additional source of income from interest payments on deposits, C is the amount of the consumption goods and V is the amount of financial assets.
Banks profits are given, in the third row and column, by

$$P_b=r*L-W_b \quad (2)$$

Where $r*L$ is interests paid on loans. In this case banks' profits depend on the lending rate minus the deposit rate (spread of interest rates).

Table 3 reports the ex-post flow of funds related to flow accounting in Table 2

	Firms	Households	Banks	Total
Deposits		ΔD	$-\Delta D$	0
Loans	$-\Delta L$		ΔL	0
Equity	$-\Delta E$	ΔE_h	ΔE_b	0
Capital	I			I
Total	P	ΔV	P_b	

Table 3.

Demand for equities arises from household savings and banks' profits

$$\Delta E^d=(\Delta V-\Delta D)+P_b \quad (3)$$

Given the equation *(3)*, the budjet constraint of banks, in the third column of Table 3 implies that $\Delta V-\Delta D=0$. The value of firms' profits is given by

$$P=C+I-W-r\cdot L \quad (4)$$

By substituting in the equation (4), equations (1) and (2), we will have

$$P=I-\Delta V-P_b \quad (5)$$

Using *(3)* which defines the demand for equities, we may have

$$P=I-\Delta E^d-\Delta D \quad (6)$$

Assuming that investment is financed by issuing new equities, and that the supply of equities matches demand the *(6)* will become:

$$P=-\Delta D \quad (7)$$

if households' demand for new bank deposits is zero, $\Delta D = 0$, firms' receipts from sales are sufficient to pay back the initial loan plus interests. If, on the contrary, households increase their end-of-period stock of deposits, firms will have a positive end-of-period debt with the banking sector. Contrary to the mainstream economics, and coherently with the theory of monetary circuit, loans create deposits.

2.4 A simple model of pure credit economy with complementary currency (Libra)[17]

Let us introduce the "Libra" complementary currency into the model. Households enter in the Libra circuit by receiving a part of their salary in complementary currency. We have also the community sector (or non-profit organizations) to introduce in the circuit. Following Amato and Fantacci, «Libra is a multilateral credit system comprising three categories of participants: businesses, individuals and non-profit organisations. The aim of the system is to allow systematic interactions between these categories of economic and social actors, preserving both the specific freedom of each single actor and the sustainability of the system as a whole.» The means of payment, in the form of electronic credits, is based on the principle of *demurrage*: within the circuit, a percentage of the credits that aren't spent are automatically transferred to another account. The electronic credits are issued by the businesses participating in the circuit to the consumers or to the employees. The individuals receive the bonus credits on a smart card (or on an online account) and may spend them for the purchase of goods or services at any of the firms participating in the circuit. The bonus credits that are not spent, and remain as a positive balance on the card, are "decumulated": they are subject to a negative interest rate ("demurrage rate"), e.g. of 1% a week. This interest is automatically transferred from the bonus account of the individual to a second account entitled to the same individual. Therefore, as long as the bonus credits aren't spent, they are gradually transformed: the individual cannot spend the transformed credits for purchases of goods or services; she or he can only transfer them to non-profit organizations of her or his choice, as a donation or as a fee for the social services provided by the organisations. The charities that receive the credits may then spend them to purchase goods and services from the firms.

The "demurrage rate" represents in this model not only a source of funding for the community sector, but also a way to sustain the demand towards the for-profit sector.

The ex-post flow accounting for a simple consistent model is reported in Table 4.

	Firms	Households	Banks	No Profit	Capital	Total
Firms		C_h		C_{np}	I	S
Households	W					Y_h
Banks	r*L					Y_b
No Profits		$s*D_t$				Y_{np}
Capital account	P	ΔV-$s*D_t$	P_b	0		Sav
Total	S	Y_h	Y_b	Y_{np}	I	

Table 4.

A part of the households income is spent (C_h), while another part is saved (ΔV):

$$W=C_h+\Delta V \qquad (1.1)$$

[17] Stefano Lucarelli and Lucio Gobbi.

Note that, in this case, bank profits do not depend on the spread of interest rates. Indeed in the Libra circuit, the deposit rate is zero. Consequently we will have:

$$P_b = r^*L \qquad (2.1)$$

A part of the individual savings in complementary currency will constitute bank deposits ΔD, while another part will be used to purchases equities[18].

$$\Delta E^d = \Delta V - \Delta D \qquad (3.1)$$

The bonus credits that aren't spent, s^*D_t, are "decumulated" to finance the non-profit organizations. The charities that receive the credits will then spend them to purchase goods and services from businesses. We will also assume that the monopolistic bank that manages the complementary monetary circuit as a Local Clearing Union, is a public service with a social consensus (expressed through inclusive democracy[19]). The whole bank profits will be distributed to the community sector.

Consequently the consumption from the non-profit organisations will be:

$$C_{np} = s^*D_t + r^*L \qquad (4.1)$$

The higher will be consumptions from households and non-profit organizations, the higher will be firms profits. The higher will be the wages and the interests paid on loans, the lower will be firms profits.

$$P = C_{np} + C_h + I - W - r^*L \qquad (5.1)$$

Table 5 reports the ex-post flow of funds related to flow accounting in Table 4

	Firms	Households	Banks	No Profit	Total
Deposits		$(\Delta D - s^*D_t)$	$-(\Delta D - s^*D_t)$		0
Loans	$-\Delta L$		$\Delta L - s^*Dt$	s^*Dt	0
Equity	$-\Delta E$	ΔE			0
No Profit	s^*D_t			$-s^*D_t$	0
Capital	I				I
Total	P	$\Delta V - s^*Dt$	0	0	

Table 5.

Considering the flow of funds, we may rewrite the equation of profits as follows:

$$P = s^*D_t - \Delta V + I \qquad (6.1)$$

Given equation (*3.1*) we will have:

$$P = s^*D_t - (\Delta E^d + \Delta D) + I \qquad (7.1)$$

We assumed that wages are paid by means of bank loans and that investments are funded by equities, i.e. $\Delta E = I$. Then equation we may transform equation *(7.1)* as follows

[18] Differently from Amato and Fantacci (2004) we introduce in the complementary monetary circuit the possibility to purchase the equities issued by the firms.
[19] See on this point the T4.3 of D-CENT.

$$P=s*D_t-\Delta D \qquad (8.1)$$

Unlike the previous model the profits may be sustained by $s*D_t$, that reduces possible losses of businesses.

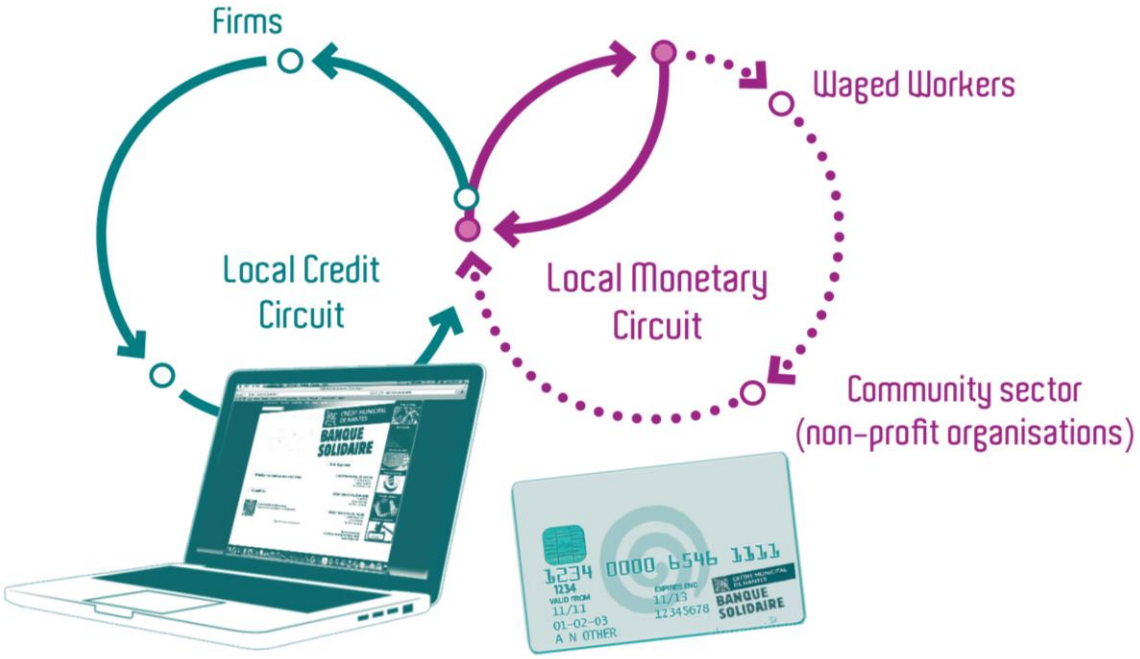

Figure 4.
Libra Complementary Circuit

Libra has been expressly designed to meet the needs of:

1. communities seeking adequate means of payments, tailored to their specific economic and social needs
2. businesses interested in an innovative instrument for their strategies of Corporate Social Responsibility
3. public administrations aiming at decentralising their social policies, by involving non-profit organizations in the provision of public goods and by promoting the free contribution of the citizens in financing them.

The system above, represented in its distinctive characteristics, allows for the continuous circulation of credits. Potential stagnation, and consequent depression, is not offset by arbitrarily correcting the direction of financial flows but by physiologically contrasting the accumulation of financial funds. The

demurrage mechanism tends to bring credits into the hands of those who need them the most, and hence are more inclined to spend them. Purchasing power flows to meet social demand, transforming it into economic demand. A sound means of payment gives a base for structural and stable relations between different categories of economic actors, leaving each of them free to choose according to their proper nature, and making them more aware of their specific economic role within the exchange community as a whole.

3. Field research on complementary currencies[20]

3.1 Setting the theoretical premises for a comparative analysis across cases

The case studies presented here are relevant for different reasons: The WIR experience is the most known and lasting complementary currency based on a Local Clearing Union. After the recent crisis WIR Bank has been able to confirm its resilience. Both the Sardex (in Sardinia, Italy) and Sonantes (in the city of Nantes, France) have been inspired by WIR Bank. Both the Sardex and Sonantes cases, as well as WIR, were born as attempts to respond to the credit crunch that hit businesses. As you will see the Sardex circuit has considerably increased since 2006. Sardex is a business-to-business model, but is experiencing the need to enlarge the circuit by including workers. At the moment the involvement of non-profit organisations, grassroots organisations or informal groupings of persons appears not to be significant. On the contrary, the Sonantes experience has been designed starting from the Libra complementary circuit. Consequently, it formally appears as a very inclusive and social needs oriented complementary monetary circuit. Unfortunately, the Sonantes experience has been characterised by very long and hierarchical decision-making processes that have delayed the commencement of social experimentation. Finally, the Solviolette (in the city of Touluse, France) case study is not built as a clearing union. It is not inspired by the WIR Bank. Nevertheless it seems based on inclusive decision-making processes actually able to monitor the social needs in a dynamic way.

3.2 Case studies

3.2.1 WIR Switzerland

WIR is both an abbreviation of *Wirtschaftsring* and the word for "we" in German, reminding participants that the economic circle is also a community. It was founded in 1934, by businessmen Werner Zimmermann and Paul Enz, as a result of currency shortages and global financial instability[21].

> "Thanks to the free money movement's broad appeal, expectations ran high when in October 1934 the WIR Economic Circle Cooperative was brought to life by 16 founding members operating with startup capital of SFr 42,000. By early 1935 there were already 1700 participants, by the end of the year 3,000. Operating within the framework of a solidarity-oriented self-help

[20] Stefano Lucarelli.
[21] See Studer 1998 and Stodder 2009.

> organisation, members were expected to draw as much as possible on other members to cover their goods-and-services needs, in order to trigger additional turnover within the Circle.
>
> These exchanges were mediated by means of interest-free clearing deposits initially created by cash payment [1 SFr for 1 WIR franc] or sale of goods, but before long by the issuance of WIR loans as well. Therewith began within the Circle a cash-free economic circulatory system that supplemented other business activities. The WIR account functioned as a kind of entry ticket into the solidarity activities of WIR users. Many small-to-medium businesses, but also public servants, farmers, and even a few large enterprises spontaneously bought WIR deposits for cash in order to participate in the WIR economic circuit. For them, obviously, a WIR deposit of one franc was worth more than a cash franc." (Studer 1998, 10)

In 1936 the Swiss Central Bank intervened to transform the WIR Circle into a bank.

For over 75 years the WIR cooperative bank has offered customers the possibility to hold current accounts denominated in a unit of account, distinct from the Swiss franc. The WIR currency is purely abstract bank money. The WIR credits may only be used to make payments to other bank accounts, according to the principle of multilateral clearing. WIR can be compared to a small Clearing Union, not between countries but between 60,000 small businesses, mostly concentrated in German-speaking Switzerland. Following the model of Keynes' International Clearing Union, WIR credits do not pay an interest: credits and debts are only originated and extinguished by a transfer of goods or services; indeed a debt is not an obligation to repay money, but to sell goods or services for an amount equivalent to those purchased; symmetrically, a credit is not an entitlement to money, but to goods or services. This would make the cost of credit independent from the volatile conditions prevailing on the market.[22] The fact of not having to borrow money from outside is sufficient to allow the bank to offer mortgage loans at very low interest rates and independent of the credit conditions in international markets.

The restriction of the circulation of the WIR currency is not perceived, especially by smaller customers, as overly limiting the possibility of spending, but as a form of support to local exchanges through an increase in the circuit velocity of money: "There are some businesses that put in circulation up to 7 million WIR per year " (interview with Yves Wellauer, Regional Director for the Region Canton Ticino, WIR Bank).

3.2.2 Sardex Network in Sardinia, Italy

The crisis that exploded in 2007 pushed the young founders of the Sardex to look for a feasible solution to the problem of money availability. In fact, since the very beginning and without having an economic background, they were drawn to focus their attention toward money and its social and cultural implications, thereby immediately rejecting those economic theories that label money as "neutral".

Starting from the case study of the *WIR* in Switzerland, the *Sardex* people got to study the thesis of Proudhon and Gesell on the role of money and credit, finding new inspirations and hints for a novel implementation of a practical instrument that reflected this theoretical framework. In fact, "depending on how the monetary system is organised, it goes to the advantage of one or the other group".

[22] For a detailed description of WIR system see http://p2pfoundation.net/WIR_Economic_Circle_Cooperative

The project of *Sardex* was based on the example of the *WIR*. Later on, an effort has been put in place to adapt it to the specific social-economic environment in which it was supposed to be implemented and a long phase of preliminary meetings with the local firms, especially in the Cagliari area, in order to generate significant grass-root support.

The goals of the Sardex network are the following:

-empower local communities;

-enhance local prosperity;

-stimulate expenditures within the community.

The people who subscribed to the circuit do not need to use money for their outlays: the compensation happens within members of the circuit thanks to the *Sardex* credits (SRD). One SRD counts for one unit of the official currency. With the subscription, an account is opened with a line of credit at zero interest, and with a card for internal expenditures.

The online portal allows all subscribers to create a profile where they can communicate all the information on their activity, explain their products, look up for other firms and set up and complete the transactions. This portal has a section devoted to banking for transactions, credits and debits that works as an accounting system, and a section for e-commerce. However, it appears that the most relevant contacts are made offline: only the 3% of the transactions on a total of 6000 occurred on the portal.

Every firm is provided with a broker that gives advice and manages transactions. The broker also supervises the payments in *Sardex* to guarantee an immediate payment and finds potential business opportunities comparing data on the supply and the demand.

> "The role of brokers is quite crucial, since it is based essentially on confidence, let us say that the brokers are like a sort of conductor: if confidence is an electric impulse, the broker is the copper WIRe, connecting people". (Carlo Mancosu, interview of January 3rd 2012)

The Sardex network currently counts seven brokers, each one is a specialist of a specific sector: this has caused a boost of bookings and all sectors have grown precisely because the firms had access to these competent advisers. In addition to creating business opportunities, brokers refer to the *Cda* and guarantee that the growth in the number of transactions goes along with the maintenance of a stable level of credit in the circuit that prevents disproportionate growth of the monetary basis. The monetary basis per capita needs to be stable: there is an equilibrium level of transactions and thus of credit for both the system and the individual.

The *Sardex* currency is therefore a local complementary currency. It is an internal accounting unit and an instrument through which it is possible to sell and buy among subscribers. Its capacity to generate additional income, allowing otherwise impossible exchanges of goods and services renders it a currency in all and for all, at least if by that we simply mean a tool that simplifies transactions.

The system offers the liquidity of the means of payment by offering a basket of goods and services that is larger than the monetary basis. Firms join, accepting on a voluntary basis the payments in *Sardex*, by subscribing a two-party agreement on the percentage of the compensation to be covered in *Sardex*. For the transactions below or equal to 1000 euro, the members agree to always accept the full amount in *Sardex*.

The credit lines are opened on the basis of collaterals that are a set of goods and services put by the firms, so that the credit is always a proportion of those collaterals.

The introduction in the *Sardex* circuit of the Business to Employee is a pilot project, launched in June 2012 that involved around 100 employees of the firms of the Cagliari area.

The idea is to pay part of the salary in *Sardex* credits: there were preliminary meetings with the unions to understand the legal feasibility of this operation. The employees were able to join the circuit Sardex.net on a voluntary basis: they were able to create their individual account on which to receive part of the wage, bonuses, wage anticipations or other reimbursements. If, for instance, one employee needs an anticipation of wage to cover an unexpected expenditure, he/she can use this account and avoid using his/her own savings or go to some credit company and pay high interests. The convenience is twofold: the worker does not have to consume his/her own savings and pay interests, the employer who anticipates the wage in *Sardex* credit form will save money in the following periods, thanks to the lower wage that remains to be paid after reimbursing the anticipation quota.

Moreover, the employer saves in at least two ways: the *Sardex* credits cost less than the credits in euro, considering that the euro credits may be not immediately available or their anticipation may require an early disinvestment. This advantage is even more evident if we think that when the employer, when pays only a fraction of the total wage in the following periods she basically obtains liquidity at a lower cost than from a bank.

Because this projects has taken off, the real capacity of credits to be spendable needs to be guaranteed. Therefore it needs an involvement always greater than the firms potentially adherent to the circuit. The act of spending by the consumers inside the circuit is awarded grants in the form of credits to be spent inside the circuit: something like the fidelity points at a grocery store, which give a concrete incentive to remain inside the circuit.

This could substitute the mechanism of discounts that guarantees savings that "do not leave".

3.2.3 SoNantes, France

Nantes' currency, SoNantes, inspired by the WIR system is promoted by the city of Nantes and the intercommunal structure of Nantes Métropole, and is being implemented by the Crédit Municipal de Nantes across the entire area of Greater Nantes.

The SoNantes currency is basically a system of exchange of goods and services between businesses (B2B), which also includes individuals (B2C). It will constitute of a payment system between members that does not rely on coins or banknotes but is entirely digital. The use of this deposit money is regulated by a mutual credit system aimed at recording each user's credits and debits, within limits set on a case-by-case basis. Every person will be able to make purchases from any company that has joined the scheme (traders, craftsmen, etc.), and will have access to certain local public services.

The scheme, which has been in preparation since 2008, is the brainchild of the current French Prime Minister Jean-Marc Ayrault.

After a long alpha-testing stage, the project was launched to the public in Spring 2014.

The purpose of the new currency is to provide credit for small companies in the Nantes area, to maximise the use of local products, and to provide some protection from international financial excesses and downturns. The initial phase will see approximately 400 businesses as members, but the idea is to rapidly extend beyond that to all 24 municipalities of the local conurbation.

Small businesses are the target users, in and around the city of Nantes itself. The big companies in the area are not being invited to join. A key part of the target market is social enterprises and green businesses, known together in France as the *economie solidaire* (solidarity economy). The president of the Credit Municipal is also president of the specialist chamber of commerce for the solidarity economy.

Citizens can also get a SoNantes account and are able to purchase goods and services from any company that has joined the scheme (traders, craftsmen, etc.).

The local currency is promoted by the city of Nantes and the intercommunal structure of Nantes Métropole, and is being implemented by the Crédit Municipal. In many ways, SoNantes has the opposite barriers to most other currency projects. Most of them are in need of high-level political backing, but have widespread local backing. For SoNantes, it is the other way around. The high profile mayor has made the project his own, and he is now prime minister. All the chambers of commerce are partners in the project and a long-established bank is supporting the project and investing in it. The plan is for the project to be self-funding within three years.

The Dutch consultancy Qoin is providing the software system to keep track of payments, based on Cyclos which is the original complementary currency system developed by the Dutch consultancy STRO and is used widely in Latin America. This is called Community Currency 2.0.

SoNantes will be established as a payment system under the European e-money directive.

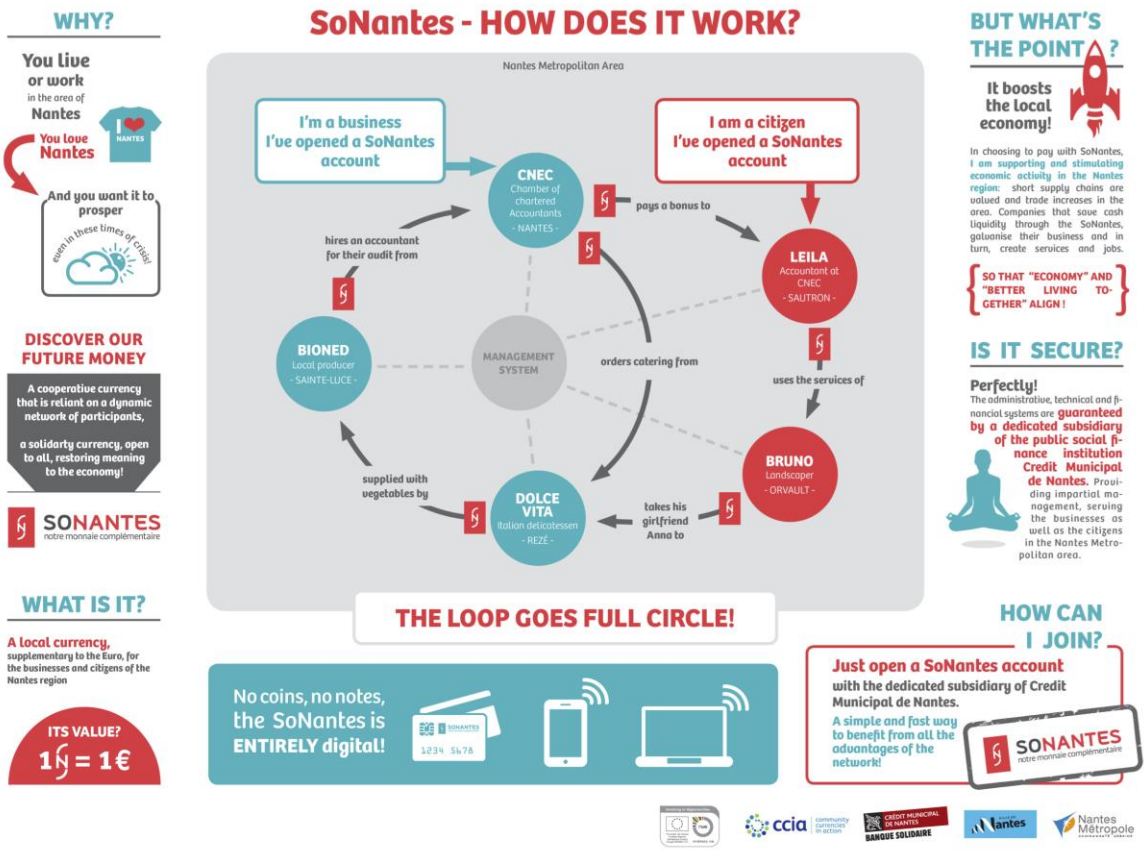

Figure 5.
Source: http://communitycurrenciesinaction.eu/curreny-pilot-sonantes/ *(accessed 25.5.2014)*

3.2.4 Sol-Violette, Toulouse

The Sol-Violette was inaugurated on May 6th 2011 in Toulouse, and designed with the aim of encouraging a society of responsible consumption.

Accepted at 50 food and transport companies and local and cultural services, each fulfilling more than 25 different criteria, the new currency promotes a different kind of consumption, one that's complementary and non-capital. Businesses, who can draw on the system as a new way to build customer loyalty, can use Sol-Violettes in the local economy. Following a 15-euro membership paid to the association in charge of the currency, Toulousains can change their euros into tickets at the Crédit Municipal or the Crédit Coopérative. Currently, there are three ticket values: 1, 5 or 10 Sols, where "*one Sol equals one euro,*" said Andrea Caro, head of the project[23]. "*However, Sols must be in constant circulation for the system to work. Thus, each Sol that does not change hands for over a trimester loses 2% of its value.*"

[23] See the interview to Andrea Caro on http://www.innovcity.com/2011/07/27/the-sol-violette-of-toulouse-an-engine-of-economic-solidarity/. In order to comprehend the atmosphere in which the project has been developed see also the 50 minutes movie on Sol-Violette on http://vimeo.com/43395372 . We have also interviewed Andrea Caro the 25th April 2014.

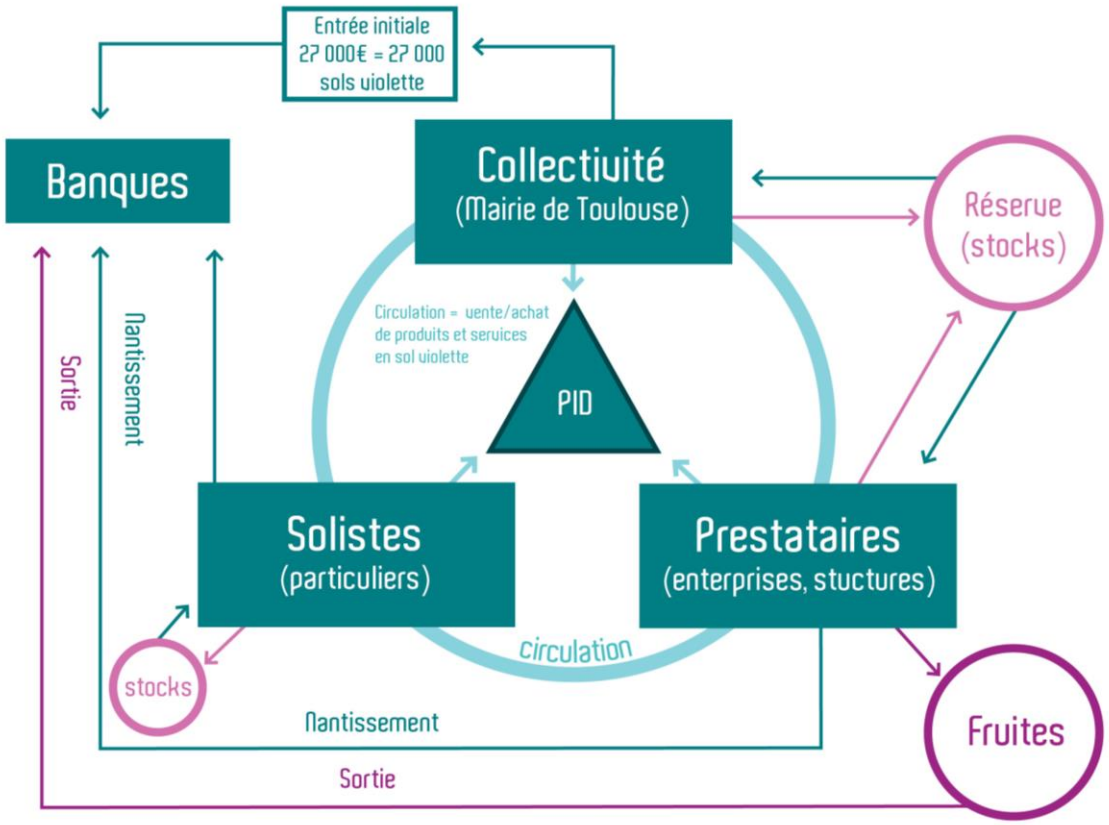

Figure 6.
Schéma de circulation du sol violette.
Modified from graphic in: 'Bilan Sol Violette. Phase d'experimentation mai 2011-décembre 2011 ': 20.

On every Sol-Violette note there is a vignette that includes a system of random air bubbles that make it possible to trace each ticket and avoid counterfeiting. In 2012, as many as 27, 000 euros, or 16,700 Sol tickets are in circulation in the territory of Toulouse. At any time, owners can re-exchange their Sols for euros. However, this is the least attractive option; during the exchange a Sol becomes devalued by 5%[24].

> *"*Contributions to the association are donated to three structures that aid families affected by unemployment*."*

More than thirty families receive 30 Sols per month, allowing them to buy ethical clothing and food, take public transport and even go to the movies. Crédit Municipal is providing micro-credits with the euros traded for Sols to those who open accounts and Crédit Coopérative has savings accounts that finance structures supporting projects that embrace the principles of economic solidarity.

> *"*The Sol creates a virtuous circle. Every time you buy with Sols, you contribute to the project's sustainability and thus to that of the local economy*."*

[24] See http://www.sol-violette.fr/sol-violette/le-projet/documentation where balance sheets for 2011, 2012 and 2013 are downloadable.

Among the fifty companies, none seem to regret their involvement, and the Sol turnover is increasing.

> "Right now, the system works very well and everyone is very satisfied. Thanks to positive word of mouth, the currency is growing at a consistent speed."

The experiment started in 2011, to be re-examined at the end of the year, and has had success with the public.

The inclusive decision making process that characterized the Sol-Violette experience represents one of the reason for its social consensus.

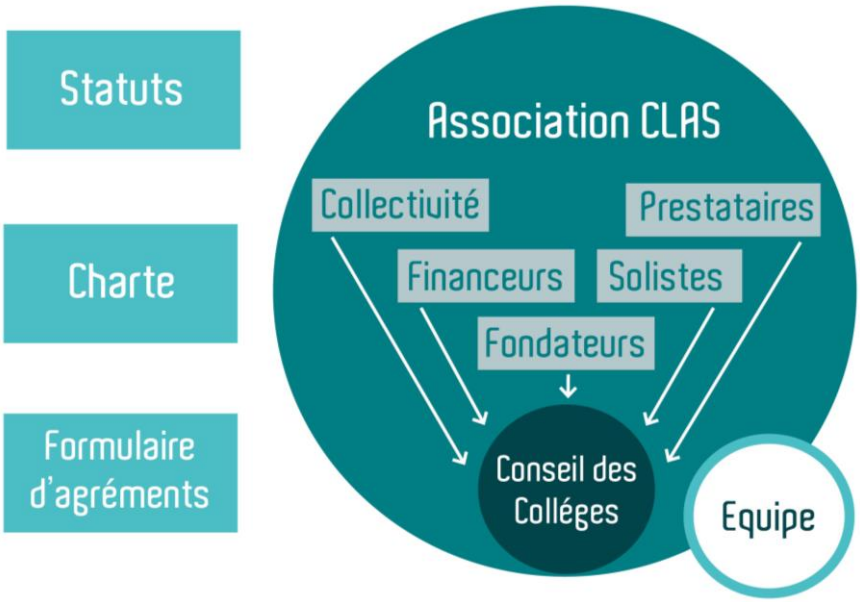

Figure 7.
Schéma de gouvernance du Sol Violette.
Modified from graphic in: 'Bilan Sol Violette. Phase d'experimentation mai 2011-décembre 2011 ': 15.

In France, Sols are already circulating in Grenoble, Rennes and Lille. Sol is a very innovative and interesting complementary currency scheme that is the result of an informal working group. The group in 1998 examined the existing different circuits of complementary currencies in the world. In order to sum up the most important features of the SOL scheme, we can usefully mention Fare (2011, 58-59):

The SOL scheme operates in collaboration with many actors:

- Social economy or third sector organisations, which could be, by statute, co-operative, mutualist or associative and which could offer goods and/or services as fair products, organic foods, solidarity tourism etc. Their aim is to encourage an economic, sustainable and local development. The participation of each organisation to SOL networks requires a certification.

This certification contains four criteria: The first and the second are address ethical and social issues ("contribute to an economy where the human have more place" and "developing democratic and cooperative practices"); the third criterion is environmental ("to contribute to a greener economy"); and the last refers to local economic development to "foster the creation of activities, the sustainability of jobs and involvement in the territory".

- Regional government and public authorities who subsidise 30% and use SOL scheme as a tool for public policy. The integration of local authorities in the scheme gives it a highly innovative dimension. Indeed, it is rare that local authorities integrate these schemes as use money as a tool of public policy.

- "Responsible consumers" who share the values of social economy and sustainable development and have a sustainable behaviour.

The Touluse experience began to work after the failure of a first step in which a structurally complex electronic currency was imposed through a top-down approach. This meant that the population could not recognise such a currency as an institution. It is not the technology that creates money; rather, technology is a function of social determinations.

The project starts to work when the need is not just a complementary currency *per se*, but also an involvement of different subjects who already represent an alternative form of political, productive, and social cooperation. Thus, money is inscribed on to this process and gives a new impulse to the project by implementing a technology whose appropriation is based on the three main principles of a currency of the common:

a) An exchange-currency that cannot be hoarded. From this perspective it is crucial that it is a *monnaie fondante* (based on the demurrage).

b) Cooperation must be pre-existing, at the very least with regard to ethical and economic objectives and imperatives as felt by individuals. Our interview to Andrea Caro[25] clearly shows that there is an ecological principle that defines those who can adhere to the citizen currency.

c) Money is also conducive to forms of income distribution, which could anticipate a sort of universal basic income. In this scenario, the proposal of giving 30 Sol-Violette a month – namely 30 Euros – to unemployed associations (120 households) has to be framed. The distribution occurs on a personal basis. Such an unconditional revenue has revitalised both the economic activity and the Sol-Violette circuit. A money of the common cannot be dissociated from a more or less pure form of social basic income: in fact, it is this latter which confers the vital energy to the construction of the circuit.

[25] Andrea Caro is one of the head of the Sol-Violette project in Touluse.

It is important that two cooperative banks are involved so that they can sustain a series of local initiatives.

The circulation speed of Sol-Violette is relevant: it circulates 6 times in the amount of time in which one Euro circulates 4 times.

The model has been imitated.

The Clearing Union is introduced in the discussion today in order to coordinate the different models of complementary currencies, which have emerged in surrounding territories.

There are two main figures that participate: the *bobo* [The term is short for bourgeois and bohemian, two social castes no one ever expected to find mixed up together.] and the working poor. That is to say: cognitive workers who do not find themselves in a situation of total precariousness and the true precarious people who are excluded from the job market. Thus, a problem of class re-composition emerges.

Participatory democracy as an element that defines the common seems to be, in this case, a central element.

There is an attempt to make possible the payment of taxes through Sol-Violette. It shows that it is possible that a currency gets diffused without being used to pay taxes.

Nature of projects	Territorial	Community	Economic
Space considered	Geopolitical space (territory politically defined)	Social space (pre-existing or ad hoc community)	Economic space (production and exchange)
Purpose	Defining, protecting and strengthening a territory	Defining, protecting and strengthening a community	Protecting, stimulating or orientating the economy
Guiding principle	Market	Reciprocity	Redistribution or political control
Principle of Clearing	Not a clearing union	Not properly a Clearing Union. But the principle of clearing is realized by means of demurrage	Clearing Union
Digitalization	High	Middle	Low
Demography	Increasing	Stable	Decreasing
Unemployment	Increasing	Stable	Decreasing
Credit Crunch	Increasing	Stable	Decreasing
Entrepreneurs	Inside the circuit (active in the decision making process)	Inside the circuit (passive in the decision making process)	Not considered
Trade Unions	Inside the circuit (active in the decision making process)	Inside the circuit (passive in the decision making process)	Not considered
Civil Society	Inside the circuit (active in the decision making process)	Inside the circuit (passive in the decision making process)	Not considered
Local government	Lender of last resort	Inside the circuit	Out of the circuit
Needs	Political needs (inclusive democracy; participation)	Collective needs	Business needs

Table 6.
Each combination in the variables may also clear the mutual constraint (X) and the conditional entropy (Ψ) characterising the case studies

	Case 1 (Wir)	Case 2 (SoNantes)	Case 3 (Sardex)	Case 4 (Sol-Violette)
Nature of projects	Territorial and Economic	Territorial, Economic and Community	Territorial and Economic	Territorial, Economic and Community
Space considered	Economic Space	Economic and Social Space	Economic Space	Social Space
Purpose	Protecting, stimulating or orientating the economy	Defining, protecting and strengthening a territory/Protecting, stimulating or orientating the economy	Protecting, stimulating or orientating the economy	Defining, protecting and strengthening a community
Guiding Principles	Market	Redistribution or political control/Market	Market	Reciprocity
Principle of Clearing	Clearing Union	Clearing Union	Clearing Union	The principle of clearing irealized by means of demurrage
Digitalization	Hight/Middle	Hight/Middle	Hight/Middle	Middle/Low
Demography	Stable	Stable	Decreasing	Increasing
Unemployment	Increasing	Increasing	Increasing	Increasing
Credit Crunch	Increasing	Increasing	Increasing	Increasing
Entrepreneurs	Inside the circuit (passive in the decision making process)	Inside the circuit (passive in the decision making process)	Inside the circuit (passive in the decision making process)	Inside the circuit (active in the decision making process)
Trade Unions	Not considered	Inside the circuit (active in the decision making process)	Not considered	Not considered
Civil Society	Not considered	Inside the circuit (passive in the decision making process)	Not considered	Inside the circuit (active in the decision making process)
Local Government	Out of the circuit	Inside the circuit	Out of the circuit	Lender of last resort
Needs	Business needs	Collective needs and Business needs	Business needs	Political needs and Collective Needs

Table 7.

3.5 The case of Banco Palmas Brazil

The struggles for the access and safeguard of the commons, financial inclusion and monetary emancipation have contributed immensely to the economic development of a poor neighbourhood in the city of Fortaleza, Brazil. The neighbourhood is Conjunto Palmeiras, an area at 22 Km from the coast. In 1973 the area was full of vegetation and a group of citizens residing on the seaside had been subjected to forced migration by the central authorities who abandoned them (Fig. 8).

Dur es
such is
one of them and was organized around the need to organise public action in the neighbourhood. This framework promoted successful struggles for the access to water, the creation of roads and the link to public transports, schooling and education:

As Hudon and Meyer document, in the following decade, struggles for the betterment of the quality of life in Conjunto Palmeiras led to the debate on the financial sustainability of the members of ASMOCOMP:

> In 1997, despite significant results in terms of territory planning, ASMOCONP organized 96 community meetings to determine with local actors what action to take to alleviate poverty

(Melo & Magalhaes, 2008). These meetings showed that ASMOCONP had to support local development by creating the local microfinance institution Banco Palmas.
(Hudon and Meyer, 2013)

Indeed, the territory was now conducive to civic life and the emphasis moved from urban planning and management to financial matters (fig. 9)

Figure 9.

Banco Palmas is a *community development bank* (CDB) informally founded in 1998 in Conjunto Plameiras, a suburb of 32,000 inhabitants as for 2014. The operations of Banco Palmas follow precise theoretical assumptions, as stated by the executive director Joachim de Melo: "the most fundamental one is that there are no poor communities, but communities can become poor after repeatedly losing their own savings drained by global capital markets" (de Melo interviewed on 25th January 2014). In order to organise its operations, Banco Palmas applies the principles of solidarity socio-economy (Miller, 2004). Alongside traditional microcredit instruments (emergency and business micro-loan, micro- insurance, on filed banking correspondents), Banco Palmas delivers public sector services such as the distribution of *Bolsa Familia,* a social welfare program by the Brazilian government in the form of a paycheck (up to 150$ per month). Finally, Banco Palmas provides non-financial services such as education and training. To complement the portfolio made by services for transacting national currency (Brazilian Real, R$), Banco Plamas issues its banknotes and offers a variety of accounts denominated in local currency pegged to the Real and fully convertible without charges.

Similarly, to the WIR, *Sardex* and SoNantes experiences, the mission of Banco Palmas is to implement alternative banking and currency practices to serve otherwise "unbankable" individuals aiming at the eradication of poverty, inequality and unemployment. Those who are usually considered not creditworthy by high street banks can now access micro- finance services without requirements as for proof of income, or guarantor (e.g. the neighbours guarantee the borrower's reliability), or registration. Moreover, and in resonance with the case of Toulouse, all stakeholders in the neighbourhood can participate to the sessions of the local economic forum (Forum Economico Local, or FECOL). Allternative approaches to banking (i.e. micro-credit) and bottom-up participation in the decision-making process for managing the money led Banco Palmas to create Instituto Palmas, the body that promotes the system nationwide. Although the path to dissemination and institutionalisation presented a few obstacles, the creation of a body for the advocacy of a complementary currency scheme is one of the elements that European experiences need to take into account when strategizing for institutionalisation of such models by central authorities.

Remarkably in these respects, Hudon and Meyer scrutinised Banco Palmas in order to see whether the model promoted eventually by central authorities in Brazil had affinities to share with Elinor Ostrom work on the management of the commons (Ostrom, 1990; Hess & Ostrom, 2003). Accordingly, there are eight design principles that regulate the sustainable use of common-pool resources:

1) Clearly defined boundaries;
2) Congruence between appropriation and provision rules and local conditions;
3) Collective-choice arrangements;
4) Monitoring;
5) Graduated sanctions;
6) Conflict- resolution mechanisms;
7) Minimal recognition of rights to organize;
8) Nested enterprises [For CPRs that are parts of larger systems].
(Ostrom, 1990)

Although Ostrom did not have in mind microfinance institutions when elaborating the eight design principles, Hudon and Meyer tested them in the context of Community Development Banks - CDBs, which are defined as "community acting corporately as both entrepreneur and enterprise in pursuit of the common good" (Peredo & Chrisman, 2006: 310). In the case of Banco Plamas, the limited financial capital available does present clear defined boundaries quantified in ~ 3 million R$ per year. However, as it is derived either through contracts with public national banks or through the repayment of interest bearing micro-loans, it cannot strictly be considered as a common. Nevertheless, the boundaries are clearly defined. Secondly, rules for appropriation and provision are inclusive in that access to financial resources is a right also for those within the national repayment default system, SPC. Risk aversion is mitigated through punctual scrutiny of the confidence to trust the applicant. If adequate to the selection standards of Banco Palmas, the applicant may directly receive a loan up to 500 R$ after providing ID and proof of residency. For loans exceeding 500 R$, social scrutiny at large with the help of community members and selection procedures managed by an external credit officer from Banco Palmas test pre-analysis reliability.

Third, the local economic forum grants collective-choice arrangements. Fourth, as Banco Palmas acquires financial capital from external resources, it is of utmost importance that the rate of defaults remains low (it is around 2% per year). This is possible by credit agents that monitor the community. The result is a high rate of renewal of the common resource. Fifth, in order to avoid intentional default,

Banco Palmas firstly attempts moral suasion, but subsequently it may get to publicly denounce the event and finally to add the person's name to the national repayment default system. As for conflict- resolution mechanisms, it is fast and cheap as the defaulting party can simply go to Banco Palmas and re-negotiate the terms. Particularly relevant for the scope of D-CENT is the test with the eight design principle on the recognition by higher-level authorities of the right to organise: Banco Palmas ED, Joachim de Melo, had been sued by the central bank when he started operations in 1998 with the reason that Banco Palmas was not a chartered financial institution and, therefore, could not provide financial services. In 2003, the central bank sued Banco Plamas for the second time with the intention to forbid local currency issuance in order to avoid charges on counterfeiting. The central bank lost since the local currency issued by Banco Palmas "at no time [...] affected the normal circulation of the Real" (Vasconcelos 2011: 81)

As a result of their tests, the Hudon and Meyer conclude:

> "Our analysis suggests that the properties of financial services such as microcredits are modified by a self-organised institution through a local public space. This area of deliberation makes it possible to create collective rules and norms for managing and governing a resource system. This proximity provides tailor-made services for the public concerned. In this case, financial nonprofit organisations could constitute institutional forms that are potentially favourable to the creation of community resources." (Hudon and Meyer, 2013)

Alongside the demonstration that the bottom-up collective participation of community members can lead to the institutionalisation of informal payment system provision, for the common good, this conclusion has three relevant implications for the upcoming development of the D-CENT currency pilot, in terms of system self-management, governance and policy, respectively:

- self-management implications: the local economic forum FECOL grants collective deliberation which, in turn, empowers participants: "FECOL allows the broad economic guidelines for Banco Palmas to be decided in a public space, while helping to strengthen social cohesion and civic engagement. FECOL keeps democratic control over Banco Palmas and has a social control over Banco Palmas, prompting it to respond to the social and economic problems of the community." (Hudon and Meyer, 2013). This forum system presents relevant model feasible within the development of and collaboration with democratic deliberation platforms in the D-CENT project, such as Your Priorities, Open Ministry and either Intercanvis or Eurocat.

- governance implications: self-management practices through collective action modifies the traditional framework and properties of financial services' management practices: "While the management of financial services by traditional market mechanisms is increasingly called into question, the financial alternatives developed by nonprofit organizations have considerable potential for citizens to re-appropriate finance. In this dynamic area, it is necessary to refine the analysis and enhance the knowledge of financial service governance by third sector and community enterprises." (Hudon and Meyer, 2013) The possibility of experimenting on this basis with state-of-the-art payment system technology offers new possibilities to explore in the governance of monetary systems.

- policy implications: Although the system was initially perceived as hostile by central authorities, the dissemination of best practices of this model are now in accord with the Brazilian central bank - Banco Central do Brasil, which started to appreciate the possibilities of efficiently alleviating poverty though financial inclusion. Indeed, the community's informal focus on the restoration, preservation and creation of the commons led the central bank to recognise the CDB's business model prototyped by Banco Palmas and promoted by Insituto Palmas as the only institutionally viable model and worth spreading in similar contexts. In partnership with the governmental central authorities (SENAES - the National Secretariat of Solidarity Economy), the three entities in concert have scaled the methodology of CDBs to 52 other cities around the country with the objective to re-wire 150 of them. It is included also the most infamous *favela* of Rio de Janeiro, the City of God (Fig. 10 a and b):

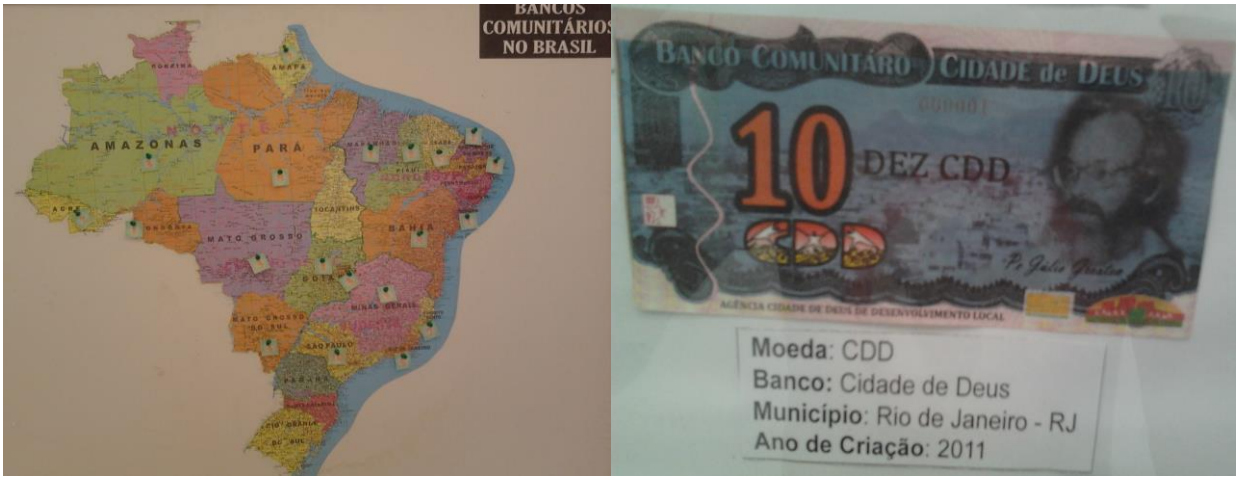

Figure10a The distribution of the Banco Palmas model in the nation of Brazil;
Figure 10b The Cidade de Deus (CDD) currency issued in the favela of Rio de Janeiro with the same name.

In Conjunto Palmeiras, the struggle for the access to water, the one for the implementation of public transport infrastructure and services and that on the re-appropriation of banking services by and for the community signal an empowering trend that community-building practices can determine in the mid-term.

3.3 The conditions for a complementary currency to survive and to accomplish the goals for which it was designed

Issuing Rules. It seems necessary to define clearly and rigorously, according to the law, the relationship between the local and the official currency, the boundaries between one and the other. In all the cases we have studied, the complementary currency has not been in competition with the legal currency, nor had the same use.

Openness. It seems important that the two monetary circuits are not completely separate. In other words it is important that, at any given moment, the complementary currency may be accepted in payment by the issuer. If the issuer is the local administration it should accept that taxes be payable in complementary currency. If the issuer is a private business (as it is in the Sardex case), it should stand ready to sell its own products (goods or services) in exchange for complementary currency.

Redemption guaranteed. The possibility of redeeming the complementary currency should always be assured. In order to circulate, money must be accepted with confidence.

Never Idle. Not only is it required that a complementary currency *can* be spent, it *must* be spent; it cannot remain idle. There is only one way in which money can create wealth: by circulating, purchasing goods and services, and remunerating labour. Only in this way can it truly provide an instrument for economic and social cooperation within a community. In all the cases we presented complementary currencies are subject to different forms of carrying costs, by which they gradually lose value if they are not circulated.

No exit. A local currency must circulate within a given community. It is designed to respond to particular needs of a specific community. If it were spent outside, it would not give direct impulse to the local economy. Nevertheless, the case of Touluse shows that the spread of the model in nearby cities helps to strengthen the social consensus necessary for confidence.

Social Needs. A local currency is designed, not just for economic, but also for social purposes.

Remuneration of labour. A complementary currency should be able to bring together work and needs. The Sardex case shows that it may be crucial, for the meaning itself of complementary currency, that it can be used to pay at least a part of the salary.

3.3.1 Emerging features for a money of the common[26]

Money is a social relation more than a machine. As such, it is not socially neutral; rather, it crystallises social relations which function as institutions as North thinks of them, namely as providers of rules for games played by social and economic agents. Thus, algorithms cannot be defined from a technical point of view – as if they were meant to solve purely technical problems. Rather, they are technical tools influenced by social variables and aimed to solve problems of social and economic coordination. The case studies presented here are useful in order to further specify the characters of the money of the common:

1. It must be "non-proprietary".

2. It must be "decumulative" or "non-cumulative", which implies a [moneta fondente] in Gesell's sense, namely a money which progressively loses part of its value when it is not used. This prevents its hoarding as well as a speculative logic founded on the "preference for liquidity".

3. It must be a liquidity that partially remunerates living labour for the common production of the common wealth. It must not establish any relation of proportion between measuring individual efforts and providing access to money.

[26] Carlo Vercellone.

4. From this standpoint, the mechanisms that create the money of the common prefigure a social basic income, which reduces the monetary imposition of the wage-relation. In so doing, such mechanisms foster both self-determination and individual freedom of choice. Simultaneously, they create a liquidity that finances networks of productive and social autonomy.

5. It must be a liquidity which finances the collective services provided by the welfare system and the activities that correspond to the social objectives and ethical criteria as defined by the money of the common.

6. The ways through which people "enter" an alternative currency – be they service providers or users who share certain social and economic issues – can be different. In the case of Toulouse such "attractor" was the agreement to re-centre the economy on the territory by favouring a model of development, which is both ecologically and socially sustainable. Such sustainability must be enacted both at the level of norms of production and at the level of norms of consumption (e.g. organic food vs. Leader Price). This is why, as the initial failure of the Toulouse experience shows, a currency conceived of as purely technical and top-down risks having as its sole social effect the disintegration of trust in the currency itself (heterogenesis of intents).

As has been outlined in the case-studies above, the various types of alternative and complementary money systems that have been successfully designed and implemented in the last three decades, from LETS in the 1980s to Cyclos in the 2000s (project.cyclos.org), all have in common the outcome: liberating the user from the imperative of conventional money as the only line of credit for performing economic interactions. Today, with new technology emerging, this can also be argued about the *Bitcoin* Virtual Currency Scheme. The new developments in the alternative and complementary currency movements show the desire to question not only how the agreement defining money influences economic trends and the behaviour of actors through the structure of incentives, but also the qualitative aspects of the very agreement defining money *per se*. Such variations of the theme around diversity of currencies include Direct Credit Clearing (Greco, 2009) the Complementary Currency approach (Lietaer, 2001, 2012), Socialist Money (Lapavitsas, 2003) and Global Commons Currencies (Quilligan, 2009). All these variations of currency design start from the need to rethink economic rationality and detach it from the traditional utilitarian straightjacket. More notably, these types of non- conventional monetary transactions endow the user with a certain *degree of autonomy* from the operations, constraints and level of subsumption to the conventional central and commercial banking systems, which can benefit from these innovations at no cost.

The Swiss, Italian and two French and case studies document economic, social and also embryonic institutional design solutions for complementary currencies from a theoretical and technical standpoint. The WIR system and the Sardex both show the high degree of resilience and scalability that dual-currency systems present (i.e. either Swiss Franc and WIR or Euro and SRD). Furthermore, the SoNantes clearly show the possibility for a higher involvement of citizens within a complementary currency scheme run in concert with local authorities and local banking players. Finally, the Sol-Violette indicates that citizens can participate within the decision-making dynamics of the currency system that is affecting their economic lives. From the perspective of diachronic analysis that will partly frame design processes of the Digital Social Currency platform, there is a trend that links proto- (WIR) and digital (Sardex) B2B counter-cyclical economic circles to an ever increasing level of cooperation among the various stakeholders (SoNantes) that begin to horizontally organise the advocacy of an institutionalisation of new and socially oriented financial vehicles (Sol-Violette). However, theory and technique are not sufficient for the steady establishment and mainstreaming of these new types of currencies. Alongside this level of analysis, there is the need to include the assessment of institutional

and political dynamics among central authorities and bottom-up monetary solutions to socio-economic problems as in the case of Banco Palmas.

PART2

4. Introducing D-CENT digital social currency experiments: Bitcoin for the common good

The core goal of the Social Digital Currency Pilot within the scope of the D-CENT Project is to link best practices from the Complementary Currency domain (Douthwaite, 1999; North, 2007; Kennedy and Lietaer, 2012) and, as appropriate, further empower citizens with new technological breakthroughs in the world of digital payment systems such as crypto-currencies like Bitcoin. Technological innovations are emerging that enable increasing dis-intermediation from the conventional money system. In the D-CENT Project, complementary currencies and alternative payment systems are going to be intentionally designed by following a lean user-centric methodology. This will maximize the empowering effect of monetary knowledge and digital currency design on the user's experience of financial transactions. As the formulation of D-CENT ecology of money in chapter 7 below will show, by applying the findings from the case studies presented above, this process will investigate the possibilities around the evocative notion of a *Bitcoin for the Common Good*.

The notion of a Bitcoin for the common good is derived from philosophy of economics and new technological developments opening up possibilities of the institutionalisation of a transparent and open P2P G/Local multi-currency system that has its theoretical roots in the literature on the *Common* (Negri and Hardt, 2009), the *Commons* (Ostrom, 1990) and even earlier, the Italian *Operaism* (Lotringer and Marazzi (eds.), 2007). Bringing together the values inherent in experiences of complementary currencies with the new technological developments, as seen in the implementation of the Bitcoin protocol over the past five years, opens up a whole new field of possibilities of currency design for the common good. The rules encoded in the Bitcoin protocol generate a programmable database, or Blockchain, which acts as a payment system. The resulting payment system is decentralised through the currency creation mechanism, or 'mining' process. Transactions take place among users in a P2P environment without the need to be processed by a central authority and with the use of double-key cryptography. The transaction ledger is public and everybody can access it thanks to built-in structural transparency. Although the social orientation of Bitcoin is easily questionable, the technological level of this protocol for the transfer of value gives users a type of autonomy from the conventional system never experienced before. Indeed, the Bitcoin protocol is qualitatively more neutral than the system derived by the rules governing conventional money: recently, when Master Card, VISA and Pay Pal temporarily interrupted their stream of donations to Wikileaks, Bitcoins became their only source of funding - redeemable for most official national currencies.

Compared to the conventional banking system, Virtual Currencies Schemes (hereafter, VCS), such as Bitcoin, are tailor-made digital payment systems designed for achieving specific economic objectives: the issuance is decentralised, and their ontology and legitimation might not be more than a series of contracts stipulating an obligation by a party to transfer value to another as for a pre-agreed set of juridical conditions executed by algorithm in the way that conventional escrow accounts function (i.e. scripted Smart Contracts - Freidenbach and Timon, 2013). As the former Governor of the Bank of England, Sir. Mervin King stated in the early days of the digital age: "[The] idea that two individuals engaged in a transaction could settle by a transfer of wealth from one electronic account to another in

real time... Pre-agreed algorithm would determine which financial assets were sold by the purchaser of the good or service according to the value of the transaction". (King, 1999)
VCS have the following features:

> (1) They are technologies that can deliver a better tradeoff between effective transfer of value and transaction costs to achieve it. In particular, VCS accounts can be activated directly on the Internet, on mobile phone networks, or still by smart card. In any case, the cost of activation is fairly cheap. A VCS account also offers offline advantages when compared with a conventional bank account: less queuing and better mobility. All these elements contribute to enhance the degree of socio-economic sustainability in a way that goes beyond the mere access to money.
>
> (2) VCS open up an ever-larger space for innovative experimentation, whereby the currency acts only within a closed digital environment and does not have a direct link with conventional money.
>
> (3) VCS can be designed in order to increase the Local Multiplier Effect in regions wherein a higher velocity of circulation of money is most needed, be that in a national economy or in a macro-regional one such as the European Union: the proposal for a *Geuro* for Greece on August 2012 was going exactly in this direction (Cf. http://euobserver.com/economic/ 116325).
>
> (4) VCS can be designed in order to lessen the burden of the cost of credit in a conditioned way: with conventional money, the cost of credit becomes part of the product's (i.e. loan) price while VCS allow for a re-distribution of costs within the supply chain.
>
> (5) The possibility to surgically condition the behaviour of currency flow within a VCS (the most acknowledged form is *demurrage*) enables users to sustain and foster intra-systemic volumes of trade and this can generate additional sources of profits for the commercial sector together with an increased tax revenue for governments.

By virtue of the deflationary nature of the system, the use of Bitcoin as a currency promoted hoarding, speculation and high volatility. Although the latter can be considered as per collective-psychology dynamics operating in every complex market exchange (Pretcher and Frost, 2001), this behaviour might be better understood if one considers that the majority of Bitcoin users approached the new protocol for the transfer of value with all the biases of the belief system underlying the conventional money system. In effect, players in the conventional system are prototyping their private blockchains, thus subsuming the Bitcoin protocol within the dynamics of the conventional system: J.P. Morgan Chase in the banking industry (*The Economist*, December 2013; http://econ.st/ 18FrLTF) and Western Union in the wire transfers sector (May 2014; http://bit.ly/1tjf4Xh) have both recently registered crypto-currency patents.

There are, however, designers and users that promote other behaviours than anti-social ones. For instance, many charities started to accept donations in Bitcoins. Secondly, experiments such as Colored Coins (coloredcoins.org) allows for the appendage of any type of contract on the blockchain via the Bitcoin protocol, thus creating virtual empowering money-scapes accessible to everyone. A third example goes even further in the direction of the democratisation of money and toward *Bitcoin for the Common Good*: MazaCoin, launched in March 2014 (http://www.mazacoin.org/) is a crypto-currency designed for the Indian people of the Traditional Lakota Nation. It is a sovereign crypto-currency aimed "to hold and preserve the wealth of a sovereign nation. Minting coinage can be a powerful symbol of national identity and sovereignty, this is especially true of tribal or micro-nations who cannot afford a fiat currency system."(http://www.mazacoin.org/) Arguably, the most interesting feature of MazaCoin is the

decision of avoiding deflation (which is characteristic of the mining curve of Bitcoins) by experimenting with an inflationary mining algorithm.
The development of socially oriented crypto-currency protocols and the findings from the cases studies in part 1 of this document encourage further investigation.

Alongside projects that translated, for example, the principles of the German *Freigeld* (Gesell, 1934) into a VCS such as *Freicoin* (http://www.freico.in) or still the recent poorly managed distribution of *Aurorarcoins* in Iceland for democratising money, a more relevant explanatory case in terms of the scope and goal of the D-CENT platform has been publicly emerging since the first quarter of 2014 in Kingston Upon Hull (cf. section 6.4.3 below), a town in the United Kingdom counting a population of 270,000. It is one of the many cities in the UK that suffered from socio-economic perturbations in the aftermath of the 2008 financial crisis and the subsequent national recession coupled with the coalition government's welfare reforms – most notably the recent reforms passed in 2012 and 2013. According to David Gilson, member of the HullCoin development team and author at CoinDesk, "This in turn has led to a large increase in the number of people living in financial poverty." (http://bit.ly/ 1jmvDxG) The reaction from the Council has been a proposal of a crypto-currency for the financially disadvantaged resident in Hull. In light of the research findings presented in the case studies of Part 1, a *Bitcoin for the Common Good* is a possibility that not only needs a better proof-of-work mechanism in order to succeed (i.e. a social proof of work), but also regulatory and political strategies that will secure its institutionalisation. They suggest that it is indeed possible to create Virtual Currency Schemes for the implementation of complementary currencies for the common good thanks to a synergic effect that software design principles for the innovation in the world of payment systems elicit on the dynamics of the Complementary Currency context made by practitioners, system managers, academics and also policymakers. As described in the following section, we will inform design choices at the grass-root level, rather than prospectively state a design. Indeed, a municipal currency can be designed with an architecture that resembles clearing mechanisms and circulated as a reward for civic engagement.

5. Description of process

5.1 Lean development

As detailed in D1.1 the D-CENT project employs a combination of *lean* and *action research* methodologies. From January to March 2014 three **lean inception workshops** took place in the three pilot countries consisting of user interviews, persona development and hypothesis testing. Rather than focusing on features, the aim of the initial workshops was to find the main problems that users were encountering and then to draft a series of hypothesis statements based on the interviews as a method to identify underlying assumptions about users' needs and solutions to be verified. Thereforem, the hypotheses generated varied in terms of how "fine grained" they were as they reflected issues raised by the variety of users. The larger-scale hypotheses typically rest on a larger amount of assumptions, needing additional verification, and to be broken down into smaller, testable hypotheses statements before these can be tested in the field.

The hypotheses discovered in the lean inception workshops are considered the **social requirements** of D-CENT, to be developed by creating lean canvases for specific user-groups and needs, and then translated into concrete technical features and Minimal Viable Products (MVPs), to be tested. It is therefore important to clearly distinguish social from technical requirements. A social requirement is what concrete social goal we are trying to fulfil in response to the needs of the community, as given by a hypothesis statement. A *technical requirement* is the software features that we believe will accomplish this goal if the software is adopted.

Lean is a cyclical and on-going process. Therefore new hypotheses will be generated as the initial ones are tested and further tests conducted until all tests are "green". The social requirements outlined in this document therefore represent a first iteration and an initial outline of the overall issues raised in the lean inception workshops, worked into currency design phase inT4.4. Below is a brief overview of the stages and elements contained in this document.

5.1.1 Interviews, user groups and personas

For each lean inception workshop in the three pilot countries, local D-CENT partners organised a program of in-depth interviews with user groups with additional interviews occurring in the weeks following, conducted by local partners as per guidance from Neo and the D-CENT service designer and using online forms to supplement. Interviews were either semi-structured or open-ended and they included both past events and current and future plans of action. The interviews dealt with a wide a range of issues. When we were interviewing groups, the questions focused on the groups' organisational history, mission, and resources and needs, and others focused on the objectives and abilities to make full use of their resources or not, as well as their use of digital technologies and the latest developments in the field. For individuals, the interviews were about their background, age, tech proficiency, and were mainly focused on the users' motivations and needs. We adopted a snowballing technique (Miles and Huberman 1984), so these informants then suggested other relevant organisations or people that we could interview to better understand the phenomenon, and to include diverse perspectives on strategies, outcomes and main processes. Following the lean methodology users will be engaged on an on-going basis with willing and active user bases identified during the interviews. The key informants for each D-CENT pilot thus include the key stakeholders that are involved in shaping and testing D-CENT tools, as outlined in each pilot Service Ecology Map (see Fig 5; Fig 6; Fig 7). The type of stakeholders

range from individual users (such as unemployed citizens or students), to social movement groups, exchange associations, local and national Governments and other public institutions. These are defined in depth in the personas and user stories we created.

The first set of interviews was conducted between the first two weeks of January 2014 in Reykjavik, Iceland during the D-CENT lean development workshop. The second set of interviews was conducted during the D-CENT lean inception workshop in Barcelona, Spain, which took place over the second and third week of February. A third round of interviews was conducted during the D-CENT lean inception workshop in in Helsinki, Finland during the first week of March. Data collection and analysis continued in all three Pilot countries up to mid-March 2014 via *Skype* interviews and written follow-ups using an online survey (see Appendix 1). All interviews were conducted in English, Icelandic, Finnish or Spanish and recorded. The interviews lasted approximately one and a half hour each or less, depending on the informant.

Out of the interviews main user groups were identified for each pilot to form the communities with whom testing of MVPs will take place. The additional interviews were then clustered into user-types based on similar experiences, issues raised and types of activities and then turned into fictional personas, highlighting the main issues raised and typical problems encountered. The number of groups and personas vary for each pilot in accordance with the levels of activity and tendencies of the local civil society to form organisations and associations, and are all presented in this document.

With the currency fieldwork only just beginning, one initial hypotheses has been developed for each group or persona to be tested in further fieldwork research before they are turned into MVPs and technical requirements. Lean canvases have been drafted, although are as of yet there no active experiments and MVPs developed for the currency pilots as these will be outlined in D4.4 when the field work will be completed.

5.1.2 Hypotheses statements

In this initial round of testing, one hypothesis per user group and persona has been drafted. Hypotheses are quickly sketched out only to serve the purpose of turning the interviews with users into potential solutions and features, and should therefore be easily discarded if the assumptions are not verified when tested in the field. Through workshops sessions with local partners and stakeholders at the end of each lean inception workshop the D-CENT team arrived at a set of hypotheses to be developed into features and lean-canvases, outlined at the end of each pilot section in this document.

5.1.3 Lean canvases

When a hypothesis has been selected for further development, a "product" is brainstormed and a set of features are noted down that are assumed to address the users' stated needs. A lean canvas is then drafted for the "product" in order to tease out further assumptions underpinning the "product" and any potential feature related to its viability in the field as well as key metrics to measure its success. The lean canvas thus serves as an initial sanity check and the first step to begin outlining which tests need to be conducted via MVPs (Minimal Viable Products) to validate assumptions and ensure that the "product" is addressing the concrete needs of users. As this is a cyclical process to take place on a regular basis during the development stage, once the lean canvases have been drafted, experiments will be launched and monitored online, allowing for distributed collaboration across pilot countries and between

partners. Three lean canvases have been developed so far for the Digital Social Currency pilots and are outlined after the user profiles, in 6.2 of this document. These have developed as cross-country pilots, responding to similar needs emerging amongst diverging user groups across the different pilot countries. This will open up for comparative analysis of the different pilot schemes, set in different socio-political and institutional frameworks.

5.1.4 Experiments

For each "product", a series of MVPs will be developed and tested. An MVP can be any type of experiment that will feed back information needed in order to validate a hypothesis and refine the product. Typically this will take the shape of low or high fidelity prototypes, depending on whether the intention is to bring value to users immediately or simply to learn more about the field. The three main questions that need to be asked are thus: *Is there a need for the solution I am designing? Is there value in the solution and features I am offering? Is my solution usable?* (Gothelf and Seiden, 2013). Tests and experiments with lead-users and communities will take place on an on-going basis and be shared and monitored by the D-CENT consortium. This iteration process will therefore serve the double function of refining the design while building an on-going relation of trust and engagement with the users from the early stage of pre-design user interviews onwards.

6. D-CENT Currency Pilots

6.1 Iceland

Iceland is an island of 317,000 people with an old democratic culture and one of the oldest Parliaments in the world the *Althing*. In 2008 the small country was thrown into a major financial and political crisis when the country's three largest commercial banks collapsed, with a debt far beyond the capacity of the Icelandic Central Bank to act as a lender of last resort. The financial meltdown shocked the population profoundly, generating an unprecedented wave of citizens' protests, resulting in a change of the government, the central bank manager, and the head of the financial authority. Strict capital controls were some of the countermeasures employed by the Icelandic government. The Auroracoin cryptocurrency, launched in early 2014 was developed largely in response to these, as the capital controls have remained in place since 2008. It is based on Litecoin (a Bitcoin derivative based on the BCRYPT hashing function instead of Bitcoin's SHA-256) and was released by the pseudonymous Baldur Friggjar-Óðinsson. Like all other Bitcoin-like currencies, is a deflationary currency based on proof-of-work "mining" for currency creation and digitally signed transaction statements in a public append-only ledger (the blockchain). Unlike Bitcoin, 50% of Auroracoin's 21million unit cap was pre-mined by Baldur Friggjar-Óðinsson, who had a stated intent to "airdrop" the currency to the Icelandic people, starting on the 25th of March 2014.

When the airdrop commenced, a website was set up where people could fetch their allotted 33.5 Auroracoins by signing up with their national identity number (kennitala [1]) or by logging in with Facebook. It's worth noting that Icelandic national identity numbers are not considered secret or private data, and it is not uncommon for people to know the identity numbers of close friends or family members. It is also possible to look up people's identity numbers through online banking applications. This of course led to a small number of enthusiasts attempting to plunder Auroracoins from other people's Airdrops. Furthermore, many Icelandic citizens were barred from fetching Auroracoins due to having been registered as living outside of Iceland, and many non-Icelandic people were capable of fetching Auroracoins because of having an identification number that correlated with an Icelandic domicile address. This, plus the frequency of system failures on the airdrop website caused the interest that had built up around Auroracoin to wane quickly.

Auroracoin was heavily criticised by various hackers and software engineers, who claimed that whereas Auroracoin's wallet source code consisted of what appeared to be an old version of Litecoin with a number of additions conflated into an unusually small number of repository commits, it was practically impossible to verify what the software was doing in practice. It was similarly criticised by various financial experts, including parliamentarian Frosti Sigurjónsson [2], who claimed that the lack of consumer protection around the coin and the difficulty in trusting a system built by a pseudonymous person who can stand no legal repercussions for any financial losses people suffer suggested that Auroracoin was not a good idea. Ultimately however, Auroracoin's demise came not from lack of interest or discouragement by experts, but rather a combination of a timed protocol change coupled with what appears to have been an attack on the Auroracoin blockchain[27] under the majority rule, after which it devalued rapidly. At its apex, it was valued at roughly 10 AUR to the BTC.

[27] Some days after the Airdrop commenced, and a fairly large number of people had installed the Auroracoin wallet software, a timed trigger in the wallet software caused a protocol change, where the rate at which new coins are mined was doubled, but the number of coins that could be gained from each successful mining action was halved. In theory the net rate of money creation would remain constant, but the a priori likelihood of coin discovery by any miner

With the aim of addressing not only financial but also democratic deficit brought to light by the Icelandic financial crisis the D-CENT Icelandic currency pilot seeks to connect direct democratic decision-making systems with alternative currencies. As a movement has emerged for expanding democratic decision-making on political and financial issues, ways of making public participation sustainable and feasible in the long run have emerged. Through the user interviews conducted in Reykjavik, Iceland in January 2014 during the **Lean Inception** workshops, it became clear that an increase in democratic participation also entails an increase in time and efforts spent by citizens on issues that are of broader interest and benefit to society. As many people also have jobs and families to take care of, the danger of frustration and burn-out often prevents people from continuing to participate. A recurring need expressed through the user interviews was thus to develop a form of reward and remuneration system for voluntary work done for the common good. Taking advantage of the increase in avenues for democratic participation since the 2008 financial and sovereign crisis, the remuneration system will build on developments by the Citizens Foundation in collaboration with the Reykjavik Town Hall as a platform.

Who are the Icelandic Stakeholders?

After Iceland's economic collapse in 2008, **the Town Hall of Reykjavík** in collaboration with the Citizens Foundation, launched **Better Reykjavik** a direct democracy platform, where everyone can submit suggestions into a community forum about things they would like to be done in the city. The direct democracy platform played a vital role in the city's municipal elections in 2010. During these elections, 10% of Reykjavik voters voiced ideas on the site, 43% of voters viewed the site, and over 1,000 priorities were created. Every month, over fifty Better Reykjavik priorities are being processed by Reykjavik's city council, and the site's top five priorities are voted upon at council meetings.

Your Priorities is managed and provided by the **Citizen Foundation**. The Citizens Foundation is a non-profit based in Reykjavik, Iceland, and there is now an open collaboration between the City Council and the Citizens Foundation. Since 2008, the Citizens Foundation has used Your Priorities to promote online, democratic debate and deliberation in Iceland and worldwide. Groups, cities, or countries can use this service to improve their communities. It allows people to submit new ideas, debate and discuss ideas and vote ideas up or down based on their priorities. The key element of the platform is a simple but powerful debate system to help improve the quality of the debate and reduce pointless arguments that happen regularly online. Each point can only be 500 characters and people can mark points as helpful or not helpful resulting in a list of the best points for and against. Both sides of the argument are equally represented in the user interface and this is highly effective in facilitating consensus and inclusion of minority arguments.

Better Reykjavik is the most successful example of a Your Priorities website. The website enables citizens to voice, debate and prioritize ideas to improve their city. The website is actively used by

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doubled, although the expected value was lower. This rollover did not however go as planned, with a lot of the wallets apparently going out of synchronization with the main block chain.

This kind of desynchronization event can take many hours to "heal", as the wallets slowly come into agreement about what time it is (as time is a crucial factor) and accept the protocol changes. Until the healing occurred, there was a bifurcation of the network, which may have enabled a small number of people to take over the blockchain and conduct transactions relatively unchecked. This is because transactions in blockchain systems are subject to rough consensus, and at minimum, a 50% + 1 majority can overrule the entire network.

residents of Reykjavik, Iceland, creating open discourse between community members and city council. While the local instance of the Your Priorities platform, Betri Reykjavik emerged as a very successful platform where priorities were developed, deliberated and implemented there still is an increasing amount of scepticism at the increase to the national scale Betra Island. More background knowledge and an increasing awareness of context and limitations are required at each increase in scale. Furthermore, amongst citizens there is a scepticism as to the willingness of the current political institutions to allow citizens to participate on issues with high stakes, a sense of "no-one is listening", and amongst supportive staff at the institutions there was a concern with how to encourage citizens to participate while protecting the institution from making promises to its electorate that it would not be able to deliver on due to constraints. Some of the main questions emerging from the interviews with the Better Reykjavik users and that D-CENT will try to address within this context are: How to encourage and allow citizens to participate at an ever increasing scale and ensuring that the participation will be worthwhile? What makes it worthwhile for citizens to be continuously engaged? What kind of feedback should come from the political system and how to formalise the commitment of policy-makers to transfer power to citizens?

In the next section we will outline key user personas and groups identified for the Icelandic D-CENT currency pilot. Main hypotheses have been derived for each persona/ group laying the foundations for the currency design and iteration process, to be outlined in D4.4.

6.1.1 Group: Reykjavik Town hall

Type

Reykjavik Town Hall

Reach

Citizens of Reykjavik

How will relationship grow

The digital social currency can incorporate an increasing amount of public services, such as free access to public pools in exchange for volunteer work etc.

How frequent will we interact

Many times pr. day

Tools

Betri Reykjavik

Main Objectives

To democratically represent the interests of the citizens of Reykjavik.

Background

The Town Hall under the leadership of the Best Party has since 2010 been in an on-going collaboration with the Citizens Foundation, adopting their Your Priorities platform, Betri Reykjavik as a method to engage citizens in budgeting and policy deliberation and implementation. However, it has become clear that citizens participating in the scheme get disillusioned and tired spending much of their own free time developing ideas and proposals, campaigning for them and conducting public information work, which might not be implemented. Even in the cases where the proposals get a positive response from the Town Hall and are implemented, the amount of time and energy spent on this volunteer work required can nevertheless be a disincentive for participating again in the future.

Needs

A digital social currency to remunerate volunteer work done by citizens, and as an incentive for using the Betri Reykjavik platform.

User Story

As the Town Hall of Reykjavik, we need a method and a system to remunerate citizens who spend much of their free time doing volunteer work for the common good of the city.

6.1.1.1 Hypotheses

We believe that by

creating a digital currency

For

Reykjavik Town Hall

We will achieve

more participation and closer collaboration between the Town Hall and citizens of Reykjavik

We will know this is true when we see

the adoption of the currency and increasing use of it by the Town Hall and Citizens

6.1.2 Group: Betri Reykjavik user (Your Priorities)

Type

Betri Reykjavik user (Your Priorities)

Reach

Up to 30.000 Your Priorities users

How will relationship grow

As project partners of D-CENT Your Priorities and Freecoin partnership will grow as the project expands

How frequent will we interact

Frequent interaction with developers at Your Priorities/Citizens Foundation. Cyclic interaction with user base for defining new rounds of prototyping as for UX tenets, before the conclusion of D4.4 (Design of Social Digital Currency).

Tools

Your Priorities

Main Objectives

Within the pilot on social digital currencies, the goal is to give Your Priorities members the possibility to design and set the rules of their own social payment system.

Background

It can be frustrating to get involved in political, environmental and social campaigns, possibly spanning years of tireless activity, without any reward from what has been accomplished. Activists do not primarily operate in view of rewards, but their contribution to the common good may deserve more compensation than we are used to acknowledging.

By rewarding users' participation on the Your Priorities platform, a system of social credits can be implemented. Through a collectively agreed-upon reward mechanism in the form of an *audit function*, Your Priority users can interface with the Freecoin-type block-chain, wherein social credits will flow in the geo-localized market place. For example, rewards can be assigned proportionally in relation to best ideas that have been selected, rewarding contributions to the collective good within the City of Reykjavik.

Needs

A way to ensure people have the time and resources to continue to contribute to Betri Reykjavik and that their contribution feels valued.

User Story

As a user of Betri Reykjavik I need to feel my contribution is valued.

6.1.2.1 Hypothesis

We believe that by

creating a reward system for measuring user engagement expressed in social credits, spendable in the Icelandic socio-economy (public/private – facilities/utilities and businesses)

For

Users of the Your Priorities platforms

We will achieve

an increase in the quality of users engagement while expanding users base.

We will know this is true when we see

An increase in the number of contributions and return users. An increase in the depth and quality of research behind the contributions.

6.1.3 Persona: Citizen Activist

Type
Citizen Activist

Name
Erla

Age
34

Gender
Female

Occupation
Kindergarten teacher

Tools
Your Priorities, Facebook

Motivations
To engage in the improvement of her local area, specifically green and natural spaces in the city.

Background
When not working at the kindergarten or taking care of her child, Erla spends much of her time doing projects, campaigning and working on environmental issues in and around Reykjavik. Her main interest is integrating nature into the city environment, doing guerrilla gardening and through campaigns on the Betri Reykjavik platform for green spaces and parks. A well-known organiser and campaigner, Erla's tireless efforts are much appreciated by local residents, who enjoy the green spaces she has campaigned for and helped to implement.

Between her work as a kindergarten teacher, her young child and the activist volunteer work, Erla is getting tired and has started to struggle financially. She is considering cutting down on her volunteer work in order to find a second job to supplement her income.

Needs
A method to remunerate voluntary/ activist work

User Story
As an activist and single mother I need to be remunerated for the volunteer work I do for the community in order to be able to continue to contribute for the common good of my local area and the city, for example by receiving free childcare while doing volunteer work.

6.1.3.1 Hypothesis

We believe that by

creating a method /currency for remunerating voluntary work done by citizens for the good of the city

For

active citizens in Reykjavik

We will achieve

more and on-going positive contributions by the citizens to their local area

We will know this is true when we see

Increasing involvement of citizens in their local areas and uptake of the method/currency

6.1.4 Persona: Unemployed Citizen

Type

Unemployed Citizen

Name

Helgi

Age

32

Gender

Male

Occupation

Unemployed

Motivations

To spend his free time as unemployed engaging in socially useful volunteer work that is remunerated through access to city resources and goods

Background

Helgi lost his job as an office clerk when the company he used to work for closed in the wake of the Icelandic banking crisis. He now attends regular sessions at the Icelandic unemployment office, looking for job offers, and writing and rewriting his CV. These sessions have begun to depress and demotivate him as he does not feel they are helping him find a job. He would rather spend his time doing activities that are meaningful and that are needed by the local area, the city and society at large, and to be adequately remunerated for these. For example by earning access to utilities, public transport and facilities in exchange of voluntary work.

Needs

A method to recognise the value and contribution of work done for the common good, outside of a workplace.

User Story

As an unemployed citizen I want to be able to contribute my spare time and efforts on useful activities and be recognised and remunerated for this.

6.1.4.1 Hypothesis

We believe that by

creating a currency to remunerate voluntary work for the common good

For

unemployed citizens engaged in voluntary work

We will achieve

less time and energy wasted on meaningless activities, better quality of life for, and positive contribution by the unemployed

We will know this is true when we see

uptake and positive feedback by the unemployed

6.1.5 Persona: SME

Type
SME

Name
Baldur

Age
36

Gender
Male

Occupation
Director of his own software development SME

Motivations
Ensure the economic sustainability and growth of his company

Background
After some years as a freelance software developer Baldur decided to open his own company and hire two more developers. A constant source of anxiety was the ability to ensure enough cash-flow to be able to pay wages and regular outgoings. Many times clients would pay late making it difficult to cover the running costs of his company. Baldur has had to take out two loans from the bank in order to cover these periods of irregular income. However, since he frequently works with a UI design SME they have agreed to keep a ledger on time and services traded between the two, as a way to reduce outgoings. Baldur would like to see such a system expanded as he is aware that other SMEs face similar problems.

Needs
A digital currency for trading goods and services with other SMEs, freelancers and suppliers when short on liquidity

User Story
As an SME I need source of capital/labour/goods during periods of irregular income.

6.1.5.1 Hypothesis

We believe that by

a digital currency for trading goods and services

For

SMEs and freelancers

We will achieve

a growing and sustainable SME community more resilient to national and global economic turmoil

We will know this is true when we see

increasing use of the currency and resilience during economic turmoil,

6.1.6 Persona: Student

Type
Student

Name
Sóley

Age
24

Gender
Female

Occupation
Political science student

Motivations
Wants to complement her studies with extra-curricular work without being punished for this financially.

Background
As a student Sóley receives a low-interest student loan with the conditions that if she is to earn any further money from other work, her loan will be reduced or halted. Over the summer Sóley wants to work full-time for an NGO to gain some relevant experience for her studies and to earn some extra money in order to buy more books. However, she does not want to risk having her loan income reduced, but she does not either want to work the whole summer without getting any form of remuneration.

Needs
A remuneration method to acquire relevant resources and goods, that would supplement student grants while avoiding reduction in funding

User Story
As a student, I need a form of remuneration for work that will not result in a reduction of my student loan.

6.1.6.1 Hypothesis

We believe that by

creating a goods and services remuneration system

For

for students

We will achieve

more engaged and less indebted students

We will know this is true when we see

more student engagement in broader activities related to their studies or student life

6.2 Spain

Like much of the Mediterranean, the Spanish property bubble (1996-2007) left the country in a recession that lasted from February 2009 to the 9th of June 2012, the day on which the provision of up to €100bn of rescue loans from Eurozone funds was agreed by the ECOFIN. As a consequence of the insufficiency of political solutions to solve financial problems, Spanish credit ratings were downgraded to "junk" status. The productive economy of the country declined steadily as an effect of tight credit and austerity measures imposed with the aim of easing deficit spending. During the period October 2007 – October 2008 Spain saw its unemployment rate climb to 36%, making it the country with the biggest unemployment crisis in Europe. Although the situation remains remarkably critical, more recently the country experienced a "mild economic recovery" (ECB, 2014). Indeed, after a peak at 27.2% in the first quarter of 2013, the Spanish unemployment rate declined to 26% at the end of the last year. Moreover, credit risk premium is declining and the injections from the European Central Bank are gradually reaching final borrowers.

However, according to the Eurotower,"financing conditions remain onerous for smaller borrowers, such as SMEs. [...] Unemployment is set to decline but will remain high. The budget deficit is set to narrow in 2014 but government debt is still expected to rise" (ECB, 2014). In other words, unemployment, especially amongst the young remains exceptionally high, SMEs face very high costs of credit, and high levels of debt drives policy towards deficit reduction and reduction in public spending. To help mitigate these trends many communities in Spain have begun creating their own currencies. As a constructive answer to the inherent insufficiency of the conventional system to fix the dichotomy between full employment and price stability, social movements and the civil society are in the process of creating new payment systems for increasing economic activity among community members. The explosion of local initiatives in response to the effects of the crisis have taken a plethora of different forms: from bartering networks to alternative housing arrangements, from consumer cooperatives to community banking, the initiatives range from developing solutions to common needs outside of a monetary system, to creating new forms of monetary systems, and finally, in the case of EuroCat, the development of a regional currency that is convertible with the Euro ensuring a straightforward conversion from Euro to EuroCat, but where EuroCat to Euro in principle will only be possible for specific goods (determined by the community).

The Spanish pilot will take place in this landscape of transversal challenges facing communities who share similar experiences of the everyday consequences of the economic crisis. In this context of urgent needs and vibrant local initiatives addressing these needs, the main aim of the Spanish Social Digital Currency pilot experiments will be to federate different communities belonging to the same geographical territory and sharing the same socio-economic landscapes working across key existing initiatives, each struggling with the organisational and technical challenges of scaling: a regional currency to re-invigorate the economy of Catalonia; inter-trading-barter networks; social networks and payment systems for increasing the volume of trade of local food producers; rating systems that simultaneously reward participation and creativity. Since the D-CENT platform will be distributed across several European countries experimentation with a federated model, as will be piloted in the Spanish case, is imperative. The Spanish pilot presents an important degree of diversity for social currency implementation and this may present new opportunities during the process of pilots federation, for example by connecting co-working networks such as Ouishare in Barcelona with WeMake in Milan (see section 6.4 below). Hence, conceived of as an API, Freecoin will bridge the various features that emerge through the user-centric emphatic design. The aim is to develop code-bases flexible enough to enable the development of tools that serve users engaged in social experimentation via the *pragmata* of currency design.

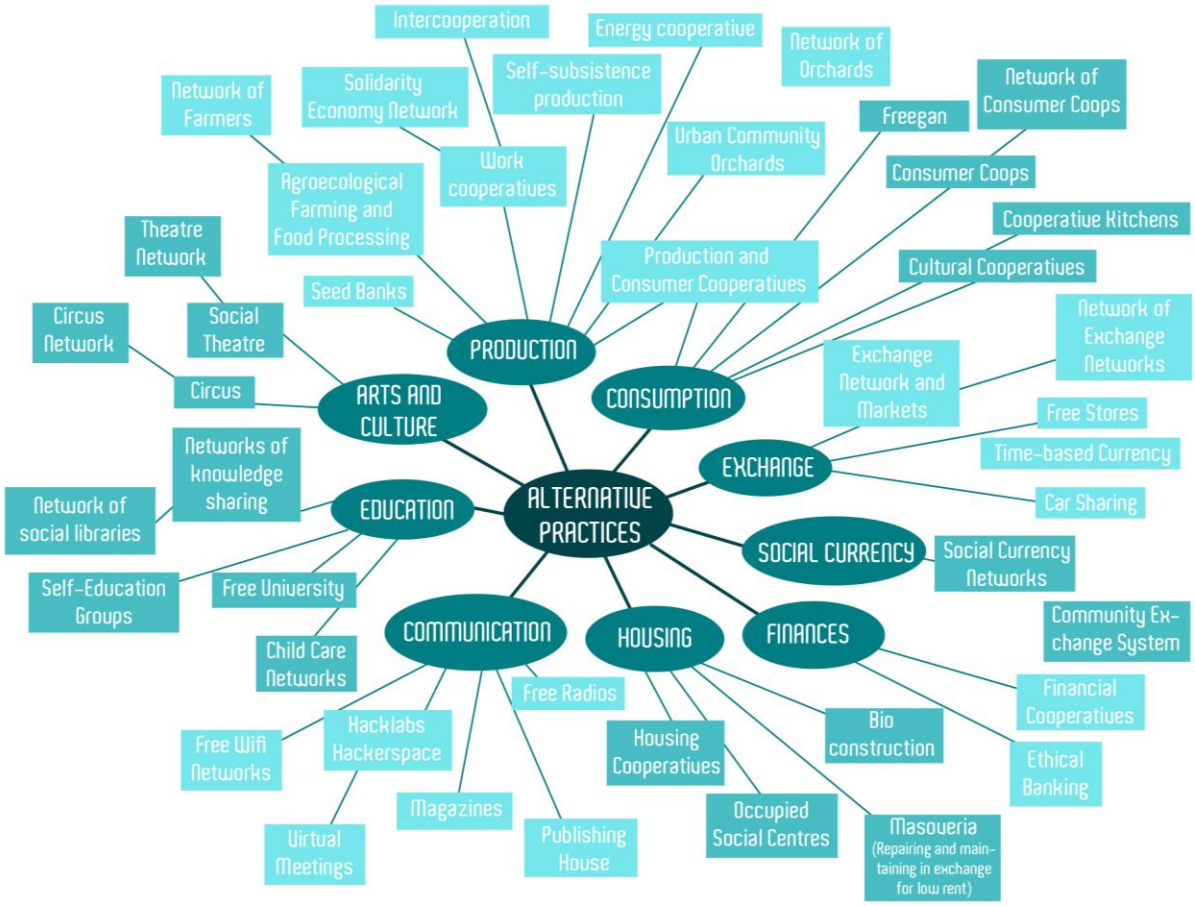


Fig:11: Universe of alternative economic practices in Catalonia
Adapted from: Castells, M., Caraça, J., & Cardoso, G. (Eds.). (2012). Aftermath: The Cultures of the Economic Crisis. OUP Oxford.

Who are the Spanish Stakeholders?

Alongside barter networks and timebanks, from 2008 to 2013, Spain saw the emergence of 70 new moneys that citizens use as a complement to the Euro, still tight in supply as for the effects of the current recession (http://www.rtve.es/). One of the most ambitious of these, and part of the D-CENT Spanish pilot, is **EuroCat** (http://euro-cat.cat/ca/), a regional currency for counteracting SMEs foreclosures and unemployment in Catalonia. As the very name intentionally suggests, EuroCat is designed to be a civic complementary currency functioning in parallel with the Euro and is created from mutual credit arrangements that are granted through a mechanism for social control of credit. A clearing-house, where productive units (largely SMEs and self-employed) have access to overdraft, it is being developed in collaboration with amongst others PIMEC (Catalan association of SMEs) as well as local authorities and trade unions, with the aim of involving the chamber of commerce.

Intercanvis is a digital platform for bartering with the ambition of federating regional barter systems in a common network for strengthening the critical mass in terms of user base (see also D1.2). It has its roots in the early 2000's as a barter network on the groupware platform TIKI (info.tiki.org/, i.e. the wiki

way of making software) – a means for adding features to their CES software wiki. In 2007, the group needed a database engine that would support geotagging items on their bartering list, linking them to the same database in a manner that would allow for bartering in a structured manner across the whole network. All this was developed through volunteer efforts that eventually grew into what is now known as Intercanvis. As a central hub for barter networking, after the financial crisis Intercanvis became widely used amongst networks in Catalonia, adding filters that would allow local groups to also organise real-world local markets (see Xaingra). A node in the Intercanvis network, the **Xaingra** barter system emerged in the Barcelona district Gracia and has over 1000 active members on its email list. Serving the needs to the community by circumventing the formal money system through barter, Xaingra is both a mailing list (a kind of Craigslist for local residents) as well as a weekly market place in Gracia. The main need of the group is to expand the reciprocity chain with other networks through intergrading (a function that a Blockchain can process). Secondly, developers at Intercanvis are researching and experimenting with geo-localised identification of users and goods to barter. Both needs genuinely integrate with the upcoming development of Freecoin in D-CENT.

Ouishare is a global decentralised organisation for the promotion of a collaborative economy, with a focus on collaborative production, consumption, finance and open knowledge. The local node in Spain also hosts the "connector" for the Spanish speaking Ouishare networks, the person responsible for connecting the local node with the global network. While the aim is to act as a bridge between local collaborative initiatives and global networks, as well as external bodies such as larger corporations and governments, the local Ouishare node is currently mostly engaged in advocacy and educational activities, such as writing blogs, hosting events, teaching classes and workshops on collaborative economy and practices. Members of the Ouishare network experience precarious contractual relations in addition to having to spend working time for the management, maintenance and development of the spaces where members co-work. Reflections that emerged in the interviews with Ouishare members suggest a solution through the design and implementation of a reward mechanism acting as a currency for intra-organisational exchange.

In the next section we will outline key user personas and groups identified for the Spanish D-CENT currency pilot through the Lean Inception workshop and interviews, which took place in February 2014. A main hypothesis has been derived for each persona/ group laying the foundations for the design and iteration process, to be outlined in D4.4.

6.2.1 Group: EuroCat

Type
EuroCat

Reach
Potentially several hundreds of thousands SMEs, self-employed and local communities in the Catalan region

How will relationship grow
After initial pilot tests, the architecture can be adopted and rolled out across the network with an emphasis on user-friendliness and financial literacy

How frequent will we interact
If implemented, the infrastructure will serve daily needs of the currency community

Main Objectives
To provide a transparent and interest free currency for communities in Catalonia, as well as solve the issue of lack of access to credit by SMEs in the region since the financial crisis.

Background
Currently in development, the Catalan EuroCat complementary currency project is in the process of expanding their network. Collaborating with PIMEC, a regional association for SMEs, the EuroCat is working towards creating viable alternatives to banks' discretionary powers, which since the crisis have prevented many SMEs from accessing credit. With their central aim of bringing the control of credit into the hands of communities, one of their big concerns lies in the expansion of financial literacy amongst these. The development of a viable and user-friendly technical infrastructure to support these core aims, coupled with the expansion of financial literacy amongst the networks is one of their main needs.

Needs
the expansion of financial literacy and user friendliness of complementary currencies amongst Catalan communities.

User Story
As a newly established regional complementary currency network, we need a user-friendly and viable technical infrastructure on which to build and expand the network while expanding financial literacy.

6.2.1.1. Hypotheses

We believe that by

developing a technical architecture with a socially performing blockchain

For

the Eurocat regional currency

We will achieve

community control over credit

We will know this is true when we see

widespread adoption of the architecture and SMEs gaining credit who were prevented from it previously

6.2.2. Group: OuiShare Network (Catalunya)

Type

OuiShare Network

Reach

Approximately 200 locally/ global reach of over 2000

How will relationship grow

Close collaboration with the local "connector" for trials, then expanded to the Spanish speaking Ouishare networks and then globally. Ouishare will also be an important partner for dissemination of other D-CENT digital social currency pilots through their information and education networks.

How frequent will we interact

Periodically, until the design phase begins, then regularly through the iteration process.

Tools

WordPress, Facebook, Twitter

Main Objectives

To establish horizontal networks of sharing and collaboration amongst local (and global) communities.

Background

Supported by volunteers OuiShare is a network that advocates and educates on collaborative economy, focusing on production, consumption, finance and open knowledge. The local node in Spain engages mainly in dissemination of information around collaborative economy, running workshops and events and producing educational material. With many people contributing to the network and helping with the platform a central issue has emerged around measuring and being able to reward contributions through an online mechanism. While encouraging more people to contribute, this would also serve as a digital proof-of-concept for the values and practices proposed by the group.

Needs

A reward mechanism that registers contributions in the form of skills and work done within the network, saving time, management and organisational costs while making it easier for members to contribute.

User Story

As the OuiShare network, we need a way to make contributions by our members visible so that these can be recognised and rewarded.

6.2.2.1 Hypotheses

We believe that by

developing a method to visualize and reward members contributions

For

the OuiShare network

We will achieve

recognition of work done by members across the network, more satisfaction by members in contributing

We will know this is true when we see

more contributions and increasing membership

6.2.3 Group: Intercanuis

Type

Intercanuis

Reach

Several thousands in Catalonia region (tbc)

How will relationship grow

Will be active in ongoing experiments with D-CENT tools

How frequent will we interact

Periodic interaction with core development team members of intercanuis.net and Drupal coupled with continual feedback and feedforward with local users and partners as for empathic design practices framing UX.

Tools

Drupal, Community Exchange System (CES – https://www.community-exchange.org/)
http://intercanuis.net/

Main Objectives

Advocacy of free-software currency to prevent time wasted in the integration of different proprietary code-bases for bartering. Barter networks Barcelona Area: to create a prototype to help these networks migrate from email lists for offers and demands to a geo-localised market-place on a common platform.

Background

Since the early 2000's Intercanuis received public funding to make its online bartering platform interoperable across clusters and credit types, but due to lack of re-funding they were forced to stop at the point of user management and total integration. Not being able to exchange incompatible forms of credits specific for each cluster of platforms/currencies hinders bartering possibilities amongst users. Too often, users accumulate one type of currency from a bartering platform with the need to spend them on another platform closer to their local area or that serves their needs. As a solution, Intercanuis has pointed to the integration amongst platforms in order to accommodate bottle-necks of hoarded currency and facilitate exchanges that would not take place in the conventional monetary economy. The creation of an interoperable barter network is thus currently the group's main need and aim.

Needs

Better connectivity among users and a method for inter-trading amongst different currencies and networks.

User Story

As the Intercanuis we need a method that allows for inter-trading between different local currencies and an easy way to know about local offers and demands across bartering networks to avoid time waste and extensive travel

6.2.3.1 Hypotheses

We believe that by

designing a free-software protocol that settles transactions between users of different websites (tiki, drupal, wordpress, elgg, joomla, cyclos, cclite, ripple, ces, etc.) and between different barter currencies

For

Community Exchange Systems of Catalonia

We will achieve

a better use of currency in order to promote exchanges within each community and between community exchange platforms.

We will know this is true when we see

the different websites of the various networks having a common system in place that allows for the exchange currency between different networks.

6.2.4 Persona: Bartering coop member (Xaingra)

Type

Bartering coop member (Xaingra)

Name

Xavier

Age

42

Gender

Male

Occupation

Bioinformatic technician

Tools

Tiki, CCLite, Intercanuis CES software, Drupal.

Motivations

Helping communities establish bartering networks and implement digital tools to help their ongoing management and expansion

Background

Xavier is a devoted free-software user who advocates the adoption of FLOSS for connecting the regional bartering network community of Barcelona and Catalonian. An enthusiast of Ripple (https://ripple.com/) a payment system, currency exchange and remittance network, Xavier has since the early 2000s been volunteering in assisting Catalonian communities start and manage a local bartering system.

Xavier drives 90 Km trip to a little village towards the Pyrenees where the manager of the local barter network is waiting for him to upgrade the CES software to a new version that better locates items within the geotagging database. He earns some time credits spendable in the local barter market of the little village, but living in Barcelona he knows that he would hardly come back to spend them anytime soon. While Xavier is happy about the volunteer work of that day , he is also increasingly frustrated by the expectation that he would have to drive 90km back in order to spend the time credits that he just earned.

Needs

Xavier personally experienced the hastle of earning barter credits from one community and not being able to spend them in his own community: "You help people in a town with many hours of dedication, they pay you with their currency, but it is not very useful if every time you have to move 90km to use the currency. There is too much effort on the side of the user for having an incentive to use these platforms."

User Story

As a member of the regional barter community, I would like to have the possibility to inter-trade among local networks. The outcome would be twofold: on the one hand, communities may see their infrastructural needs for bartering more easily met as there would be an increase of offers for community building services in that – on the other – the credits gained by service providers would be then spent in the same or different productive local economies of Catalonia

6.2.4.1 Hypothesis

We believe that by

creating a tool for allowing users to make interoperable transactions in the barter networks of Catalonia

For

barter participants in different CES in the region

We will achieve

A more efficient exchange dynamic among different local barter networks

We will know this is true when we see

an increase in membership and intensification in the velocity of money within the regional multi-currency barter system Intercanvis/Xaingra.

6.3 Finland

Finland is one of the best functioning democratic systems, due to its stable political system as well as an open and accountable public administration. However, while emerging from the global financial crisis relatively unscathed, new citizen movements for increasing citizens' participation have developed in response to a system that still operates largely in a traditional method, interacting with traditional stakeholders and interest groups. Taking both a top-down and bottom-up form, these movements are expressed through for example the emergence of neighbourhood citizen activist groups such as in Kallio as well as the establishment of Democracy Units at both Town Hall and National levels for the development of citizen involvement in democratic processes. The Unit for Democracy, Language Affairs and Fundamental Rights in the Ministry of Justice was set up under the Ministry of Justice in 2007 in order to improve public engagement and citizen buy-in and participation in the political process, and the Town Hall of Helsinki formed a "Democracy Network" to share best practices and increase citizen involvement in the running of the city. The process of opening up traditional democratic institutions was largely spurred by the 2012 introduction of the Citizens' Initiative Act that allows citizens to develop legislative proposals which, if they reach 50.000 signatures of support, is required to be voted on in parliament. These movements and new institutional developments tend to make active use of new technological possibilities, as of yet mainly in the areas of communication, deliberation and networking. However, as these new democratic processes mature, the need to develop new methods of sustaining participation and activities, sharing of common resources and skills as well as avoiding burn-out and disillusionment amongst active citizens becomes pressing. An example could be where communities would request donations from the public in any form of currency that is convertible into a Digital Social Currency (including CES credits and traditional currency). The community can then distribute the Digital Social Currency to the people who are contributing their time and efforts to the campaign in question. The community can also crowd-source tasks from the wider public, for example, offering compensation for people who research background information, print and distribute flyers, create emails lists of journalists or talk to people on the streets, etc. The Digital Social Currency would help communities track and reward the tasks needed for a successful campaign.

The highly developed institutional space of Finland also entails a tightly regulated socio-political space in which innovation often risks facing regulatory issues. This was raised in several user-interviews in Finland, examples including systemic restraints on the growth and sustainability of civil society groups through strict regulation on donations. Aimed at preventing political or corporate favouratism the tight regulation is nevertheless heavily enforced impacting small crowdfunding initiatives and independent makers, NGOs and neighbourhood associations. After pressure from civil society groups this issue is currently under review in parliament as a group of MPs decided to drive for a legislative change suggested by the civil society campaign. Another example is the recently imposed taxation on earnings in alternative currencies, affecting for example the 'Tovi' timebank currency severely. The Finnish context of strong state and city institutions thus presents both a challenge, in the form of tight regulatory frameworks and oversight, as well as opportunities in the form of possible widespread and effective piloting at scale. Close collaboration with the national and city level Democracy Units and engagement with civic bodies such as the Open Ministry and Citizens Initiatives are essential for meeting these challenges and opening up a space for monetary innovation. The Finnish pilot will thus see experimentation with the coupling of institutional innovation and emerging civic democratisation movements with new methods of exchange and sharing of common resources taking advantage of possibilities opened up by technological and institutional innovation.

Who are the Finnish stakeholders?

The City of Helsinki employs 40,000 people and has direct responsibility in the provision of municipal public services, such as transportation, education, urban planning, waste collection and energy policy. The highest decision making body is the City Council, elected in municipal elections every four years. Helsinki City Council has 85 permanent members and an equal number of deputy members. With staff numbering in the 40.000 across the public sector, the City of Helsinki had for a long time relegated citizen engagement in the IT department. It became clear however that IT did not cover the full range of development and enhancement of citizens engagement, and the Democracy Unit was established in order to promote and develop democratisation across the city departments. The unit has from the beginning prioritised user-friendly open-source tools and are wary of being "locked-in" to restrictive and expensive service contracts with large companies. In the realm of user engagement, mass scale civic participation and democracy, the **Helsinki City Council** opened their municipal decision-making platform, providing all the public decision making documents; agendas and minutes of all the council, committee and sub-committee meetings in open data format. Forum Virium Helsinki has supported the city in opening the data, and will continue supporting the expansion beyond Helsinki, to other municipalities and at national level.

The **Citizens Initiative** law allows citizens to put forward proposals for new laws, so that if a single proposal receives more than fifty thousand supporters, it is the obligation of the Finnish Parliament to vote on it. The proposals receive the same full process as government bills passed to the Parliament. The process of developing a Citizens Initiative usually has three stages: preparation of the campaign, launch of the citizens initiative campaign, after which the one has 6 months to gather the required 50.000 signatures, followed by a lobbying stage, ensuring that the bill will pass in parliament. These three stages amount to a long-drawn process and much work for citizens, and have emerged as one of the main deterrents to further participation. The **Open Ministry** voluntary project was started in part to alleviate this issue by providing assistance and advice for Citizens Initiative activists in terms of planning, legal drafting and strategy. Five out of the six initiatives that have so far managed to reach parliamentary vote where supported by the Open Ministry. They run a website with some 10,000 people registered in the user community and some 15,000 unique monthly visitors. Around 600 suggestions for improving the legislation have already been submitted by individual citizens or citizen groups for public deliberation. The most promising ideas are selected by the community and volunteers for online deliberation and co-edited into draft proposals and eventually into a legal format with the help of experts and lawyers.

In 2011 a soup kitchen in the Helsinki neighbourhood of Kallio was going to be shut down after a town hall consultation with the local association had brought forward complaints about the people using it. In response, some younger residents started a group on Facebook to discuss the matter, and from this a movement for neighbourhood tolerance developed, and events were organised in favour of the soup-kitchen. The group grew rapidly, and soon had supporters numbering in the thousands with a core of approximately 30 people emerging who started to meet and organise. A conscious decision was made not to formalise the group into an official association, but instead continue in a horizontal manner where anyone could join and propose initiatives. The group, now named **Kallio-Liike** started organising street parties in the area, that became wildly popular with over 10.000 participants, local flea-markets, picnics and other neighbourhood events, quickly gaining a reputation across the city and in the media, being the first type of young, social-media based neighbourhood movement of its kind in Finland. This since expanded into many splinter groups, inspiring more formal activities, a recent example of which is the **Made In Kallio** network of designers and makers. While many of the Kallio-Liike events inspired creativity and action, they were temporary in nature, interventions in the public space of the neighbourhood lasting no longer than a day. Forming part of an active ecology of young people who are taking an active part in positively shaping their neighbourhood Mia Lehti and Jon Sundell decided to open

the Made In Kallio space in 2012 with the aim of establishing a more lasting intervention that would support and grow the emerging community of independent makers and designers.

Founded in 2009, **Helsinki Timebank** is an active group operating in the main metropolitan area and connected to rest of the time-banks network in Finland. There are some 3000 members in Helsinki City region, with approximately 1000 exchanges. At Helsinki Timebank, the time-unit is the Tovi - 'moment' in Finnish, corresponding to an hour of work by designed neutral to intrinsic quality. In the early days, the initiative was presented as a valuable socio-economic experiment strengthening the fabric of society, with publicity in the national TV. Regulators were mild and just left the time-banking system emerge and self-organise. After a few years, the situation dramatically changed. As a result, professional work of any kind requiring (specialised) skills delivered for exchange of time-credit/Tovi began to be subject to taxation. This decision by public authorities triggered the reaction of Helsinki Timebank, which advocates a call-for-action on the issue.

Finally, Helsinki Timebank are also part of the **Community Exchange System** global network, CES - https://www.community-exchange.org/). CES has received relatively large scale use despite the usability and other limitations of the online platform, and will therefore benefit from interoperable and scalable infrastructures to extend electronic resource sharing mechanisms, linking direct democratic decision making processes to innovative ways to share common resources. There are 30 timebanks in Finland using the South African-based CES platform, with 3000 thousands members in Helsinki city region, but less than 1000 had exchanges, totalling some 1500 hours exchanged. The largest timebanking network in Helsinki facilitates thousands of exchanges annually and has several thousand registered users with increasing amount of visibility and public recognition.

In the next section we will outline key user personas and groups identified for the Finnish D-CENT currency pilot through the Lean Inception workshop and interviews, which took place in February 2014. Main hypotheses have been derived for each persona/ group laying the foundations for the design and iteration process, to be outlined in D4.4.

6.3.1 Group: Made In Kallio

Type
Made In Kallio

Reach
Approximately 20 people in the core, broader reach of the Kallio makers communities and followers (potentially 1000)

How will relationship grow
Made in Kallio may carry out extensive pilots in the local neighbourhood as D-CENT pilot tools come available

How frequent will we interact
Increasingly, as the tools are first designed (monthly) and then developed implemented into the local context (weekly)

Tools
Wordpress, facebook, googledocs, wiki, sharetribe

Main Objectives
To provide space, resources and synergy benefits for local makers and designers and design processes that benefit the neighbourhood and the society at large.

Background
Made In Kallio emerged out of the surge of youth-led new neighbourhood initiatives in Kallio and more specifically the Kallio-Liike neighbourhood movement. With the desire to create something more long-lasting than many of the movements temporary events and public space interventions, Made In Kallio was founded by Jon Sundell and Mia Lehti to support the work of local independent makers and designers. Made In Kallio consists of an evolving array of workshops like a TV channel, shoe and garment studios, accounting office and a café and event space where people can collaborate, develop and showcase their work.

Needs
An effective and user-friendly system to collaborate and exchange all kinds of resources (time, expertise, tools) amongst makers, designers as well as enable sales of goods and services among clients and suppliers in the local area. A tool which can circumventing the need for outside capital or bank-loans and that can enable self-employed young people to realise ambitious projects.

User Story
As a network of makers and designers we need a way to exchange goods and services between ourselves and with the community in order to empower the work of everybody involved.

6.3.1.1 Hypotheses

We believe that by

creating a digital service and a local currency that will allow small-scale producers and the local community to exchange goods and services

For

everybody involved in the local supply chain from producers and retailers to the consumers.

We will achieve

a sustainable and growing local economy amongst independent producers

We will know this is true when we see

increased economic activity and growing use of the currency

6.3.2 Group: Helsinki Town Hall

Type
Town Hall democracy unit

Reach
Citizens of Helsinki

How will relationship grow
After initial trials and pilots, the remuneration system can be expanded across public services.

How frequent will we interact
Increasingly, and eventually daily as the remuneration system is implemented and expanded.

Tools
Email, town hall website and IT tools

Main Objectives
To increase citizen participation and engagement in the running of the city.

Background
With the Helsinki Town Hall Democracy Unit only recently established, it is looking for new and innovative ways to engage citizens in the policies and budgets of the city. Online forums, a notification system on Town Hall agendas using open data APIs, as well as local level Citizens Initiatives (https://www.kuntalaisaloite.fi/fi) are some examples of these. However, in order to make sure that citizens feel that their participation is valued and to encourage on-going participation in what can be very time-consuming processes, there is also a need for remuneration and reward mechanisms. Citizen engagement in policy and voluntary work for the common good of Helsinki and the local neighbourhoods otherwise risks causing disillusionment as engagement might not always lead to the reward of implementation.

Needs
A method to ensure that it is feasible for citizens to engage in the running of the city and are not left feeling that the efforts they put in when taking part in new participation mechanisms are not recognized.

User Story
As the democracy unit of Helsinki we are expanding the ways in which citizens can have a say in the running of the city, but as we require more time and effort from citizens we need a way to encourage and remunerate continued participation to make it worth their while.

6.3.2.1 Hypotheses

We believe that by

developing a system to remunerate participation by citizens in democratic deliberation processes

For

Helsinki town hall democracy unit

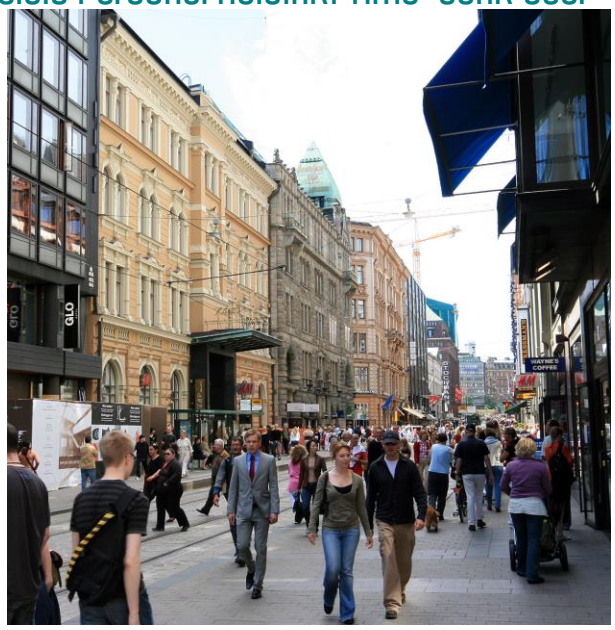
We will achieve

an increase in citizens engagement and long-term sustainability of increased democratic participation

We will know this is true when we see

an increasing amount of citizens participating

6.3.3 Persona: Helsinki Time-bank user



Type

Time-bank user

Name

Ruby

Age

35

Gender

Female

Occupation

Helsinki Timebank co-manager

Tools

CES, activists portals such as http://www.commons.fi

Motivations

To spread the use of complimentary currencies and find tools and methods to make them more effective

Background

Ruby is a Helsinki Timebanking CES lead-user and co-manager. Active in the Complementary Currency Movement, she is an enthusiast for the advocacy of the socio-economic and political long-term empowering values and practices of time banking. According to Ruby, "time banking and Basic Income are twin sisters for democratizing citizenship and the public sphere more in general."

The Helsinki time-bank has a 2% levy on all Toui's exchanged, both on the Toui's earned by the provider, as well as on the Toui's spent by the receiver of any service exchanged. This levy is distributed as follows: every member in Helsinki Timebank can her or himself choose to which organization member in the time-bank its levy is going, whenever he or she provides a service. The levy of the receiver of the service always automatically goes to the common account of the time-bank, and is used for the defined purposes of that account. The problem arises from the fact that most of the accounting entrances in the system are made by users leading to a high rate of errors.

Needs

Conditioning the behaviour of the *internal Toui levy* in the broader landscape of automated error-correction procedures; maintenance time drains too much attention from necessary activities (such as campaigning against the taxation of services transacted in Toui.)

User Story

As a co-manager of the Helsinki Timebank, I want to find a solution to the problem of monitoring user activity and facilitate correct accounting procedures.

6.3.3.1 Hypothesis

We believe that by

creating a tool/UI for allowing users to make time-banking transactions in Toui more efficiently in a payment system and digital market place that allow for a better automatized operations

For

members of Helsinki Timebank, and potentially the whole Finnish time banking network

We will achieve

A more efficient exchange dynamic among members and the system as a whole

We will know this is true when we see

Nationwide increase in the quality of total systemic accountancy for Finnish time-banks in general, i.e. maximization of internal levy conditioning and better error correction monitoring measurable as a change in behaviour of more engaged members, who are now less constrained by payment procedures in that they enjoy higher quality software

6.3.4 Persona: Citizen Initiative activists

Type

Citizen Initiative activist

Name

Daavid

Age

29

Gender

Male

Occupation

Student

Tools

Googledocs, facebook, twitter, email

Motivations

To influence Finnish legislation by organising Citizens Initiative campaigns

Background

As a law-student Daavid was approached by some friends who wanted to do a CI campaign to change regulation of donations in Finland, which currently criminalises donations to organisations that are not officially approved affecting the ability of community groups, entrepreneurs, associations and NGOs to raise money. Being a student, Daavid ended up spending the majority of his time working on the campaign. He had originally been asked to help draft the law proposal, but he quickly got engaged in other aspects, looking at budget and fundraising for the campaign, researching case-studies and mapping target groups. While the campaign ended with successfully reaching the required 50.000 signatures for it to be processed in parliament, Daavid had by then spent all his savings and all his time on the campaign, neglecting his studies. He was exhausted, and although the experience had been successful, meeting new people, learning lots of new skills, he decided to leave the campaign and not take part in the lobbying of parliamentarians to ensure it would get passed. Overall he felt the required work to get an issue to parliament through the CI required an inordinate amount of voluntary work and time, only to face the possibility of being voted down in parliament.

Needs

A remuneration method to make volunteer work for the CI sustainable and rewarding.

User Story

As an activist involved in preparing and conducting CI campaigns I need to feel that my hard work and efforts are not for nothing and are being valued.

6.3.4.1 Hypotheses

We believe that by

creating a system for remunerating voluntary work for the common good

For

citizens Initiative activists

We will achieve

increased likelihood of continued participation in democratic processes, less burn-out

We will know this is true when we see

increase in the number and quality of Citizens Initiatives and positive feedback from CI activists

6.4 Additional use-cases across Europe:

Responding to the emergence of a broader interest in the development of the D-CENT project, the currency iteration and piloting process has been opened up to additional potential stakeholders. Where the use-cases look feasible, these are developed further, user requirements gathered and analysed to help uncover latent needs and outline possible implementation schemes. Currently, three additional use-cases have been identified and are in development. While in the early stages of engagement, an iteration process has been deemed viable. In particular, the commonality of needs in terms of remunerating voluntary work and rewarding participation to the common good invite to experiment different prototypes in view of finding a common code-base for solving the same type of problems. Due to the high innovative rate at which digital currency design proceeds nowadays, it is important to take into account the highest number of cases that can contribute in shaping, and possibly adopting the tools developed within D-CENT. Moreover, the engagement with communities in Italy (Milan) and the United Kingdom (Hull) will help fine-tuning community requirements, therefore perfecting the strategy for the upcoming design stages. Hence, the use-cases presented below will serve as a further basis for the design of Freecoin.

WeMake Milan is a makerspace equipped with machines and instruments (3D printer, laser printer, milling machine, sewing machine, etc.). They mostly share knowledge, networks, projects and tools amongst single individuals, non-organised makerspaces, enterprises, non-profits, associations, schools, universities, libraries and others who share their approach to production and dissemination. Run through a membership model, makers can sign up to WeMake for a minimum of one month. The membership includes machine-hours for the use of the equipment in the space. Research of financial capital revealed that investors are today less keen to fund cooperatives. Thus, in order to support the values of the sister association, WeMake makers chartered a private company that allows them to negotiate successfully with investors and secure the ability of applying for public bids dedicated to SMEs, and for tributary comfort. It is thus an enterprise and an association at the same time. The company's shareholders agreement stipulates that investors will not dispose of any dividends for the first five years of operation, in this way securing the financial sustainability of the social enterprise. Because the association is not allowed by law to create a company it fosters all non-profit projects by WeMake: education and dissemination of digital culture and technologies. As a founder of WeMake, Zoe Romano, put it: "it seemed that having a double-head was the solution in light of the economic situation in Italy". WeMake are currently attempting to register as an 'innovative start-up' in the Chamber of Commerce in Milan. Their activities mainly consist of events and initiatives for the Makers' community in Milan since 2011 on the themes of Open Design, Digital Fabrication and e-Wearables. WeMake face the same issues as many other makerspaces comprising mainly precarious workforce: due to inadequate access to finance they are unable to pay workers that deliver value to WeMake (e.g. preparing and publishing tutorials on a platform like www.instructable.com).

Macao emerged in response to precarious working conditions of cultural workers in the arts and entertainment industries of Milan. Initially the group developed as a concrete and proactive critique of the contradictions that exist in the city of Milano, where a high concentration of financial resources sits next to a decaying cultural heritage. Developing a notion of radical active citizenship the group decided to occupy the Torre Galfa, then Palazzo Citterio (a seventieth century building abandoned since the 1970s) for a period and then finally settling in a more permanent location in the city's former meat stock exchange in the East. With the more permanent base the project is now able to begin addressing the practical needs of precarious cultural workers by developing alternative models of cultural production. Run horizontally by the people involved, the space hosts co-working spaces, events, exhibitions and

workshops and is looking into expanding the network across other spaces that share similar values connecting up resources, equipment and skill-sets.

On March the 7th, 2014 in response to increasing requests for economic and financial support by disadvantaged citizens of Hull, the **HullCoin** team organised a workshop at the Hull Financial Inclusion Forum to introduce the very first UK local government operated crypto-currency. The main motivation was an acknowledgement of the extremely flexible methods in which crypto-coins can be traded in a highly dis-intermediated dynamic, akin to blockchain transfers, especially at the micro-economic level. The design of HullCoin started in August 2013 and resulted in an hybrid between the altcoin Feathercoin - in order to exploit GPU mining possibilities that the Litecoin client offers *vis a vis* the Bitcoin client (CPU based), and Ven - also here *vis a vis* Bitcoin: HullCoin is backed by a basket of commodities and this allows for less volatility and a far steadier price stability of the means of exchange. As of May 2014, Hull City Council has been actively mining with the intention of managing the system via an Android API synchronized with a central crypto-wallet. Its script-based GPU mining rig hosts two Sapphire R9 290X graphics cards running at 1.6 MH/sec (http://bit.ly/1jmvDxG). As for funding, the financial resources for the equipment did not come from tax-payer revenues, but as the result of a charitable donation (http://bit.ly/1jmvDxG and Lisa Bovill Interview, 15th May 2014). HullCoin as a VCS is intended to be part of the 'Hull People's Premium' scheme, the latter is a Council run program providing financial services to the people of Hull, i.e. managing their savings, and giving advice and aid on food, fuel and finance (members of the 'Hull People's Premium' are the very potential user base for HullCoin). In a document entitled 'Benefits and Digital Currency', drafted by Hull City Council's Welfare Rights Manager Lisa Bovill submitted to the UK Department of Work & Pensions, the HullCoin implementation process is currently facing the test with legislative authorities. While introducing their case for legitimation, still under scrutiny by authorities, the very designers of HullCoin describe the scenario in which the new payment system would operate, i.e. as a Type 3 VCS in the ECB classification with the caveat that HullCoin is unlikely to be paid regularly or as a substitute for or enhancement to wages under a contract of employment. Lisa Bovill, who remains very open with regards to the future of HullCoin, and in comparing the HullCoin with the spread of corporate loyalty schemes states that she *cannot see how social loyalty would fall to be less favorably treated than corporate loyalty by the state.* In sum, as David Shepherdson put it during a field interview with the HullCoin core development team, "the idea is to take Bitcoin and apply it within the city social context." (David Shepherdson interviewed in Hull on 15th of May 2014).

6.4.1 Group: Macao

Type
Macao

Reach
Initially approximately 200, potentially reaching in the 1000s when broadening across makers networks in the city and beyond

How will relationship grow
First event, the seminar on Money of the Common held in Milan on 21st and 22nd June 2014, then increasingly through the iteration process

How frequent will we interact
Periodic interaction with Macao lead users, increasing as iteration process begins.

Main Objectives
To establish networks for the sharing and exchange of skills, resources and means of production amongst precarious cultural workers with the aim of creating indirect income, higher turnover, accessibility to art creations while integrating direct income for those involved.

Background
As a diverse and broad group of cultural workers, a central aim of Macao is to experiment and develop new ways of producing, sharing and earning an income. Currently this is done mainly by developing and activating latent networks of people who share a similar approach, building resources and capacity together. Often doing much more with less, the group has begun a process of researching and rethinking money. Having hosted members of the Bitcoin core development team for residencies at Macao, a keen interest has emerged around the possibilities posed by digital currencies as a potential solution to facilitate the creation of circuits of exchange for immaterial goods, means of production (spaces, machinery) and art creations in order to increase cultural production.

Needs
A social / digital market place were artists and cultural workers can share resources, knowledge and goods and engage in internal crowdfunding initiatives

User Story
As a self-organised network of cultural workers we need a platform through which we can share and exchange skills, resources and goods

6.4.1.1 Hypotheses

We believe that by

deueloping a digital social market place

For

connecting contexts and workers who want to share skills, competences and cultural means of production

We will achieue

more capacity in the network to produce and distribute, locally, regionally and across Europe

We will know this is true when we see

a growing community and increasing productiuity and wealth amongst makers.

6.4.2 WeMake

Type

WeMake Milan

Reach

Approx. 200, with possibility to expand related projects in the city, reaching several 1000s

How will relationship grow

Initially through the iteration process, then expanding to other related networks and groups

How frequent will we interact

Periodically throughout the iteration process with ongoing feedback from the WeMake lead users and IT team

Tools

Arduino, 3D printing machines, wearable computing, RFID on smart cards and readers

Main Objectives

To develop a community amongst small working groups engaged in digital design and fabrication i.e. devices or projects related to ICT, by using the equipment present in the WeMake Milan working space.

Background

Membership is currently by invitation only, and new associates are invited to subscribe for minimum one month and for a steady period of time in order to ensure the necessary funding for processing the costs of machines use and maintenance. The membership package includes machine-hours that you can spend for using machinery in the space. Machine hours are held as vouchers "Candyes" that can be bought for Euros at a 1:1 conversion and held on an RFID smart card. In order to remunerate the voluntary work that the space depends on, WeMake would like to develop a digital version of Candyes. This includes remuneration for: a) formally welcoming new members: b) running courses on design techniques, hardware development, the machinery; c) in the spirit of FLOSS, create tutorials and documentation in the WeMake wiki (wemake.cc). After three months of enrollment, members earn Candyes and can either spend them as a discount (~30%) for the next membership fee or use them on the machines. Currently, R&D on Candyes is done by WeMake and by two web agencies (http://www.link-me.it/; http://bryan.it/) with the need for further assistance on the currency design and architecture.

Needs

A digital currency for equitably rewarding precarious work: paying for voluntary work within and for the makerspace WeMake (teaching fees for courses, tutorials, business coaching, etc.).

User Story

As a makerspace with very little available money we need a digital

currency that will allow us to reward or remunerate voluntary work done by and for our members.

6.4.2.1 Hypotheses

We believe that by

designing and implementing a internal currency system, Candyes

For

for the precarious workers at WeMake Milan

We will achieve

the monetary reward of voluntary working time employed for increasing WeMake value

We will know this is true when we see

an increase in the amount of knowledge produced and shared within WeMake
(a change in behaviour – more participation in the enhancement of WeMake value –measurable in tutorial, documentation materials, teaching events, etc.)

6.4.3 Group: HullCoin, Hull City Council

Type

HullCoin

Reach

Potentially up to 20.000

How will relationship grow

Initially through a co-hosted workshop with members of the CCIA, followed by an iteration process during the design phase.

How frequently will we interact

Periodically and increasingly as the iteration process begins

Main Objectives

Economic and social crisis relief for citizens facing difficulties; to encourage financial inclusion and sound financial decision-making; stimulate local trade and promote local events; encourage positive social action; promote digital inclusion; position the city in relation to emerging peer to peer financial exchange technology; to test the idea of a local currency that is digital in nature and creates additional value.

Background

The intention is for HullCoin to act as a catalyzer for the members of the publicly run local savings scheme 'Hull People's Premium' furthering their involvement in this club as well as a mechanism to remunerate voluntary work done for the broader good of the Hull community. The HullCoin tokens earned can then be spent in the local area for paying rent or acquiring basic goods, by setting up partnerships with for example local markets. Currently facing issues around national level taxation and risks of reduction in benefits for those earning HullCoin, the scheme is still in its early design and piloting phase.

Needs

A digital infrastructure for the HullCoin

User Story

As the HullCoin team of the City of Hull we need a reliable digital architecture for the HullCoin

6.4.3.1 Hypothesis

We believe that by

developing a social digital market place (API prototyping).

For

HullCoin recipients (Hull City Premium members)

We will achieve

a better reciprocity chain for the circulation of the currency

We will know this is true when we see

when app downloads and user engagement increases.

6.5 Lean Canvases

6.5.1 Lean Canvas 1: Municipal currencies

Problem

Citizen participation in new democratic platforms and processes (cf. Betri Reykjavik and Citizens Initiatives) takes a lot of time and energy and often leads to exhaustion and frustration from citizens.

People that have been hit by economic hardship are also facing cuts to welfare provision, struggling to cover basic needs.

Existing alternatives

SoNantes

HullCoin

Basic Income

Social Welfare

Solution

A municipal currency and social market place to remunerate voluntary work for the common good with for example access to additional services, or the ability to pay rent, utilities and basic goods.

Key Metrics

Number of wallets using the currency

Levels and frequency of trading

Poverty reduction in local areas

Increase in citizen participation in new democratic platforms

Unique Value Proposition

Relieve poverty and overwork by rewarding actions done for the common good

High-level concept

Bitcoin for the social good

Unfair Advantage

D-CENT is free to use

Close partnerships with local government institutions as well as key civil society organisations in each pilot country

Channels

Betri Reykjavik

Open Ministry

Digital wallets

Social market place

User Segment

Reykjavik Town Hall

Helsinki Town Hall

Hull City Council (HullCoin)

Betri Reykjavik

Open Ministry

Unemployed

Welfare recipients

Early adopters

Betri Reykjavik

Open Ministry

HullCoin

Cost structure

Free to use, open source

Revenue stream

Self-sustainable

6.5.2 Lean Canvas 2: Socially Controlled Commercial Credit Circuits

Problem

SMEs and independent producers have limited access to affordable and viable lines of credit streams – a tendency that has been exacerbated since the financial crisis.

Existing alternatives

WIR

Sardex

SoNantes

Solution

A Digital Social Currency architecture that allows for social control and management of credit

Key Metrics

Increase Local Multiplier Effect in pilot areas also measured in time-credits

Increase Velocity of Circulation of Currency

(Vt ={nT} / {M})

Decline in the unemployment rate

Unique Value Proposition

A scalable system for access to credit for those who need it the most, determined by the communities themselves

High-level concept

"Mining" for the social good

Unfair Advantage

D-CENT is free to use

Close collaboration with founders of EuroCat, Intercanvis and Helsinki Timebank

Channels

Eurocat

Intercanvis

Helsinki Timebank

CES systems

Digital wallets

User Segment

EuroCat

Intercanvis

Helsinki Timebank

Icelandic SMEs and freelancers

Early adopters

Eurocat

Intercanvis

Helsinki Timebank

Cost structure

Free to use, open source

Revenue stream

Self-sustainable

6.5.3 Lean Canvas 3: Reward Systems

<table>
<tr>
<td rowspan="2">Problem

With little and irregular revenue streams makers spaces and communities of independent producers are not able to remunerate the voluntary work required to run and sustain their spaces

Existing alternatives

Ven (ven.vc)</td>
<td>Solution

A reward system that allows makers spaces and communities of independent producers to reward each other for contributions in terms of work, skills or materials

Cf. Candyes in 7.4.2</td>
<td rowspan="2">Unique Value Proposition

Develop community loyalty and sustainability by rewarding internal contributions

High-level concept

A “nectar card” for makers spaces of communities of producers</td>
<td>Unfair Advantage

D-CENT is free to use

Close collaboration with Ouishare, WeMake and Macao</td>
<td rowspan="2">User Segment

Ouishare

WeMake

Macao

Made In Kallio

Early adopters

Ouishare

WeMake

Macao</td>
</tr>
<tr>
<td>Key Metrics

Level of subscription, use and uptake

Expansion of reward-types</td>
<td>Channels

Digital wallets</td>
</tr>
<tr>
<td colspan="2">Cost structure

Free to use, open source</td>
<td colspan="3">Revenue stream

Self-sustaining</td>
</tr>
</table>

7. Next steps: designing Digital Social currencies for D-CENT pilot implementation

The case studies presented in Part 1 and the personas built in Part 2 (derived from the lean inception sessions in early 2014) together make up the Ecology of Money within the D-CENT project. Evidence of unmet needs, problems, unused resources and the creative thinking that have developed in response to interview rounds frame the methodological foundations for the upcoming Digital Social Currency design in T4.4. The design process is directly informed by the social, political and institutional contexts and economic relations in each of the pilot experimentation sites in Spain, Iceland, Finland, and additional use-cases in UK and Italy through an on-going iteration process with the user groups described in this document (see D1.1). This final chapter will bring together Part 1 and 2 to form an overall analysis and lay out the roadmap for the development of a Digital Social Currency ecology that will embed in its architecture the diversity of moneys that can empower the D-CENT socio-economy as a whole.

7.1 What kind of Ecology of Money in D-CENT?

Ecology of Money is a notion that draws from theoretical ecology and offers valuable insights into the structural level at which money systems operate (Lietaer, Ulanowicz *et al.,* 2009 and 2010). In contrast to the evidently inherently non-viable 'monoculture' of national currencies, a sustainable ecosystem of currencies can prove more resilient in facing of economic downturns: "A vibrant diversity of [currencies] is more likely to protect us than a reliance on a single monetary monoculture that may fail" (North, 2010). The leading principle is to allow users to engage fully in the socio-economic life of their choice. The technical specifications resulting from T4.4 will be flexible enough for community developers to tailor-make features that are in line with users requirements and needs. It is possible to envision a scenario where a user engages in commercial activity with conventional money and a complementary currency in her professional life, while exchanging reward points earned through voluntary work in her free time and exchanged for public services. In addition to this, proprietary systems could also be incorporated, for example air miles could be managed on the same multi-currency digital wallet. The four currencies – conventional national currencies, commercial-credit complementary currency, reward social credits and miles – would be managed on the same device running apps, in this case merging both proprietary (conventional money and miles) and open source (commercial credit and rewards) systems.

As explained in the next sections, an Ecology of Money therefore entails the careful management of a money system in a sustainable way, both by mimicking the structure of natural ecosystems and by adding new currencies through transaction-optimal socio-economic practices. Hence, in an attempt to federate already existing currency solutions with newly designed ones under a shared code-base, the result of the analysis in this chapter will show the possibilities, advantages and drawbacks of design implementations emerging from cross-pilot and cross-cases comparative analysis. The exercise will contribute to the advancement of the state of the art in digital currency design.

7.2 The theoretical basis of the D-CENT Ecology of Money

What are the general laws that govern natural ecosystems as well as low-complexity systems such as digital money systems? Process ecology includes the following three non-controversial postulates, onto which the following analogy with monetary systems is based (Ulanowicz, 2009)

> I. The operation of any system is vulnerable to disruption by chance events.
>
> II. A process, via mediation by other processes, may be capable of influencing itself.
>
> III. Systems differ from one another according to their history, some of which is recorded in their material configurations.

The corollaries relating to those three postulates state as follows: first, an exclusive focus on fixed laws (for example 'price stability' in monetary policy) is an obstacle for understanding whole systems and, therefore, the emphasis should be shifted toward the "description of processes, [which] exert the power to return nonrandom response to random inputs" (*Ibid.*) Secondly, process ecology demands a further important philosophical re-formulation of assumptions: from the Cartesian dualism of matter and soul toward a Heraclitean world-view centred on the study of processes regarding flow systems (*Ibid.*): from objects to 'configurations of processes' as exemplified by the stock-flow consistent modelling methodology presented in Part 1(section 2.2). Finally, the corollary to the third axiom of process ecology states that "patterns and forms in the living realm result from transactions between agonistic tendencies" (*Ibid.*) Otherwise, systems become non-sustainable by virtue of pushing one tendency too far at the expense of the other.

Mathematics borrowed from Information Theory provides a tool for rigorously studying such agonistic tendencies and to give a mathematical demonstration of the "analogy" between ecology in nature and in money systems. Lietaer argues that "a system's capacity to undergo change (H) has two components: order and the absence of order ($H = X + \psi$)" (Lietaer, Ulanowicz et al., 2010):

> • 'X' is "mutual constraint": this component "quantifies all that is regular, orderly, coherent and efficient. It encompasses basically all the concerns of conventional science"
>
> • 'ψ' is "conditional entropy" or " "uncommitted potential": it represents the "incoherent and inefficient potential behaviours that escaped the scrutiny of science". In critical terms, it states that disorder is a key feature of a system, if it is to endure in the long run, "to adapt to changing environment, or survive unexpected challenges" (*Ibid.*).

Optimal systems, those that endure in nature, structurally result from a combination of efficiency (measured by the streamlining degree of 'node-to-node pathway steps') and resilience (measured by the number of 'links per node'). In nature, too much efficiency leads to brittle systemic configurations, while too much resilience leads to stagnation. On the one hand the natural ecosystem offers uncountable examples of natural ecosystems that have been successfully enduring in the long run with both efficiency and resilience steadily in the value range of the window of viability. On the other hand, artificial systems such as conventional monetary systems show simultaneously high efficiency, but very low levels of resilience because the latter is not included as a valuable parameter in Orthodox Monetary Theory for systems design. As Lietaer put it:

> "In ecosystems, as in economies, size is generally measured as the total volume of system throughput/ activity. Gross Domestic Product (GDP) measures size this way in economies and Total System Throughput (TST) does so in ecosystems. Many economists urge endless growth in size (GDP) because they assume that growth in size is a sufficient measure of health. GDP and

> TST, however, are both poor measures of sustainable viability because *they ignore network structure*. They cannot, for example, distinguish between a resilient economy and a bubble that is doomed to burst" (Lietaer, Ulanowicz et al., 2010).

Since money should be first an essential medium of exchange in economic transactions, Lietaer develops the analogy further by arguing that money "is to the real economy like biomass in an ecosystem". Accordingly, monetary orthodoxy focuses on the 'node to node pathway steps' of the network resembling the monetary system, while there is an underestimation of the importance of having a sufficient amount of 'links per node' a sustainable complex flow system to develop. The result is that low diversity of moneys is the catalyst for high efficiency at the expense of an optimal level of systemic resilience. In other words, increasing efficiency triggers an increasing brittleness rather than reducing it (i.e. the magnitude of bubble bursts increases exponentially for each cycle).

Therefore, given that another monoculture of currencies will resemble the present systemic framework without improving it, a main parameter in the design of an alternative framework of the present monetary system will be to increase systemic diversity. More diversity means

> "an increase in structural interconnectivity with the deployment of several types of currencies [put in circulation] among people and businesses to facilitate their exchanges, through the implementation of [community] and complementary currencies. [These] different types of currencies are called 'complementary' because they are designed to operate in parallel with, as complements to, conventional national moneys" (Lietaer, Ulanowicz et al., 2010).

Thus, the implementation of an ecosystem of different types of currencies will frame the structure of D-CENT digital payment system and social market place, lowering risk at the systemic level in both pilots and use-cases sites. Put it in another way, they are negotiable instruments designed in order to facilitate trading by virtue of enhanced interconnectivity of the system as a whole, especially in those situations in which the supply of conventional national currency is tight.

7.3 Common themes emerging from an analysis of Part 1 case studies and Part 2 use cases

A comparative analysis of the case studies in Part 1 and the use-cases in Part 2 brings to light common themes across geographical locations. The Swiss, Italian and two French case studies show economic, social and institutional design solutions for complementary currencies. The WIR system and the *Sardex* both show the high degree of resilience and scalability that dual-currency systems (i.e. either Swiss Franc and WIR or Euro and SRD) grant. Furthermore, the SoNantes demonstrates the possibility for a higher involvement of citizens within a complementary currency scheme run in concert with local authorities and local banking players, therefore promoting sectorial resilience. Moreover, the *Sol-Violette* indicates that citizens can participate within the decision-making dynamics of the currency system affecting their economic lives while fostering institutional diversity. From the perspective of diachronic analysis that will partly frame design processes of the Digital Social Currency platform, there is a trend that links proto- (WIR) and digital (*Sardex)* B2B counter-cyclical economic circles to an ever increasing level of cooperation among the various stakeholders (SoNantes) that begin to develop new governance models and socially oriented financial vehicles (*Sol-Violette).*

These common themes form the basis for building - *structurally* - more interconnectivity not only among the participants to the D-CENT Social Digital Currency platform but extended to those communities

already operating: *Sardex, SoNantes, Sol-violette* and HullCoin.[28] The different cases outline the existence of common socio-economic needs and constellations animating the efforts toward solutions to a common problem - the consequences of the last financial crisis - that they are facing. In order to manage complexity in the context of the D-CENT project, the analytical process will focus on three main areas of interconnection among the theories and best practices coming from the case studies and use-cases and the group and user personas emerged by qualitative data gathering through LEAN-UX methodology applied in each pilot.

The following analysis will show overlapping features, where the research on case studies (Part 1) and use-cases (Part 2) point towards the design of a Digital Social Currency platform that will supply code-bases for developing, respectively:

1) *Municipal currencies* in Iceland and Finland, inspired by the case studies from France (SoNantes) coupled with the use-case in the United Kingdom (HullCoin)

2) *A clearing system* for the social control of credit and regional scale commercial exchange that EuroCat/intercanvis in Spain and SME-freelancers in Iceland demand, thus mimicking best practices the Swiss WIR, the Italian Sardex and the French SoNantes systems.

3) *A reward system* that Ouishare, Betri Reykjavik Your Priorities and Citizens Initiative in Finland shares with Solviolette, WeMake and Macao.

These will be outlined in more detail for each pilot country below.

7.3.1 Municipal currencies

The case studies from France (most notably SoNantes) coupled with the use-case in the United Kingdom (HullCoin) give a leading route for developing these types of complementary currency on the Digital Social Currency platform. In Iceland, interview rounds and surveys revealed needs of citizens such as activists or the unemployed to have their voluntary work recognised and rewarded. A method to do this would be to integrate their political and socioeconomic participation as citizens with the services provided by the Town Hall in terms of remuneration of voluntary work, often serviced to the public. Similarly, in Finland, also in the corridors of the Town Hall democracy unit at Helsinki City Council, discussion related to the spectrum defining a reward or remuneration system for citizens' participation and voluntary work. This correlates with what is happening in Nantes, where the municipality will run the SoNantes scheme. Even more relevant, in Hull, experimentation with crypto-currencies mined for the common good shows a huge step in the direction of city-level socio-economic initiatives that merge the toolkit of complementary currency design with the technical framework of digital currency development. By virtue of qualitative data gathering in pilot countries, the design of Freecoin will prototype and co-design with pilot implementation of complementary currencies for targeted residents in Reykjavik or Helsinki. The design in T4.4 will also take into account the experimentation on new forms of digital currencies derived by Bitcoin-based protocols in order to increase the impact that the notion of social proof-of-work can have in real world experiments.

[28] The open source nature of the tools developed in D-CENT virtually includes also the Brazilian case on Banco Palmas in the list of potential candidates for adoption of D-CENT tools.

7.3.2 Clearing system: Regional scale commercial exchange systems through social control of credit

The second strand emerges from the need to couple participatory democracy with regional economic development. A historical comparison with one of the case studies presented above may exemplify better the relevance of the theoretical framework presented in the previous section. The WIR case emerged after the Great Crash in order to fix the following Great Depression during which European countries faced hard times and the Swiss economy experienced a puzzling situation from 1929 to 1932: In this period of time, worldwide bank deposits plummeted while in Switzerland the volume remained nearly unchanged. According to Studer, the paradox resulted in the following vicious circle: "on the one hand, far too little money was flowing into public demand for goods and services that would create jobs, while on the other hand a lot of money remained on deposits in the bank" (Studer, 1998) With the decline of node-to-node pathway efficiency, the Swiss economy directed itself toward total stasis and eventual collapse. The impressive reaction to such slow velocity in the circulation of money came from the 16 founders of the WIR Economic Circle Cooperative. They enhanced the like per node diversity of the system and the model is still existent and resilient.

Similarly to what is happening in Spain with the EuroCat and Intercanvis and in the Icelandic SME and freelance sector, such group of businessmen chose a "self-help route, a union of small-medium sized businesses with the goal of reducing underutilised capacity through a cashless barter system. This barter was not to replace the accustomed money commerce but to complement it, thus providing genuine increases in turnover". (*Ibid.)* Together with the Swiss WIR clearing B2B model, its heirs, Sardex and SoNantes, give a solid basis onto which build with state-of-the-art digital protocols for the transfer of value in the pilot site EuroCat. Especially Sardex is relevant for the incubation methodology (brokering) regarding the development of a decentralised and resilient inter-trading barter system for Intercanvis.

In the design phases, the Social Blockchain will be tested against both systems in order to verify to what extent EuroCat and Intercanvis could share a common Digital Social Currency platform. The same digital currency framework will be applied to framing currency solutions for SMEs and freelancers in Iceland. In parallel, this social currency mechanism could also benefit students to increase their spending capabilities as they prepare to enter the labour market, or flexible and casual workers such as freelancers that don't have a continuous income. The design team for the Digital Currency Pilot will monitor the developments of and increase the scope of inquiry on the possibilities that models such as HullCoin and *Sol-Violette* can offer for this and similar *personas* across different pilots.

7.3.3 Reward systems: rewarding participation

Liquid democracy traced the watershed between traditional political representation and new crowd-sourced forms of political and civic engagement. In this third strand, direct participatory democracy and direct engagement in the work place intersect. Indeed, on the one hand Your Priorities in Iceland and the Democracy Units and Open Ministry/ Citizen Initiative in Finland are looking for tools that reward the political engagement of civic activists, with the additional possibility of using such reward credits as a currency since it generates positive social value. As the lesson from the *Sol-Violette* case study documents, a project including a complementary currency starts to function when the socio-economy into which it should flow is engaged in the development and dynamics of their territory. Both Your Priorities and Open Ministry/Citizen Initiative present high levels of participation in their respective socio-economic contexts. In the Icelandic case, users of the participatory democracy platform will have the possibility to experiment with the design and prototyping of a social proof-of-work. The idea is to

link spending capabilities of remunerated participants only after they participate more to democratic deliberation or to the activation and management of citizens' campaigns and civic actions.

Similarly, albeit in a different context, Ouishare in Catalonia is also in the need to adopt a reward mechanism for the remuneration of co-workers that contribute to the enhancement of the value of the organisation. In these respects, use-cases WeMake and Macao offer elements for solving the same set of problems. For instance, WeMake 'Candyes' vouchers are thought of as a reward system for co-workers engagement, therefore representing a set of experimental tests that will inform the design of Ouishare reward system. During the design phase, user-centric prototyping will give the coordinates for framing the reward system more adapt to the needs of these communities that share the same socio-economic conditions. In this case, the social proof-of-work will be tested against reward incentives that arise from participation to the development of a co-working space, which also includes the production and delivery of services and sharing of skills and knowledge.

In sum, either by earning rewards through civic participation and spending them in the socio-economy or by earning them via participation in activities that increase the value of co-working space and then spend them within the networks affiliated are the class of problems that D-CENT design for the Digital Social Currency platform will help users to address.

2.4 Preliminary conclusions

Alternative and complementary currencies present themselves as a remarkable and desirable improvement to monetary economics with regards to whole system's sustainability. Interconnectivity among different possible currencies substantiates a system more resilient than one presenting a unique type of currency. In D-CENT, the Digital Social Currency is being conceived as the element for catalysing productive processes, allocating resources and more generally enable a decentralised, open digital market based on the commons. In this respect, structural issues matter the most: "in economies, as in ecosystems and living organisms, the health of the whole depends heavily on the structure by which the catalysing medium, in this case, money, [in another case, biomass n.d.r.] circulates among businesses and individuals." (*Ibid.*) The cases presented above relate to different network structures and different socio-economic contexts but share permeable values, and the goal in T4.4 will be to strengthen best practices and implement experimentation at micro-to-regional levels in a federated manner. The development process in the design phase in T4.4 will help prioritisation and organisation of community involvement in Freecoin prototyping. As a result, it is premature now to indicate a preferential line of design development. In fact, all the three abovementioned strands (municipal currencies; clearing system; reward system) and the possibility to structure them around the same Social Blockchain indicates that the following has to be thought of as synchronic analysis to inform design choices, rather than prospectively stating them. The theoretical framework presented in the previous section substantiates this approach: interconnectivity among different possible currencies advances a system more resilient than one presenting a unique type of currency. Our urgent concern is sustainability, increasing resiliency, and democracy. Conscious of the way technology systems can facilitate the representation and circulation of values within societies, we individuate in Free Software the ethical movement that has achieved the most in this direction, producing a vast amount of useful code-bases and related literature.

Finally, the team devoted to the design and development of the Digital Social Currency platform will help pilot communities with liaising activity that will strategise and systematise the relation with external stakeholders such as local governments, local banking institutions, the business sector and non-profit players as relevant in each pilot context. All these elements will take into account the findings of the

participatory action research in Part 1. In turn, to engage grassroots communities of developers, we intend to publish free and open source software, packaged in a standard way and documented, to help people deploy D-CENT tools to address these processes within different contexts. Anyone with enough curiosity should be able to establish routing nodes for the communications needed to run the two end-points of economic exchange: the confidential conversation and the agreement. The first is achieved applying grades of anonymity and privacy, the second is achieved using a blockchain of contracts. This technical social currency design will be described in full details in the next deliverable (D4.4) where the Freecoin architecture and its pilot implementation will be fully documented as the outcome of the co-design process described in this document.

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Appendix 1

Money of the Common and guaranteed social income[29]

Marx critique of Proudhon: first controversy on money of the common

Some of the methodological elements linking together money and division of labour were underlying Marx's critique to the Proudhon's proposition to create a credit money denominated in hours of labour. The Proudhon's reform was aimed at weakening the prevailing relations of production by extending the funding of petty production. The issue of labour-money by a Popular Bank consisted actually in directly conferring to the individual producer's labour its quality of social labour. Proudhon and his disciples lamented indeed the privilege owned by precious metals in the circulation of commodities. They were convinced that the high interest rates, notably during the crises, were only due to a kind of monopoly of the possessors of precious metals on the means of payment of the society. By affording the producer to directly exchange the product of his/her labour for a monetary equivalent expressed in hours of labour, the pretensions of possessors of money would be abolished until the interest rate would be nil. The point was not only to euthanize the rentier as in Keynes but to afford the producer to own the whole product of his/her labour under the form of exchange coupons. Thus labour and money of the common would be identical since all the products of private labour would play the role of money.

In reality, the reform devised by Proudhon was based on petty production at a period where the progress of division of labour and the extension of capitalist mode of production were marginalizing it (Dardot and Laval, 2012). Thus the free credit financed by labour-money would have only concerned a small fraction of the working population who would have reproduced itself at the margin of the increasing hegemony of capitalist production. The reform did not touch at all the basis of the monetary power of capital on labour, namely that through which the labourer is forced to « to offer for sale as a commodity [his] labour-power, which exists only in his living self » (Marx, 1887, p. 117). Within this framework, the mutualistic project of free credit would have risked to be taken over, as Napoléon III tried to do with the setting of popular savings banks (Lucarelli, 2013).

Moreover, according to Marx issuing of labour-money, to the extent that it came to confer to all commodities the quality of money, denied not only the financial power resulting from the monopoly of precious metals and from capital on the workers' labour, but the essence of money itself. For what is money if not the objective representative of value and thus of the social labour time congealed in the commodity? If the individuals exchange the products of their labour for money, it is precisely because they do not directly produce social labour. That is the reason why within the conditions of market production, the quality of social labour is embodied in an objective form of labour, commodity or money.

[29] Laurent Baronian and Carlo Vercellone.

But not only a money measured in hours of labour removes the difference between price and value which is inherent to market economy and thus supposes the balance between supply and demand, production and consumption; not only it denies the development of the labour productivity which would permanently increase its power of purchase and the financial burden of debtors. It also denies more profoundly the particular nature of the social organization of the market production in which labour never directly exchanges for labour but in which productive activities combine each other indirectly through exchange of labour products as commodities and become social labour in this way (Marx, 1980).

Marx called this reform utopian insofar as it attempts to abolish the basic features of the market production while keeping the form of exchange corresponding to this mode of production. This reform consisted indeed in avoiding the drawbacks of a mode of production based on monetary exchange just by changing the means of exchange and measure unit of commodities. Therefore, either the reform would only touch a minor part of the social production and benefit a small number of independent producers between whom the central bank would intervene by buying and selling their products for labour-money. Or it would concern the whole of social exchanges, in which case it would ask a sudden transformation in the existing relations of production. « If every such transformation of circulation were itself to presuppose changes m the other conditions of production and social upheavals, that would of course be the end of the doctrine which advocates smart gimmicks in the sphere of circulation in order to prevent changes from assuming a violent character on the one hand, and on the other to cast the changes themselves in the role not of the premise but on the contrary of the gradual result of reforms in the sphere of circulation. » (Marx, 1986, p. 60). As a matter of fact this kind of monetary reform would make the central bank as the universal purchaser and seller of the produced commodities. Through its issuing policy, the Bank indeed would decide to which products of labour conferring the quality of social labour and that function would mean controlling the production of these goods itself. As a gosplan, it would be « the despot governing production and managing distribution » (Marx, 1986, p. 93).

In order to come back to the money of the common, that money would be different from the Proudhonians' time-sheets, since it would circulate inside not a community of independent producers but inside a society of producers cooperating together. In these conditions issuing of this kind of money could not so much change the current relations of production than accelerating the changes occurring within these relations of production. Moreover, as a policy, i.e. as a conscious and deliberate action, issuing of money of the common would mean that the society tends not to subject itself to social production as fate foreign and independent of individuals (as shown dramatically in crises) but rather the opposite to subject the production to « the individuals who manage it as their common wealth. » (Marx, 1986, p. 96). However this reversal of relationships would change the nature of banking institutions of the society. In these conditions indeed, money of the common would only be an account unit issued by « a board [carrying] on the book-keeping and accounting for society working in common » (Marx, 1986, p. 93) and would lose its monetary quality as a universal representative of the values of commodities. The Proudhon's wish would be granted since labour itself would become universal money, provided it be posited as « not particular but general labour from the outset », i.e. « as part of *general production* » (Marx, 1986, p. 108).

In other words, the Marxian critique of the Proudhonian's project, as shown in his reaction to the Paris Commune, is not a Statist and centralizing opposition to mutualist forms of organisations, but an opposition to the danger of their subordinated embeddness to the prevailing logics of capital and State.
For Marx, the crucial question concerned the way capitalism restrain labour within the institutions of a monetary production economy, by opposition to petty production where money is just a means of exchange.

The logic of capitalism is indeed very different from the formula Commodity-money-commodity (C-M-C) to which the Proudhon's project implicitly refers. It is true that C-M-C still play a crucial role in the enlarged reproduction of economic and social conditions of capital accumulation. But this role has nothing to do with the independent producer but is rather part of the reproduction of the labour power where the worker exchanges its wages for consumption goods. Within this circuit, the reproduction of the labour power is subjected to the general formula of capital in its economic form as well as in its concrete existence.

We can still learn an important lesson from the controversy between Marx and Proudhon. Only by starting from the capital/labour opposition, where the law of value is dependent on the law of surplus value, is it possible to conceive the idea of money of the common, i.e. a money not based on equal private labours but on the challenge of the monetary constraint that defines the formal subsumption of labour power to the capital and wage relationship.

From the theory of the monetary circuit to the problem of the Common

The contribution to the theory of monetary circuit is to have related the capital/labour relationship to the asymmetry opposing two social classes in their conditions of access to money.

On the one hand, the capitalist class is able to get money independently of its labour and to determine the extent and orientation of the production thanks to the property of means of production and the control of monetary creation. To paraphrase Kaldor and Kalecki, this class earns what its spends and thus may collectively control the mechanisms of its indebtedness. On the other hand, the working class is forced to sell its labour power to the capitalist class in order to get money and thus an income. Therefore it just spends what it earns and this relationship to income limits its access to consumer credit. This relationship thus explains the increase of capital power on labour resulting from workers' indebtedness even when the conditions of credit are speculatively relaxed as in subprime credit.

Let us note that the main somersault of commodity is the one made by the labour power. As the latter is restrained in the circuit C-M-C, its access to money is dependent on capitalists' anticipations on the volume of production and thus on jobs judged as profitable.

Therefore the function of money as a store of value dominates the conditions of monetary circulation within this economic system. It is this function that permits the institution of the logic of surplus value in which « The circulation of money as capital is […] an end in itself » (Marx, 1887, p. 105). As the general formula of capital clearly expresses it, valorization of capital is a process without limits insofar as its goal is not use value but accumulation of abstract wealth represented in money.

For capital, commodity and production are just means to reach this goal in order to constantly increase its power of command that money confers to on society and labour, precisely by permitting it to appropriate directly or indirectly the surplus value.

It goes without saying that the enlarged reproduction of capital has to face market constraints weighing on the development of social production. Actually capitalism has always sought to overcome the limits that the law of value imposes on the production of surplus value through its system of money and credit. Even the bill of exchange, by allowing transfer of commodities before payment in money was the main driving force of all the great crises that have shaken the English industry during the first middle of the 19th century. But it is above all since the end of the gold standard system that money creation is not

conditioned by the amount of metallic reserves available in the safes of central banks and seems to completely depend on credit demand. But money creation through deposits at the disposal of capitalists actually consists in antevalidating (de Brunhoff, 1979) a production still to come under the condition of completing a circuit dependent itself on the realization of surplus value. Certainly money is created ex nihilo as an equivalent of virtual commodities but it becomes a general equivalent only through the effective selling of the produced commodities. It is certainly an endogenous money, but banking money is endogenous to capital insofar as its creation depends on realization of surplus value. Through monopoly of money creation, « *capital*, as said by Robinson and Eatwell, is the command over resources which the capitalists use to gain command over labour » (1973, An introduction to Modern economics, McGraw-Hill, Maidenhead, p. 14).

Thus the power of control on money creation is finally the key factor that allows the power on labour and structures social relationships not only because it goes hand in hand with the property of means of production. But because this power on money condenses and crystallizes the power on human beings, especially today where the power of finance goes hand in hand with an increasing dematerialization of means of production which are always more incorporated into the living body of the labour power as expressed by the oxymoron: immaterial capital.

Although the theory of monetary circuit stresses on the monetary asymmetry in the reproduction of capitalism, it leads to favour a static and objectivist vision of market and monetary constraints weighing on its completeness of the circuit. The constraints weighing on realization of surplus value for the accumulation of capital on the one hand; the constraints weighing on the conversion of the labour power in wages which is dependent on capitalists' anticipations on the volume of profitable employment on the other hand. Few are the contributions focusing on the way money is in fact the antevalidation of commodities *still to be produced and thus of a surplus value which has not been yet extracted.*

But only this aspect permits a dynamic view of the system that may define the historical changes in the division of labour and the forms of constraint to the wage relationship on which depends the possibility of the Common. For the purchase and selling of the labour power concern the disposal of an amount of time during which the worker is formally at the disposal of the capitalist, and not his/her effective labour. Consequently, for capital there is a structural uncertainty not only on the conditions of execution of the labour contract, but also and more basically on a conflictual field where the economic and socio-political aspects of the capital/labour antagonism cannot be dissociated. First because the managers of the labour process are able to impose the intensity and quality of labour. Second because those who possess the productive knowledge are in conditions to manage the production, i.e. to determine the organization and social ends of labour, by building up again the possibility of the Common as a mode of production. This would be a mode of cooperation reintroducing democracy within production in opposition to the principle of hierarchy in the capitalist firm as well as to the bureaucratic logic in the public administration.

The importance of this conflictual dynamic concerning the control of intellectual powers of the production explains why the development of capitalist division of labour after the first industrial revolution has consisted in trying to deprive labour as far as possible from its cognitive dimension and to transform it to a pure mechanical, repetitive, impersonal activity and totally subjected to the science incorporated into the fixed capital. Therefore in the development of industrial capital, the formal subsumption of labour to capital is coupled with the real subsumption: it leads not only to reduce the uncertainty on execution of the labour contract, but also to exclude within production the possibility of the Common (as a product of the labour power's voluntary cooperation) notably because of the inappropriable nature of « … » (1988, …), as Gorz had thought at one time.

However this trend which found its historical achievement in the large corporation at the era of Mixed Economy, will always remain imperfect since a new kind of knowledge will be reformed at the highest level of the technical and social division of labour. In the historical circumstances leading to the crisis of Fordism, this dynamic has been expressed through the conflicts that led to the creation of a diffuse intellectuality and to the development of collective services of the Welfare State (health, education, research, etc.) beyond the compatibilities of the Fordist regulation (Monneir and Vercellone, 2010). Thus, the conditions underlying an economy based on the motor role and diffusion of knowledge have been set out according a dynamic that seems to realize many trends involved in the Marxian hypothesis of *general intellect*.[30]

However a knowledge-based economy precedes logically and historically and opposes to the formation of a cognitive and financialized capitalism. The latter is the result of a process of restructuring through which capital tries to appropriate and subject to its parasitic logic the collective conditions of knowledge, by suffocating the potential of emancipation of the general intellect society. Within this framework the central issue of capital valorization and forms of property is the rentier appropriation of the Common and transformation of knowledge into a fictitious commodity (Negri and Vercellone, 2008).

Therefore in contemporary capitalism the monetary aspect of the subjection of labour to capital is all the more strong and crucial that the rise of cognitive labour permits the productive cooperation to free from the capitalist management. Certainly nothing guarantees the transition from potential autonomy to real autonomy of the labour power. But at the level of the social labour process, the subsumption of labour to capital becomes chiefly formal again. It significantly goes hand in hand with a dramatic reinforcement of the monetary constraint of the wage relationship which is notably accomplished through the questioning of the Welfare guarantees and the increasing precariousness of the conditions of remuneration and employment. At the same time, everything goes as if a movement of autonomisation of capital under its abstract, mobile and flexible form of money were corresponding to this movement of autonomisation of labour cooperation. The power of capital on society seems to rest more and more on the control of monetary and financial mechanisms often without filling any real function necessary to the organization of the production process.

The conditions necessary to think the Common arise precisely at this development level of the division of labour in which the rise of collective intelligence goes hand in hand with the reinforcement of the monetary constraint to the wage relationship.

[30] See for a detailed analysisi of this Marxian category Negri (1996), Baronian (2011) and Vercellone (2007).