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ONLINE PLATFORM
PIE NEWS
SINCE 2016
FOSTERING COMMONFARE

USER RESEARCH REPORT AND SCENARIOS

D3.1

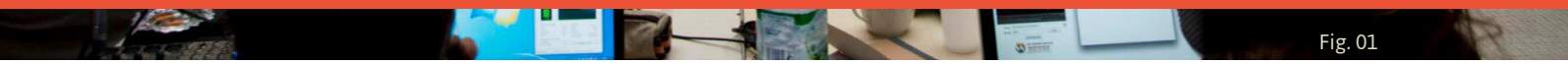

Fig. 01

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This deliverable reports on the empirical research carried out as part of Work Package 3.

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EXECUTIVE SUMMARY

Fig. 02

This document reports on research into possible aspects of social engagement and dynamics systems on commonfare.net as the platform evolves to include the story-telling and support hubs and beyond.

The aim of this research was to furnish the WP3 team with information and evidence to guide the design of three platform systems: "reputation" mechanics, digital currency circulation, and social network dynamics analysis.

The report describes findings from four main strands of empirical research conducted by AU and Dyne, then considers how social network dynamic analysis may be used to both facilitate the functioning of the "reputation" and currency systems and encourage sustainability and growth in the platform.

The four main strands of empirical research are: a survey of existing, conventional reputation systems (sections 2.1.1-2.1.6); a partial ethnography of existing discussion forums associated with online support groups for people experiencing unemployment and financial problems (section 2.1.7); in-depth interviews with potential commonfare.net participants in the pilot sites (section 2.2); and a trial co-design and implementation of a digital currency system within the Italian pilot context (section 2.3).

The main findings of these different types of field research can be summarised as follows:

- Reputation systems are common features of transactional/trading sites and expert Q&A sites, but less frequently feature on community support sites.
- Conventional reputation systems are almost always based on a highly individualistic, acquisitive model which effectively commoditises "reputation" and risks hollowing out cooperation and trust at the human level. Such systems seem to be philosophically at odds with the principles cooperation and contribution to the common good inherent to a commonfare approach.
- Those experiencing PIE conditions in the target groups at the pilot sites have varied experiences and aspirations, but there are some commonalities in terms of values and relationships. In particular, relationships with the State, bureaucracy and the corporate world seemed to be widely perceived as negative or, at best, neutral through irrelevance; and qualities such as independence and dignity are highly valued.
- Social capital in the form of family and friendship ties is critical to many people's management of precarity, as is a sense of social contribution or vocation. Users of commonfare.net are as likely to be seeking affective support and a sense of community as practical help.
- In general, PIE conditions are likely to be associated with stress, anxiety and depression. We therefore need to avoid creating yet another sphere (that of online reputation) in which people can experience poverty and precarity.
- The co-design and trial of a digital currency system in a community at the Milan site showed how effective this process can be in meeting a group of users' needs; however it also raised questions about how to transfer and grow this tailor-made system to less well-defined groups with less well-defined tasks to complete and be rewarded for.

All these factors seemed to suggest that we should move away from conventional notions of individual and accumulating reputation, towards a system where reward is for interactions that contribute to the building of the commonfare. This will be particularly important given the intention to convert "reputation" (or better, commonfare contribution) metrics into digital currency.

At the same time as this empirical research effort was

under way, WP3 team members at CN-FBK were exploring the possible mechanisms for creating and encouraging dynamics within the commonfare.net network that might lead to growth and sustainability, for example by optimizing information diffusion and opportunities to create supportive social connections. These, together with ways in which measurements of social network densities and flows might be used to measure commonfare contribution, to understand the digital currency flows and to look for instances of misbehaviour or platform manipulation/ currency abuse, are presented in Chapter 3.

Finally, six personas and associated scenarios developed on the basis of the research described in Chapters 2-3 are presented in Chapter 4. These personas and scenarios will be further used for the design and associated work which will be present in the second deliverable of WP3 (D3.2).

The range of research approaches and sites reported in this document has provided WP3 with a rich and solid basis on which to develop the concrete proposals for mechanisms and interface that will be presented in D3.2.

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ACRONYMS

ACRONYM	MEANING
AU	Abertay University (United Kingdom)
BIN	Basic Income Network (Italy)
CMS	Centre for Peace Studies (Croatia)
CN-FBK	CREATE-NET - Fondazione Bruno Kessler (Italy)
DC	Digital Currency
DNA	Dynamic Network Analysis
DYNE	Stichting Dyne.org (the Netherlands)
M-ITI	Madeira Interactive Technologies Institute (Portugal)
MdC	Museu da Crise (the Netherlands)
PIE	Poverty, Inequality and unEmployment
Q&A	Question and Answer
RS	Reputation System
UNITN	University of Trento (Italy)

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1. RESEARCH AIMS / WP3 CONTEXT

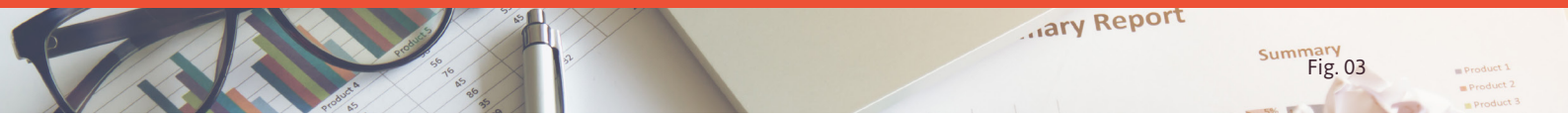


Fig. 03

The PIE News project is dedicated to the development of a web-based platform through which to promote and facilitate commonfare, an alternative approach to social welfare (Fumagalli & Lucarelli, 2015). A commonfare approach is grounded in the recognition that the social and economic are not separate spheres, but instead are inextricably and intricately connected. Key features of a commonfare approach include the reappropriation of the common (including immaterial as well as material goods), provision of a Basic Income to all members of society and development of alternative, complementary financial circuits for the management and circulation of social wealth.

The commonfare.net platform is planned to include a range of features and aspects that relate to the commonfare approach. Work Package 3 is focused on developing suggestions and designs for some aspects that are expected to be critical for building the commonfare. It consists of three research and development strands, each being primarily the responsibility of different institutions:

- Reputation system (RS) - Abertay
- Digital currency (DC) – Dyne
- Dynamic network analysis (DNA) – CN-FBK

Because it is anticipated that those engaging with the platform are likely to be geographically separated (and potentially complete strangers), it will be important to develop an environment in which people feel they can trust (and in which they feel they can trust each other). The original idea set out in the project proposal was for a reputation system, similar to those already implemented in various web-based contexts, that would facilitate trust-building among users of commonfare.net. In addition, it was envisaged that reputation metrics could be used to determine income levels (beyond the Basic Income) for individuals in the site's crypto-currency. As will become clear in succeeding chapters, the empirical research conducted for this work package has led to a reformulation of the reputation system idea, so that trust-building and reward are more weakly coupled. Instead, we propose to augment the Basic Income on the basis of contribution to the commonfare.

The circulation of a digital currency is another critical component of the original proposal. The intention is to use this to provide registered users with the Basic Income, and to create one of the alternative financial circuits mentioned above. In addition to the Basic Income, those engaging with the site may be rewarded with additional currency according to metrics (to be determined in WP3) relating to activities recorded on the platform. In the original conceptualization, these were planned to be reputation metrics. However, as the project has progressed, it has become clear that it is interactions that contribute to the commonfare, rather than individuals' accrual of reputation, that should be rewarded.

Finally, dynamic network analysis (DNA) features may serve several purposes on commonfare.net. First, they may be used to build sustainability into the platform, by maximizing its utility and fit for individual users (through, e.g., recommendation and matching systems) and by encouraging participation. Second, they may be used to create the "reputation" and "commonfare contribution" metrics. Third, and finally, they may be put to work to identify episodes of collusion or site misuse.

It is important that the three strands of social dynamics, digital currency and reputation system are woven together so that we design an integrated and coherent system that simultaneously:

- monitors and encourages participation in the platform;
- recognizes constructive/productive contributions to the platform and calculates an associated metric;
- rewards such contributions with the allocation of digital currency;
- maps the circulation of the currency within and outside of the platform; and
- identifies possible instances of collusion or other ways in which the system might be exploited.

We can visualise the basic research and development strands as in Figure 4 below.

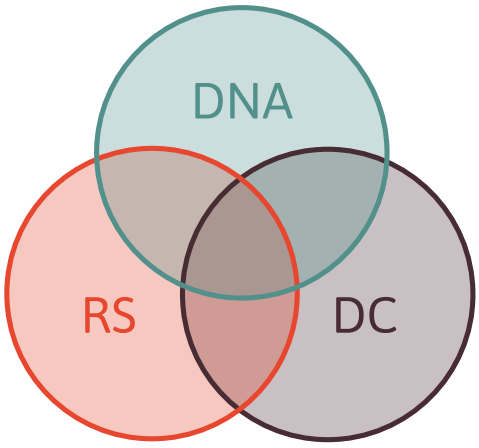


Figure 4 The three stands of WP3

Each strand comprises the following elements:

RS

- Research into existing online reputation systems
- Research into value placed by users on different in- and out-of-platform activities
- Development of a reputation and/or commonfare contribution metric

DC

- Development of technical system to implement digital currency in platform
- Stakeholder engagement
- Research into user experience relating to earning and spending digital currencies

DNA

- Mathematical models for the study of activation level of the platform, the processes of diffusion of information across the platform, opinion dynamics and learning in social networks.
- Based on the models developed, propose simulations for network dynamics, which regard flows of information, and include topological aspects such as friendship ties, factors influencing retention and participation
- Guidelines for the development of tools to monitor in-platform activities

One can then consider what activities and connections are contained in the overlaps between each activity. Some of these connections are fairly clear – for example, the reputation and commonfare contribution system must allow for the contribution metric to be translated into the digital currency, and the currency allocated to reward different activities must reflect the value placed on those activities by the community of users. It has been important for the integrated functioning of WP3, and the proposals for the systems to be made in D3.2, that other connections are identified and explored. These ideas form recurring themes in this report and are a particular focus of Chapter 3, where the potentially integrating role of the DNA is considered.

The following chapters report on research conducted for each of these strands in the early stages of the PIE News project and design of commonfare.net. One of the key aims of this phase has been the creation of personas and scenarios representing the possible user base for commonfare.net, which can then be used in the platform design process.

Chapter 2 covers various types of user-research. Section 2.1 presents an overview of existing online reputation systems. This is used to highlight both features that commonfare.net might adopt and problems with conventional reputation systems in the commonfare context. Section 2.2 presents findings from interviews with potential participants in each of the pilot sites. Section 2.3 presents an advanced use-case of the proposed digital currency, based on tests at the Milan pilot site.

Chapter 3 focuses on possible dynamic social network analysis metrics and the ways in which these may integrate the three strands of WP3.

Chapter 4 presents the personas and scenarios developed as a result of the research described in Chapters 2 and 3.

Chapter 5 summarizes the findings of the WP3 work to date.

2. USER RESEARCH

Fig. 05

This chapter describes the various strands of research exploring the experiences and attitudes of potential users of the commonfare.net platform, particularly in relation to issues that will inform the design of the reputation mechanism, the digital currency and network dynamic analysis.

2.1 SURVEY OF REPUTATION SYSTEMS

The AU team were responsible for carrying out internet-based research to inform the design of the planned reputation/trust mechanisms for the commonfare.net platform. The initial aims were to carry out a survey of existing reputation systems, to see what might be re-used or re-purposed for commonfare.net. During this research, some potential drawbacks with conventional approaches to reputation measurement were identified. In order to better understand what some of the risks might be of using a conventional reputation system in a platform aiming to serve people experiencing unemployment, financial hardship and precariousness, an additional study was carried out of two existing online support groups that aim to support people experiencing Unemployment and Financial Problems.

2.1.1 Introduction to reputation systems

Online reputation systems are systems that draw on data about a user's activities to generate an indication of that user's standing within one or more online communities (Dellarocas, 2003; Jensen, Davis, & Farnham, 2002; Resnick et al., 2000). Although in some ways similar to the points systems and leader-boards common to online games, in which points are sought competitively and can often be "spent" within the game-world, reputation systems outside of games have a stronger focus on providing users with a metric on which to base judgments about whether to trust other users or select them as partners for a transaction. They are now default parts of the design of traditional-model e-commerce sites, where items are bought and sold in conventional financial transactions. They are also integral to the increasing number of sites based on a "gig" (Friedman, 2014) or "sharing" (Hamari, Sjöklint, & Ukkonen, 2015) economic model. In the former, members offer their skills and services for money but in a freelance capacity; in the latter, they provide or/and seek resources such as tools, transport or accommodation without the exchange of money. In addition, many expert and Q&A sites (usually based on discussion forum rather than trading structures) employ reputation systems so that questioners can judge whether or not to trust an answer, or community members can build up their own reputation as experts (see, e.g., Movshovitz-Attias et al., 2013). These latter may involve some aspects of game-based points systems, in the belief that users will find kudos an incentive to participate or even become more expert in a particular area.

Reputation systems can base reputation measures on data from a range of sources, processed in a range of ways (Costagliola, Fuccella & Pascuccio, 2014; Hendrikx, Bubendorfer & Chard 2015; Vavilis, Petković & Zannone, 2014). They may employ data generated directly from a user's activities, such as how many times they visit a site, how long they spend on a site, how many transactions they complete, the ratio of completed to started transactions, how many contributions they make to a discussion, how many network ties they have, and so on. They may also draw on ratings of that user's contributions/behaviour provided by other users: for example, through "likes," up- and down-votes, ratings against particular reputation-items such as helpfulness, reliability, promptness etc., or qualitative feedback in the form of text-based reviews. Whichever factors are included in a reputation system, they are often (but not always) used to generate a numerical measure of the user's overall behaviour/reputation/ranking within the relevant community; alternatively, information may be kept at a more granular level. Reputation "scores" may be made public to other community members, so that they can make decisions about how and with whom they interact; or they may be known only to the site administrators (or an automated process) and used to make decisions about allowing or removing privileges within, and even access to, the site. In the former case, they will also be visualised on the interface of the service, often through graphical

representations (e.g. using star-ratings or badges). Scores may be aggregates or averages; the data used to calculate these scores may be unweighted or weighted according to a range of factors, including the reputation of the user submitting the ratings and the age of the rating.

2.1.2 Reputation systems and commonfare.net: initial considerations

While reputation systems are now well-established, common elements of online environments, commonfare.net is expected to combine a range of aims, features and user-characteristics in a (possibly unique) way that means careful thought must go into the design of its reputation system. Getting the reputation system right is particularly critical because of the intention to translate reputation scores (or some other participation metric) into the site's cryptocurrency, for expenditure within and outwith the commonfare.net platform. It is also important because of the potential contribution to users' self-esteem, an aspect that has emerged strongly through empirical research conducted for the project.

The first steps in designing a reputation system require understanding of the features and affordances of the platform. As described in the initial project proposal and indicated at http://pieproject.eu, the functionalities of Commonfare.net can be described in terms of three "hubs" (although these may not be clearly separated from the users' point of view):

- Informing about welfare state provision and relevant data;
- Sharing good practices through digital storytelling;
- Supporting initiatives based on resource-sharing and bottom-up solutions to real needs.

The second and third of these in particular will rely on user input and participation, and so will be the parts of the platform through which users may primarily be able to build up their reputation and contribute to the commonfare.

The precise form of the reputation and contribution system will depend on:

- the activities in which users are able to engage, particularly in the digital storytelling and resource-sharing hubs, and
- the actions and interactions valued by the users themselves, as emerging through the empirical research conducted in the pilot sites and reported on here and in D2.1.

In the following we consider both of these.

2.1.3 Digital storytelling: possible actions and interactions

According to the project proposal, the digital storytelling hub is planned to include vlog/blog posts in which users describe their own experiences and strategies for dealing with aspects of living in conditions of poverty or financial hardship and associated problems with, for example, housing, food, transport and wellbeing. In a conventional reputation system, users who contribute their own stories might be rewarded for their participation through the accrual of reputation.

However, this hub may also allow other users to "like," rate or review the stories being told, or to add comments, possibly through associated discussion threads (for example using the Disqus, IntenseDebate or Livefyre systems (Shin et al., 2013)). These user-generated ratings and comments might be used to modify the reputation accruing to the storyteller, or to allow reputation to accrue to those doing the liking/rating/reviewing/commenting (and thereby contributing to the site's function). The parts of the reputation and contribution system relating to the digital story-telling hub may thus be similar to those used in expert sites and community Q&A forums; however, as discussed in section 2.1.7, there may be some differences because of both the likely characteristics of the target population and the aims of the commonfare.net platform.

It is worth noting that (as explored in more detail below) mental health issues – particularly depression and anxiety – are often associated with unemployment, financial difficulties, and the social isolation that may accompany them (see, for example, Belle Doucet, 2003; Galea et al., 2007; Murali & Oyebode, 2004; Murphy & Athanasou 1999; Paul & Moser, 2009; Vinokur, Price & Kaplan, 1996). Some of the stories on the digital storytelling hub may thus address mental health maintenance and improvement. Similarly, users reading and responding to digital stories may themselves be experiencing depression or anxiety. Users' ability to respond and/or provide ratings, and the question of who gets to see comments and ratings, will thus need to be designed with these possibilities in mind.

2.1.4 The resource-sharing hub: possible actions and interactions

Possible goals for the resource-sharing hub may be to allow users to connect with each other to achieve some or all of the following:

- Find other users experiencing similar conditions with whom to talk and share ideas/strategies/advice, or of whom to ask questions;
- Get together offline to form local community action groups, for example to develop a shared childcare system;
- Share resources, for example through ride-sharing or freecycling, with no explicit expectation of reciprocity;
- Trade whatever skills, resources or knowledge users have in a bartering system model – for example, by allowing a retired maths teacher who can no longer manage her own garden to find someone to tend to her

garden for her, in return for providing maths tuition to that person or the person's children;

- Trade whatever skills, resources or knowledge users have using the Freecoin Social Wallet monetary system – for example, by allowing the same retired maths teacher to use the commoncoins she has earned to buy gardening services without having to provide maths tuition in return.

Which of these are included, and what form they take, will depend on other decisions made about, for example, what information users share when registering and on the public profile, and how the site can be searched by users (for example by key words in current conversations, or on profile information).

The relative desirability of these features will hopefully become clear through activities with the pilot partners carried out for WP2 and WP4. However, whichever ones are implemented, this part of the site may require aspects of reputation systems used on transaction-based sites such as the conventional, gig and sharing economies mentioned above, as well as (similar to the storytelling hub) those used on expert/Q&A/community support sites.

To further develop these ideas, the following sections explore different types of site and associated reputation system.

2.1.5 Reputation systems on transactional/ trading platforms

There have been several studies of reputation systems on trading/transactional type sites, and so the next section draws primarily on existing studies but augments them with our own observations.

2.1.5.1 Reputation in the conventional online economy: eBay, Lyft and Etsy

One of the best-known and most widely studied reputation systems is that operating on the e-commerce platform eBay. Both sellers and buyers can provide feedback: sellers do not have to provide feedback to buyers, and if they do it must be positive (in principle to ensure buyers feel free to leave honest reviews), but eBay lets buyers rate their experience with individual sellers as either +1 (positive), 0 (neutral) or -1 (negative). If a buyer wants to provide more detailed feedback they can, but only by going to eBay's Feedback Forum.

The positive/neutral/negative ratings are aggregated, which means that relatively new or infrequent sellers have low reputation numbers; they are also translated into a coloured star system: 10-49 = yellow, 50-99=blue, 100-499=turquoise and so on. As may be evident from this brief list of colours, they are not exactly intuitive (that is, there is no obvious relationship between colour and reputation score, such as might be achieved by e.g. changing from red to amber to green with increasing score). The aggregate score is visible when a buyer views an item, along with the seller's name, the percentage positive feedback and a coloured star. No explanation is given of either the numerical score or the coloured star. When a buyer views a seller's profile, they see their overall rating, together with the percentage of positive ratings given to the seller, the length of time the seller has been on eBay and their geographical location. They can also see four subscales represented by five gold stars, relating to:

- accuracy of item description;
- seller's communication;
- speed of dispatch;
- reasonableness of Postage & Packaging charges.

Next to each set of stars is another number, again with no explanation, although buyers can obtain more information about feedback scores by clicking through to another page. The number of positive, neutral and negative ratings received by the seller in the last 12 months is also presented, as is a single comment. Users can click again to see more: if they do, they are presented with a page of detailed feedback information as shown in Figure 6 below.

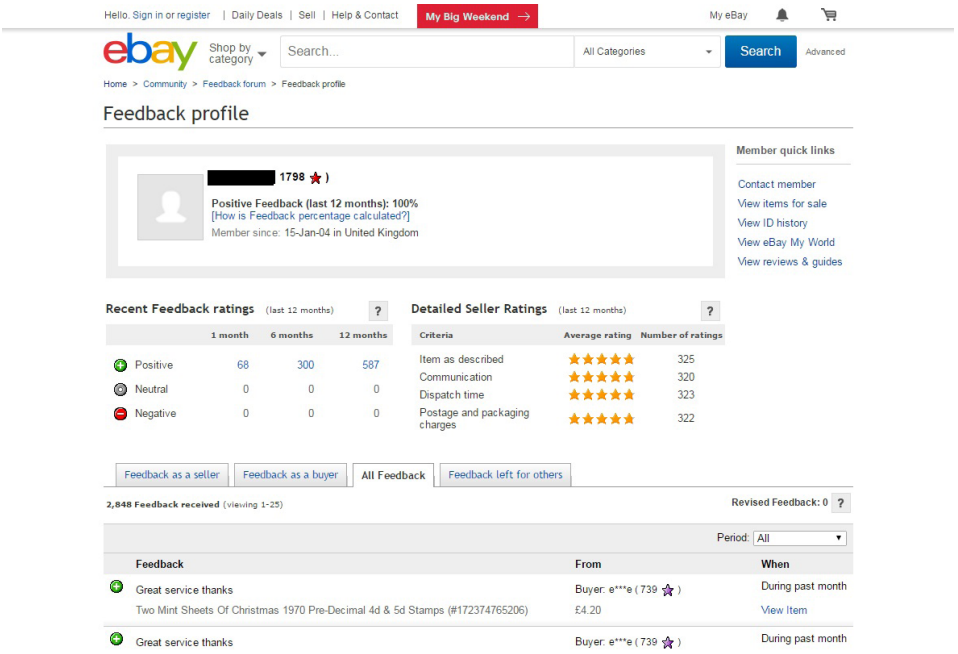


Figure 6 Feedback and reputation on eBay

There have been several studies of eBay's reputation system and the impact it has on participation in the system (see, for example, Cabral & Hortaçsu, 2010; Dellarocas, Fan & Wood, 2004; Houser & Wooders, 2006; Hui et al., 2014; Resnick et al., 2000; Resnick & Zeckhauser, 2002; Resnick, Zeckhauser & Swanson, 2006). The main findings of this research suggest that feedback contributions on eBay are not strongly driven by pure altruism (Dellarocas, Fan & Wood, 2004), and instead are more strongly driven by an expectation of reciprocity. Indeed, Resnick et al. (2000) suggest that users not only reciprocate but also retaliate. They also suggest that users of the site become less likely to participate in the feedback process once they have accumulated experience (and reputation). This observation is consistent with the suggestion that users' participation in the feedback process is not strongly driven by altruism, as it may imply that once users have built up a secure reputation, they no longer feel the need to elicit ratings from others by providing ratings themselves. Resnick, Zeckhauser and Swanson (2006) showed that reputation is, however, important, and that the same items, sold by the same seller under two different identities, attracted an 8% lower price when sold through a newly-established identity with low reputation, as compared to the seller's "real" (well-established, high reputation) identity. Cabral and Hortaçsu (2010) studied the impact of negative feedback, finding amongst other things that the first time a seller receives negative ratings/feedback has a more significant impact on his/her sales than subsequent negative ratings, but also that once a seller receives a negative rating, they are much more likely to receive more. They also found that sellers with low reputations are more likely to exit the system.

The second transaction/trading site we explored is Etsy. Unlike eBay, Etsy positions itself as a service providing a social good, rather than simply a platform on which people can buy and sell goods: '*Our mission is to reimagine commerce in ways that build a more fulfilling and lasting world. We are building a human, authentic and community-centric global and local marketplace. We are committed to using the power of business to create a better world through our platform, our members, our employees and the communities we serve*' (Etsy, 2016). This rhetoric ties in with the kinds of user it wishes to attract. Sellers are small-scale, independent operators who are most likely to be selling some kind of art, craft or design product, such as earrings, clothes hand-made from materials bought in charity shops, and so on. Buyers are encouraged to think of themselves as supporting an out-of-the-mainstream, independent economy, challenging at least some of the evils of hegemonic multinational capitalism. In the end, though, it is still a site on which people exchange goods for money, and their reputation system is not that different from other e-commerce sites.

Sellers' profile pages display a 5 star overall rating, a numerical value – in this case 127 – which appears to be an aggregate of all reviews (rather than an average), the number of reviews this is based on, and the number of times they have been favourited by customers (Etsy's favourite icon is a heart). This section of the profile page is shown in Figure 7.

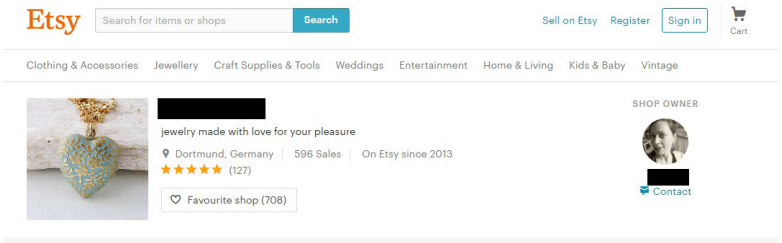


Figure 7 Example of the top part of a user profile page on Etsy

Most of this information is repeated lower down the page, where the number of favourites is described as the number of "admirers," and instead of a heart icon, users can click on the "admirers" link to see a list of all the users who favourite and therefore admire this shop.

Users can also see item-based reviews from customers, which include a five-star overall rating and a minimum of five words free text feedback (buyers are required to submit this). An example of an item review from Etsy is shown in Figure 8. The buyer's profile picture and userid appear next to the free text feedback, along with some information about the item purchased. While this may indicate a somewhat relaxed approach to user privacy, the more digitally literate users may be aware that they can use any picture on their profile, and are not actually required to use their real name or a photograph of themselves. One way in which Etsy's reviewing system differs from those on other standard commerce platforms is that feedback can be edited by buyers for up to 60 days, in principle allowing sellers to contact buyers and solve whatever led to a bad rating, should they receive one.

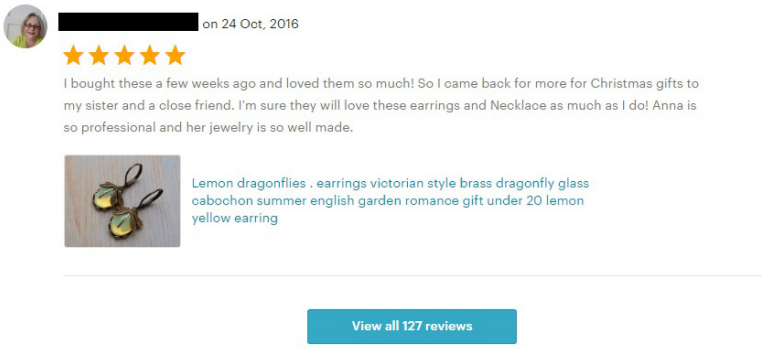


Figure 8 Example item review on Etsy

The third site we examined is Lyft. Lyft is a ride-sharing site that might be considered to be on the margins of the sharing economy, and has indeed been described as an example of the sharing economy (Belk, 2014; Schor, 2014) since it allows users to exploit "idling capacity" (Botsman & Rogers, 2011) in the form of empty seats in cars. However, the site itself doesn't emphasise sharing, and rides are bought with money, not traded for other rides or other goods/resources. Lyft seems more to market itself as a highly-flexible taxi service than as a social good: '*Wherever you're headed, count on Lyft for rides in minutes. The Lyft app matches you with local drivers at the tap of a button. Just request and go*' (Lyft, 2016).

Lyft's reputation system has some interesting features: not only are drivers allowed to rate passengers, they are actually required to do so in order to retain their registration on the site. However, drivers' ratings of passengers are only seen by Lyft HQ – they are not available for other drivers to see, nor are they aggregated into a passenger reputation score. Both driver and passenger rate each other on a five-star scale; if either rates the other at three stars or lower, the system will not pair them up again.

Drivers' overall reputation scores are displayed in the form of a five-star scale and a number, based on their last 100 passenger ratings. (Lyft requires drivers to maintain a reputation rating of above four stars in order to keep their registration.) Reviews of individual rides take the form of an overall experience rating using a five-star scale. Rather than requiring ratings on separate subscales for promptness, value for money, etc., as on Ebay and other trading sites, the system allows passengers to flag negative experiences of navigation, safety, cleanliness and friendliness. Drivers can respond to negative ratings by leaving a comment, which is then evidence for Lyft HQ to examine when deciding whether to keep the driver on the books. Thus the reputation system serves as the basis on which Lyft decides whether to give drivers access to their matching service, as well as providing information to allow those seeking rides to decide whether to accept the match that Lyft provides them.

2.1.5.2 Reputation systems in gig economic sites

Lyft's model is perhaps closer to a so-called gig economy than a conventional one, but there has been a recent increase in the number of web platforms operating with a more explicit, extreme gig approach. Two such sites that make information about their reputation systems relatively easy to access are the Australian site Airtasker.com, and the non-location specific site fiverr.com.

Airtasker is a platform matching chores, odd jobs, and other one-off tasks to potential "taskers": '*We are here to make people's lives better … Airtasker is a trusted community marketplace for people and businesses to outsource tasks, find local services or hire flexible staff in minutes - online or via mobile*' (Airtasker, 2016). According to Allen (2015), '*Airtasker has facilitated $5.85 million in jobs between more than 160,000 people*' (p24) from its inception in 2012 to the time of Allen's writing in 2015. Because it is often the case that the tasks advertised on Airtasker need to be carried out in a user's home or other private location, trust and reputation are very important to those using the site. It may thus serve as a partial model for the commonfare.net supporting hub, which is also likely to lead from online interactions to offline connections, where users meet face-to-face to form community action groups, or to undertake tasks for each other, possibly in their own homes or vehicles, and potentially involving activities or services requiring extremely high levels of trust such as childcare provision.

A substantial amount of the information made available about taskers on Airtasker.com is intended to generate trust and to give a sense that the tasker's identity has been validated. When a user views another user's profile on Airtasker, the top of the page (and so what is seen initially) looks like the example shown in Figure 9.

Figure 9 The top part of a tasker's profile page on Airtasker.com

As can be seen in Figure 9, browsing users are presented with the following reputation-related information: when the user was last online, where they are based, how long they have been a member, a five-star scale overall rating and a numerical value (the average of all ratings received), the number of reviews this rating is based on, and the number and fraction of completed tasks. There is also a short self-penned "About."

The "About" section is followed by what the site refers to as "verifications" – icons indicating identity-related information that has been checked by Airtasker but is not made available publicly. Taskers can also post pictures to a "portfolio" (used by some to display their work) and detail skills they claim to have. Information regarding what forms of transportation they have access to is also available. This part of the profile page is shown in Figure 10.

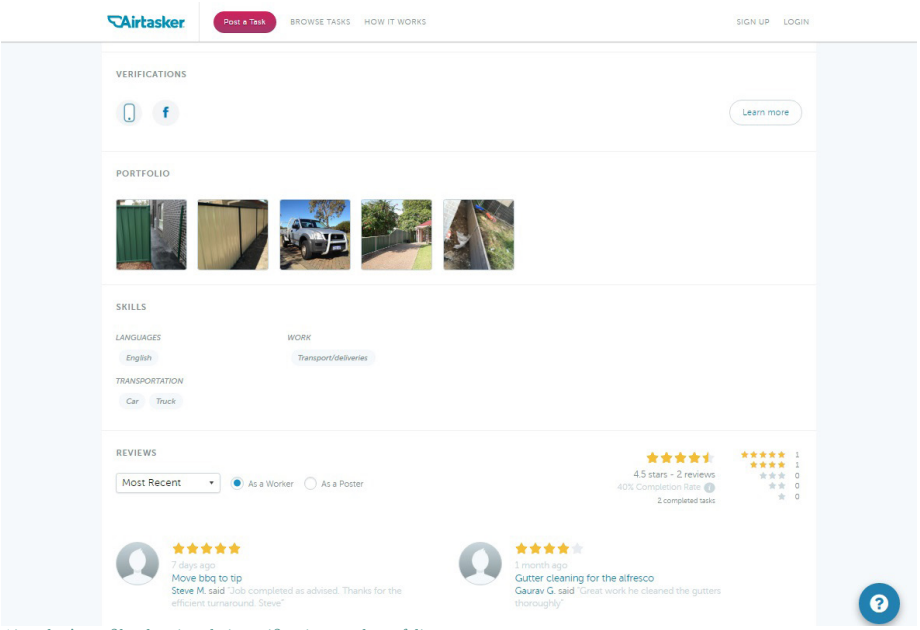


Figure 10 Part of an Airtasker's profile, showing their verifications and portfolio

Unlike many other sites, Airtasker shows not only the overall score, but also the number of each star review rating a tasker has received (see figure above). At the bottom of the profile page, individual user reviews are listed, showing an overall rating using a five-star scale plus the task-recipient's profile picture and userid, a brief description of the task, and a free text comment. Airtasker includes in-app private messaging, so that contact details do not need to be exchanged and addresses/task locations can be shared privately.

The second example of a gig economy site we examined is Fiverr.com. Here, users can offer up their skills for cash. It positions itself as more artistic, cool and humorous/ironic than Airtasker. It explicitly uses the term "gig" to describe what Airtasker would refer to as tasks; gigs currently being advertised include (in the Music category) '*I will record anything on the trumpet*' and (in the Fun and Bizarre category) '*I will sing happy birthday as Tin Foil Man dressed only in a thong.*' According to the site, '*People who love what they do get things done at an unbeatable value*' (Fiverr, 2016). Fiverr's reputation system uses five-star rating scales, generating an overall rating based on three subscales (communication, service as described, would recommend); however, there is no numerical rating provided (suggesting the overall rating is a rounded average). There is a favourite button for each gig, but there is no means of flagging something up as inappropriate. Fiverr goes beyond the reputation systems described above by including a game-like system of "perks" associated with formal levels. Level 1 is achieved once a gigger has been active on the site for more than 30 days, completed 10 gigs and maintained "excellent" feedback ratings. Level 2 is achieved after completing 50 gigs in two months. Top Rated Seller status is achieved on the basis of manual selection by Fiverr editors, and thus in a somewhat opaque way. Perks include being allowed to create increasing numbers of gigs, being allowed to offer "gig extras" such as an extra fast service or bundles of gigs called "gig multiples" and (for level 2 and TRS) "priority support" from Fiverr.

2.1.5.3 Reputation systems in sharing economic sites

A relatively small number of transactional/trading sites adopt a genuine sharing economy (Hamari, Sjöklint, & Ukkonen, 2015) model. Botsman and Rogers (2011) describe four principles for successful collaborative consumption/sharing economies:

1. trust between strangers;
2. idling capacity (the unused potential of a resource held by someone in the community);
3. critical mass (to ensure a sense that members of the community can make choices); and
4. belief in the commons.

While platforms such as Lyft, Airtasker and Fiverr require varying amounts of trust between strangers, and all exploit idling capacity and require critical mass allowing users to choose whether to accept a match or gig, none of them truly require a belief in the commons. There are, however, some platforms that come closer to satisfying all four of Botsman and Rogers's principles, such as Neighborgoods, which facilitates the sharing of items like ladders and bicycles through a borrow/lend system, and Couchsurfing, a site allowing users to find places to stay for free, in a reciprocal host/guest system.

Neighborgoods.net includes a reputation system; unfortunately there is no easily accessible information about how it operates. Users have up to three stars on their profiles, but it is not clear how these are achieved. In addition to the star rating, users also have a publicly visible "impact" panel, including the number of completed transactions and the amount of money Neighborgoods calculates that the user has saved those s/he has shared her/his items with. On their private profile, users can also see how much they themselves have saved by borrowing from others. These savings (for others and for oneself) are calculated using an algorithm based on the estimated value of the object being shared.

Like Etsy, Couchsurfing.com positions itself as setting out to achieve a social good: '*We envision a world made better by travel and travel made richer by connection. Couchsurfers share their lives with the people they encounter, fostering cultural exchange and mutual respect*' (Couchsurfing, 2016). Couchsurfing.com relies on substantial levels of trust between strangers, as users share their homes with each other (without any monetary exchange). Lauterbach (2009) also showed that there are significant levels of both direct and generalised reciprocity within the overall Couchsurfing community. The existence of generalized reciprocity suggests the kind of belief in the commons that commonfare.net hopes to encourage, rather than the individual reciprocity/retaliation observed by Resnick et al. (2000) in their study of eBay.

Couchsurfing's reputation system has two unusual features. The first is in its use of friendship ties. Users can identify the type of relationship they have with other users, choosing from: Haven't met yet, Acquaintance, CouchSurfing friend, Friend, Good friend, Close friend, and Best friend. Couchsurfers who have hosted or stayed with other members are permitted to submit private feedback (to Couchsurfing) and public references for 14 days after a stay. Members must have a couch request with the "Yes" "Maybe" or "Confirmed" status in order to leave a Surf/Host reference. Other members may create references under the "Other" or "Friend" reference designations (as opposed to "Surf" or "Host").

Users' publicly visible reputation information is simply the number of references they have been given, and the number of those that are positive and have been confirmed (i.e. the user has confirmed the host/guest exchange). Other users can see free text references left by former guests/hosts.

Couchsurfing has a second unusual feature, which may provide an illustration of something we should try to avoid. After some years of operating with the system described above, Couchsurfing.com introduced an additional "vouching" system, to allow some users to increase their reputation levels. This very restrictive system allows users to vouch for other users only if they have received three or more "vouches" themselves, effectively restricting vouching to in elite core: in 2009, only 6.8% of members were able to vouch (Lauterbach et al., 2009).

2.1.6 Considerations and implications for reputation and reward systems on commonfare.net

These findings raise important considerations for reputation on the commonfare.net platform. First, considering the research conducted into eBay and elsewhere, it is clear that we need to try to ensure that any mechanisms included that allow users to rate or review each other are structured/presented so as to encourage users to do so altruistically. Exaggerated reciprocity or retaliation might be detected through some form of network analysis (for example, cluster detection might be used to show when certain groups of users engage in reciprocal ratings and reviews). However, this would be an after-the-fact approach that might lead to sanctions, rather than a design feature that encouraged the kind of use we are hoping for.

We also need to think about how to protect users who have only recently entered the site, and thus have had less chance to build up reputation than more established users. One way to avoid the negative consequences of being a novice is to use average scores, rather than aggregates, and to combine this with an uncertainty reflecting the lack of "track record" of the new user. This kind of "fuzzy logic" approach has not been implemented in any reputation systems for transactional/trading sites that we are aware of, but would be consistent with one of the possible approaches described by Hendrikx, Bubendorfer and Chard (2015). Another would be to provide something akin to an annualised rating.

We also need to think about negative feedback. In the light of the findings about negative ratings/feedback on eBay (Cabral & Hortaçsu, 2010), it may be that the commonfare.net reputation system should not allow negative ratings/feedback, in order to avoid the possibility of both retaliation and the apparent domino-effect of triggering more negative ratings (and ultimately the loss of participants from the site). As well as this rather obvious impact on a user's likely continued participation in the site, we need to be sensitive to the affective impact of such feedback. Negative feedback may be damaging to already vulnerable users' self-esteem and may contribute to levels of depression and anxiety in a way that is completely counter to the aims of the site. Because of this, we suggest avoiding a system in which ratings for feedback are explicitly negative, as in the -1, 0 and +1 system used by eBay. (There may need to be a provision to register negative experiences, but this may be achieved through the withholding of points or flagging, rather than rating, poor behaviour.)

Issues that Etsy's system highlighted for commonfare.net include privacy/identifiability and the question of whether users who participate in some kind of transaction should be required to give feedback/rate each other. A similar question is raised by Lyft: should users that engage in transactional activities on commonfare.net's supporting hub be required to rate/review each other? Lyft also raises the question of whether users should be given the opportunity to rate on separate subscales, as is the case on eBay, or

instead submit an overall rating but augment this with flags (whether negative or positive) reflecting particular aspects of their experience? In the light of our comments regarding negative ratings on eBay, it may be preferable to make ratings on commonfare.net both simple and optional, so that only those who wish to leave a rating in the form of a "like" or a "thumbs up" do so. Indeed, the approach taken by Couchsurfing, in which a user's reputation information is essentially the number of confirmed transactions plus (optionally) the number of references or comments, may be sufficient as a trust-establishing system.

Etsy also raises the question of who has access to what – should individual transaction reviews (and the reviews of others) be made available to everyone, as is the case for customer reviews on Etsy? Or should rating/review information at the granular level be known only to the system (or system and moderators)?

These questions lead on to the issue of how the system itself uses reputation scores. Some authors have suggested that in systems like Lyft's, where there is a punitive or sanctioning aspect associated with scores, users are extremely reluctant to give negative feedback or low scores, leading to a situation where every driver is rated as wonderful or every stay is rated superb (Slee, 2016; Zervas, Proserpio, & Byers, 2015). Again, this is something that we need to consider carefully in designing a system that motivates engagement without seeming to penalize lack of engagement or contributions that are rated less than excellent by other users.

Another important point relates to data longevity. Lyft is the only one of the conventional economic transaction-based sites described here that has a data-aging policy – that is, Lyft only uses the 100 most recent ratings in its calculation of driver reputation. This is based on the notion that a user's near-future behaviour is most accurately predicted by their recent behaviour. However, alternative approaches argue that recent behaviour might be aberrant, and instead predictions of future behaviour are more reliably made on longer-term averages. What should happen on commonfare.net; should those engaging with the platform be able to escape shadows (or enjoy benefits) from their pasts?

The gig-economic sites Airtasker and Fiverr also raise a variety of issues to consider in the commonfare.net reputation system. For example, where online interactions can lead to offline interactions, how much validation of users' identities is needed, and what forms might that take (e.g., is a validated Facebook account as useful as a mobile phone number)? Such questions may be particularly relevant when we consider that the commonfare.net user community may have limited access to technology and so a limited digital footprint.

Fiverr's introduction of levels and associated perks is also something to consider. As commonfare.net users increase their activity within the system, what perks can be offered them? Or should commonfare.net take almost the opposite approach, providing more support for those who appear to be struggling to find ways to contribute to the commonfare?

In respect of the sharing economic sites, Lauterbach et al. (2009) observed that not only was Couchsurfing's vouching system restrictive, but it was also highly (possibly overly) reciprocal; they speculated that because vouches tended to be between friends, there was pressure to respond in kind of one is vouched for, since it is a public act. This again raises issues for commonfare.net regarding who has access to what information about a user's interactions with and feedback from other users. Finally, Couchsurfing's system raises the question of whether users of comonfare.net should be able to rate each other regardless of whether a specific transaction has taken place. Indeed, this raises the question of whether it is transactions, experiences or individuals that are the object of ratings.

Before moving on to consider reputation systems in Q&A sites, it is worth noting that this survey of transaction/trading-based sites suggests that there are now a few features which have essentially become a common language. First, the use of five-star scales, where the stars are gold, as the visual indicator of reputation, seems to be almost universal (this would need some additional thought if an uncertainty factor is to be included). Second, most systems have some form of "liking," which may be represented by hearts (most common) or thumbs up/down (less common). While a heart icon might be the most common, it has drawbacks in that it may have multiple interpretations, including bookmarking and sympathy (see below). Thumbs up is more consistently used to signify approval.

2.1.7 Reputation systems on expert/community Q&A sites

While the above survey raises some important considerations for commonfare.net in terms of creating a reputation system with elements that are familiar and therefore easy to adopt and interpret, it also raises serious issues regarding the "tone" of the site. In all the above examples, reputation is effectively reduced to a commodity – something that can be accumulated and lost, for which there exists a competitive market, and which is highly individualized. Given that the purpose of commonfare.net is to promote cooperation, collaboration and the building of the commonfare, introducing such a capitalism of reputation may be counterproductive.

To help us think further about reputation, trust and reward in a commonfare context, we therefore turn to existing systems on other, more community-action-oriented sites.

2.1.7.1 Stackoverflow: an expert Q&A site

Probably the best-known and most elaborately-developed reputation system in a Q&A site is that used in StackOverflow (Bosu et al., 2013; Hart & Sarma, 2014; Movshovitz-Attias et al., 2013).

StackOverflow is a Q&A site where programmers can ask and answer questions relating to technical issues. The site has a blog, which uses Disqus as its commenting system, but has its own discussion forum system for user questions and answers. Users can up-vote and down-vote questions and answers provided by others, actions that not only contribute to reputation building but also move questions up and down in terms of the order of display, and so make them more or less visible. Users build their reputation in a variety of ways. Reputation is gained by:

- question is voted up: +5;
- answer is voted up: +10;
- answer is marked "accepted": +15 (+2 to acceptor);
- suggested edit is accepted: +2 (up to +1000 total per user);
- bounty awarded to your answer: + full bounty amount;
- one of your answers is awarded a bounty automatically: + half of the bounty amount;
- site association bonus: +100 on each site (awarded a maximum of one time per site);
- example you contributed to is voted up: +5;
- proposed change is approved: +2;
- first time an answer that cites documentation you contributed to is upvoted: +5.

The offering of bounties is the only way that reputation points can be "spent" in StackOverflow; if you haven't had an answer to a good question, you can spend some of your reputation points by putting them up as a bounty so that whoever eventually gives a good answer will get extra points.

- Reputation is lost when:
- your question is voted down: –2;
- your answer is voted down: –2;
- you vote down an answer: –1;
- you place a bounty on a question: – full bounty amount;
- one of your posts receives 6 spam or offensive flags: –100.

All users start with one reputation point, and reputation can never drop below 1. Accepting your own answer does not increase your reputation. Deleted posts do not affect reputation, for voters, authors or anyone else involved. If a user reverses a vote, the corresponding reputation loss or gain will be reversed as well. Vote reversal in response to voting fraud will also return lost or gained reputation. Users are allowed to accumulate a maximum of 200 reputation points per day.

Points are converted into privileges: for example once a user has 15 points, they can vote up a question or answer; once they have 20, they can talk in a chat; once they have 125, they can vote down questions or answers; and so on. At 1500 points users are allowed to add new tags to the site (questions are tagged as corresponding to particular topic areas, such as SQL or java); at 200, users can edit other users' questions and answers. At 10000 points users gain moderation rights; at 25000, they have access to the site's analytics. Thus there are incentives to build one's reputation that go beyond the acquisition of reputation for its own sake, or in order to gain the trust of other users.

Movshovitz-Attias et al. (2013) found that while the majority of questions on the site were posted by novice users with low reputations, on average higher reputation users ask more questions than lower reputation users, simply because they contribute more often to the site.

The features of StackOverflow's reputation system described above may provide a useful foundation for the aspects of commonfare.net's own system that relate to blogging and discussion forum contributions. As raised above during the discussion of transaction-based sites, we also need to consider whether or not we wish to include negative ratings, voting down, and so on. We also need to be aware that StackOverflow has been found to (unintentionally) exclude or discourage female participants (Vasilescu et al., 2012), which has been partially attributed to the reward system.

An online community-building context for which the role of formal reputation systems has received much less research attention is the development of social support networks, either in the form of developing personal friendships or seeking support from others by creating communities of people experiencing similar situations. To our knowledge, the quantification of reputation in community support groups has not previously been studied, and so we have undertaken our own study of two such support groups (aimed at people experiencing financial problems and unemployment respectively).

In order to consider how a system like StackOverflow's might need to be modified for the commonfare.net context, we therefore consider in the following how the community and its aims differ, and how that might impact on the requirements for the reputation system.

2.1.7.2 Important contextual considerations for commonfare.net

Because peer-support is an important feature of the commonfare.net platform, there are some parallels with the kind of community Q&A site represented by StackOverflow, described above. However, there are some important differences in context.

First, StackOverflow is a professional/technical interest community site. Its participants are people who already have some degree of technical expertise (and therefore knowledge and cultural capital) and are seeking more. Several things follow from this:

- Questions on StackOverflow are technical in nature, seeking specific solutions to specific coding, implementation or operating system problems.
- They are likely to have answers which can be clearly judged as right, wrong or useful, depending on whether these answers lead to solutions that the questioner (and other members of the community) can implement.
- There may be more than one correct answer/workable solution, but some will be more efficient or simpler to implement than others, and can be judged better on those grounds.
- Because users have some existing level of expertise, their judgment as to the value of answers might be expected to be reasonably objective and reliable.
- Users are proud of their expertise and are keen to provide answers if they have them.
- Users are often enthusiasts for computers and coding, and so are discussing something they enjoy doing.

- Users may be motivated to gain reputation points and badges for reasons of kudos within the StackOverflow community; they like to have their expertise recognized.
- Questions (and answers) on StackOverflow are almost never personal or emotional; they are rarely likely to be of dramatic importance to the questioner's life or living conditions.

In contrast, the stories that may be told, and the advice and guidance sought and given on commonfare.net may relate to issues which are of substantial personal significance to users. As noted above, there is a well-established correlation between PIE conditions and depression/anxiety (see, for example, Belle Doucet, 2003; Galea et al., 2007; Murali & Oyebode, 2004; Murphy & Athanasou 1999; Paul & Moser, 2009; Vinokur, Price & Kaplan, 1996), which is not surprising given the potential for experiences of precariousness, social exclusion and social isolation, and feelings of inadequacy and decreasing hope. While people may well have positive stories and strategies to share, they may often be describing how they overcame a difficulty that was quite an unpleasant experience. Similarly, those visiting the site in order to find help and advice may well be seeking the emotional, as well as practical, support that can be provided by a community of people experiencing similar difficulties. Indeed, the interviews with potential users in the pilot sites described in section 2.2 support these suggestions. Finally, it may be desirable to reward the raising and discussion of new or rarely discussed topics, as well as those that are immediately most popular and reflect common issues – for example, it may be that stories on where to obtain cheap food are common, but mobility, which can be a thorny issue for those experiencing financial hardship, may be less frequently discussed.

The commonfare.net community may thus have as much (or more) in common with online community/social support groups as it does with expert/technical Q&A forums. There are many such communities, some facilitated by charities, health systems, or other authoritative figures or structures, but others having a more grass roots or community-driven character (see, for example, Barak, Boniel-Nissim & Suler, 2008; Chung, 2013). Many are associated with particular illnesses, whether physical or mental (see, for example, Eysenbach et al., 2004; Griffiths et al., 2009; Wright & Bell, 2003). Some discussion forums and mailing lists have developed to provide a safe space for minority groups such as the LGBTQI community (Mehra, Merkel, & Bishop, 2004). Others provide discussion forums for larger groups, a good example being the parenting forum Mumsnet (Pedersen & Smithson, 2013). However, very few such support groups employ a reputation system.

One might speculate on the potential impact of bringing a public reputation system into such an environment. While on the one hand users might value reputation scores as they decide who to interact with and seek support from, it is easy to imagine situations in which reputation scores might have negative impacts, for example on users' self-esteem.

It is thus an important step in planning the commonfare.net network to consider such effects. We found two (related) relevant online support groups (both run from the same over-arching support group platform, http://www.supportgroups.com) that do employ a visible reputation points system. One discussion forum is dedicated to financial problems, and had (as of 06/10/2016) 21576 members. The other is dedicated to unemployment, and had 19661 members (as of the same date). We have studied user interactions within these discussion forums, and the interaction patterns of those with both high levels of in-group activity and high reputation scores in particular.

2.1.7.3 Case study: Reputation in the support groups site

While not explicitly set up with a commonfare model in mind, the support group discussion forums might be seen as building towards a commonfare that mobilizes knowledge and affect for the good of all who participate. The two discussion forums studied are hosted on the same overarching site, and so have both the same affordances and a common reputation system. Once a user has registered with the site, they may join up to ten of a range of support group discussion forums. Within these, users can initiate threads, comment on initial posts, reply to comments, "sympathise" with a post, comment or reply, or support individuals (mutual supporters can send private messages within the site). Each of these interactions might be seen as contributing to the growing commonfare.

In these discussion forums, users can build reputation in the following ways:

- Upload a profile picture (one time only): + 25 points;
- Update gender (one time only): + 25 points;
- Update zipcode (one time only): + 25 points;
- Update About me (one time only): + 5 points;
- Join a group (maximum 10 groups): + 25 points per group;
- Log in (maximum once per day): + 25 points;
- Answer a poll: + 5 points;
- Complete a self test: + 5 points.
- Support someone: + 10 points;
- Create a post: + 10 points;
- Comment on a post: + 25 points;
- Reply to a comment: + 10 points;
- Like (or "sympathise with") a post, comment or reply: + 5 points;

Thus new users start with some points based on the information they make available via their profiles and their decision to join specific groups. Over time, the majority of points are likely to be gained by logging on and engaging in the discussions; thus the system rewards the simple act of participation, in a way that could be seen as a Basic Income in reputation. Interestingly, comments on posts (direct responses to initial posts) attract more reputation points than initial posts, perhaps reflecting the "support group" nature of these discussions – users who can offer help or advice to those posting in search of it are rewarded more than those who seek help, or those that add follow-up

replies to comments. Thus in this system, certain types of contribution to the commonfare appear to be valued more highly than others.

A user's current reputation score, together with the number of people they support and are supported by, is publicly visible on their profile page (however, users may choose not to make their profile public).

While there is no explicit information about losing reputation, during the period we observed these groups, some users' reputation scores went down as well as up, indicating that either some activities attract direct points loss (which seemed unlikely on the grounds that two of the users for whom we observed points decreases were site moderators) or that some kind of points-ageing algorithm is in place.

It is worth noting that reputation in this system is closely linked to the creation f a profile and clear identity. The creation of a unique and continuous identity, and the amount of information that participants are required or are able to provide to the system, is something that will have to be handled sensitively (and probably flexibly) on commonfare.net, to reflect the privacy and trust concerns described in Section 2.2. Thus we are unlikely, for example, to want to give points for providing zip codes or other location data.

Visualising the support groups networks

Historical data were obtained directly from the discussion forum pages. Information about interactions was collected for the period December 2015-August 2016. The details recorded included the user responsible for initiating a thread, users commenting on the initial post, users replying to comments, users' reputation points, and the number of times posts, comments and replies were "sympathised." Over 400 individual users contributed to the discussions. While no demographic data was available for them, the content of the discussions suggested that most were based in the USA. However, other countries were represented, with some users explicitly referring to their country of residence including the UK, Denmark, India, South Korea, Australia, Iran and an unnamed 'third world country.'

These data allow the construction of various visualizations of the connections between members of the support community. Figures 11 and 12 give examples of the ways in which the support groups can be represented as directed networks of users who are connected to each other via ties that indicate that one user has commented on or replied to another. These Figures represent interactions in the Financial Problems discussion forum, which is represented by a graph of 256 nodes connected by 536 lines (the graphs for the Unemployment discussion forum have very similar properties). If one conceives of the discussion forums as assemblages of users, text and interactions that contribute to a commonfare of emotional support and practical advice, these network graphs may be seen as partial representations of the commonfare assemblage.

There is a high degree of reciprocity in the network, with a reciprocated line ratio of 0.65, but the graph is fairly low density, as most members of the "community" connect with only a very small number of other members. Thus the community has a highly skewed "betweenness centrality" distribution (see Chapter 3), with only 38 of the 256 nodes having a betweenness centrality higher than the average. These are represented in the figures by the discs that are located in the centres (or at the hubs) of clusters.

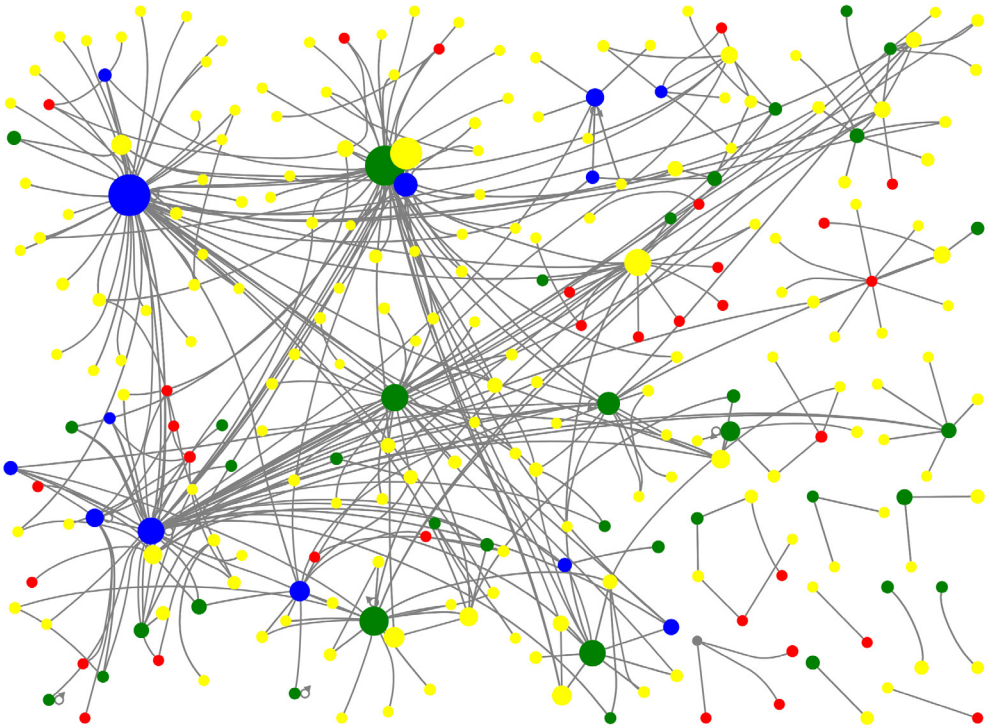


Figure 11 Financial problems discussion forum network. - Disc sizes reflect number of posts. See text for details

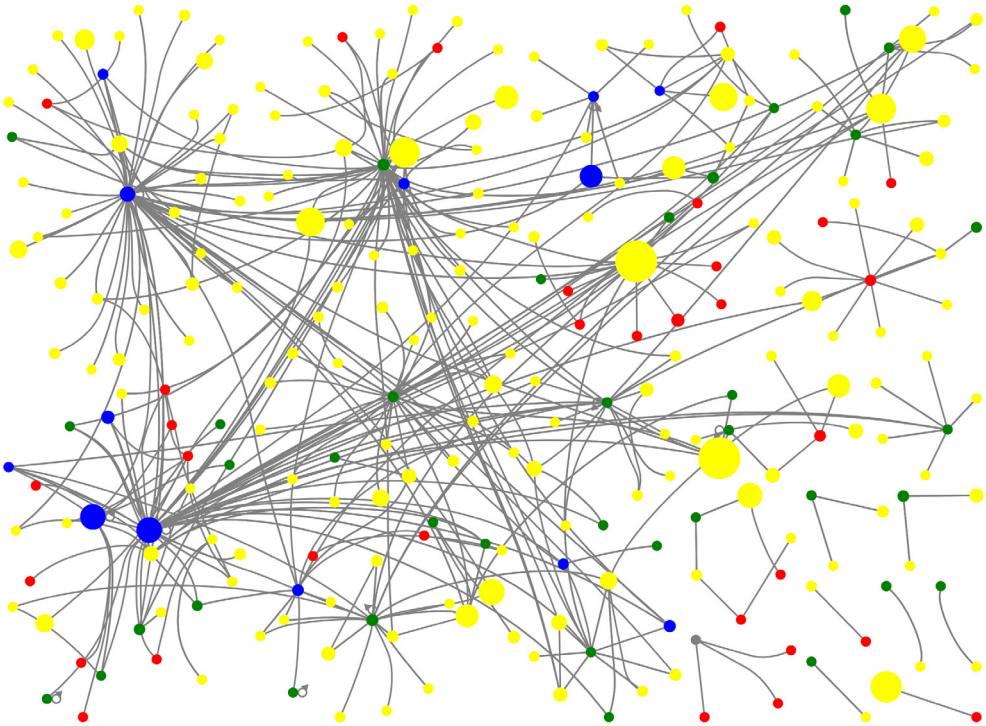


Figure 12 Financial problems discussion forum network. - Disc sizes reflect number of reputation points. See text for details

In these figures, each user is represented by a coloured disc. The colours of the discs indicate the kinds of activity that the user engaged in in the discussion forum. We might consider interactions in the forum as contributions to the commonfare of that community, as some users offer support and advice, while others offer opportunities for the diffusion of knowledge and affect/compassion by seeking help. Red discs indicate users who only initiated threads, and did not post a response or comment to any other user, in the period observed. Yellow discs indicate users who only responded or commented, and initiated no threads. Green discs indicate users who initiated threads and responded to others within them, but do not respond or comment in threads they did not initiate. Blue discs indicate users who initiated threads and commented or responded in threads initiated by others.

In Figure 11, the size of the discs scales to the user's level of activity within that discussion forum. In Figure 12, the size of the discs indicate number of reputation points that user had acquired by the end of the observation period. A clustering algorithm has been applied to highlight the (dis) connectedness of groups or clusters of users. The broadly hub-and-spoke pattern of these clusters highlights the skewed distribution of betweenness centrality noted above – it is evident that some users interact with large numbers of the support group membership, but others interact with only one or two other people. It is also evident, from the predominance of yellow discs, that users are far more likely to comment on or reply to a post than to initiate a thread. In fact, of the 256 users who contributed to the discussion, only 84 initiated threads. Of those, 33 initiated threads which they did not continue to participate in – i.e., they only ever initiated threads and so are represented by red discs.

The users who appear to act as "hubs" within the conversations are indicated by the discs at the centre of some of the clusters. Interestingly, not all of these hubs participate in the discussion forum threads in the same ways. While no participants who only initiated threads occupy hub-like positions, participants who engaged in all other combinations of ways – only responding, only responding within threads initiated by themselves, and both initiating and responding within threads initiated by others – do. It is also interesting that while most of these "hubs" have fairly high levels of activity, and so are represented by relatively large discs in Figure 12, they do not all have high numbers of reputation points and so are not all represented by the larger discs in Figure 12.

In fact, it is clear from the two figures that reputation does not strongly correlate with level of activity. This may seem counterintuitive, but is likely partly the result of the fact that discussion forum participants can be members of up to 10 support groups, and so may acquire the bulk of their reputation scores by contributing to discussion forums that do not focus on financial problems or unemployment. Equally, those who are most recent members of the groups may be currently highly active but not yet have built up their reputation scores to the levels of those who are long term members but no longer particularly active contributors. Reputation points were distributed very unevenly, ranging from 10 to 400,000, with an average of 17802 but a median of 1515 and a mode of 10. In fact, there are 17 contributors to this discussion forum with over 100K reputation points. This means that even a highly active new user is still a long way from making it onto an imagined leader-board.

Another potentially interesting way to look at contributions to the discussion forum commonfare assemblage is by the number of times a user posted something that was favourited by others. Figure 13 shows the network graph for the same discussion forum but now scaling the discs according to the average number of favourites per post acquired by the relevant user.

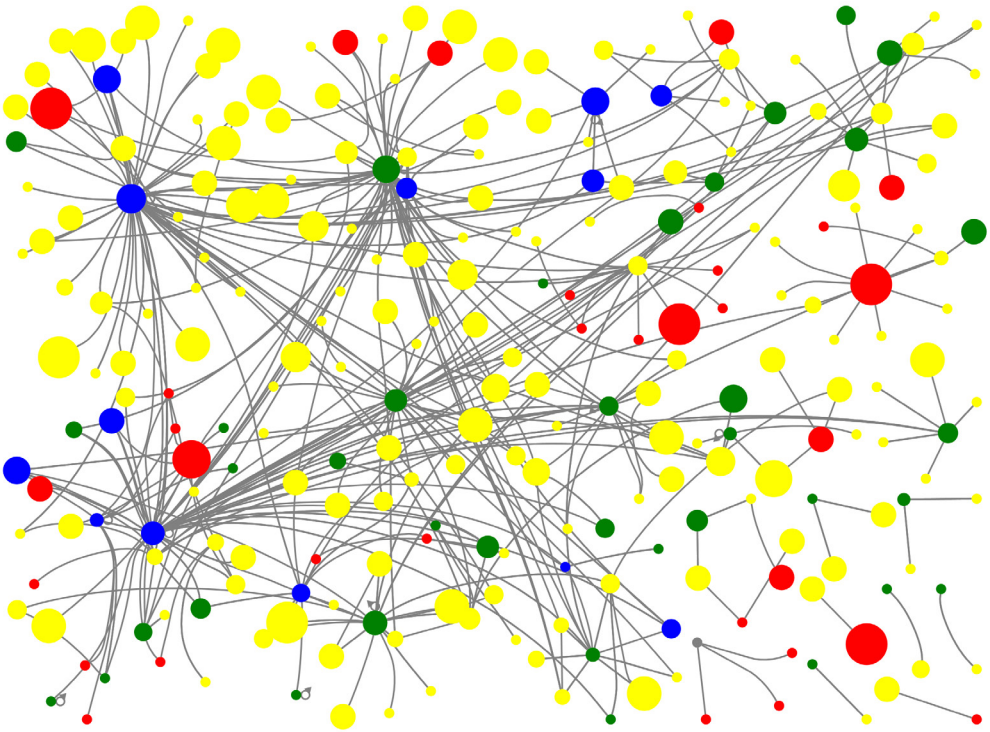


Figure 13 Financial problems discussion forum network - Disc sizes reflect average favourites per post.

In this visualization, it is actually the users represented by discs that are not in hub positions that are, more often than not, attracting the most favourites from other users. In fact, high favourite:post ratios are generally associated with users who either only initiate threads or only respond to threads initiated by others.

This may reflect the somewhat ambiguous meaning of favouriting in these discussion forums. The action is carried out by clicking on a heart icon, and is referred to as favouriting or liking in some of the text on the site. As such, it might be expected that users who are familiar with the widespread use of the heart icon as the button on which to click to indicate favouriting, liking, or general approval on other platforms will interpret and use it in the same way. However, the alt text that appears when hovering above the heart icon in the context of the discussions is actually "sympathise ." Thus there may be two ways in which the heart icon is being used. People may be using it in a conventional way, to express approval or agreement – and so if someone responds to an initial post with a suggestion or advice, and that comment attracts "favourites," they may be meant in this conventional way. However people may also be using it to express sympathy with the situation or sentiment expressed in a post. Since many of the posts by those who initiated threads but did not contribute in any other way were seeking support or advice, or simply expressing frustration and depression, this latter use may explain the relative prominence of some of the red discs in Figure 13. This serves to highlight a different type of contribution to the commonfare – the generation of opportunities for the flow, within the assemblage, of positive affect.

This leads to the question of what kind of things are discussed in the forums. In general, research into Q&A sites that use reputation points has tended to ignore the actual content of the discussions. This may be because, in most cases, studies have been performed of sites devoted to technical issues (such as StackOverflow and Slashdot). In these kinds of site, it may be relatively safely assumed that the majority of discussions will be emotionally neutral, and that the help being sought is of a type that can be provided in the form of technical knowledge. This is rather different to the situation here, where people may be seeking practical advice and support around a variety of issues such as applying for jobs, dealing with debt, finding accommodation and so on, but may also be participating in the site because they are feeling excluded from their "real world" community and are looking for mutual support.

An examination of the posts that initiated threads in the two discussion forums explored here suggests that, in these cases, a significant majority of posts were seeking emotional support as much as practical advice. Typical exchanges included:

> *P1: Hi all. How do you make ends meet? I have five little ones. I work. I provide for them, but I totally neglect myself. :(*
>
> *P2: Please take extra good care of yourself!*
>
> *P1: How do I do that without feeling guilty for spending on myself?*
>
> *P2: By remembering the proverbial instructions given on airplanes to "put the oxygen mask on yourself before putting on others ." Without you, what would happen to your "five little ones"?*
>
> *P1: :) Thank you!*

In this exchange, P1 was a newcomer to the site (as indicated by her reputation score of 30), while P2 was more experienced, with a reputation score of 4000.

One of the features of this post that was common to many thread-initiating posts was the lack of specificity regarding the help or advice that was being sought. Many users

initiated threads with posts that combined expressions of depression or distress with questions such as '*Any money saving tips*?' or '*Is anyone else on social security*?' It was in the responses to these initial posts that patterns of post-type began to emerge. Some forum participants always responded with a message of emotional support ('*Hang in there*' or '*Hugs*'); amongst these, some also provided what might be termed emotional advice, i.e. advice on how to battle depression and anxiety or how to cope with the fact that your friends and family look down on you for being unemployed or in debt. Others frequently responded by expressing camaraderie and then going on to discuss their own (usually dire) situation. Less than half of the discussion forum participants responded to posts with concrete, practical advice about sources of income, charities that provide food/rent contributions etc. However those that did tended to do so consistently, often offering the same advice several times (for example, one user repeatedly suggested to others that they should find a room mate; another repeatedly suggested making a spreadsheet in order to budget properly; another repeatedly advised walking in to businesses and asking to see the boss as the best way of finding work).

Another emerging pattern within the threads was what might be termed as situational one-upmanship. This was when responses went beyond empathy and into a kind of competitive claiming of distress. Threads that were initiated with statements about the poster's current financial, emotional and/or personal status, were not infrequently responded to with statements from other users about how their own situation was worse, as in the following:

> *P3: I'm behind with the rent and have no money. How can I have let this happen?*
>
> *P4: I understand what you're going through, I am struggling through a period of being homeless, not having a place to eat and not knowing where I am going to sleep.*

Such responses might, in actuality, detract from the commonfare that the discussion forum attempts to create, inducing a kind of generalized hopelessness or depression. But reputation, as calculated in this system, increases regardless of the content or effect of an interaction.

In addition, it became clear that the emotional state of some of the support group members meant that those trying to provide positive and upbeat advice were sometimes facing a hopeless task. For example, one of the longest threads in the Financial Problems support group, consisting of 38 posts made by seven different people, saw the thread initiator respond to eight pieces of concrete advice with rationalizations for why that advice couldn't work for her. Again, while generating opportunities for the flow of knowledge and affect might be considered as building commonfare, such relentlessly negative responses are more likely to be neutral or even destructive of it.

2.1.7.4 Implications for commonfare.net

The observations of the two discussion forums outlined above have implications for the design of both the commonfare.net platform itself and the reputation system.

It must be noted that the support group nature of these forums, and their being hosted on the same site as other support groups including for depression and anxiety, means that their membership is likely skewed towards those experiencing mental health difficulties as well as financial ones. However, the two forums do illustrate the connection between these two situations and the apparent need for emotional and affective support among those experiencing unemployment and financial difficulties. If the commonfare.net platform includes a discussion forum, it may be that some users will use it to seek emotional advice and support, and that that will be a valued function of the platform. How such support might be rewarded, and how its value might be measured in comparison with more practical support, is a question that needs to be explored together with the potential users of the platform.

The lack of consistent correspondence between level of activity and reputation score in the discussion forums investigated above suggests that aggregate scores, as has been suggested on other grounds above, may not be ideal for commonfare.net. The alternative in conventional systems is to use an average. However, our analysis highlights the importance of network structures and that it is interactions that build the commonfare, suggesting a possible direction for a radical reconceptualization of reward systems in favour of network metrics that reflect interactions that contribute to the commonfare.

2.1.8 Summary

As has been described above, the commonfare.net platform will combine a number of features allowing users to contribute to and participate in the site in a variety of ways. The "sharing/story-telling" and "supporting" hubs will have elements of both transaction/trading sites and on expert/Q&A sites, but may also have elements more commonly seen in community support sites and discussion forums. Because of this, the commonfare.net reputation and contribution system may need to be able to do any or all of the following:

- Recognize users' contributions to the commonfare in terms of telling their own stories, asking questions, and answering questions;
- Provide users a way in which they can indicate the value of stories told by others on the digital storytelling hub, or questions asked and/or answered by others on the supporting/resource-sharing hub;
- Recognize users' contributions to the commonfare through their rating, reviewing and commenting activities;
- Help users decide which other users they wish to interact with online;
- Help users decide which other users they wish to interact with offline;
- Provide users with income beyond the Basic Income by conversion of reputation into commoncoins.

Our investigations of existing platforms and reputation systems have raised the following issues.

Privacy and identifiability

We need to carefully consider issues of identifiability and privacy. On the one hand, users should have a reasonable expectation of privacy and anonymity, especially if they are asking for help or sharing their own experiences. On the other hand, the possibility that online interactions will lead to offline connections, or that participants may use the site to share and trade resources and skills, means that identity validation may be a real concern. Given the potentially limited digital footprint of participants, this may need to be limited to, e.g., the provision (to the system) of a valid email address, although one could consider something similar to (but not as restrictive as) Couchsurfing's vouching system as a means for participants to "build up" their identity validations.

Emotion and affect

As demonstrated in the case study of the support group discussion forums, it may be that users will seek and value emotional advice and support, as well as financial and practical advice and support. Assigning reputation scores or in-platform/digital currency rewards in respect of such activities needs to be handled sensitively.

In addition, we need to be aware of the possibility of the kind of "desperation one-upmanship" seen in some of the discussion forum threads, as these types of threads rarely seemed to lead to any kind of positive resolution or action. That is, we may need to consider ways in which reward for contribution to the commonfare can be distributed according to effect as well as simply instance of interaction.

Altruism, generalized reciprocation and the commonfare motive

We hope that participation in the platform will be driven by a belief in the commons, both in terms of common goods and commonfare, and a desire to improve users' own lives. As such, we hope that participation in rating and feedback activities, if built into the platform, will be driven by the (altruistic) desire to recognize and acknowledge positive contributions, rather than by a desire to receive positive ratings in return.

One way to encourage altruism might be to reward users for the impact they have on other users, as seems to be the case on the Neighborgoods platform; a similar motive seems to be behind the support groups site's decision to reward participants more for responding to an initial post than for initiating a thread. The high level of generalized reciprocation seen on the Couchsurfing system (Lauterbach et al., 2009) suggests that sharing economy/common consumption platforms may have less of a problem with direct reciprocation-seeking than sites such as Ebay; this might be connected with the fact that users can submit ratings in a range of capacities (host, guest, friend), and that they can explicitly acknowledge their relationship category.

Altruism may also be encouraged by providing "in-system" rewards, such as giving those who have contributed positively to the site privileges. Whether users would see taking on the role of discussion forum moderator, for example, as a reward, is something that remains to be determined.

However, some unwanted reciprocity-seeking behaviour is likely, and so mechanisms should be developed to detect exaggerated reciprocity. One possibility would be to exploit social network analysis techniques such as cluster detection to identify possible collusion (Benevenuto et al., 2009; Lian et al., 2007).

The above survey was carried out using freely-available, public, online data. Having established some baseline issues around reputation and reward in a commonfare context, the next step was to conduct empirical research in the pilot sites to help us develop realistic personas and scenarios for use in subsequent stages of the system's design. The results of this research are presented in section 2.2.

2.2 QUALITATIVE INTERVIEWS WITH POTENTIAL COMMONFARERS IN THE PILOT SITES

At the first Design Workshop in Zagreb, September 2016, it was decided that the qualitative data required for the Social Dynamics work package development should be collected independently of the complementary quantitative and qualitative data gathered for Work Package 2 and reported on in deliverable D2.1. Thus arrangements were made to undertake a number of interviews with potential participants in the pilots in Italy, Croatia and the Netherlands.

2.2.1 Interview details

In total, 34 interviews were carried out, in a mixture of face-to-face and computer-mediated (usually Skype) modes. Details of the interviews are provided in Tables 1 to 3 below.

TABLE 1 CROATIA-BASED INTERVIEW DETAILS

Basic demographic and interview information for interviews carried out through the Croatian pilot site.

INTERVIEW	MODE	GENDER	AGE	LOCATION	TARGET GROUP / EMPLOYMENT STATUS
HR1	Skype	Female	20-29	Regional Croatia	Unemployed
HR2	Skype	Male	20-29	Zagreb	Employed
HR3	Skype	Female	20-29	Zagreb	Unemployed
HR4	Skype	Male	20-29	Zagreb	Unemployed/student
HR5	Skype	Female	20-29	Zagreb	Government internship scheme
HR6	Skype	Female	20-29	Zagreb	Freelance/precarious

TABLE 2 ITALY-BASED INTERVIEW DETAILS

Basic demographic and interview information for interviews carried out through the Croatian pilot site.

INTERVIEW	MODE	GENDER	AGE	LOCATION	TARGET GROUP / EMPLOYMENT STATUS
IT1	F2F	Male	40-40	Milan	Employed (precarious history)
IT2	F2F	Male	40-49	Milan	Freelance
IT3	F2F	Male	30-39	Milan	Freelance
IT4	F2F	Male	30-39	Milan	Unemployed
IT5	F2F	Male	30-39	Milan	Precarious
IT6	F2F	Male	40-49	Rome	Precarious
IT7	F2F	Male	20-29	Rome	Precarious
IT8	F2F	Male	20-29	Rome	Student/precarious worker
IT9	F2F	Female	20-29	Milan	Freelance
IT10	F2F	Female	20-29	Milan	Student/precarious worker
IT11	F2F	Female	30-39	Milan	Employed
IT12	F2F	Female	30-39	Milan	Freelance

TABLE 3 NETHERLANDS-BASED INTERVIEW DETAILS

Basic demographic and interview information for interviews carried out through the Croatian pilot site.

INTERVIEW	MODE	GENDER	AGE	LOCATION	TARGET GROUP / EMPLOYMENT STATUS
NL1	F2F	Female	50+	Rotterdam	On benefits
NL2	F2F	Male	20-29	Rotterdam	On benefits
NL3	F2F	Male	50+	Rotterdam	On benefits
NL4	F2F	Male	50+	Rotterdam	On benefits
NL5	F2F	Male	50+	Rotterdam	On benefits
NL6	F2F	Male	40-49	Amsterdam	Freelance
NL7	F2F	Female	40-49	Amsterdam	Freelance
NL8	F2F	Female	50+	Amsterdam	Non-Western migrant
NL9	F2F	Female	30-39	Amsterdam	Non-Western migrant
NL10	F2F	Male	40-49	Amsterdam	Non-Western migrant
NL11	F2F	Male	40-49	Amsterdam	Non-Western migrant
NL12	Skype	Female	40-49	The Hague	Freelance
NL13	Skype	Male	30-39	Amsterdam	Freelance

As has been noted by project partner CMS in deliverable D2.1, is has proved harder to recruit participants in our co-research activities in Croatia than in the other pilot sites. For this reason, we were only able to undertake six interviews with young Croatians. However, these proved to be a rich source of information about the experiences, preoccupations and concerns of young Croatians in various financial conditions, including unemployed, precarious, and student experiences.

The interviews carried out in Milan and Rome provided information on both members of the Italian target group (precarious workers) and on some of the individuals who might act as "power users" or "brokers" in the commonfare.net platform. Because of a pre-existing relationship with a social activist organization in Milan, in particular, the Italian interviewees included people who are not in precarious positions, but who have been in the past and are now highly active in social or community organizations that aim to establish spaces in which people can work, live and organize cooperatively.

The interviews carried out with potential commonfare.net participants in the Netherlands spanned all three target groups in that pilot: those receiving state benefits, non-Western migrants, and the self-employed or free-lancers.

It is worth emphasising that interviewees were engaged in a wide range of activities, not just working and looking for work. Most described spending time on other things including hobbies or interests such as cycling and music; informal community involvement, social or political activism; and/or formal or organized volunteering. Many people were juggling caring for sick/elderly relatives with other activities/hardships; some had to deal with personal physical illness as well as financial hardship.

In short, our interviewees were engaged and talented people living rich and often complex lives.

2.2.2 Aims and methodology

The main purpose of these interviews was to gather information to help inform the design of the reputation system, digital currency and social dynamic algorithms for commonfare.net. Analysis of the interviews was critical in determining the features and characteristics that needed to be included in the personas and scenarios.

Our key aim was to ensure that these personas and scenarios represented not only the commonalities across the experiences recounted in the interviews, but also the range and richness. For this reason, the interviews were analysed using an approach developed from the methods of phenomenography (Åkerlind, 2005; Marton, 1981; Marton, 1986). Phenomenography was originally developed in the field of education studies, but can be applied in any social science research. The core idea in phenomenography is that our experiences and understandings are composed of different dimensions, and within each dimension, there is variation in the way that dimension can be experienced. Basically, phenomenography provides a way of looking at human experience of particular phenomena holistically, despite the fact that the same phenomena may be perceived differently by different people and under different circumstances. The outcomes of the analysis represent the range of possible ways of experiencing the phenomenon in question, at this particular point in time, for the population represented by the sample group. That is, we do not try to describe an average experience, but rather focus on difference and possibility.

... I don't want to get caught back in that trap, the trap of the social system.

The findings from the interviews are therefore set out as a series of dimensions of experience, within each of which one can find qualitative variation. While the target groups in each pilot have some differences, as has already been highlighted in D2.1, there were also important commonalities across the pilots, and differences within each pilot. An important source of variation emerged from the interviews that was not based primarily on pilot site but instead seemed to stem more from how much freedom for movement, dignity and control interviewees felt they had over their own lives. While all interviewees were or had been experiencing financial precariousness, some were in this position as a result of what they felt to be their own decisions and life choices, whereas others felt it to be forced on them by circumstances beyond their control. People also experienced different levels of agency with respect to what they could do to change their situation (if they wanted to). This difference meant that each of the dimensions were experienced in different ways, depending on the degree to which interviewees felt (at that moment, or in that context) in control.

2.2.3 Emerging themes

The main dimensions of experience we describe are:

- Values and aspirations
- Relationships with
  - the State/system
  - family/friends
  - nature/the environment
- Practical problems/daily life
- Time

It is these, then, that form the basis for creating the personas and scenarios needed to inform the design of the reputation system, digital currency and network dynamics elements of commonfare.net.

As well as describing their experiences, interviewees also gave us several valuable suggestions relating to the design of comonfare.net; these are described in section 2.2.5.

2.2.3.1 Values and aspirations

It is well-established (Chiu, Hsu & Wang, 2006) that shared values are important to the successful creation of (online) cooperative communities. Although we did not explicitly ask interviewees about their values, their answers to various questions and their descriptions of their experiences suggested that, for many, maintaining a sense of their own freedom, independence and dignity was important. These spontaneous references to values as well as aspirations indicated that this was an important element to reflect in the personas and scenarios. The degree to which they managed to maintain their sense of independence inevitably impacted on the level of control interviewees felt they could exert on their lives. Another aspect of their experiences that emerged as important in creating or diminishing interviewees' sense of agency and self-authorship was whether they saw themselves as following a vocation or (social) mission. Related to this was the question of where interviewees identified the source of their own value or self-worth, in relation to talent, work, and/or contribution to society. Together, these affected interviewees' attitudes to education and learning, and their dreams and aspirations for the future. The following shows how interviewees' experiences varied between and within the pilot groups.

Freedom and dignity, paths and vocations

One of the key ways in which interviewees' sense of the degree to which they had control over their lives became evident was when they discussed what they valued. In all interviews, it was clear that freedom, dignity and independence were important, as illustrated by the following typical comments:

> *I am very proud of my family, as we have always lived with dignity.* (IT7)
>
> *I always keep a standard where I feel good.* (NL7)
>
> *It's also more freedom, being free to get out, not owning a place ...* (HR2)
>
> *... I don't want to get caught back in that trap, the trap of the social system.* (NL13)

Such a sense of control over one's own existence was often accompanied by evident pride in following or continuing a vocation, or in a talent being put to good use. Sometimes this was expressed as commitment to a role despite obstacles, as in the case of a man who continued his academic work despite having been unable to find paid employment since experiencing serious illness:

> *I'm still doing my work as an economist, and that's good. That's what I'm proud of, that I am still doing my work. I don't give up.* (NL3)

Other times it manifested in pride in having chosen intrinsic over extrinsic rewards, as in the case of this freelancer:

> *[I'm] proud to have had the courage to listen to the heart and stop a job, losing €3000 per month, to stay happy … it was a very difficult decision because I had nothing, but I managed it, and it ended up being a statement. The reactions were very interesting, some of the other dancers in the company were shocked. They would like to do it but didn't know how … it was a decision of path.* (NL7)

This notion of 'path' was important to many of those interviewees who expressed a sense of control over their lives. It was often coupled with a belief that the interviewee was contributing to society in some way, either through the work they were doing or through socio-political activism. This contribution might be at the level of helping individual people, contributing to reform within a profession, or attempting to remake society at large:

> *… I am precarious because I have certain values and political ideas which I intentionally practice. I live precariousness because the occupied place that I frequent had been under eviction since we started occupation, plus now various fines are starting to arrive. Finally, I am precarious because I like to play music [in] a hardcore punk band, and this is not the kind of activity that increases your possibilities to find a job.* (IT7)

… I am precarious because I have certain values and political ideas which I intentionally practice.

Source of (self-)worth

There was a related theme of to what extent, and in what ways, interviewees felt their own value to be determined by work. Here, again, the extent to which interviewees felt themselves to be in control was important. For some, the determination of their value through work was seen as culturally imposed. For others, this cultural norm had been internalised, and produced intense frustration when opportunities to demonstrate value through work were not available. This view dominated among those facing extremely high unemployment rates and the prospect of significant difficulties finding any kind of work, let alone high quality work:

> *… it's just really hard if you are 27 years old like myself, and you are as they say on the top of your game, you have huge ambitions, you have a lot of energy, and you have no chance to sort of show it to someone somewhere, where you would like to work or any kind of job for that matter … we have absolutely no chance to become economically independent in any kind of way you know. We cannot get our own apartments, we cannot move from our parents' house.* (HR1)

When work is seen as the key arena in which one could develop oneself, the absence of work implies an absence of opportunity to develop, and can lead to a sense of stasis or stagnation. Not surprisingly, these kinds of feelings can result in stress, anxiety and depression, as indicated by the following excerpt:

> *… it's obvious that I won't find a job, you know in the field of my interest, maybe in the next five or ten years you know, you don't have any opportunity to have a … better quality start … Maybe that's what's really bothering me … I really know that I have some skills and talents which are maybe very high quality and … I have the will … to do a lot of things, but I don't have an opportunity … I have a lack of self-confidence, you know, and I think that's really normal in my situation but … it became a problem during these months, and I would like to work on it, but I can't work on it if I don't have … an opportunity …* (HR3)

Among many of the interviewees and across all pilot groups, the relationship between work and an individual's (self-)worth was also frequently seen to rest on the socially "useful" nature of their work, as illustrated in the following two excerpts:

> *The key for me is … if I am going to spend an enormous amount of my life working and being away from my family, then it needs to be something that's useful, or at least doesn't impact on the world so much. Not working for massive companies, who don't really give a fuck.* (NL13)

> *I hate the idea of a 9 to 5 job. Even if it's well paid … there's something in me that like dies a little when I think that I would do that for 40 years straight. And I like working, but I like working on things that actually make some difference, like not just like clerical, procedural or pro forma work that has to be done because someone said it was important.* (HR6)

Among the Italy-based interviewees there was evidence of some conflict in this respect. Here, there were many who did not want to define life/self-worth through work, but some who found themselves pushed by their circumstances into doing so. For example, one Italian precarious worker described how his 'passion is writing poetry and also prose,' but then went on to tell us that 'you are so much projected into the need to work, it is hard to feel realized and satisfied as you cannot do those things you would like to do' (IT5). Similarly, while able to see that precariousness might offer some freedom, some interviewees described how the reality of the situation meant they were not really free to do anything other than work.

Attitudes to education and self-improvement

Closely related to how interviewees saw the relationship between work and self-value, another theme emerging from the interviews was the importance of education and learning in people's lives.

For those interviewees who saw their precariousness as a side-effect of a life choice or vocation, education and learning were mostly positioned as matters of personal development. For example, one Croatian freelancer described how her own view of learning was quite different from that of her parents:

> *So school was always perceived as ... operational ... [a] way of, you know, attaining a middle class life. ... And well anyhow, I went to school but I always saw it as this way of like – I dunno, like a personal journey in a sense.* (HR6)

This kind of desire for continuous learning usually related to the interviewees' sense of mission, that is, that they are contributing something important to society by becoming better and better at what they do. Sometimes this was even expressly related to precariousness, and seen as a positive deriving from it.

For those experiencing their precariousness as externally imposed, while education and learning were still seen as having intrinsic value, they also tended to be viewed additionally in a more instrumental way. That is, quite understandably, such interviewees saw continued learning as a means to get additional "employability" skills, and so were both more likely to educate themselves in areas they were not actually passionate about or interested in and more keen on credentialed learning. Perhaps paradoxically, this was particularly the case for those (especially young Croatians) who had seen their existing qualifications devalued, until '*young people nowadays have this feeling that even your MA doesn't mean anything, let along your BA degree*' (HR1). This could lead to real frustration as '*on the one hand you develop new skills, but on the other you have to lower your expectations, continuously*' (IT5).

...young people nowadays have this feeling that even your MA doesn't mean anything, let along your BA degree.

Given the importance interviewees placed on commonfare.net providing opportunities to learn (see below), these attitudes also needed to be reflected in the personas and scenarios.

Dreams and aspirations

The different ways in which people experienced agency and self-determination appeared also to contribute to different types of dream and aspiration, with different scopes and expectations of fulfilment.

When asked where they saw themselves in 5-10 years, some interviewees responded with immediate, individual ambitions. A surprising number of interviewees described wanting to work in academia and in particular to do a PhD. This ambition was particularly common among the Croatian interviewees, perhaps reflecting their sense that a Bachelor's degree is now relatively worthless in the job market, but it seemed that there was also a genuine desire to engage in research and to continue to learn. Although a PhD was less commonly identified as a dream among the Italy- and Netherlands-based interviewees, it did feature among them, and the desire for continued learning was widespread.

Among the freelancers and others who saw themselves as following a vocation or mission, in all three pilot countries, there was a tendency to describe dreams and aspirations that involved social change. Some combined the personal and the social, as evident in the aspirations of a precarious Italian student who described wanting a PhD position and to try co-housing in the hope of reducing the risk of eviction, but also wanting '*more serenity in everyday life, politics and in my job*' (IT7).

Among the non-Western migrants, there was a clear desire for social and political change both in their immediate environments and in the wider world. While two interviewees described wanting '*more green in the streets, more playgrounds, more safety*' (NL10) locally, two also had bigger hopes for what was seen as much-needed change in society at large:

> *... hatred is like a disease in this world for which there is no medication ... It's all about finding the medicine for this hatred.* (NL11).

However, there was also a sense of realism and constraint among many of the interviewees. The constraining experience of being out of work for some time could result in aspirations limited to what some people would expect as normal, unremarkable parts of life, such as the chance to go camping, or to drink wine with friends, or have a coffee in a bar. For others, dreams of perhaps following an unconventional, "true-to-oneself" life were being replaced by dreams of stability and an ability to provide for family, so that, for example, dreams of being a writer were substituted for by hopes of getting a more likely job as a database programmer. For those experiencing their situation as an extreme loss of agency, the sense of being unable to control one's life even led to an inability to have (or at least articulate) goals.

Thus variations in the way agency and self-authorship were experienced were evident throughout the interviews. These variations showed themselves through the values expressed by interviewees and their sense of vocation or mission, whether or not they ascribed their self-worth to simply being in work or to fulfilling some kind of potential, their attitudes to and experiences of education, and their dreams and aspirations.

2.2.3.2 Relationships

Another important dimension of experience that emerged in our interviews can be described as the experience of

various different types of relationship, which might be seen as providing interviewees with (or cutting them off from) social, and some forms of cultural, capital. Most important among these were relationships with the State or system and relationships with family and/or friends; but there was also some importance placed on relationships with the natural world. This highlights the existence of our interviewees as within complex assemblages of actors that impact on their welfare. Again, the apparent importance of both positive and negative relationships, confirming the inadequacy of individualized discourses of success and failure, needed to be reflected in the personas and scenarios we developed.

Relationships with the State/system

Interactions with the State and bureaucracy were almost always described using powerful language suggesting that interviewees' freedom and dignity were being eroded. For example, one Netherlands-based freelancer described an occasion when she had started the process of applying for State support, but had found the whole process so embarrassing that she walked away from it. Similarly, other Netherlands- and Italy-based interviewees described '*corrosive*' (IT6) interactions with the State using terms such as '*chains*' and '*slavery*'. This not only reinforced people's desires for freedom and independence, but also gave rise to a generally high level of political awareness and distrust. In fact, almost every interviewee expressed generalised distrust of and disaffection from the political and business systems. The attitude among young Croatians can be summarised by the statement, '*Of course it's only logical that I don't trust the State*' (HR1). This, in turn, sometimes led to the adoption of alternative solutions, outside of the conventional social framework.

A common theme that emerged in the interviews and that clearly impacted on self-determination and agency related to exploitative practices and a generally unfair culture. This manifested itself in slightly different ways depending on the national context, for example with nepotism being described as a key feature in Croatia. Young Croatians also reported frequent experiences of not being paid for work they had done, both within the black economy and even when working on a contract. Unique (in this study) to the Italian experience of precarity was the increasing use of job vouchers in place of payment in actual currency. (Although changes to Italian labour law will soon render this practice obsolete, it is likely that other questionable employment practices will lead to continued precarity.) Unique to the Croatian context is the Government's internship scheme, in which young people work for only around €280 per month (often for 12 months). All interviewees based in Croatia described this scheme as highly exploitative, noting that the work was often menial (filing, photocopying) and not connected to their chosen field, but also that participating employers were getting a very cheap, but well-educated, labour force, and that in addition they would have lower tax bills than if they employed people on real contracts.

In all three countries, it appeared that having a "proper" job in the conventional sense did little to reduce the risk or experience of exploitation, with employers able to '*blackmail*' (IT5) workers into accepting terrible contracts.

In both Croatia and Italy, young people felt that they were particularly disadvantaged. The young Croatians we interviewed repeatedly referred to their lack of prospects, and one Italian freelancer also described being exploited because of her youth and gender (this was the only time gender was mentioned as an issue in the interviews).

Among the Netherlands-based interviewees, the older generation frequently talked about how hard it is for younger people now, and some among the non-Western migrants worried about the potential impact of young people's sense of disadvantage, raising the possibility that it might be a factor in developing extremist views. On the other hand, some interviewees described how their sense of exploitation and disadvantage led them to become more positively politically active and to search for other ways of living.

Many of the interviewees in all three countries showed a keen awareness of politics and the social impact of both government policies and capitalist economics. Many interviewees in Italy and the Netherlands expressed anti-austerity or anti-capitalist views, and all Croatian interviewees made disparaging comments about their own government. One Dutch interviewee described how a right-wing city government 'made several measures that stimulate poverty instead of repairing it' (NL3). An example of such poverty-increasing actions was described by another Dutch interviewee:

> *And actually it's the Dutch government, and all its layers, who is getting people more and more into debt. It's ridiculous here. Instead of – er – helping in a situation and saying OK, you have your debts and we're going to sort it out and bit by bit we try to get you out of those debts – no way. It's just the other way around. The tax office, the auditings, the audit offices, oh, you failed! Bang. You are trapped. You get a fine if you don't pay … How do you pay the fine if you can't pay the first thing. And its accumulating. It gets interest as well. Yes. It's totally ridiculous.* (NL5)

Another interviewee suggested that policy documents were deliberately written to make them hard for people to understand, so that they would be less likely to understand what was being done and raise objections.

This awareness had led several of the interviewees to get involved in socio-political activities such as occupations and cooperatives in Italy, and anti-poverty and community organizations in the Netherlands. This was not the case with the Croatian interviewees, suggesting that those experiencing an externally-imposed precarity (as is the case for most young Croatians) tend to have less sense of agency and self-authorship.

A final theme reflecting interviewees' relationships with the State and society as a whole relates to the representation of unemployed and precarious people in the media and the attitude society holds towards them. Interviewees in all three countries described a pervasive culture in which the poor and precarious were seen as at fault for their condition. Sometimes, this was experienced in relation to precarious housing, for example in descriptions of the police beating up homeless people who were squatting or staying

in abandoned buildings. Other times it was described in relation to society's treatment of those unable to find work: interviewees described how society judged it was their own fault if they could not find a job, in what was widely perceived as a '*blame the victim*' (NL5) culture.

Relationships with family/friends

Perhaps partly as a result of the pervading sense that the State/capitalist culture does not provide a secure or supportive structure within which they could live, the interviewees all placed heavy emphasis on their personal networks of family and/or friends. This was evident in descriptions of both connections and isolation.

Family were relied on by many for both emotional and financial support. The critical position of parents in the lives of young Croatians was evident among both those living at home and those who had moved away, and some Italian interviewees described relying on parental support when it came to rent or mortgages.

Friendship networks were also really important in providing both practical and emotional support. Interviewees described friends helping with painting the walls of a flat, transport, learning, and more. Among the Italy-based interviewees, this kind of help sometimes evolved into a more formalized structure. Examples include a cooperative kindergarten and mutual assistance arrangements such as help to buy food or groceries.

While friendships were described as important for emotional support across the interviews, they appeared to be particularly important for the freelancers, who frequently worked alone, and often had moved a long way from their origins and families:

Among the older interviewees in the Netherlands, friendships were more often described in terms of the support they themselves were able to offer. Some interviewees described how difficult financial conditions had actually strengthened their friendships, for example as neighbours shared care for each other's children during school holidays, and people tended to see a lot of each other in the local area.

However, the impact of precarious financial conditions on relationships was acknowledged by some to be potentially negative. Sometimes friendships were lost as people subscribed to the blame the victim culture described above. On a personal level, precariousness could mean that future relationships were uncertain, and that starting a family, in particular, was stressful to contemplate. Some interviewees also felt that precariousness was changing society's cohesion. For example, the restructuring of work into a more individual and precarious model was itself identified as causing a lack of solidarity.

Reliance on friends and family for emotional and practical support meant that it was very easy for interviewees to experience isolation, or to see the dangers of isolation for people in similar situations. That is, although many felt themselves to be embed in strong social networks, some still saw precarity in social as well as financial capital.

Isolation could be a result of geographical separation, as people moved away from family and friends. People sometimes found it difficult to replace lost or diminished relationships, particularly if a migrant in a new country. Even for those who, on the surface, appear to be living in an identifiable community, sociocultural issues may result in a relative lack of support. This was brought up by three of the non-Western migrants interviewed in the Netherlands, who described divided families and a strong sense of pride forming a barrier between women when they are suffering or struggling.

As well as geographical separation, lack of money was also identified as a factor increasing the risk of loneliness – people simply didn't have enough money to do things like go out for a coffee.

Similarly, the need to work all the time often prevented those interviewees who did have jobs from finding time to maintain friendships. One Netherlands-based freelancer described how she and her friends were all so busy that they rarely had time to see each other. A precarious Italian worker described how needing to adapt to constantly changing jobs had a similarly negative impact on his social connections.

Some of the interviewees also described how local and national government policies could contribute to isolation. For example, one Dutch benefit recipient described how the closure of community centres as a result of austerity policies impacted on the elderly and unemployed.

One cause of loss of social connections that was mentioned by some of the interviewees who had chosen to follow a vocation was a kind of alienation from their roots or former communities that resulted from their own personal development. Related to this sense of diminishing mutual understanding as a result of personal development was a larger sense of a lack of intergenerational understanding – a sense most often evident in the interviews held in Croatia and Italy, among the younger interviewees. In both countries, this was related by our interviewees to changing societal (and particularly working) conditions. Some felt that the older generation tend to see a university degree as a guarantee of success, whereas this is far from the case in the current context of a massified higher education system and high unemployment even among graduates. Generational differences were seen by several of the young Croatians we interviewed as contributing to their unfair treatment by society.

It is clear that, for those with strong family and friendship ties, their ability to draw on social capital helps them manage their precarity. However, as we shall see below, relying on others can also lead to a sense of indebtedness that diminishes one's sense of control.

Relationships with nature/the environment

A less common but still note-worthy theme in the interviews related to nature and the environment. Several interviewees in all three pilot countries referred to ways in which they were aware of and concerned for the environment. Some preferred to buy organic or unprocessed food; some were keen to buy second-hand goods and recycle as much as possible not only as a strategy for reducing outgoings, but also because it is better for the environment and the health of the planet.

As already noted above, two of the non-Western migrants interviewed in the Netherlands described a desire for more green spaces in their local environment – one emphasising that he wanted to see flowers and trees, as this was for beauty and space, not for something as utilitarian as growing one's own produce. One young Croatian was involved in a society that participated in conserving the historic environment. Another young Croatian had interests in both plant-based medicines and sustainable food production. Going further, some of the interviewees expressed a positive relationship with the natural environment, such that provided comfort and calm in otherwise stressful lives.

Relationships, then, formed another key dimension of experience for our interviewees, one that was gain critical to include in the personas and scenarios. Relationships with the State and/or authorities were mostly described in negative terms, as eroding freedom or as corrosive: the State was definitely not seen as a source of social capital. In contrast, family and friendship networks were experienced as extremely important, with varying foci, and flows of social capital were clearly important both in helping our interviewees get by, but also in establishing their own value as they provided support to others. Relationships to the natural world were also, for some, very important in creating peace and inner stability.

2.2.3.3 Practical problems

An important dimension of the experience of precariousness of our interviewees was simply daily life. Interviewees described practical problems and issues they encountered, together with strategies or approaches they employed to get by.

Practical problems in dealings with the State or the actions of authorities

As described above, for many of our interviewees, relationships with the State or authorities were sufficiently negative that they tried to avoid them as much as possible. However, for the Netherlands-based benefit recipients and non-Western migrants, avoidance of the State was not an option. For these groups, many of the practical problems they encountered were actually the result of State actions.

One of the most common types of State-induced problem appeared to be the need to adapt to changing requirements or conditions. Several of the Netherlands-based interviewees referred to the removal or reduction of State support. For example, parents described losing child benefits when their children reached a certain age, even though they were still living at home and in need of support. Others described how austerity policies had reduced their benefits from previous levels. Another way in which austerity policies were impacting on everyday life was the closure of community centres, removing venues for free, communal activities. This could in turn increase the dangers of isolation and loneliness described above.

Some students in both the Croatian and Italian pilots also described losing benefits. This was sometimes a result of austerity policies, but they could also be a result of punitive policies within the education system.

As well as reductions and removals in benefits, several of the Netherlands-based interviewees described changes in the rules which had to be satisfied in order to make a claim: '*the bureaucracy and all the rules are making it worse in their lives. Really, a lot worse*' (NL5). New rules requiring claimants to wait longer before they receive benefits (in one case compounded by bureaucratic errors leading to an eight week period with no income of any sort) can result in people accumulating more debt and getting deeper into precarity.

None of the interviewees who referred to State-generated difficulties of these types described strategies for dealing with them, other than simply to keep going and to make more cuts to their own living costs.

Another difficulty in dealing with the State related to language skills. This was not simply to do with not being a native speaker of the language, but also to do with not being native to the system itself. In the Netherlands-based interviews, language and the ability to communicate in a certain way was highlighted as an issue for native Dutch speakers as well. That is, language issues were sometimes seen as partly the result of an unhelpful, unsupportive relationship between the State and individual citizens.

Housing

Not surprisingly, housing was a common issue across all target groups. People in all three countries described experiencing homelessness, unstable living conditions and difficulties in finding affordable rents. For many, this meant accepting low physical standards in the home environment such as inadequate heating or shabby conditions. One Netherlands-based interviewee described living with no furniture for an extended length of time. For others, the lack of affordable housing meant they had to accept poor tenancy conditions, or even no contract. Some turned to squatting as a solution, but this of course was itself an unstable solution, in the Croatian case with the threat of police violence as well as eviction. In contrast, one Italian freelancer described an extremely positive experience of finding housing through a special Project Community. Such positive experiences could be re-told on commonfare.net in the hope of stimulating other alternative approaches to housing.

Childcare and children

Childcare and associated costs were mentioned only in two of the Italy-based interviews. In one case, an Italian freelancer and social activist described how competition for places in State-funded nursery schools meant that he was faced with the, for him, prohibitive costs of the private sector. His solution to this – the creation of a self-managed nursery school with other parents in the same position – has already been described in D2.1.

The only other time childcare costs were mentioned was in an interview with another Italian freelancer, who described how having a child had not in fact impacted on his financial situation. It is likely that this is not a common experience across Europe, as especially in Northern Europe childcare costs can be such that the cost of care for two children is higher than the additional income a mother would bring in if returning to work.

The lack of mention of childcare costs among the other target groups is probably the result of quite different causes. Among the Croatian interviewees, none had children. Indeed, their deeply-felt instability and lack of prospects meant that they could not envisage a time when they could start a family. This was mentioned explicitly by four of the six Croatian interviewees. Among the Netherlands-based interviewees, the high unemployment and cultural expectations about the role of women among the non-Western migrants may mean that there is usually someone at home to look after children. Among the Netherlands-based freelancers, only one had children; and among the benefit recipients, those that had children looked back on the times when they were young and living at home as times when State support was far greater.

Managing

The pressures of unstable and inadequate income were dealt with on a day-to-day basis by the interviewees in a variety of ways.

Several interviewees described how they were willing to do without a great deal in order to be independent. Sometimes interviewees described doing without items that others would deem as essentials, such as heating or warm clothes in winter; however even in these circumstances, pride and a desire to maintain a sense of dignity could lead to a refusal to admit discomfort to others or to ask for help.

As well as simply doing without, some interviewees described strategies for acquiring free food. Food banks were mentioned in several of the Netherlands-based interviews, and one interviewee described having relied on the Salvation Army's soup kitchens for a while. One interviewee described getting free food in exchange for helping distribute food to the homeless. Another described living off the remains of other people's meals in a university cafeteria; the subsidised meals available in such cafeterias seemed to be important for several interviewees engaged in (or with friends/family engaged in) higher education.

Others described buying items such as mobile phones, books and music second hand, identifying stores where some items were particularly cheap and doing grocery shopping in multiple shops to buy the cheapest products in each store. Some of the Italy-based interviewees belonged to cooperative food purchasing groups, but these were not referred to in the interviews in the other pilot sites.

Others (particularly among the freelancers in all three pilot countries) described prioritizing purchases related to work, being willing to cut back on "luxury" spending such as non-essential books or going out for a drink, and making very strict plans about what to buy when.

Others described dealing with the need for money simply by either selling their belongings or trying to find additional work. Comments such as '*… you don't have much option, you know? Then you do whatever there is you can take*' (HR1) were common.

Another option for acquiring income was to work cash-in-hand. This was described in all pilot groups, but seemed to be most common (and most accepted as inevitable) in Italy. In Croatia, feelings about working off the books seemed generally to be a little more negative. While terrible employment conditions could mean that '*it turns out that it's better to work on black, with no papers or nothing*,' (HR4) some felt it was morally dubious, and so would be reluctant to do cash-in-hand work beyond activities such as baby-sitting or other one-off, small scale jobs. Another reason for some reluctance emerged in an interview with a Netherlands-based freelancer, who described it as rather regressive, '*sort of going back to the jobs what you originally did when you first left school*' (NL13).

The final option described as a means of coping with or improving their current situation was emigration. This was raised in every Croatia-based interview. Emigration was raised as a solution in just one Italy-based interview. It did not feature in the Netherlands-based interviews.

Thus the interviewees described many ways in which they tried to manage or improve their situation. The one thing that was glaringly absent was turning to the State for assistance.

Debt, indebtedness

Despite all these strategies for getting by, people sometimes find themselves in debt. This might be formal debts, deliberately taken on in attempts to improve one's situation, such as debts accumulated during education or mortgages. These were the source of substantial levels of stress for many of those who had incurred them. In extreme cases, debt could lead to far more complex forms of precarity, as in the following example:

> *I borrowed from some suspicious people some money and – did some stuff for them. Anyway they – it turned out that … they have a bad history, they like got out of prison, they were dealing weapons, drugs … at some point I couldn't return some part of it … there was like this really hectic situation … I just kind of ran away, because I didn't know what to do. I was afraid they would beat me up, and then that I would have like problems with them. They were trying all the time to pull me in their circle and I didn't want this to happen.* (HR4)

Equally important in our interviews was informal debt and an accompanying sense of indebtedness and inadequacy. Many interviewees, particularly in Croatia and Italy, had had to borrow from or otherwise rely on their families for support for education, housing and just to live. This was commonly experienced by those experiencing precarious conditions not as the result of a vocation or choice. Such dependence can lead to a sense of guilt and frustration, as those indebted to their families would like to be in a position to help them in return.

Thus many of the interviewees' difficulties are actually generated, rather than alleviated, by interactions with the State. Not surprisingly, people experiencing precarious financial conditions may face day-to-day problems to have enough food, heating and clothing; but faced with this, there is a continued striving for independence and a desire to overcome challenges and live life with dignity. This, however, can make debt and indebtedness a particularly stressful and unwelcome experience, as it can reinforce a persistent sense of loss of control and inadequacy.

2.2.3.4 Time

The experience of *time* also emerged as a major theme across all pilots. At first glance, one might be tempted to include time as one of the elements making up the dimension of practical, day-to-day experiences. However, although time often appeared in the interviews because interviewees did not have enough of it, it also figured in ways that suggested that interviewees not only experienced time poverty, they also saw it as something that was not something they could control, or was somehow slipping away from them.

You don't have any free time, you don't have any money, you don't have nothing so why like kill yourself?

Almost all of the interviewees felt themselves to be immensely busy, with looking for work, studying, voluntary work, working to get enough income, etc. For some, there were not quite enough hours in the day. Many felt they had not enough time to do things they wanted to do, such as read fiction, or maintain relationships.

While such endless work might seem acceptable to those who were pursuing a career that they valued, for those carrying out work at a menial level for very low pay, such a cycle could appear pointless. As one interviewee told us,

> *And then I have to go again on the job, I sleep and go to the job ... what's the sense, why even work? You don't have any free time, you don't have any money, you don't have nothing so why like* ***kill*** *yourself?* (HR4)

For some, the fact of not having enough time meant they had to carefully prioritize, especially in relation to what they did online, as there was so much out there they could read and be interested in.

Among the freelancers and precarious workers, time seemed to be experienced in two different ways. For most of those who had elected to follow unconventional career paths because of a vocation or desire for freedom, time was one of the things they were in control of, since they could choose how much to work, and how much to devote to other aspects of their life. But for those who were precarious and stressed by their situation, time was often described as something that had slipped out of their control. The need to constantly search for additional income just to get by left one interviewee feeling '*all in that cycle of always you're behind yourself and trying to catch up*' (NL13).

For those who felt less control and agency, there was frequently a sense that time was slipping away. This was commonly expressed in the Croatia-based interviews, where interviewees were more likely to experience their precarity as imposed. Among these interviewees, there was a frequent sense that they had not achieved a stability or the markers of conventional success that society expected of them by their late twenties. For those that had spent a long time in education, and possibly also the Croatian Government internship scheme after that, there was also a sense of time lost for no identifiable benefit to their career or prospects.

This sense of lack of control over time, and of time racing on or slipping away from them, made some interviewees reluctant to think about (or at least voice hopes for) their futures. This notion of a life '*strictly bound to the present*' (IT9) seemed in strong contrast with the future-focused thinking of some of those following a mission or vocation.

Time, therefore, seemed to be an important part of the way in which our interviewees experienced their precariousness.

2.2.4 Summary of emerging themes

Our findings in relation to the experience of precarity are summarised in the table below. Interviewees might find themselves at any point between the extremes of low and high sense of agency, depending on the context and circumstances.

TABLE 4 SUMMARY OF DIMENSIONS OF EXPERIENCE OF PRECARITY

DIMENSION OF EXPERIENCE	LOW SENSE OF AGENCY/ SELF-AUTHORSHIP/CONTROL	HIGH SENSE OF AGENCY/ SELF-AUTHORSHIP/CONTROL
Values and aspirations	Loss of freedom and dignity. Feeling one's value to society lies in capacity to contribute professionally, but no opportunity to do so. Aspirations tempered by realism, or feeling unable to think of the future.	Maintaining a sense of freedom and dignity. Pursuit of a vocation and/or social mission gives one's actions value. Self-improvement in pursuit of own goals.
Relationships	Erosion of freedom and dignity in interactions with State. Looked down on by others, blame the victim. Isolation from supportive networks of friends/family.	Two-way flows of social capital, i.e. individual offers as well as receives support. Feeling able to form settled intimate relationships, start a family if desired.

DIMENSION OF EXPERIENCE	LOW SENSE OF AGENCY/ SELF-AUTHORSHIP/CONTROL	HIGH SENSE OF AGENCY/ SELF-AUTHORSHIP/CONTROL
Relationships	Inability to settle down, start a family	
Practical problems	Inability to cope without help. Debt and indebtedness.	Pursuit of a vocation and/or social mission makes it worth putting up with material deprivation. Cooperative strategies such as food-buying groups, occupations.
Time	Time poverty. Time slipping away.	Able to use time wisely. Investing time in self-development.

2.2.5 Issues relating to the commonfare.net design and social dynamics features

> *I don't have anything I want to do or anything that I would offer. I don't want to start any sharing like that, because I'm really kind of – I don't want to give my things to other people.* (HR5)

> *... we need to build a tool that allows to create mechanisms for mutual solidarity among peers among people that recognise the same framework of values* (IT3)

In almost all of the interviews, we asked specific questions about what interviewees might find useful or desirable in a platform such as commonfare.net. We also asked about skills, resources or stories that they might be willing to share with others. As the above two excerpts show, attitudes differed widely.

Below, we list some of the concrete suggestions made for commonfare.net.

Information provision

Some interviewees wanted the platform to provide authoritative information. For example, some of those receiving benefits or currently unemployed wanted the platform to provide clarity about the responsibilities and job-purpose of those working in social services with whom they would have to deal. More commonly, interviewees suggested, '*the most important service you could offer is to have a place where people [experiencing precarity] can access information on how to solve their problems*' (IT5).

Communal knowledge sharing

Many interviewees wanted the platform to provide opportunities for communal knowledge sharing. For example, one interviewee suggested the site have a "tips" feature: '*maybe some cooking tips, on making a cheap meal*' (NL1). Others saw the opportunity to share knowledge within their profession. Sometimes this might be receiving the benefit of the experience of others, or sharing their own experience and knowledge.

Caution re stories

Among the Croatia-based interviewees, there was a general feeling that they would not want to take part in story-telling. While most other interviewees seemed reasonably happy to talk about their own experiences online, one interviewee for whom narrative was part of her professional life advised caution and care with how narratives are constructed for commonfare.net, noting the difference in perspective and interpretation between teller and reader.

Limited pushed information

As described above, most interviews felt themselves to be very busy, experiencing a kind of time precarity as well as economic and potential social precarity. They were thus frequently vociferous about not wanting a system that bombarded them with more messages, more emails, or more demands on their time.

However, some would like to be able to receive real time tips, '*like you have to go to that store, they have a sale on that, like really practical stuff*' (NL1).

Others thought a regular but not-too-frequent newsletter would be appropriate – perhaps once per month.

Educational opportunities

Interviewees in all pilots wanted the platform to provide opportunities for learning. Opportunities to re-educate were put forward as ways of changing career path, or of pursuing self-development. The former would need to be credentialed in some way, whereas the latter could be simply through sharing knowledge. One Netherlands-based interviewee, who felt strongly that many people experiencing precarity have difficulty negotiating with the State, suggested that the platform teach negotiation skills via scenarios ("what went wrong").

Practical connections

Some interviewees (in all three pilots) suggested the platform could allow for practical connections, in particular increasing opportunities for people to find jobs. For example, one interviewee told us '*What I would need is a platform that autonomously signals you some possible offers from a community (help, food, job openings and or new events to which you can participate), and where you can directly apply without going out from the platform itself*' (IT9). Similarly, other interviewees imagined creating profiles listing their skills (for example as a language teacher) or their availability in the hope of getting work.

Others imagined sharing, including sharing involvement in community organizations, rather than simply finding jobs.

Supportive connections

A common request was to have the opportunity to create supportive connections. As one interviewee put it, '*I think the most important thing for the precarious worker who is*

surrendering and feeling disenfranchised is to be able to see him/herself. Because s/he is alone, and risks getting lost as s/he is reduced to a function in society, dehumanised' (IT5).

It was hoped that commonfare.net might provide a solution to the loss of community resulting from modern life. The need to connect with others in a similar situation was also connected to knowledge-sharing: '*… a sense of community with people who are all trying to make ends meet in ways that are different from what is conventional at the moment. And to see how they do it and maybe help each other out*' (NL12).

For the already socio-politically active interviewees, it was also important that it should be '*a totally networked organization, not hierarchical*' (NL3).

How trust is built

Direct, face-to-face interactions with others was a major theme in relation to building trusting, sustainable relationships and communities. As described above, all interviewees talked of how important their relationships (with friends and family) and/or interactions with others in voluntary work were, and many talked of how they preferred direct interactions to online relationships. Some even went as far as to say that wholly virtual relationships were not "real."

Some interviewees who already used the internet for their work or to make contact with people with shared interests described how trust is built up through regular contact over an extended period of time, and through sincerity and authenticity. In contrast, a small number of interviewees indicated that trust wasn't really necessary for online interactions as long as the stakes in those interactions were low.

The issue of whether reputation metrics or other indicators of trustworthiness would be needed (or welcomed) also elicited highly varied responses. Some interviewees were very positive about the possibility to leave and view comments, for example when looking for a good cake recipe. In such a context, reading and coming to decisions based on other people's opinions was a normal part of internet use for some interviewees, along with the assumption that some of those opinions might be deliberately misleading or negative.

The Croatia-based interviewees (who were generally younger than the Italy- and Netherlands-based interviewees) expressed some preference for formal indicators of trustworthiness such as ratings or star-based systems. This seemed to be consistent with the high levels of general distrust among this group. However, among the other interviewees, there was a fear that ratings and star systems might be trivializing, or worse that they might undermine the purpose of the commonfare endeavour.

Dislike of social media, distrust of corporate tech

One final point which is relevant to the design of the social dynamics aspects of commonfare.net is the widespread distrust of social media in relation to both privacy and honesty, and the perceived dangers of social media use.

Although some interviewees described using social media (and Facebook in particular) to keep in touch with friends, the majority either did not use it or kept use to a minimum. Some used a fake name to maintain a level of privacy.

For others, the dangers of social media lay more in its addictive and time-wasting nature – time that busy people trying to earn enough to support themselves and their families could not afford.

There was also a sense that Facebook and other technology corporations could not be trusted.

Even some of those who admitted using Facebook a lot were ambivalent towards it, with comments about "love-hate" relationships with the platform fairly common.

2.2.6 Summary

The interviews described in the preceding sections were thus an important source of information and insight about both the ways in which precarity may be experienced and attitudes to the internet and social networks. They provided us with key themes, including experiences and aspirations, with which to build the personas and scenarios presented in Chapter 4. They also indicated that, as already suggested in Section 2.1, issues around trust and reputation metrics will need to be handled very sensitively in the commonfare.net design process.

The interviews provided the WP3 team with background and context relating to experiences of precarity, sense of community and attitudes to and use of the internet and social media. However, they could not provide detailed insights into the possible uses of the planned digital currency. To gain thee, a parallel research was undertaken by Dyne, field-trialling a digital currency with a group based in Milan. This is described in the following section.

2.3 DIGITAL CURRENCY USE CASE

In this section, we provide an overview of progress towards the design and implementation of a digital currency for the commonfare.net platform. In addition to the empirical work described in the sections 2.1 and 2.2, it has been possible to develop a use-case for commonfare.net's digital currency mechanism. This section describes the experiences and choices of pilot participants in Milan who trialled the Social Wallet approach being developed by Dyne.

First, in Section 2.3.1, we present an overview of the planned digital currency. Following this, in Sections 2.3.2-2.3.4, we give some details of the field trial. Then in Section 2.3.5 and 2.3.6 we speculate about possible uses in the Dutch and Croatian pilots. Finally, in Section 2.3.7, we consider the digital currency at the level of the commonfare.net platform.

2.3.1 Design and implementation elements of the Digital Currency

The digital currency (DC) for the Commonfare platform is being designed as a version of bottom-up basic income in the form of a complementary currency deployed as a cryptocurrency stored in the Freecoin Social Wallet implementation, which is the digital wallet prototyped for pilot participants. This section provides a breakdown of the elements for the DC: basic income, complementary currency, and cryptocurrency and distributed ledgers technologies.

According to Van Parijs, "a basic income (or demogrant) is an income paid by a political community to all its members on an individual basis, without means test or work requirement" Van Parijs (2004, 1; see also Atkinson, 1996). In other words, basic income has been traditionally conceived as a form of monetary provision by the State to all citizens independently of their social status. Van Parijs also specifies the "central case for basic income, as a strategy against both poverty and unemployment" (ibid.). Moreover, economics professors Andrea Fumagalli and Stefano Lucarelli argue that "basic income can be seen as a viable economic policy able to contrast the instability generated by the present form(s) of accumulation, as it increases productivity through network and learning processes" (Fumagalli & Lucarelli, 2008). Basic income as a form of reappropriation of the means of production and distribution of money is currently gaining more and more momentum. For instance, in June 2016 Switzerland was the first country in history that held a referendum to ask the population to decide on this topic.

In the context of a commonfare approach, in which basic income is thought of as a bottom-up practice, Fumagalli proposes framing welfare provision by grounding commonfare on two main pillars: the institutionalisation of universal basic income and a new management framework of common goods and the commonwealth, both of which can be considered in the light of contemporary digital or crypto-currencies. In relation to the former, Fumagalli and Lucarelli argue that "an unconditional basic income should be understood as a kind of monetary compensation (remuneration) of the social productivity and of productive time which are not certified by the existing labour contracts" (Fumagalli & Lucarelli, 2015, 170) – a description that invites parallels with the kind of reputation or contribution system discussed in section 2.1.

The second design element for commonfare.net is the notion of complementary currency. In relation to this, the key idea is the recognition that in the money creation process, the current dominant monopoly of a monoculture of national currencies (Euro, Pound, Dollar, Yen, Yuan, Rupee, etc.) creates a system which is inherently characterised by a significantly fragile structure, prone to poor systemic performance as illustrated by continuous crises at the banking, monetary and sovereign levels. In fact, globally, "*there were 145 banking crises, 208 monetary crashes and 72 sovereign debt crises between 1970 and 2010*" (Lietaer et al., 2012, 51).

...there were 145 banking crises, 208 monetary crashes and 72 sovereign debt crises between 1970 and 2010.

(Lietaer et al., 2012, 51).

Since the conventional monetary framework based on a monoculture of national currencies favours recurrent crises (as documented by the World Bank and International Monetary Fund), complementary currencies have been proposed as a structural solution based on a diversity in the types of currencies available to users of money systems. Accordingly, "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, 13).

Lucarelli and Gobbi add clarity to the terminology defining these types of currencies, stating:

> "'*Unofficial' currencies have many labels such as complementary, parallel, targeted, local, social, mutual help and cooperative or community, all of which are significant qualifications describing different features of these social institutions. They are complementary (and parallel) because they do not replace official money but circulate alongside it for specific purposes (in which sense they can also be called targeted). They can be called local, as they usually circulate in a delimitated territory and respond to the peculiar needs of a given community. They therefore meet certain social needs by providing the purchasing power needed to engage in productive activities, create employment and buy goods and services. They are also called mutual-help currencies because they can be used to enhance non-profit organisations. Finally, they are called cooperative (or community) when they represent the labour and social cooperation of the members of the community.*"
>
> (Lucarelli & Gobbi, 2016, 6. Italics in the original)

In the context of the DC for the Commonfare platform, such currencies are defined as complementary in that they are designed to operate in parallel with conventional bank-debt money (Euro in Italian and Dutch pilots and Kuna in Croatian), rather than trying to substitute for it completely. The systemic effect of the introduction of complementary currencies is, primarily, to give more sustainability to the monetary system as a whole. In other words, the implementation of different types of complementary currencies changes the structure of the monetary system and, by definition, such modification can structurally improve the level of overall systemic resilience due to increased interconnectivity. This in turn will increase the overall sustainability of the monetary system. In a nutshell, the possibility of making more economic connections through the use of different types of currencies – framed around tailor-made agreements within communities – will enhance the potential capability of every economic agent taking part to the pilots in the PIE News project to proactively respond to unexpected or unpredicted systemic failures in the domain of conventional bank-debt money, especially in the context of economic austerity generating PIE conditions. That is, the commonfare approach implemented through the use of digital currencies may provide an opportunity to transform a discourse of poverty and scarcity into one of abundance.

Complementary currencies have a long history spanning from ancient times to the present day (Lietaer, 2010). For instance, in Ancient Egypt, gold was the currency for long trade transactions used by the higher strata of society. In parallel, common Egyptians used a more widespread and less valuable currency, the 'ostraca', which was connected to the food storage system.

Nowadays, one of the best complementary currency experiences may be the Bristol Pound in the United Kingdom:

> *"In March 2015, Bristol City Council became the first local authority in Britain to accept a community currency - in this case the Bristol Pound - as a means to pay council tax. As well as representing a landmark project for the community currency movement, the council's announcement essentially guarantees that anyone holding Bristol Pounds will always have a spending opportunity - everyone needs to pay council tax. Gaining this level of participation from a council helps hugely in building trust in a currency and establishing belief in its value."*
>
> (NEF 2015, 78)

This innovative initiative, backed by Bristol's former Mayor, George Ferguson, can be considered as a watershed in the complementary currency domain as, finally, the circuit is closed: to be able to pay taxes with the Bristol Pound is an important step towards a more widespread social acceptance and institutionalisation of this monetary instrument. Similar developments at the regulatory level are springing up globally as the recent motions in California (Alternative Currencies Act, AB-129, approved by the Governor on June 28, 2014) and France (French Law for the Economie Social et Solidaire passed on July 2014) illustrate.

The third design element of the DC for the Commonfare platform is the monetary innovation represented by cryptocurrencies and the underlying distributed ledgers technology. According to the alleged initiator of this innovative field in the monetary domain and creator of Bitcoin, Satoshi Nakamoto:

> *"Bitcoin is a decentralized electronic cash system that uses peer-to-peer networking, digital signatures and cryptographic proof so as to enable users to conduct irreversible transactions without relying on trust[1]. Nodes broadcast transactions to the network, which records them in a public history, called the blockchain, after validating them with a proof-of-work system. Users make transactions with bitcoins, an alternative, digital currency that the network issues according to predetermined rules. Bitcoins do not have the backing of and do not represent any government-issued currency"*
>
> (Nakamoto, 2008: 3).

A cryptocurrency such as Bitcoin is transacted on a distributed ledger. The latter is a timestamped digital accounting book shared by all nodes participating in a system based on, in this example, the Bitcoin protocol (Bitcoin Core). The Bitcoin distributed ledger, or Blockchain, allows for the creation of a new architecture in payment systems design: every device participating in the network – and the people using them – share the same transaction history by abiding by the longest chain rule. The Blockchain is a tree-like structure that consists of all valid blocks whose entire ancestry is known, up to the genesis block. This common understanding, or consensus, creates a shared agreement within the whole Bitcoin community about the reliability of using the decentralized currency in that the Blockchain is a programmable database that allows exclusively 'write-only' operations.

Although this technological innovation is experiencing some success in terms of uptake at the time of writing this report, Bitcoin has been the object of critique. Some consider centralised exchanges where Bitcoin is traded as prone to fraudulent behaviour. Bitcoin has also been accused of being a Ponzi scheme in that those who started mining and exchanging it first enjoyed a speculative advantage with respect to newcomers (Moore & Christin, 2013) – another aspect of digital currency development that invites comparison with the characteristics of conventional reputation systems as described in Section 2.1. Moreover, although they still do not consider it as a threat to financial stability, the European Central Bank warned about the risk

[1] Note the description here of a system in which trust is set aside, rather than made central as indicated to be preferable in many of the interviews described in Section 2.2. In the commonfare.net context, we shall need to be careful not to treat trust in this rather hollowed out, side-stepped way.

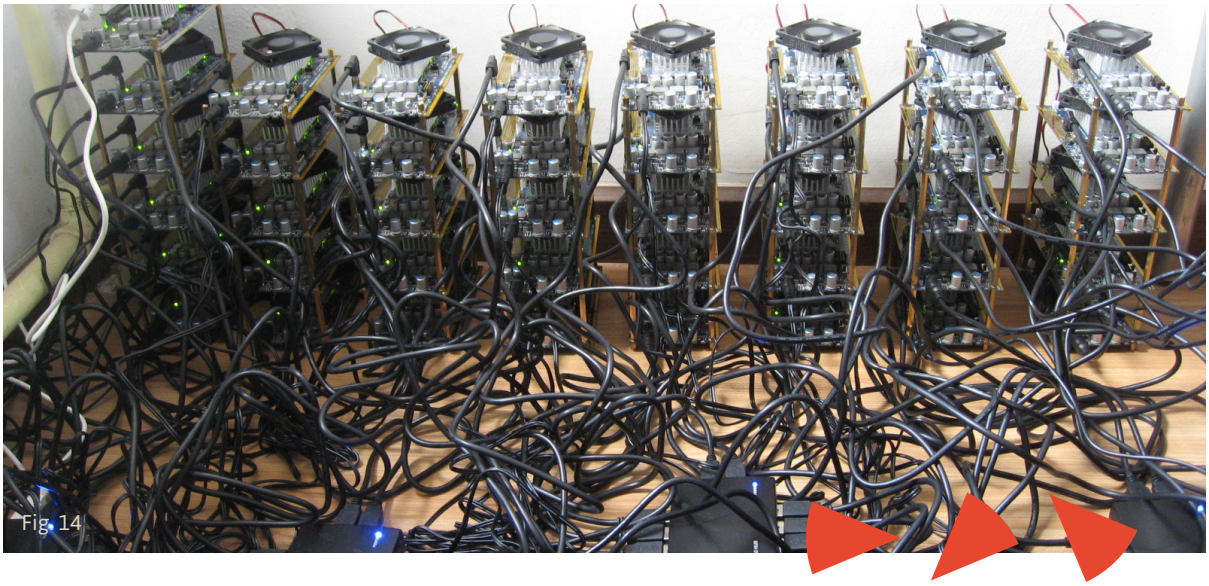


Fig. 14

that Bitcoin poses in terms of "money laundering" (European Central Bank, 2016, 9).

Aside from the centrality of Bitcoin in the mainstream perception of crypto-currencies, the technology underlying them, the Blockchain, or more generally the distributed ledgers technology, enables a new way to collectively self-manage trust within a decentralized system in a transparent and dis-intermediated fashion.

By virtue of both positive and negative aspects of this technology, for the commonfare.net DC we chose the cryptocurrency Faircoin, which better reflects the ethos of the PIE News project. According to the initiators of Faircoin:

> *"FairCoin is the first fairly distributed crypto currency. 99.99% Proof-Of-Stake, FairCoin rewards savers. All the coins were pre-mined and fairly distributed to thousands of people from all over the world. Backed by a strong, diverse and committed community. Promotes prosperity and financial freedom with real value. Working to become the coin of fair trade. Faircoin is the first project where the coins are not bought but rather distributed equally between everyone who wants them regardless of their current financial status, and promotes equality."*
>
> (https://fair-coin.org/)

In fact, contrary to what happens with Bitcoin, and to be more environmentally friendly, faircoins have been created, or pre-mined, within the genesis block. Secondly, Faircoin is based on a different proof for reaching decentralised consensus for validation of transactions on its ledger: the Proof-of-Stake, rather than the Proof-of-Work. In this case, transactions are validated on the basis of how much hard-drive memory a participant in the network shares with the network as whole.

Furthermore, Faircoin2 goes beyond the critique of Bitcoin about the waste of electricity to mine the currency and validate transactions, one of the main critiques to Bitcoin's Proof-of-Work so far (and also beyond the limits of Proof-of-Stake). In fact, developers at Faircoin2 implemented a new consensus mechanism, still based on cryptography (the Schnorr signature algorithm [Schnorr 1991] instead of Secure Hashing Algorithm - SHA256 as for Bitcoin), which can be considered a watershed in the design and implementation of cryptocurrencies and distributed ledgers technology for the common good. This new consensus mechanism is not based on machines' clock cycles, wasting electricity as with Bitcoin. By contrast, consensus to validate transactions is reached by resorting to Proof-of-Cooperation (König & Duran, 2016). In this regime, consensus is reached among Certified Validation Nodes (CVN) operated by trusted participants. According to the core developers of Faircoin2, the node certification procedure has the purpose of:

> *"expos[ing] the applicant to the public to some extent. This is to ensure that all CVN are operated by honest individuals who would not risk to get a bad reputation. The system can cope with a certain degree of misbehaving CVN. Moreover misbehaving nodes will be banned from the network and the certi-fication revoked and thus will no longer be able to do harm to the network. Bad CVN will be automati-cally banned by all nodes in the network and later the certification will be revoked manually. Adding a new CVN is also a manual process."*
>
> (https://fair.coop/groups/faircoin2/forum/topic/node-certification-procedure-ncp/; see also König and Duran 2016)

As a node is validated by Faircoin2 developers, essentially by identifying the node operator through personal contact and verification, each Certified Validation Node simply verifies the new block by following a chronological order without making machines work just to find the new block. Instead, there is a more democratic process where one waits one's turn to sign the next set of transactions to broadcast within the Faircoin2 distributed ledger. This architecture can thus also be adopted for the DC of the Commonfare platform.

After the three design elements, the fourth and final element composing the ideation of the DC for the Commonfare platform relates to the implementation of the codebase to run the DC, i.e. the Freecoin codebase. The philosophy behind Freecoin can be summarised as follows (Roio & Sachy, 2015, 4):

- FOR participatory and democratic organisations
- WHO want to incentivise participation
- IS a set of tools that lets people run a reward scheme that is transparent and auditable to other organisations

Fig. 15

- UNLIKE centralized banking databases
- IT IS a social digital currency that is reliable, simple and resilient.

Although Freecoin was initially a fork of Bitcoin intended to democratise the genesis block, during the transition between D-CENT and PIE News/commonfare.net, the developers changed the name from Freecoin to Freecoin Social Wallet. This highlights the fact that Freecoin is not in fact a crypto-currency in itself, but rather it is a modular software in which it is possible to encode constituent governance rules that can adapt to various different crypto-currency and distributed ledgers backends. Work Package 3 of the PIE News project provided an excellent opportunity to try a real-world test of the software codebase in the context of the Italian pilot in view of its tailor-made design and application in the other two pilots.

In conclusion, this approach to the design and implementation of a cryptocurrency has been determined to be the optimal one to design the DC for the Commonfare platform as an example of the implementation of a blockchain for the social good of pilot participants. The Faircoin2 cryptocurrency can be stored in the Freecoin Social Wallet system, creating an economic circuit on the Commonfare platform as well as a currency in which to pay the basic income. In this way, pilot communities can be provided with a DC addressing their common need relating to access to monetary resources, as participants expressed it during the research conducted by pilot partners in WP2. Moreover, alongside this innovative and alternative form of basic income, the DC for the Commonfare platform will be designed in a way that is flexible enough to adapt to the specific context peculiar to each pilot.

2.3.2 Context of Macao's Commoncoin

In this section, we present the concept of a Commonfare system for the Italian pilot – Commoncoin – co-designed to serve the needs of Macao, a collective of precarious artists based in an occupied space in Milan. Commoncoin is an advanced use case because its design and early implementation result from a work begun within the activities of a former CAPS project, the DCENT project (http://tools.dcent.project.eu) between October 2013 and June 2016.

Macao is an informal organization in which a group of people come together to cooperate and collaborate in labour, political and social spheres. It emerged in 2011 in response to the precarious working conditions of cultural workers in the arts and entertainment industries in Milan.

Initially, the collective was born as a concrete and proactive critique of the contradictions in Milan, where a high concentration of financial resources sits alongside an underfunded artist community. By building on the notion of radical active citizenship, the collective of precarious artists decided to occupy first the Torre Galfa and then Palazzo Citterio (a seventieth century building abandoned since the 1970s). Finally, since 2012, Macao has settled in more permanent – albeit occupied – premises in the city's former meat stock exchange in a neighbourhood of Eastern Milan (see Figure 16).

The desire for more control over the relationship between work and money is an important element in Macao's decision to trial a digital currency. As Giovanni, one of the circa 80 members of the Macao collective, put it:

> *... as we found a stable place to occupy ... we understood that the first thing to do was to know each other and why we were getting active with the occupation at Macao. So we made an internal inquiry ... The spectrum went from people living in hard precarious conditions to others that were economically satisfied, but wished to be more socially engaged. However, all stated that apart from the economic side, they had the wish to be able to decide on the quality and remuneration of their jobs.*

In practice, the space is run informally by the people involved. Moreover, it hosts co-working spaces, events, exhibitions and workshops while it is looking into expanding the network across other spaces in the city, which align with similar values by sharing resources, equipment and skill-sets.

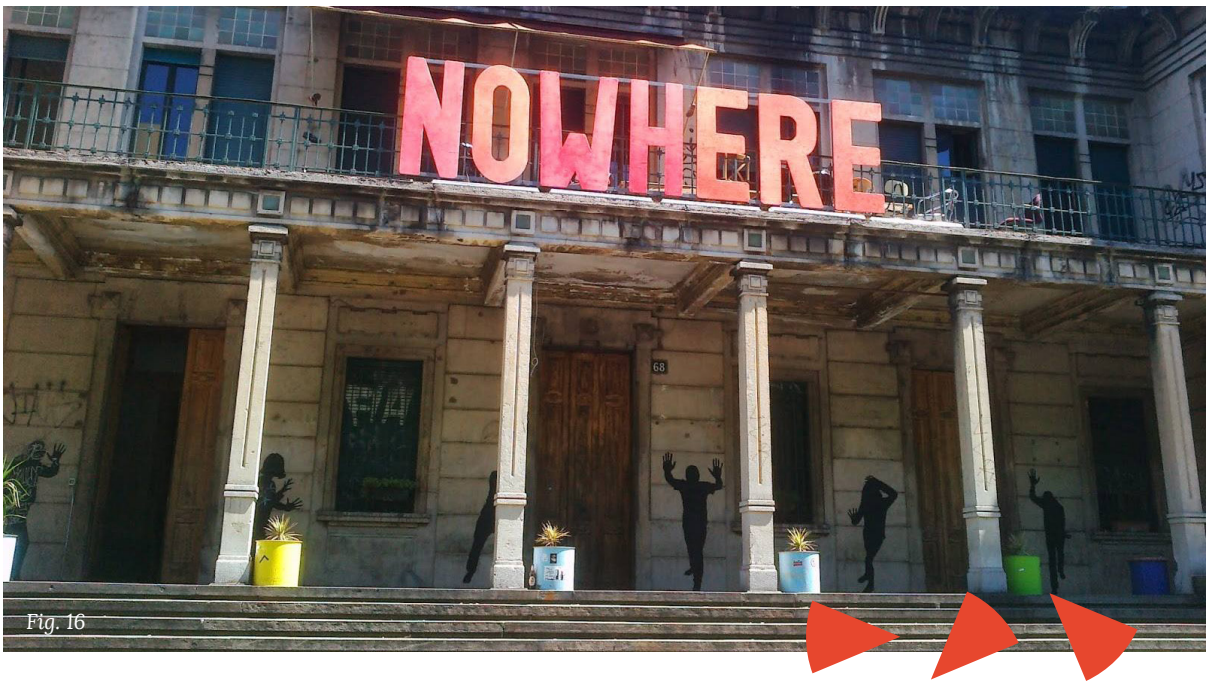


Fig. 16

2.3.3 Commoncoin: a multi-signature self-remuneration complementary crypto-currency and basic income provision system

Commoncoin at Macao is an experimental attempt to make Commonfare a real-world, bottom-up welfare best practice. It is a complementary crypto-currency for self-remuneration and a basic income provisioning system that measures members' engagement within Macao. As Paolo stated:

> *Commoncoin is an attempt to defend ourselves from the attacks to these bottom up types of economic circuits by the financialization of the economy at large, which hinders scalability of alternatives as it goes against the exodus from the Market. Then, if I look at transition towns experiences and the like, the real rupture arrived with Bitcoin that, at least at the beginning, was really an alternative system. Also Bitcoin has limits in that the network fell back into the mainstream dynamics.*

In effect, Bitcoin, the first crypto-currency ever invented, is a technology that needs to be applied with critical thinking, if it is to promote social cooperation and the building of the commonfare.

Commoncoin is an attempt to defend ourselves from the attacks to these bottom up types of economic circuits by the financialization of the economy at large, which hinders scalability of alternatives as it goes against the exodus from the Market.

Accordingly, on the one hand, a complementary crypto-currency - commoncoin - is issued to reward labour contributions in a decentralised fashion. On the other hand, the Commoncoin system becomes a source of basic income in Euros as members can cash out commoncoins in exchange for Euros (convertibility ration is 1:1). The revenue in Euros is generated through public events organised at Macao on a monthly basis: theatre shows, exhibitions, music concerts, Yoga classes and the like. At the beginning of each calendar month, there is an air-drop distribution of commoncoins to the various groups that form the Macao collective, a sort of quantitative easing for the people from the bottom-up. If a member works at Macao to support daily operations (named 'continuous functions') they are paid for it with commoncoins by Macao itself. Alternatively, a member can acquire commoncoins from the groups that need labour force to run their group activities (named 'autonomous functions'). In both cases, a member can meet the conditions set by the Macao collective to earn basic income in Euros.

In terms of 'autonomous functions', commoncoins are used by groups to buy calendar slots to organise events and raise labour force around a project and pay for it in commoncoins. The rationale to price calendar slots is defined around the idea that certain slots can generate more revenue in Euros for Macao than others. Indeed, events organised on Friday nights (such as a music concert) require more commoncoins to reserve the calendar slot than events organised, for example, on Tuesday mornings (such as Yoga classes) as the former are expected to yield more revenue than the latter. In turn, the revenue in Euros is split as follows: 40% is parked in Macao common account - 'cassa comune' - while the collective organising the event keeps the remaining 60% and shares it autonomously among its members. In order to access basic income in Euros from the 40% parked in the common account, each member has to accumulate a certain amount of commoncoins - the 'basic income threshold' – not only by performing work to run the space daily (continuous functions), by working into group projects that generate revenue in Euros (autonomous functions), but also by participating to weekly assemblies, wherein political and economic strategies to secure Macao's common good are discussed. (We note here that this setting of threshold conditions that must be met before the shared Euro-based income is distributed is not quite consistent with the notion of an unconditional basic income as put forward in the commonfare approach; we suggest that no such conditions should be set for the commoncoin basic income on commonfare.net.)

Organisers at Macao conceived of Commoncoin as an internal complementary crypto-currency and basic income provisioning system in Euros for financing and remunerating production, while discouraging hoarding and speculative practices. In turn, this process is politically controlled by the members that participate in it in a collective fashion:

> *we conceived the idea of Commoncoin, which was validated during the two-days seminar we organized in Macao in June 2014. At this event, the narrative on the re-appropriation of the power of money evolved in that we thought to apply the self-governance structure that we conceived in the previous two years to manage Macao, now applied to manage Commoncoin. We wondered: why don't we go beyond barter of services as money can allow for more initiatives to develop? Basic income and welfare more in general were the main ideas. However, what happened concretely was that, although networking was very successful, we had to acknowledge that our implementations capabilities were very limited: we could not serve ourselves properly let alone other collectives. The latter thus told us that they liked the idea, but until there was something usable, they would not make further efforts in that direction. So we started the path of tools development, firstly within DCENT as a use case and now as a pilot in PIE News.*

Marco Sachy, the WP3 team member responsible for the digital currencies strand of the work package, took part in the seminar at Macao in June 2014, where he presented

Freecoin Social Wallet in order to advocate its adoption by the community at Macao as a use case within the DCENT project (Fumagalli & Braga, 2015). Thus, this approach to critical thinking has been endorsed by the organisers of the Commoncoin complementary crypto-currency and basic income provisioning system by and for the members of Macao.

As described in the introductory section on the DC for the Commonfare platform, the tools used to run the system are Faircoin as a backend complementary crypto-currency and the Freecoin Social Wallet both at the service of basic income provisioning in Euros. In particular, after the air-drop at the beginning of the month, the calendar slots are booked with the FXC Secret Sharing protocol in a collective fashion as at least three members of each group running an autonomous function need to sign the transaction tossed coins to Macao common crypto-wallet to book the calendar slot, which was designed to serve the needs of the Spanish pilot in DCENT (for the description of the multisignature FXC Secret Sharing Protocol, please see DCENT deliverable D5.5, pp. 30-34, available at http://bit.ly/2rP7oTS). Further, Macao members self-remunerate themselves with commoncoins in a decentralised fashion - albeit the crypto-coins that circulate in the backend are faircoins. Recurring to Faircoin has been necessary as Macao does not have the infrastructure to run a freshly made crypto-currency by themselves. Finally, at the beginning of the following month, the air-drop is repeated as commoncoins are recycled as organisers send commoncoins from Macao's common crypto-wallet to the various groups to book calendar slots for that month and to pay workers executing continuous functions.

2.3.4 Commoncoin: Test Description and Results

Commoncoin is designed to take care of the relation between social, economic and cultural value produced at Macao and the social relations necessary to produce such value. The results of the tests run by Macao members implementing the Commoncoin system in the real world are concrete examples of social, economic and cultural value production through the Common. Indeed, by drawing from Hardt and Negri (2004 and 2009), the Common is both condition of possibility and result of value production, in a dynamic whereby social relations produce value and the latter becomes the basis for new social relations.

At the economic and monetary levels, this self-reinforcing process needs then to be organised with the implementation of a set of tools, in this case Faircoin and Freecoin Social Wallet, that can help answer the following question: how to automate with digital technologies the processes that define different redistributive models starting from a platform made to share biopolitical value production by and for the participants to the pilots in the PIE News project? The answer given by Michele, one of the managers of Commoncoin, is as follows:

> *Commoncoin does this, for instance, through a process of discussion during the weekly activists' As-sembly at Macao by giving birth, through trial and error, to a first test, a first model that answered to some issues: focus especially on production and therefore compensation of labour; and on the sharing of the means of production, rather than focusing on the internal market, i.e. the place where you sell products. Another index that determined the Commoncoin model allowed to have an economic model that discouraged hoarding of reserves while encouraging behaviours that enables to reach the threshold to get the basic income in Euros.*

Although it is an informal organization, if one assesses Macao as an enterprise, I will argue that the Macao experience is the first in which a crypto-currency is intentionally implemented to substantiate Money for the Common Wealth of the Multitude. Indeed, all biopolitical production created inside Macao is possible by virtue of the Common that they share and it is monetised in commoncoins.

All these transactions used to be tracked by few organisers at Macao manually on a spreadsheet using Google-docs. By contrast, Faircoin together with Freecoin Social Wallet have been designed and prototyped to decentralise the management of Commoncoin while assuring transparency and traceability. As Manuela put it in the interview that I collected while visiting Macao:

> *We are striving to design and implement an automatised dynamic whereby the more one is active for the construction of the common, which is Macao, the more*

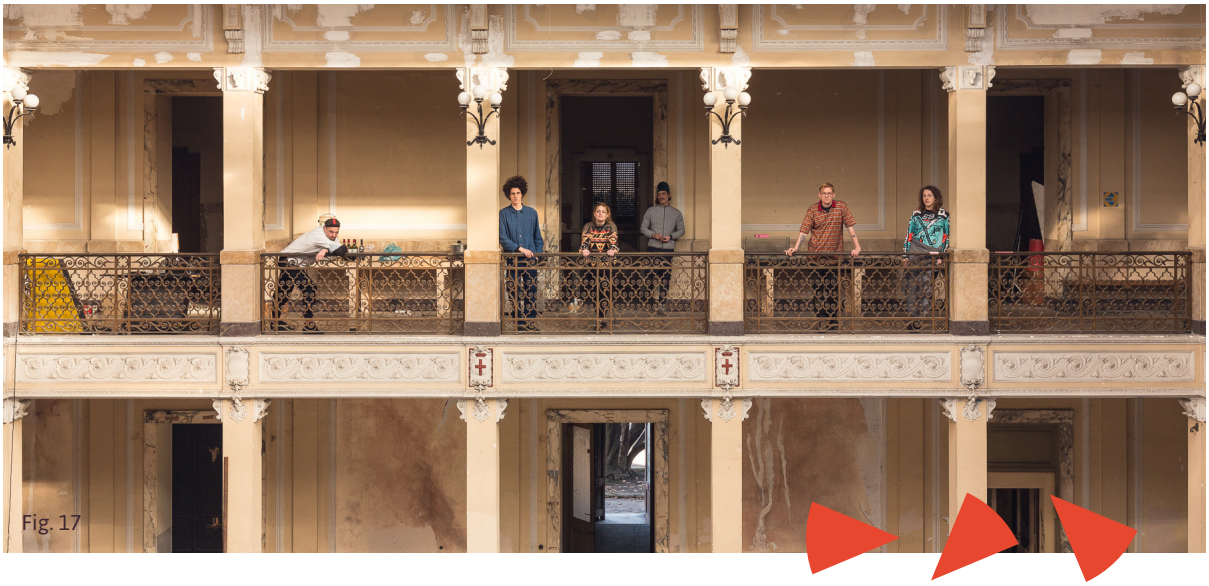


Fig. 17

one can use the space and the resources to achieve one's goals and increase the common good at Macao. And since Macao has income in Euros coming from the public who consumes the productions made by the various artistic projects developed within the autonomous functions, Macao decided in the assembly the amount of reserves in Euros, which is not spent to pay the labour of continuous functions, but are paid for in commoncoins. The reserves go in a common pot that is than re-distributed to those who contributed more to the growth of the common value of Macao by working in continuous functions and taking part to assemblies in the form of basic income in Euros.

A first test using Faircoin crypto-currency and Freecoin Social Wallet as a backend and front end for commoncoin, respectively, ran in mid November until 31st of December 2016. Two other rounds ran in February and March 2017, respectively.

The screenshots in Figure 18 below represent parts of spreadsheets which detail some of the continuous functions (those that are needed to run Macao on a daily basis, designated as 'secretary', 'maintenance', 'communication-press office', and 'accounting') with related Macao members (first column on the left). In the second column there are the details of the continuous functions such as 'answering to emails', 'maintenance of walls and columns' of the building, 'doors' and 'electricity circuits'. In the third column there is the amount of commoncoins that each Macao member gained for the labour s/he offered by working in such continuous functions.

SEGRETERIA	[tutti rispondono mail]	1000
Livia	gestione cozi (come in+prog) + mail cinema	166
Alessandro L.	progetto commonfood, teatro, cinema, organiz comunicazione	166
Manuella	coordinare info da segreteria agli altri gruppi, cibo (pizza, pane), cafe let	166

MANUTENZIONE	restauro colonne, porta, gruppo elettrogeno	2500
Fede		156
Piero Luigi	acqua	156
Tullio	acqua	156

COMUNICAZIONE/UFFICIO STAMPA		1500
Fede	giornalisti	150
Cami	giornalisti	150
Manu C	interviste	0

ACCOUNTING		1000
Livio	monitoraggio eventi	500
Braga	gestione cassa macao	500
Diego	raccolta wallet, calcolo funzione bi	0

Figure 18 Screenshot showing examples of continuous functions (source: Macao 2017)

Moreover, in Figure 19 below one can see a screenshot of the part of the spreadsheet showing the 'name' (first column), 'wallet' address (second column), commoncoins gained from organization of 'events' (third column) and the participation to the weekly 'Assembly' (fourth, fifth, sixth and seventh columns) rewarded with 40 commoncoins. In the wallet column, one should notice that each Faircoin address remanding to a Freecoin Social Wallet instance has the letter 'f' as the initial alphanumeric element in order to identify the address to the Faircoin backend while Macao users experience them as commoncoins in their daily communication. Starting from September 2017, participants will also interact with the Freecoin Social Wallet from a frontend, i.e. user interface perspective as commonfare.net designers and software developers develop the graphic user interface of Commoncoin:

NOME	WALLET	EVENTI	ASSEMBLEA 1	ASSEMBLEA 2	ASSEMBLEA 3	ASSEMBLEA 4
Accio	fESe3cw43NMZLYXZRazRHTgZSWizLhax1m	0	40			
albertone	fXbfwm2rULAvyASJG2ph6ghnh7c3vd5rqR	240				
Alessandrino	fLsJZMMcGEaP7rzAhGJuHrz4oack3gchx1	470		40	40	
ALESSANDRO L.	fRL6Mn2SZJkqXJfFe1beJP7LSzuzrny9pN	35	40			
ana s	fMVTDRUevuAMS8t7XxqRD1QGmu2HKgBdqR	0				
andrea g	fJgFFh58kvW2mKGnvVqz2dc5tJ686cnTNx	195	40			
Andrea P. (ama?)	fXm3epAMQNHygDecqkGxtzk1e3rhEwzmPB	120				
Anna Luisa Di Lauro	fXWicBeUeXpkexYRMiUssgfn85xbrQVzUA	285	40	40		
anselmo l	fKMZmm54E4SzSUC51bD6PZTvtqMV6xGs5J	0				
arcangelo	fH7TF3MPfSx5dpvoXgkkWSTP6DBBqN6BAH	25				
ariberto	fT92g2oG4H1XFTEJ67YtvTBFU2m1oq9A7g	250	40			
arthur t	fRRHvC2VRNReCkmXbiGdZrdeemybjccAxo	0				
Asmir L	fN8brdvWwbEhJe3fFUdxUg9xMJvwMFzYNw	345				

Figure 19 screenshot showing an example of Macao members and commoncoins gained by working to organise events, i.e. Autonomous functions (source: Macao 2017)

TOT cc	24147	20884	26467
Deviazione standard	312.091049	223.5502063	291.0596225
Soglia	500	359.2080871	467.6845169
Aventi diritto al reddito	23	25	29
Fondo lavoratori totale	10000	7355	10022
Reddito procapite	435	294	346

Figure 20 basic income figures related to the prototyping tests run at Macao on december 2016, february and march 2017 (source: Macao 2017)

Finally, Figure 20 is a screenshot showing the number of Macao members - in red - that accessed basic income in the months of December 2016 (23 members), February 2017 (25 members) and March 2017 (29 members). Although at Macao they are starting to use standard deviation to determine the threshold to access basic income, the important point to notice is that the threshold ('Soglia' - third row) to access basic income changes in relation to the workers fund allocated for basic income provision, which comes from the amount of Euros that Macao enjoys each month as 40% of the revenue generated by the events organised as autonomous functions: 10000 EUR for December 2016, 7355 EUR for February 2017 and 10022 EUR for March 2017. The descending income per-capita has been 435 EUR for December 2016, 294 EUR for February 2017 and 346 EUR for March 2017. These sums are then divided by the number of participants to the weekly assembly. The result is the amount of basic income - 'Reddito procapite' - in Euros that each participant is endowed with:

In conclusion, out of the 80 members active in Macao acquiring commoncoins by working in either continuous or autonomous functions, and sometimes both, there are between 20 to 30 members, roughly, who are also active in the assembly and, therefore, receive a basic income in Euros at the end of each month. The 'Soglia', i.e. the 'basic income threshold' changes as a result of assembly deliberation, because members and organisers are still looking for the optimal quantity of commoncoins necessary to access basic income. However, since December 2016, the number of participants to the weekly assembly, i.e. the number of basic income recipients - 'Aventi diritto al reddito' - has increased. Furthermore, the total workers' fund - 'Fondo lavoratori totale' - varies according to the revenue in Euros that Macao generates each month, which conditions the amount of basic income that Macao members receive per capita.

In five years from now, we could see a rhizomatic scaling process, whereby every node has its own autonomy and features (...) to automatise the process of value sharing in an ad hoc fashion...

The potential future of Commoncoin is well expressed by Raffaella, an interviewee that put it as follows when I asked her to think about Commoncoin in five years from November 2016:

> *In five years from now, we could see a rhizomatic scaling process, whereby every node has its own autonomy and features (from car sharing to local agricultural production) to automatise the process of value sharing in an ad hoc fashion, while creating a network where the commoncoin crypto-currency can be spent across nodes. In brief, the crypto-currency that I use in my node can be spent in other nodes/interfaces of like-minded peers. Last, the potential to interface this local production with international networks and infrastructures.*

The underlying assumption for the creation of a complementary crypto-currency as a tool for basic income provision in Euro such as commoncoin emerges from the need to enable pilot participants, and possibly others, to find proactive and emancipatory ways to face the hurdles of a life lived in precarious working conditions.

The Macao experience makes a set of themes emerge. First, the fact that the co-design of a system such as Commoncoin by and for the users who self-remunerate themselves is game changing. Indeed, in the Italian pilot in Milan users themselves not only chose the features of the complementary currency that they wanted to adopt, but they also decided in assemblies how such currency had to relate with the conventional one, i.e. the Euro in the form of basic income provision with a mix of labour remuneration and political participation. It may appear a marginal development in currency and payment systems design as the experience at Macao regards some 80 people. However, this sort of approach at a larger scale could be game changing in terms of how nation states deal with welfare provisioning and monetary policy more at large as the Swiss Vollgeld initiative and the Bristol Pound cases that I presented in the introduction to this chapter, for instance, document at the national and municipal levels.

2.3.5 The DC for the Commonfare platform - the Dutch pilot

After the presentation of the most advanced pilot experimentation in Italy, i.e. Macao's Commoncoin, the second pilot community for which the DC will be designed and implemented is the Dutch one. Also in this case, the DC is intended to help address the needs emerged in the research on pilot communities performed by pilot partners in the works of WP2. In the Dutch pilot, three different types of communities were selected to take part in the pilot: welfare recipients, non-Western migrants and freelancers

in the cities of Rotterdam, Den Haag and Amsterdam, respectively.

Although members of these three groups differ in terms of their specific needs, a common theme shared also by the other pilot communities was the access to basic income. As it happened for Macao's Commoncoin, also in the Dutch case, basic income can be seen in general as the provision of a crypto-token (or cryptocoin representing the circulating cryptocurrency) to be used among pilot participants to foster their participation on the commonfare.net platform. In fact, all three groups participating in the focus groups for the research on the Dutch pilot singled the lack of time and money as one of the most pressing problems they needed to address. Accordingly, the DC for commonfare.net can be designed to increase liquidity, that is, as a way to increase disposable income of pilot participants in the form of a complementary crypto-token, which can function as a form of basic income provisioned in parallel with welfare benefits coming from the Dutch public sector.

This access to a crypto-token could then be operationalised in accordance to the specific needs of the various participants to the pilots. Freelancers could spend the DC among themselves in order to reward each other for exchanging their skills and the services related to their professions. Secondly, non-Western migrants could use the DC as a complementary for of money to buy food, for instance at the local food cooperatives present in their cities (e.g. VOKUMOKUM in Amsterdam as documented in D2.1), or potentially to pay for translations of official documentation into non-Dutch first languages. Welfare recipients will have a tailor-made and complementary line of credit to spend on the commonfare.net platform to access services offered on the platform in order to save Euros received from the public welfare institutions in a way to optimise their spending habits. For instance, a welfare recipient could chose to access services for personal care offered by other members of the commonfare.net platform and pay for them by exchanging crypto-tokens, rather than resorting to the same services provided by the private sector to be paid for in Euros.

The work in WP2 has suggested that the biggest and most pressing issue for participants in the Dutch pilot is debt (see Deliverable 2.1). This is particularly the case for those who are indebted to local and state government (between them, the largest creditors in the Netherlands). It may be possible to draw lessons from the Bristol example and try to work with local authorities and other creditors to develop ways in which debts could be re-paid using the commoncoin crypto-currency. The Netherlands-based work reported in D2.1 (and continued since then) also suggests that "solidarity" is rather fragmented in this country, and so potential ways for the digital currency to circulate between rather than simply within different user groups could help to build a more coherent and genuinely collective community.

2.3.6 The DC for the Commonfare platform - the Croatian pilot

As for the Dutch pilot, the DC pilot in Croatia can also be seen - similarly to Macao's Commoncoin experimentation - as a way to empower disenfranchised citizens, i.e. young precarious agents of the Croatian economy. This can be encouraged on the Commonfare platform by giving pilot participants a virtual place, wherein they can acquire knowledge about money and to connect them to friendly institutions such as Ebanka (https://www.ebanka.eu/en), a Croatian Cooperative for Ethical Financing which supplied a letter of support to Croatian project partners when finalizing the bid for the PIE News project. In effect, if a first need emerged from D2.1 need was to fight corruption from the bottom up, a proactive way to do so can be to partner with local institutions such as Ebanka in order to build financial instruments that can shield Croatian pilot participants from the adverse dynamics of the larger economic context in which they live. According the their website:

> *"Ebanka is an ethical development bank owned entirely by its own members. Instead of high profits, its primary goals are contributing to a better society and the well-being of its co-owners. Join us. Become a co-owner. Be the change you want to see in Croatia. Ebanka is a member of the European Federation of Ethical and Alternative Banks (FEBEA)."*
>
> (https://www.ebanka.eu/en)

In effect, both monetary literacy and the adoption of a complementary cryptocurrency coupled with access to credit in the national currency Kuna have the potential to help addressing the second need emerged as a result of the research conducted in WP2: employment stability, job stability, and work stability. If job insecurity was one of the biggest preoccupations for 64 out of the 74 respondents to the questionnaire delivered by Croatian partners to pilot participants in the research effort in WP2, then both bottom-up creation of job opportunities by exchanging services on commonfare.net and the access to conventional credit in national currency from institutions such as Ebanka can be understood as the two main ingredients that young precarious workers taking part in the Croatian pilot could count on from a DC perspective within the experimentation in the PIE News project. While no concrete plans have yet been developed for collaboration with Ebanka, they did provide a letter of support when the PIE News project was proposed, suggesting that they might consider partnerships in the future.

Furthermore, and similarly to the previous two cases in Italy and the Netherlands, the provision of a complementary cryptocurrency as a way to facilitate the exchange of services on the Commonfare platform can be seen also as a way to innovate in the domain of basic income and guaranteed minimum income. This indeed was the third need that pilot participants signalled when they took part to the research in WP2. Accordingly, to think of the DC for the Commonfare platform as a form of basic and guaranteed minimum income is to enable all pilot participants to begin – as is already happening with Commoncoin at Macao – from an equal starting point. All participants can be given an instance of the Freecoin Social Wallet already containing an amount of complementary cryptocurrency. In turn, the complementary cryptocurrency is designed to allow participants to trade services among each other. In brief, the reward of participants' skills and talents exchanged in their local economic circles as for the traditional tenets of

local, community and complementary currencies as defined above by Lucarelli and Gobbi (2016).

In fact, a further need that emerged in the research for the Croatian pilot in WP2 was what has been referred to as 'the need for quality education for skills development for the 21st century'. In order to meet such need from the bottom-up as for the ethos of the Commonfare platform, pilot participants could use the DC as a resource to teach others the skills they have in exchange for the complementary cryptocurrency provisioned as a form of basic income. This could happen either as a form of reward gained by sharing skills in the form of stories on the stories hub or by organising more structured courses on specific domains in a form that mimic university courses, especially distance learning modules and webinars (e.g. MOOCs - Massive Open Online Courses), which universities around the world already supply.

For instance, pilot partners could either become part of MOOC platforms in order to offer Croatian pilot participants a way to increase their educational levels and skill sets while strengthening the interconnectivity of the Commonfare platform in a win-win scenario. As the scenarios presented below will show more in concrete, this kind of approach favouring the adoption of the DC within multiple contexts such as basic income provisioning, services and skills exchange together with an increased monetary literacy and access to financial vehicles from institutions such as ebanka, are the ingredients composing the rich potential for social emancipation and empowerment of young precarious workers participating in the Croatian pilot.

2.3.7 How the DC could work on the Commonfare platform

In general the DC for the Commonfare platform is designed to work for the pilots as a basic income provision system in the form of a complementary cryptocurrency implemented for the participants to the pilots in the PIE News project. The cryptocurrency to operationalise the complementary basic income provision system will be Faricoin2, based on Proof-of-Cooperation. Thus, each pilot community will run a Faricoin2 node as they will be trained to become Certified Validation Nodes. However, the rules for the exchange of the complementary cryptocurrency will be pilot specific as Macao's Commoncoin is one instance of how faircoins can serve as a backend to deploy the Freecoin Social Wallet to serve community needs. In other words, the rules of the game for the exchange of the DC will be pilot dependent and specified in D3.2. The focus on basic income stems not only from the theoretical tenets of Commonfare, but also at the light of pilot participants own requests, the DC will operate as a way to substantiate the right endowed to pilot communities to access basic income in the form of a complementary cryptocurrency. However, members of pilot communities will decide how the currency will sustainably work in each pilot after the end of the PIE News project as they will test the DC during 2018 and 2019.

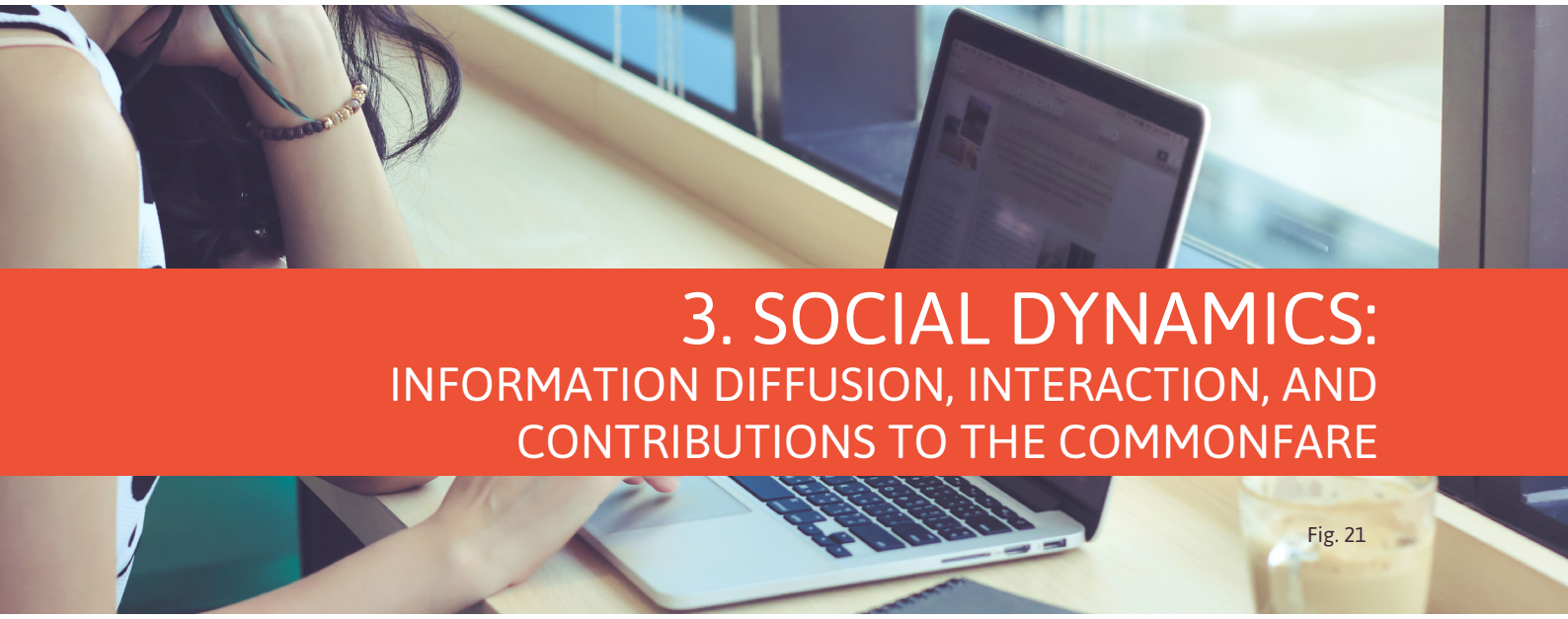
Because the common need for a basic income emerged in all three pilots, the DC for the Commonfare platform will be primarily a form of basic income complementary to the Euro. This will result in an advancement of the state-of-the-art in the monetary domain, i.e. merging the notion and practices coming from the three domains of basic income, complementary and cryptocurrencies for the social good. In particular, when a participant creates a Freecoin Social Wallet account from her/his browser, s/he will be endowed with an amount of faircoins to be spent on the platform. Accordingly, the DC supplied as a form of basic income to enable pilot participants to trade among themselves at both intra-pilots and potentially inter-pilots levels, will be provisioned for the general exchange of services as a platform-based complementary cryptocurrency. This rationale will be common in the approach to co-design and implementation of the DC in each pilot.

However, this common theme relating to the advocacy of basic income in the form of a complementary cryptocurrency will also be tailor-made to the needs specific for each pilot. As the case of Commoncoin at Macao already documents, the approach to design and implement the DC for the Commonfare platform will vary according to the needs of each pilot. Indeed, pilots differ in each context and it is more effective to plan the deployment of the DC according to a tailor-made approach peculiar to the bottom-up dynamics present in each pilot, rather than forcing a top-down approach whereby one size should fit all. The latter approach could jeopardise the long term adoption and sustainability of the DC in each pilot after the project's end. In other words, the complementary cryptocurrency will operate in accordance with the particular design choices emerging from the different scenarios produced for each pilot.

2.4 SUMMARY OF EMPIRICAL RESEARCH

This chapter has presented empirical research conducted with an intention of informing the co-design processes for the reputation and reward systems and the digital currency. Section 2.1 described conventional reputation systems, and raised questions about their suitability in a commonfare context. Section 2.2 presented the results of interviews conducted through the three pilots, and drew out key characteristics and experiences to form the basis of personas and scenarios to be used in the platform design process. Section 2.3 described a real-world test of the Freecoin Social Wallet system with a pre-existing artists' collective at the Milan pilot site, showing how the co-design process led to the creation of a system tailor-made for their needs, and raising questions about the transferability of such a system to contexts in which there is no prior organised collection action.

All of the findings are important for the design of systems to help establish trust, to implement a Basic Income and to reward contributions to the building of the commonfare, and hence to the future sustainability of commonfare.net. In the following chapter, we present some reflections on ways in which social network dynamics measures might be used to link with the trust and reward systems, and to enhance the platform's sustainability in other ways.



3. SOCIAL DYNAMICS: INFORMATION DIFFUSION, INTERACTION, AND CONTRIBUTIONS TO THE COMMONFARE

Fig. 21

As indicated in the introduction, it may be useful to track and measure some aspects of social network dynamics on commonfare.net. Studying network dynamics may tell us a great deal about how commonfare.net is evolving. For example, analysis of these dynamics will show who interacts with whom, whether cliques and isolated groups are developing, and so on. However, the value of such interactions and the emergence of, e.g., cliques and clusters of people, have to be related to the commonfare aim. Analyses such as those carried out in Section 2.1.7.3 can reveal individuals and group entities that are particularly effective in forming bridges between different groups. However, centrality may happen with opposite sign. In fact, individuals may be strong contributors and yet contribute to a negative general perception of people in PIE situations, e.g., by diffusion of self-diminishing statements and resignation messages. The same may happen, for the good, for those who prove pivotal to the efficient dissemination of useful information and of good practices within the same network. Those individuals may be active in supporting others or creating opportunities for the flow of support. The latter individuals can thus be useful in the development of systems to facilitate trust, and to recognize and reward actions and interactions that contribute to the commonfare.

In relation to the facilitation of trust and recognition of contribution to the commonfare, analysis of the network dynamics might inform the development of, for example: recommender or matching systems for content and contacts/friendship requests; invitations to moderate discussion forums based on dynamic network analysis (DNA) metrics; and mechanisms for the generation of commonfare contribution metrics.

In relation to the digital currency, network dynamic analysis might be used in, for example, a recommender or matching system for trading activities. Analysis of tagged digital currency networks/circulation may also provide a different network to analyse, complementary to "social"-type ties such as friendships, interactions on forums, likes and so on, for example allowing the identification of "trapped coin" situations where the currency's flow is blocked or limited.

Perhaps, most importantly, given the innovations planned within commonfare.net, social network dynamic analyses may also be used to integrate all the activities and functions of the platform by generating the commonfare contribution metric which can then in turn be converted into coins in the Freecoin Social Wallet to augment the Basic Income received by all those registered on the site. The conversion of contribution points to currency brings risks, however – risks which may also be mitigated through the analysis of network dynamics. For example, dynamic network analysis might be used to detect collusion and bot-like behaviour.

In addition, network dynamic metrics may be useful for the growth and sustainability of the network. However, all such analyses raise issues of privacy and the ethics of surveillance; questions around how much control users have over the public/private nature of their data; and important questions about what qualities and values the platform needs to be imbued with in order for users with the experiences and characteristics outlined in Section 2.2 to have trust not just in each other, but in the system itself.

In the following, we review best practice for the creation of sustainable social networks, and discuss some possible network metrics that could be measured within commonfare.net.

3.1 BEST PRACTICE FOR SOCIAL NETWORK DESIGN

The commonfare.net platform has the intention of being an on-line community, a web-based online service with features that enable members to communicate with each other. Thus active participation is essential for the sustainability of the community (Kim, 2000). Lack of user activity and contributions has been the most frequently cited reason for the failure of online communities. Therefore, understanding what makes users participate has become a key question in online community studies. Online participation is connected to many positive outcomes as it indicates greater member loyalty and satisfaction with the online community (Malinen, 2015).

In the following, we list some best practices and functionalities that can potentially incentivise users' active participation. We also consider potential advantages and drawbacks in the commonfare.net context.

To participate fully in an online social network, users should have the possibility of registering on the site, perhaps under a pseudonym. Users may volunteer information about themselves (e.g., their birthday, place of residence, the state of employment or interests), which is added to their own profile. The profile can be used to publish stories, posts, sharing good practices, delivering useful information. This raises questions for commonfare.net about levels of registration and commitment; what information should be required; what information should be made public; and how much control registered users have over the extent to which their data is publicly accessible and the choices they can make about what can be seen and who can see it. Relevant aspects of this associated with data collection for commonfare.net have been presented and discussed in D1.2 "Data Management Plan." Especially in the light of the high levels of distrust described in Section 2.2 (particularly among the young Croatia-based interviewees), there is a need to consider what information is associated with a static profile, and whether story-telling should be carried out within a profile page or as a separate activity, perhaps through blogs which could be associated with individuals, groups, themes, activities, etc.

The site could also allow **browsing of public data without explicit sign-up**. Thus, the following should be observed:

- Give the users the opportunity to quickly explore what the site is all about before they sign up.
- Give them a chance to see why they should sign up.
- Let them search for people they already know on the site.
- Individuals should be able to choose not to sign up; however participation in the Basic Income/ commonfare contribution reward schemes will not be possible without registration.

The site should **foster easy access to users' friends, both new and old**. In conventional social network platforms, this may be achieved by:

- the username of the most recently registered community member;
- the names of the most recent users that have browsed a specific user's homepage;
- the names of similar users may be displayed on a specific user's homepage; similarity can be assessed through self-reported background variables, but also potentially through automated detection of similar patterns of behaviour and content access/content of contributions.

Again, these are important considerations in the design of commonfare.net, as they raise questions about privacy and intrusiveness. Noting the high levels of both independence and distrust reported in Section 2.2, the ways in which users can search for others needs to be carefully thought-through. We also need to be careful not to encourage the creation of isolated cliques and separate groups based on overly-similar experiences. For example, conventional social networking sites encourage the **matching of users based on common features/interests**. Users might be allowed to search out other users with a search engine handling criteria such as:

- sub-string of the username
- gender
- age
- place of residence
- employment status, etc.

However, while place of residence may be useful in helping establish connections that might lead to local community action, it is important to remember that the purpose of commonfare.net is to facilitate, create and grow the commonfare within and beyond the community of users. We should therefore focus on action, support and activism, and it may thus be best to allow for searches based on themes, values, interests and involvements. To facilitate this, we might perhaps encourage users to have tags or keywords associated with their profiles which can then be searched on or even used for a matching service.

In an online social network, users can form links for one of several reasons. Links connecting two nodes can represent real-world acquaintances, online acquaintances, business contacts, or they can be driven by common interests.

A user's links, along with her profile, can be visible to those who visit the user's account. Thus, users are able to explore the social network by following user-to-user links, browsing the profile information and any contributed content of visited users as they go. Some restriction can be adopted, that is the site can only allow a user to browse other user accounts within her neighbourhood – that is, those accounts that are only one or two steps away in the network.

Contacts could then be created in a range of ways:

- directed links such as in Twitter (leader-follower relation): links are created without the explicit acceptance of the linked user
- undirected like in Facebook, with a friendship request;
- The platform could allow also for two mutually exclusive relations (as in aNobii), for instance: friendship (with people known offline) and neighbourhood (with people whose profile interests you). Recalling the study of Couchsurfing.com described in Section 2.1, we note that this site, in which users are able to identify a range of different types of relationship, is particularly successful in generating generalized reciprocity. We

might speculate that this is in part because the ability to identify different types of relationship avoids forcing people to use the language of friendship when purely online relationships may be viewed as less real (see section 2.2).

To keep people active, access to content should be easy and it should match on the basis of common features. It is important to have **dynamic content**, to keep content updated and to stream it with selection/recommendation (Kim, 2000). The newest, most popular, and most valuable information must continually be pushed to the forefront for users: e.g., the names of the most popular storytellers, the most followed topic of discussion, new "institutional" messages. Updated content keeps users coming back, as there's more to see each time they visit (Kim, 2000).

It can be useful to have a search tool able to visualize everyone speaking about a certain topic in the platform, without the need to know the person.

However, it is also important to recall that the purpose of the site is to improve lives by building the commonfare. Thus it is important to position users as active participants and contributors, shapers and creators of the commonfare, rather than simply consumers of content. It will be essential to build and maintain a sense of ownership among the user community – this may be particularly important for encouraging the sense of self-authorship that emerged as critical in Section 2.2.

Another very relevant aspect for the commonfare.net is to enable users to create and join **special interest groups**. Users can post messages to groups and upload shared content to the group. Certain groups might be moderated, making admission and postings to the group, controlled by a user designated as the group's moderator. Other groups might be unrestricted, allowing any member to join and post messages or content.

Finally, the site should **make communication easy**: this is because the ultimate goal of the planned social network is to build the commonfare among the users, and this can best be achieved if information, practice and action can diffuse effectively through the network (Kim, 2000). Making it difficult for users to converse with each other is thus likely to shorten the lifetime of the platform.

Social network sites typically leverage on **multiple means of communication**:

- Emails: specific type of offline communication.
- Live chat or instant messaging: connecting users directly.
- Discussion forum: providing open discussion threads.
- Public wall messages or comments: visible by all the online users, e.g. "institutional" messages: pre-filtered and studied in order to be accessible by the most users.

Each type of communication mechanism between users generates a different online social network with a precise graph structure. A deep understanding of the graph structure of the social networks is important for a variety of reasons:

1. In general, it is necessary to evaluate current systems, to design future improvements and to understand the impact of the platform onto users and the Internet.
2. It is important to investigate the social network structure to understand the dynamics of some possible processes unfolding on it, such e.g., diffusion of opinions and information, or to mitigate emails spam and to defend against Sybil attacks (Mislove, 2007).
3. In the commonfare.net context, social network dynamic analyses may help to show how the commonfare, conceived as an assemblage as described in Section 2.1.7, is growing or unfolding.
4. In turn, social network analyses may then provide a means of identifying and quantifying contributions to the commonfare, thus providing metrics which can be converted into the digital currency and used to reward groups and individuals.
5. Finally, social network analyses may provide novel ways to understand and so facilitiate the circulation of the digital complementary currency within and even outside of the site.

To explore these possibilities further, in the next section, we provide an overview of the most popular metrics used for providing an analysis of the social network structure.

3.2 SOCIAL NETWORK ANALYSIS

Social network theory looks at the community of individuals as connected agents and uses mathematical models to study its structure, development, and evolution (Wasserman & Faust, 1994). Each individual agent in a community is treated as a node; the interactions between nodes are represented by links (also referred to as edges, connections, ties).

Social networks can form in many levels, from individual people to families, and communities. The kind of ties between nodes could be communication frequency, friendship, kinship, financial exchange, sexual relationships, or common interests or beliefs. Together they form a complex graph structure (Pan, 2012).

3.2.1 Networks: definition and notation

Graph theory can be used to mathematically formalize networks (M. E. Newman, 2003), in the original notion of a graph as a neighbourhood relation. A graph is a collection of points, called nodes (or vertices), and a set of connections, called links (or edges). Edges between nodes represent the presence of an interaction, or relations, between those vertices, which in our case may represent the individuals of the commonfare platform. Interaction can be bidirectional which defines undirected networks, or it can be directional

which defines directed networks, or digraphs. A graph of size N (say, with N vertices, and L links) is represented by using an N x N adjacency matrix A, with elements a_{ij}=1 if an edge is connecting nodes *i* and *j* and zero otherwise. A is a symmetric matrix in undirected graphs, and asymmetric in directed graphs.

Connectedness, Shortest path length and Diameter

A *path* $P_{i,n}$ is a sequence of different edges (i_j,i_{j+1}), $j=0,\ldots,n-1$ that connect nodes i_0 *and* i_n. The number of edges crossed, *n*, is called the *length* of the path. A graph is *connected* if there exists a path connecting any two vertices in the graph. A component C of a graph is defined as a connected subgraph.

The shortest *path* l_{ij} between two nodes *i* and *j* is defined as the length of the shortest path (though may not be unique) joining *i* and *j*. The *average shortest path length* $< l >$ is the average of the value of l_{ij} over all pairs of vertices in the network.

The diameter of a network is the maximum value of all the pairwise shortest path lengths. The diameter of a network is an overall indication of its compactness.

3.2.2 Network centrality: Who is "important," based on their network positions

Calculation of several metrics is typically performed on graphs to characterize the network structure. Each of the network metrics captures a different dimension of the size and shape of the graph as a whole and the location and connection properties of each person or entity in the network graph.

Indicators of **centrality** are used to identify the most central/ important vertices within a graph, based on their network position.

Clearly, the meaning of "importance" is strongly related to the action/process on the network that we are interested in. This allows centrality to be classified by the type of flow or transfer we want to consider (e.g. information diffusion, opinion diffusion ...). "Importance" can alternately be seen as involving the cohesiveness of the network. Thus, centralities can be classified based on how they measure cohesiveness. As remarked previously, however, the centrality of information spreaders is not sufficient per se, but it needs to be considered jointly with the effect of information with respect to the commonfare mission.

Centrality measure can be local (or neighbourhood based) or global (distance or feedback based) (Klein, 2012).

Local measures (Undirected networks)

- **Degree centrality (he or she who has many friends is important):** degree of node *i*, is the number of edges emanating from *i*, i.e the number of its neighbours, that is $k_i=\sum_j a_{ij}$. With degree centrality, the centrality of the nodes is inferred from their local connectivity: the more connections a node has, the more important it is. The number of connection is an effective centrality measure in order to consider the potential connections with other individuals in the commonfare, e.g., people that will do favours for you, people you can talk to, etc. Also, degree centrality has the benefit of the ease of implementation. The Normalized degree centrality is obtained by the degree centrality dividing it by the max possible, i.e (N-1), where N is the number of nodes in the graph.
- **Degree distribution (indication about the homogeneity of the nodes in the network):** The degree distribution *P*(*k*) of a network is the probability that a randomly chosen vertex has degree *k*. In a finite network, it denotes the fraction of vertices with degree exactly equal to *k*. In the commonfare platform, it can be used to track the evolution of the network and to study the evolution of degree centrality, i.e., how many active individuals are present at each point in time, or the specifics of where/when they are playing a central role in interactions with the others.

Global measures (Undirected networks)

In some cases, local measures fail to capture centrality, (e.g., in a finite lattice graph). The degree may be insufficient to describe centrality if we want to consider the ability to broker information or opinions between groups or the likelihood that information originating anywhere in the network reaches a specific target node. Global measures, instead, are indicator of global properties of the network and use a distance measure between nodes, often the shortest path. In the case of commonfare, "bridge" individuals and/ or cross-cutting interactions (e.g., a very popular narrative), can create shortcuts across group and scale-up the interaction rates and so the diffusion of knowledge.

- **Betweenness (the extent of a node lying between other nodes)**. Intuition: how many pairs of nodes would have to pass through you for reaching one another in the minimum number of hops? Thus, e.g., more information will pass through the node with higher betweenness. It is obtained by counting the number of the all-pairs shortest paths that pass through the node (Freeman, 1978), (R. M. Christley, 2005).

  The betweenness b_i of a node *i*, is defined as

$$b_i = \sum_{j,k \in N, j \neq k} \frac{n_{jk}(i)}{n_{jk}}$$

  where n_{jk} is the number of shortest paths connecting *j* and *k*, while $n_{jk}(i)$ is the number of shortest paths connecting *j* and *k* and passing through *i*.

  If it is not important to have many friends or stay between others, but one still wants to be in the middle of things, not too far from the centre we can use the closeness.
- **Closeness (How near nodes are to all other nodes in the network):** It is based on the length of the average shortest path between a vertex and all vertices in the graph. The closeness is of particular interest for information networks as it assumes that nodes with a short distance to other nodes can spread some information very effectively across the network (Borgatti, 2005). The closeness of a node i it is defined as

$$c_i = \frac{1}{\sum_j d(j,i)}$$

where $d(j,i)$ is the length of the shortest path from j and i.

In general, different centrality metrics are positively correlated, however, it may happen they are not, in this case, there is likely something interesting about the network to know. An understanding of the presence of negative correlation is reported in the following table (taken up by the materials collected in "Network centrality", by Lada Adamic, University of Michigan).

	LOW DEGREE	LOW CLOSENESS	LOW BETWEENNESS
HIGH DEGREE		Embedded in a cluster that is far from the rest of the network	The connection of the node is redundant. Communication bypasses him/her
HIGH CLOSENESS	Key player tied to important/active players		Probably multiple paths in the network, the node is near many people, but so are many others
HIGH BETWEENNESS	The ties of the node are crucial for network flow	The node monopolizes the ties from a small number of people to many others.	

By counting shortest paths, it is assumed that some sort of communication between nodes spreads only along those shortest paths, which, however, it is not always the case. To relax this hypothesis, Newman proposed the random-walk centrality (M. E. Newman, 2005) that considers a node central when it is crossed by many random walks. Thus, basically this approach involves the contributions from essentially all the paths between nodes, though it still gives more weight to shortest paths.

Some feedback-based measures rely implicitly on random walks, like PageRank centrality (see (Perra, 2008)).

- **Assortativity (measure of the likelihood for nodes to connect to other nodes with similar degree):** The assortativity coefficient r, also called *Pearson correlation coefficient*, that is a measure of degree correlation is defined as:

$$r = \sum_{j\,k} \frac{jk(e_{jk} - q_j q_k)}{\sigma_q^2}$$

where e_{jk} is the joint-excess degree probability for excess degree j and excess degree k (the excess degree, also known as remaining degree, of a node is equal to the degree of that node minus one).

The term q_k is the distribution of the excess degree of a randomly selected node, and it is derived from the degree distribution p_k as $q_k = \frac{(k+1)p_{k+1}}{\sum_{j\geq 1} jp_j}$

The assortativity coefficient ranges between -1 and 1, a high assortativity coefficient means that nodes tend to connect to nodes of similar degree, while a negative coefficient means that nodes likely connect to nodes with different degree from their own.

A network is said to be assortative when high degree nodes are, on average, connected to other nodes with high degree and low degree nodes are, on average, connected to other nodes with low degree. A network is said to be dissortative when, on average, high degree nodes are connected to nodes with low(er) degree and, on average, low degree nodes are connected to nodes with high(er) degree. Assortativity provides information about the structure of a network, but also about the dynamic behaviour of the network and robustness of the network, such as random or targeted attack and virus spread (Noldus, 2015).

Assortativity does not reveal information about individual nodes. Not all nodes contribute equally to the network's assortativity. A network that is non-assortative overall may comprise nodes that are themselves highly assortative, e.g., comprise high-degree nodes that connect to other high degree nodes. The assortativity contribution is referred to as local assortativity (see (Piraveenan, 2010)) or node assortativity.

In the commonfare, assortativity may provide relevant information on the type of interactions which the platform is able to generate, e.g., popular individuals dominate, e.g., reflecting the hierarchical structure of a collective, or instead interactions are more or less flat with no dependence on the underlying social structure or hierarchy.

- **Dyadicity (measure of the degree to which the nodes of a network are connected to other nodes that share some characteristic):** it is able to characterize the modular structure of a network by considering the distribution of the functions over the nodes and their connectivity. Hence it is useful to explore questions of increasing importance in network characterization, i.e., how the node properties correlate with the underlying network topologies. A network is called heterophilic when different categories are connected more (less) often than expected under a random model (see (Park, 2007)).

The function of a node, in the commonfare case, may be represented by the role of an individual within the information diffusion process, e.g., there are individuals who tend to share information, other who do not

relay information, individuals who preferably react to others' actions or individuals who are posting original narratives.

We report the counterparts of the metrics in the directed case for the sake of completeness. However, we remark once again, the choice of a directed or an undirected model depends on the nature of the underlying relations induced by the platform: sending an email to a destination establishes a directional link, whereas establishing a friendship relation in the commonfare is a bidirectional relation. Same individuals of the commonfare can be part of directed and undirected graphs depending on the implementation preferences.

Local measures (Directed networks)

- **Degree centrality:** We have both *in-degree* k^{in} and *out-degree* k^{out}, as the number of edges that end in i or start from i, respectively. The *total degree*, is their sum.
- **Degree distribution:** Two different distributions, the *out-degree* P^{out} (k^{out}) and the *in-degree* P^{in} (k^{in}) distributions, though in-degree and out-degree of a given vertex might not be independent.

Global measures (Directed networks)

- **Betweenness:** It considers the fraction of all directed paths between any two vertices that pass through a node

$$b_{ik}(p_j) = \frac{n_{ik}(j)}{n_{ik}},$$

where n_{ik} is the number of geodesics from i to k, and n_{ik} (j) is the number of geodesics that contain node j as an intermediary in the geodesics from i to k. Betweenness is an index of the degree to which i and k need j in order to communicate along the shortest path linking them together. When b_{ik} (j)=1, k and i cannot communicate along the geodesic(s) linking them without the support of j, it might distort or falsify any information passing through him (White, 1994).

- **Closeness:** usually consider only nodes from which the node i in question can be reached.
- **Degree assortativity of directed graphs**

For a directed network, the assortativity may be differentiated in three classes (see (Noldus, 2015)):

  - in-degree assortativity, which measures the tendency of nodes with particular in-degree to connect to other nodes with the same in-degree or with different in-degree;
  - out-degree assortativity, which measures the tendency of nodes with particular out-degree to connect to other nodes with the same out-degree or with different out-degree;
  - overall assortativity, which forms an aggregation of the in-degree assortativity and the outdegree assortativity.

We can consider also the notion of *prestige*: e.g., a person nominated by many others for a reward has a high prestige or a paper cited by many others. (This may be a useful concept if seeking metrics to convert to the kind of reputation discussed in Chapter 2.) Thus, the directed network is formed by who appoint you. The notion of prestige is used, e.g., in the eigenvector centrality. This metric is based on the principle that the importance of a node depends on the importance of its neighbours. It is designed to be distinctively different from simple degree centrality when there are some high degree nodes connected to many low degree others or some low degree nodes are connected to a few high degree others.

- **Eigenvector centrality (ranking measure of the influence of a node in a network):** It assigns relative score/prestige to all nodes in the network. The prestige x_i of node i is proportional to the sum of the prestige of the neighbouring nodes pointing to it:

$$x_i = \alpha \sum_{j:j\to i} x_j + \epsilon_i = \alpha(\boldsymbol{A}^t\boldsymbol{x})_i + \epsilon_i,$$

where ϵ_i is a prestige assigned to each node that is independent of its relationships with other nodes. The parameter α weighs the relative importance of the contribution of the peers versus that of the node itself (Perra, 2008).

Thus, a node with many neighbours does not necessarily have a high eigenvector centrality (it might be that all neighbours have low or null eigenvector centrality). Moreover, a node with high eigenvector centrality is not necessarily highly linked (the node might have few but important linkers).

Interesting topological properties of the structure and time evolution of a network, constructed from users' activity, are reported below.

Clustering: Clustering refers to transitivity property of the network, i.e., the relative propensity of two nodes to be connected, provided that they share a common neighbour. Acquaintance networks are expected to have a high degree of transitivity (Wasserman & Faust, 1994), or in other words, a high density of triangles, since if person A knows B and C, then person B and C are likely to be acquainted.

The clustering coefficient C, that is precisely the probability that two of one's friends are friends themselves, is defined by

$$C = \frac{3\times(\text{number of triangles on the graph})}{(\text{number of connected triples of vertices})}$$

A triplet consists of three connected nodes. A triangle therefore includes three closed triplets, one centered on each of the nodes. The global clustering coefficient is the number of closed triplets (or 3 x triangles) over the total number of triplets (both open and closed). This measure gives an indication of the clustering in the whole network (global), and can be applied to both undirected and directed networks. It is often called transitivity (Wasserman, 1994).

Community Structure: A community or cluster (or cohesive subgroup) of a given network of vertices N and set of edges L is a subgraph G'(N'; L'), whose nodes are tightly connected, i.e., cohesive, and between communities there are only looser connections. The structural connection between the nodes of G' can be quantified in several different ways,

consequently, there are different formal definitions of community structures. A related terminology of community structure of a network is *clique*. A clique is a maximal complete subgraph of three or more nodes, all of which are adjacent to each other, and such that no other nodes exist adjacent to all of them.

3.2.3 Network synthesis on commonfare.net and potential network metric uses

The structure of the commonfare network will be induced by the interactions between individuals taking part to the platform. In this respect, the synthesis of the commonfare.net network should be analysed beforehand since, e.g., the definitions of network metrics change for directed and undirected graphs. This holds for different target applications to be implemented on the commonfare, e.g., for reputation mechanisms, for information diffusion algorithms, and for money exchange. There are many possible types of communication and different types of contacts between users in an online social network. Consequently, in the following we describe the kind of network structures deriving from a set of predefined yet de-facto standard interaction patterns in social networks, namely examples made in the case of different possible types of contacts among individuals on the platform. We can study metrics on each of these networks, as well as on the union of these networks generated by each of these contacts.

- *Friendship request* (Facebook-style platform): the friendship network a classical example of a bi-directional network (undirected graph);
- *Leader-follower network structure* (Twitter-style platform): Links between users are directed (digraphs or directed graphs) and created unilaterally.
- *Emails* (private messages, live chats or instant messaging): private communication, in the sense that no one in the community, except the sender and receiver, can access them. For instance, in several cases, not even information on how many messages other users have received are retrievable for other users are available (we can consider the generated connections as part of an undirected graph)
- *Discussion forum/comments on stories/post*: they provide open discussion threads; here links may be represented by individual comments to a story, or an answer to a question as a directed link from one who comments/answers to the one who post the story/start a discussion;
- *Messages posted on a common page*: each message is visible by all the online users. For example, "institutional" messages which are pre-filtered and meant to be accessible by the most users connect different individuals.

Precisely which metrics will be most effective thus depends on choices to be made about the nature and structure of the commonfare network. These choices will be informed by work with participants in the pilots through WP2 and WP4, as well as on the basis of the attitudes towards online social networking presented in Section 2.2. However it is likely that a variety of contact and interaction types will be possible, meaning that metrics such as closeness and betweenness centrality will be calculable. These could be used in calculations of users' contributions to the commonfare. For example, centralities could be calculated on a regular (daily or weekly) basis and graphed as a function of time for each entity registered for the Basic Income on commonfare.net. Visualizations of contribution over time might then serve as evidence on which to base trust-related decisions about whom to undertake transactions with or make new friendship-type links with, in place of a cumulative (numerical) reputation score. They could also be used to determine the additional quantities of the digital currency, over and above the Basic Income, to be awarded to entities, perhaps by integrating the graphs or by calculating the average value over a fixed period of time. The second and third platform releases may provide opportunities to experiment with different algorithms, comparing results using closeness versus betweenness or some combination of the two. Similarly, they may provide opportunities to look out for instances in which high centrality actually corresponds to behavior that is destructive of the common good, for example through the situational one-upmanship described in Section 2.1 or in the form of collusion or Sybil attacks.

It is these ideas that underpin the conceptualization of the reputation and contribution systems mentioned in the scenarios presented in the following chapter.

4. PERSONAS AND SCENARIOS

Fig. 22

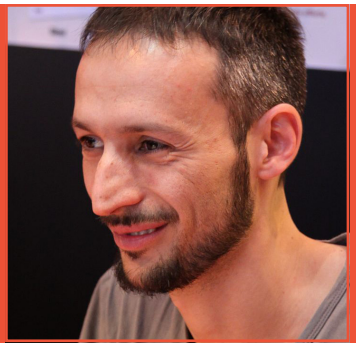
In this chapter, we present the personas and scenarios we have developed for use in the platform design process, in particular with respect to the reputation system, digital currency and dynamic network analysis designs.

We have developed six individual personas, each representing a fictional commonfare.net user experiencing a situation of a type that commonly emerged in the interviews described in Section 2.2. As befits a project in which participant co-design is key, these overlap with but are not identical or limited to the target groups of precarious worker; young unemployed; benefit recipient; non-Western migrant; and self-employed. Instead they are: precarious by choice; unhappily precarious; unemployed with no benefits; self-supporting student; benefit recipient; and non-Western migrant.

In addition to these individual personas, we have also experimented with the development of collective or group personas. This is in response to the clear need and desire, emerging from the research carried out for both Work Packages 2 and 3, for group and collective/cooperative identities within commonfare.net.

Having developed the personas, we then went on to imagine specific commonfare.net use scenarios that were relevant to the reputation system, digital currency and dynamic network analysis systems design. These will form the basis for a user needs analysis in D3.2.

The individual personas are presented on pages 57 - 62, and the scenarios related to them follow in pages 63 - 68.



PERSONA: ALESSANDRO BIANCHI | AGE: 28
LIVES IN ROME
HAS A PARTNER, NO CHILDREN.

FINANCIAL SITUATION

Alessandro works as a waiter in a bar. A year ago, he and his partners borrowed money from their parents and applied for a mortgage. The repayments put the couple under pressure. They would like to start a family, but feel they can't until Alessandro has a more stable, better paid job.

WORK HISTORY / SKILLS

Despite many applications, Alessandro could not find a job related to his degree. Initially he worked with no contract nor security, and has had a few bad experiences where the money never materialised. He has a contract now - however, the bar's owner declares only a fraction of his pay. Until recently he was paid the rest in vouchers, but the government has just abolished this scheme. Now he has been forced to accept a pay cut, and he receives some cash-in-hand. Alessandro is unhappy, but feels it is better to have some work than none at all.

He is a political activist. He participates in the occupation of an abandoned building, and writes for a left-wing journal online. Alessandro and his friends form an informal sharing network. He knows about bikes, so he helps to fix them and in return they do things for him, such as helping with the new apartment.

HOME CIRCUMSTANCES

Alessandro and his girlfriend live in a small, run-down apartment in a poor area of Rome; however they are glad to own it themselves. Alessandro is slowly renovating it – his partner helps when she can, but she often works long hours and so he tries to do most of the work, with the help of his friends.

INTERNET USE

He owns a laptop and uses the internet to keep up to date with current affairs and do research for the articles he writes. He is not a member of any community and does not contribute to discussion forums. He has a Facebook account which he seldom uses it as he does not trust Facebook to respect privacy.

EMOTIONAL STATE/PERSONALITY

Proud, angry, hardworking, disillusioned, tired and disenchanted. Feels exploited and lacking in possibilities to fulfil his potential.

GOALS

Wants to be a writer - political commentator / Wants to have children / Would love to do a Masters in Journalism / Wants to see the city he lives in function more fairly. / Wants to be able to repay his parents for their help in buying the apartment

FRUSTRATIONS

Not having a stable income; being paid in vouchers/cash-in-hand. / Social inequity, for which he blames the capitalist system. / That his degree is not enough to get him a good job.

QUOTES

"A job is a problem even if you have one ... your employer can blackmail you because since you have a stable contract, you are better off than many other people and so you have to shut up and work for unpaid extra hours"

"What I want is a place for me and my friends ... a place where it is possible for me to give something to others ... In the past, my grandmother used to go to the river to wash clothes, she found other people doing the same thing and they used to talk about their problems and to find ways to solve them. Today, we are more isolated from each other."

"I like everything that is self-organised, while I don't trust much institutions as they don't keep their promises, usually."

"If someone messages me on Facebook, then we are not really friends."

PERSONA: ANA DÌEZ | AGE: 37

SINGLE, NO PARTNER OR CHILDREN;

ALSO NO CLOSE FAMILY, AS SHE WAS BORN IN NORTHERN SPAIN AND MOVED ALONE TO ROME 17 YEARS AGO.

FINANCIAL SITUATION

Ana is a freelance web designer. She has sufficient income to cover her daily expenses and she always makes sure that she has at least three months' worth of savings. Right now she has enough to live on for about 6 months. She has no pension.

EDUCATIONAL HISTORY

Ana has a degree in Fine Art. She has taught herself to use various web design packages. She is continually engaged in self-study, especially around her passion, which is to make creativity and art part of everyone's lives, particularly those who might usually be cut off from it through disability or illness.

WORK HISTORY / SKILLS

After graduating, Ana got a job in a private art gallery. This work brought her into contact with wealthy people who were buying art purely as status symbols, with no real eye for talent or understanding of the political dimension of engaged art. Ana felt it was soul-destroying, and decided to quit in 2005.

Ana then worked in various short-term and cash-in-hand jobs in cafes and bars. While doing this, she settled on the idea of freelance work in the area of web design. This work allows her to make use of her artistic talents while also allowing her to choose what kinds of people and organizations she creates sites for. Equally importantly, she can work when she likes, often doing so in the evenings and into the small hours. Ana works enough to get by but does not want all her time to be taken up working. She is not motivated by money. It is more important to her to have time to use her skills and talents to help others. She does this by providing arts based therapy to autistic/disabled young people through activities she runs at community health centres in her city.

HOME CIRCUMSTANCES

Ana rents a small apartment in Rome. She is a vegan and environmentalist, and prefers to eat organic produce. She keeps her flat spotlessly clean; although it is rather sparsely furnished, a few treasured objects (small hand-made sculptures, pieces of driftwood, old photos of her family back in Spain) give it a personal and welcoming feel. Ana has a small, close-knit group of friends, mostly met through artistic and activist activities, and many of them (like her) are migrants to Italy. However, despite these close friendships, Ana is fiercely independent and prefers to stay single.

INTERNET USE

Ana uses the internet daily for work, mostly on her laptop. She is not registered on any freelancer sites and instead has her own website, which includes links to examples of her work and some testaments from former clients. She does not use a survey to gather feedback from her clients, feeling that if they want to say something to her they will.

Ana also uses the internet for self-education, for example keeping up to date with the latest ideas and developments in arts-based therapy provision. She is on Facebook, but only uses it to find out about cultural and activist events, or to find organizations that might be interested in partnering with her to promote or provide space for her arts-based therapeutic workshops. She worries about using the internet for too much, however, and is concerned that it is both addictive and toxic. She prefers her friendships to develop in the physical world.

Emotional state/personality traits

Independent, self-sufficient, proud, calm, and generally happy with her life.

GOALS

Staying independent / Helping others by engaging them in artistic and creative activities / She knows she should start thinking about saving for the long term soon

FRUSTRATIONS

Sees modern society as too materialistic and selfish / Dislikes wastefulness

QUOTES

"It's my life and I'm in control of it. I can always find stability in all this instability."

"I think what would appeal to me is to have a sense of community with people who are all trying to make ends meet in ways that are different from what is conventional at the moment. And to see how they do it and maybe help each other out."

"Without trust there is no ability to move forward, to make a connection ... I believe respect is a good starting point to have trust. But the relationship and trust and respect are built together"

PERSONA: KAS FRANKEN | AGE: 58

DIVORCED WITH TWO GROWN-UP CHILDREN AND TWO GRANDCHILDREN

FINANCIAL SITUATION

Unemployed and receiving state benefits. Has debts from previous mortgage. The benefits Kas receives are only just enough to cover his rent, food and utility bills. As he says, he no longer has enough money to pay for luxuries like cigarettes or coffee in a café.

EDUCATIONAL HISTORY

Kas left school at 16, although he had wanted to continue studying.

Eventually, he attended further education as a mature student. He now has degree in politics and sociology.

WORK HISTORY / SKILLS

On leaving school, Kas undertook an apprenticeship as a shop-fitter and worked in this trade for a few years. However, he felt he wasn't fulfilling his potential and after a while quit and went travelling. During the 1970s and early 1980s, he travelled widely, supporting himself because of the practical skills that he had acquired as a shop-fitter, but also acquiring new skills and knowledge as he went. Eventually he returned to the Netherlands for good and, in the early 90s, started his own business repairing electronic goods. At first this went well, but as both product design and people's buying habits changed, the demand for repairs dropped drastically and the business went under just as the financial crisis started to bite.

After a period of illness following the failure of his business, he undertook a bachelor's degree in politics and sociology. He has not been able to find work since. He puts this down to his age. He now spends some of his time volunteering in the local drop-in centre, where he helps out by doing odd jobs around the building as well as helping the young people that come in look for ways to improve their lives. He also regularly helps some of his neighbours with repairs and odd jobs around their flats.

HOME CIRCUMSTANCES

Kas and his wife split up 10 years ago. He had to sell his house when his business failed in 2008; unfortunately he did not make money on the sale, and still has some debt from the mortgage. As a result of all these stresses, Kas experienced a period of serious depression. He started drinking, and became somewhat estranged from his family. Kas managed to overcome his health problems but there remains a real distance between him and his children and grandchildren.

He now lives in rented accommodation. His flat is in a poor area of Rotterdam. He has very little furniture or possessions, and relies on the library to have access to books and DVDs.

INTERNET USE

Kas uses the web several times a day, to keep up to date with the news and current affairs, and to find new knowledge. He does not like (or use) Facebook or Twitter, and avoids social media generally. He is irritated by the proliferation of user surveys and ratings requests that he now encounters every time he interacts with something online; he believes that it is not fair to let everyone have an equal say about the quality of someone's work, since often it takes professional or informed expertise to know whether someone has done something particularly well.

EMOTIONAL STATE/PERSONALITY TRAITS

Describes himself as stubborn, but comes across to others as having an inner strength that has helped him get through various crises. Generous and empathetic. Needs to feel that his skills and contributions are recognized. Disillusioned with the government.

GOALS

To have a better relationship with his children - grandchildren / To find a job. / To have the chance to really relax.

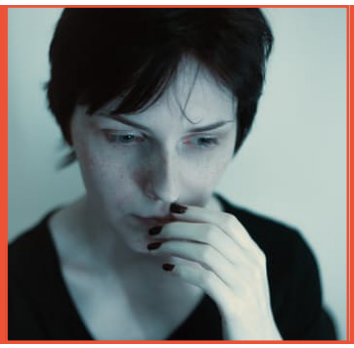
FRUSTRATIONS

Not having enough money to do anything but keep going / Social inequity, feeling like his community has been abandonned

QUOTES

"I try to leave being on benefits every day, because I want to have more freedom to move, to travel. More relaxing times. Maybe camping, two weeks to do nothing, to discuss, to drink wine over dinner, maybe smoke something, a cigar maybe - to get quiet. Just small pleasures."

"In stressful situations, even if you can't handle it, do the things that are right in front of you, like do the dishes. Like cleaning your shoes. And do it with full attention."



PERSONA: LANA JOZIĆ AGE: 26

SINGLE

RETURNED TO HER HOME TOWN AFTER SEVERAL YEARS STUDYING IN ZAGREB; NOW LIVES WITH PARENTS.

FINANCIAL SITUATION

Lana is currently unemployed and is not receiving any benefits; she is totally reliant on parents.

EDUCATIONAL HISTORY

Lana has a degree in Media Studies and is currently teaching herself German.

WORK HISTORY / SKILLS

During her university studies, Lana worked in a call-centre. She often did not know what hours she would be assigned, and sometimes was not paid for the work she did.

On graduating, she applied for various places in the Government's internship programme. She had been hoping to get a position giving her some experience relevant to her field but ended up on a placement with the local municipality in her family's home region, where she essentially worked as a low-skilled office assistant, photocopying and filing. Lana felt exploited by the internship, which paid very badly and did not improve her skills. Most of her friends have had similar experiences on the scheme, but since there are very few jobs to be had, they have to accept what they can get.

Since finishing the 12 month placement, Lana has been unable to find work.

HOME CIRCUMSTANCES

Lana is living at home with her parents in a small town in a semi-rural area. She would prefer to live in Zagreb where she has friends from university but cannot afford to. She has a younger sister who her parents also support, adding to the overall financial pressure within the household.

With the continued unemployment and lack of opportunity to see the friends she made during the 7 years she lived in Zagreb, Lana has become depressed. Her sense of uncertainty and doubt about her future is also resulting in anxiety, which makes it even harder for her to get out of the house and go into social situations. Most of the friends she had before she left to study in Zagreb have moved away (many have emigrated) so she feels very isolated.

INTERNET USE

Lana spends hours on the internet every day. It is the primary means by which she can look for work, and since she feels constant pressure to find a job she spends a great deal of her day doing so.

She also uses it to keep in touch with her friends from college, who are still in Zagreb, and the large number of her friends who have moved abroad. She has a Facebook profile and frequently checks on her friends' status updates. She also uses Skype to chat with two or three close friends who now live in Germany, Austria and Italy. However, she says she would not start a friendship online – she uses social media to keep in touch with her existing friends, but she prefers friendships that start because of shared encounters in real situations, for example in the park, at the theatre, or at a music concert.

EMOTIONAL STATE/PERSONALITY TRAITS

Depressed, anxious, guilty at still being a burden on her parents at her age. Frustrated at not being given opportunities to show her skills and develop as a person. Trying very hard to stay positive but on a knife edge. Like most of her friends and peers, she is almost completely disaffected from Croatian political life and what she sees as a broken, corrupt system.

GOALS

To get a job that reflects her qualifications both in terms of status and field / To move into a place of her own / To improve her overall well-being and feel less stressed

FRUSTRATIONS

Apparent impossibility to find work / Lack of control over own future / Distance from friends

QUOTES

"I really know that I have some skills and talents which are very high quality and I have the will to do a lot of things, but I don't have an opportunity."

"You have to be strong, you know always be positive, but it's really hard you know … sometimes I'm really, really sick of it, you know?"

PERSONA: MARIAM ZAHRAA AMARI | AGE: 33

RECENTLY DIVORCED, HAS TWO CHILDREN AGE 10 & 12;

LIVING IN AMSTERDAM BUT ORIGINALLY FROM MOROCCO.

FINANCIAL SITUATION

Mariam is currently receiving benefits, but only after a period of about 12 months when she got nothing. It was particularly difficult for her to find out what state help she is eligible for, as her Dutch was, until recently, quite limited. This made reading through the guidelines, and negotiating the bureaucratic processes and forms, even harder than usual. She would not have survived the past year without the local foodbank.

EDUCATIONAL HISTORY

Mariam has a degree in Physiotherapy, but it is from Morocco and does not allow her to practice in the Netherlands without undergoing further training.

WORK HISTORY / SKILLS

Mariam worked as a physiotherapist in a hospital after qualifying in Morocco, where she met her husband (a hospital administrator). They moved to Amsterdam to get away from what they felt to be a dictatorial regime, arriving 8 years ago with their 2 young children. When they first arrived, neither spoke any Dutch, and Mariam's husband had to take whatever work he could get. He began to work as a taxi driver and, to supplement their income, Mariam managed to get work with a company that organized early morning cleaning teams for offices. Following her divorce 18 months ago, she found it difficult to work as she had to be home to look after the children.

Ultimately Mariam would like to practice physiotherapy again, but she feels she cannot study (and so re-qualify) while trying to provide for and care for her children.

HOME CIRCUMSTANCES

Mariam lives in North Amsterdam, in an area mostly populated by non-Western migrants. Her marriage had been under stress because of the move to the Netherlands, the dislocation from family and friends, and difficulties in making a new life with poor language skills. Both she and her husband were also suffering loss of self-esteem because of their inability to proceed with what had been professional, white-collar work. Her relationship with her husband broke down irretrievably and they eventually divorced. Mariam suffered some depression since then, as she struggled to make ends meet, provide a good home and food for her kids, and cope with the stigma that some members of her community associate with divorce.

Mariam started going to Dutch language classes at her local community centre about a year ago. This led to her meeting more people and she now has more of a support network; she and some of the other ladies attending the class now regularly meet afterwards to drink tea together. Together, they are thinking of ways they might be able to generate some income. She is also now able to reciprocate childcare with the other women meaning that she can look for some work again.

INTERNET USE

Mariam is on Facebook and uses it, and Whatsapp, to keep in touch with her friends. Her local community centre has a Facebook page which she also regularly checks to find out if there are new opportunities for self-development and social interactions.

However, Mariam has never used the internet to make contact with people that she has not met in the flesh. She worries that as a young Muslim woman, she may be exposed to racism and anti-Muslim rhetoric if she starts interacting in more public spheres. She is also very worried about the impact that social media and internet use might have on her children, who she knows access the web on their phones.

GOALS

To get a local qualification allowing her to practice as a physiotherapist again / To improve her Dutch language skills / To provide a happy and stable life for her two children / To have a better life than they would have had in Morocco

FRUSTRATIONS

Not being able to obtain work in the area she is qualified in / Lack of childcare – makes it very hard to work / Lack of any family support – she had this in Morocco and misses it in her new life

QUOTES

"I'd love to be able to get my kids some football boots"

"It is not a matter of distrust toward some agency or organisation, but it is important to find the right person to talk to."

PERSONA: TOMI JANKOVIĆ | AGE: 23
LIVES IN A SHARED HOUSE.
FIRST IN HIS FAMILY TO GO TO UNIVERSITY.

FINANCIAL SITUATION

Tomi is in a precarious financial situation as he tries to study while working to support himself. He failed his first attempt at the second year of his degree, and as a result has lost his student privileges and so is unable to take advantage of cheap food in the subsidised mensa. As he tries to repeat the year in order to progress, he also has no financial support from the state, and he cannot ask his family for help. He has also already accumulated debt during his previous years of study. At one point he ended up borrowing from loan sharks, who threatened him and his former girlfriend with violence when he failed to make a repayment on time.

EDUCATIONAL HISTORY

Tomi did well at high school and was encouraged by his working class parents to go to university. He started a degree in Philosophy, but partly due to difficulties in balancing work and study time, didn't pass the exams needed to progress to 3rd year. He is now repeating the modules he failed.

However, because he is not sure whether he will be able to carry on with his degree, Tomi is also thinking of emigrating to Germany. To make it easier to get a job, he is using free online courses and materials to improve on the German he learned at school.

WORK HISTORY / SKILLS

Tomi has worked in several casual, part-time and cash-in-hand jobs. As a teenager, he had a paper round and worked in a local café. During his first year at university he worked as a waiter. Now, he has a job distributing flyers during the day, and works in a bar at night. He is rather entrepreneurial, and will try his hand at anything.

HOME CIRCUMSTANCES

Tomi is currently living in a large, shabby shared house with six other people. The house is often cold as it is not well insulated and the heating costs a lot. It's usually untidy. Sleep is often disturbed with people coming and going at various hours of the day and night. There is internet access, but it's a bit unreliable and slow with so many people using it.

Tomi's girlfriend lives in a neighbouring district. They enjoy each other's company, but because of Tomi's long working hours and need to study, they don't find time to meet that often. When they do, they find it difficult to get any privacy, since they both live in shared houses. He also doesn't like to go out too much, not only because his financial situation makes it difficult but also because his experiences with loan sharks have left him distrustful and afraid.

INTERNET USE

Tomi mainly uses the web to search for jobs, to look for opportunities overseas, to download pirated books, movies and so on. He has a fake account on Facebook, not using his real name, as he is (in his own words) "a little paranoid" about cyber-security and the amount of information about him that might be available to others on the web (and to Facebook itself).

EMOTIONAL STATE/PERSONALITY TRAITS

Confident - even a little reckless. Independent, proud of his family and roots but also proud that he is able to study at a higher level. Sceptical to the point of cynicism about the state, the "system", and possibilities for his future.

GOALS

To complete his degree. / He says in an ideal world he would be in a rock band, but this is not going to happen. / Would like to get a job in another country – preferably Germany

FRUSTRATIONS

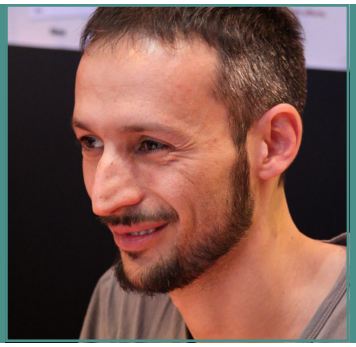
Lack of trust in authority / Being exploited by unscrupulous employers / Lack of comfortable living conditions

QUOTES

"You get to your twenties and you start to worry about existential things and then you don't hang out that much with your friends; you tend to drift apart and you only keep a few friends that are really close"

"I saw like some really terrifying stuff ... afterwards I was really really really careful ... I don't really trust people, I'm really careful with them ... kind of paranoid".

"My relationship with my girlfriend suffers as we have to fight to meet each other as a result of trying to match study, work and mobility. It is not easy at the moment. To compensate, I sleep less."



ALESSANDRO'S SCENARIO: GETTING IDEAS AND NEW CONTACTS.

Alessandro Bianchi wants to raise awareness of the possibility to occupy abandoned buildings and use them for community purposes. He knows that while this is a practice that many Italians are aware of, not so many actually take action and do something with buildings in their own area. He also knows that it is not such a widely-known practice in some other European countries. While he already uses the left-wing journal he writes for to discuss the occupation movement, he worries that, with this, he is preaching to the converted.

One of Alessandro's friends recently recommended that he join commonfare.net in order to promote his bicycle repairs. He was initially sceptical, imagining that it would be just another gig economy site where people could set up profiles and advertise themselves as if they were themselves products to be traded in a capitalist system. However, when he visited the site, Alessandro was intrigued by the idea of using a basic income provided in an alternative currency to facilitate a sharing of skills and resources. He spent some time exploring the site, trying to decide whether he could trust it; he remained a little suspicious that the basic income might be some sort of scam, and in addition he is always cautious about letting any platform have access to information about him and his activities.

As he reads some of the stories of good practice that are already on commonfare.net, he begins to feel reassured that the site is genuine and that it seems to be consistent with many of his own values. He is particularly struck by a story of social cooperation among freelancers in the Netherlands – he reads how, by establishing a physical space in which they can meet, they have begun to build a sense of community and strength in numbers.

This gives Alessandro an idea – if he can raise awareness of the abandoned warehouse he is involved in occupying, then freelancers and other self-employed workers from across his own city can use it as a physical space, like in the story he has just read. He decides to write a story of his own to share on commonfare.net, not only describing the practice and politics of occupation but also advertising the availability of the warehouse for freelancers and others to set up work and social spaces.

Alessandro leaves a comment on the original story, letting its authors know that they have given him some inspiration. He also opts to follow them, so that when he returns to the site he will be notified if they have published a new story. The commonfare.net platform considers his comment as an interaction that indicates some value has been added to the commonfare through the sharing of knowledge. It also recognizes that Alessandro's decision to follow the Dutch group is an interaction that builds the online community. Alessandro's own story attracts several comments from freelancers in Rome; some saying they would like to have such a space to work, and others telling of similar cooperative spaces that have already been set up for artists' collectives. Each of these interactions is also counted as adding value by the commonfare.net platform. After a certain period of time, commonfare.net provides the total value of the common which has been created from these interactions. Subsequently Alessandro and the other users are informed about the extra value generated through the platform which will in turn be distributed among them on the basis of their contributions.

Some of those leaving comments opt to follow Alessandro's blog; two of the freelancers ask for permission to send him direct messages so that they can talk in more practical terms about using the building. Alessandro puts them in touch with each other. The commonfare.net platform provides users with an understanding of how their relationships and interactions help add to the commonfare. Because of his interactions, commonfare.net tells Alessandro that his contribution has increased, as he provides a connection between the authors of the original article and the readers of his own story.

After a few weeks of occasionally checking activities on commonfare.net, Alessandro has become sufficiently comfortable with it that he decides to use it to promote his bicycle repairs, as his friend had originally suggested. After he has created a listing advertising his skills, he receives a direct message from Antonio, a freelance web designer who is having problems with the gears on his bike. Alessandro quickly looks at some of Antonio's previous activities on commonfare.net, which Antonio has opted to make visible on the site. Commonfare.net shows Alessandro when Antonio first joined the platform, who he interacts with most, and what groups he is a member of. Like Alessandro, he is relatively new to the site: he has not written a blog or engaged in any discussions yet. Alessandro feels he has no reason not to trust him. They arrange to meet at Alessandro's home, where he has the tools he needs, and Alessandro is able to fix the problem. While Alessandro works, the two men chat and Antonio finds out about the space available in the abandoned warehouse – he is enthusiastic about the idea of sharing a workspace with other freelancers. When the work is finished, they discuss whether Antonio can do anything in return, but right now Alessandro has no need of web design skills. Antonio uses his mobile phone to register the successful repair on commonfare.net, and triggers the transfer of a small amount of the digital currency from his own SocialWallet to Alessandro's. The successful interaction is now visible for others to see on Alessandro's skills listing, but since it has already been rewarded directly by Antonio, it is not counted as an increase in the total value of the commonfare. Later that evening, Antonio uses his laptop to look at Alessandro's blog about the occupied warehouse. He discovers that the freelancers who are already using it have a group identity on commonfare.net so that they can more easily pool their commonshare incomes to buy equipment, furniture and so on for their new working space, and to raise their own profile so that others may join them. Antonio opts to follow the group on commonfare.net, and also decides to call in to the warehouse the following day. Maybe if it works out, he will join the group himself.

ANA'S SCENARIO: THE SOCIAL ART AMAZONS

Ana Diez is a freelance web-designer from Bilbao with a degree in Fine Arts. She is an independent woman who left her homeland, the Basque Countries, after graduation and has been based in Rome for 17 years now. In her spare time, Ana is a social worker who helps autistic and disabled people by providing arts based therapy through activities she runs at community health centres in her city. After a few years working in a private gallery, she quit her job as the art market turned out to be toxic with regards to her ethos as a woman and artist who tries to create art forms that are emancipatory for society at large. Although she is a web designer, Ana does not like to consider herself a geek or to spend too much time online, apart from staying up-to-date in her sector. Ana uses her Facebook account mainly to find out about cultural and activist events, or to find organizations that might be interested in partnering with her to promote or provide space for her arts-based therapeutic workshops.

On a spring night, Ana is home browsing her Facebook wall and reads from Flaminia, a friend of hers based in Rome, about the existence of a new community-building platform called Commonfare. She is curious about this new network, which Flaminia says is quite different from others she has come across as it combines some of the featurs of standard social networking platforms with others she would more usually associate with social or political activism. Ana decides to visit commonfare.net to find out more. There, she finds information about governemtn social policies and benefits, including relating to housing and education. She favorites an item about support for ongoing professional learning to remind herself to come back to it when she has more time. She also finds listings for cultural events in her area. There, she reads about an event organised by a Rome-based women-only group of precarious artists: they will gather the following Friday outside Roma Termini train station to take photos to document the conditions of the new wave of refugees coming from Syria and hosted in a few tents outside the train station. Ana decides to join the gathering with Flaminia. At the gathering, she learns about Commonfare's basic income and Social Wallet and decides to sign up and start using it.

After a few weeks, she starts gaining social coins in addition to the basic income through her activity on the platform as she got a few calls from local schools owning group accounts on the Commonfare social network to deliver her art therapy sessions to autistic children, as a form of volunteering. Ana's art therapy sessions with disabled children are contributions to the social good, which are certified on a database connected to her Social Wallet as local schools representatives send Ana social coins as rewards for her volunteering work. Indeed, the betterment of the social good and related positive externalities are accounted for as economic achievements on Commofare as they are activities that give value, i.e. they increase the common good built on the platform as a whole. As the platform's motto goes: 'Commonfare is not simply a social network, it is a social-purpose network of people'. In turn, and in order to give a social meaning to her experience, Ana also becomes a member of the Roman women precarious artists' group on Commonfare, the newly created cooperative 'Social Art Amazons'. As they explain on their homepage, the group decided to create an identity on commonfare.net for several reasons. First, they believe in the platform's social mission, and want to contribute to it through their performances and installations, through which they bring art to all. Second, they believe a Basic Income is the best way to ensure people are not trapped in low quality, degrading work. Third, they believe that by acting as a group, they can pool their strength and resources to achieve more than they could as (networked) individuals.

Ana joins by deciding to spend some of her social coins as shares to become co-owner of Social Art Amazons, whereby economic risk and artistic content generation are spread and co-created by participants, respectively. The first project by Social Art Amazons - 'From a War of Invasion to a War for Integration' - is to build a virtual art gallery made by the photos that documented the experience of the refugees camped outside of Roma Termini. The group decides to try to create some revenue from the photos by offering them on the private art market as most of the members, Ana included, have contacts who might be interested. If successful, the Social Art Amazons will share part of the profits made in euros to help the refugees themselves. It is now a Friday afternoon, Rome is empty as it is the middle of the summer break and Ana is home talking on Skype to her parents. She was not able to visit them in Bilbao during the days of Aste Nagusia (Great Week festival) as she needs to save money and could not travel during the high season, since flights during that period are always extremely expensive. As she is speaking, she receives another Skype call from a German number. Ana puts the call with her parents on hold to answer and she discovers that Berlin Biennale for Contemporary Art is interested in hosting 'From a War of Invasion to a War for Integration' during the next Biennale.

KAS'S SCENARIO:

PROTESTING AGAINST DEHUMANIZING TREATMENT

Kas Franken is feeling really down. He has been struggling to get by on the reduced benefits he receives since more cuts were made a few years ago, but he has always managed to cope, and to keep pride in the fact that he still has a useful role in society with his practical handy-man help at the local drop-in centre and for his neighbours.

Now, however, he feels even this sense of usefulness is being taken away from him by the state. Because of the way that the municipality is implementing the Participation Act, he has been told that in order to continue receiving benefits he is no longer free to volunteer where he wants. Instead, he must participate through the government-run scheme, which has placed him in a group packing boxes in a warehouse under the supervision of a private sub-contractor. Now, he is using neither his practical skills from his shop-fitting days, nor the knowledge skills he acquired through his return to education as a mature student. In addition, the friendly relations he had with the staff in the community drop-in centre have been replaced by a relationship of surveillance and the threat of sanctions with his new supervisors.

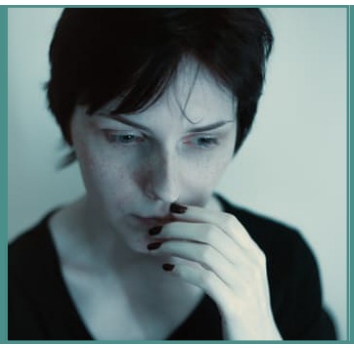
Kas knows that he has to speak out about his situation and generate support for himself and the other people who are losing their dignity in this scheme. He has been following some of the stories told on the developing platform, commonfare.net, and decides that now is the time for him to act. He creates his own story on the platform, writing a lucid and compelling piece questioning the value to society of removing him from an informal role where he could match his competencies to a genuine need, and placing him in a position where he is reduced almost to a robot, and which would otherwise require the sub-contractors to pay someone at least on the minimum wage. His story attracts a great deal of attention, both from other people in similar situations and from other regions, where the Participation Act is being interpreted and implemented somewhat differently. It is also read by Kas's case worker at the Social Services, who has been aware of the platform since it was first set up. Commonfare.net considers these interactions as adding value to the common store of shared knowledge and solidarity. After a period of time, commonfare.net provides Kas and other users with the total commonfare value created by their interactions, and also the total value created across the platform in the same period, which will be used to reward the users who created it.

Kas is significantly cheered by the strong response his story receives. He receives a number of friendship request, and finds himself providing support to others. His natural stubbornness makes him want to do more than narrate his story, though: he wants to do something about it. He starts up a dialogue with one of the people who has recently contacted him - a young woman who has been unable to find a job since failing to complete her studies in European politics. Surely, since they both have knowledge of politics, EU law and social policy, as well as experience of the benefits system, they can attract enough attention to at least spark some public protest?

Kas's younger friend Lena gets in touch with contacts at her former university department and introduces them to commonfare.net by suggesting they read Kas's story and the various comments and responses to it. In this way, she and Kas bring together two groups; experts in EU and employment law, and benefit recipients. Commonfare.net considers this creation of new connections as building the commonfare, and counts them towards the total value. It also provides Lena and Kas with information about their own role in these new connections, and rewards them on the basis of how much their actions and interactions have contributed to the increase in the commonfare's value.

Together, Kas and Lena persuade the employment law specialist to provide her expertise for free, by running drop-in advice sessions at the local commonKiosk. They publicise these sessions through their networks on commonfare.net and elsewhere. A local TV reporter picks up on the story, and soon the municipality's harsh implementation of the Participation Act is being opened up to more public debate. Soon Kas's story is getting many mentions on external social media platforms such as Twitter and Facebook. Commonfare.net considers these as contributing to the commonfare by attracting attention to the platform and potentially drawing in new participants. Again both Kas and Lena (and now also the employment law specialist, who has chosen to participate in the platform's reward system) are rewarded for their contributions to the growing commonfare.

In the meantime, Kas's case worker - who had previously been unaware of his skills and community activities - has decided they need to reassess Kas's participation requirements, and calls him to make an appointment to do this. She wonders how many other people currently packing boxes at the warehouse were already making real and valued contributions to the community. She resolves to discuss this with her colleagues and so arranges a meeting the following Monday.



LANA'S SCENARIO: A JOB INTERVIEW IN ZAGREB

Lana Jozić has just received an email telling her she has been shortlisted for a job as a runner with DiTZ TV. Although she is happy to finally get an interview, she has somewhat mixed feelings since a runner is really an entry level position and she feels that, following her degree and internship, she should probably aim for something higher. However she also feels that she is not in a position to pick and choose, and does not think she can afford to let this possibility of a job pass by.

The interview is scheduled for the following Tuesday and is at DiTZ's headquarters in Zagreb. She will need to find a way to get to Zagreb, and since the interview is at 9.30am she will need to find somewhere to stay the night before. She is reluctant to ask her parents for money for coach tickets – it is the end of the month, when most of their utility bills fall due. She knows if she asked them they would scrape the money together somehow, but she does not want to add to the financial pressure the household is already under.

Lana messages one of her friends in Zagreb on Facebook, to ask if she can sleep on her sofa when she comes to Zagreb. Then she goes to commonfare.net, and posts a question to a group dedicated to sharing transport: Is anyone travelling from her region to Zagreb between now and next Tuesday, who could give her a ride? Commonfare.net considers Lana's request as an interaction that builds the commonfare, since she is connecting with others in the community and opening up a new possibility for cooperation. By that evening, she has received a response from Kristjan, a young man who works for an organic food producers' cooperative. He is travelling to Zagreb with a van full of produce early on Saturday, to sell at Dolac Market. He says Lana can come with him if she can get herself to his place by 4am and if she will help load and unload the van. Commonfare.net counts Kristjan's response as an interaction that builds the commonfare, and logs it as a contribution from the ride-sharing group as a whole. Lana checks his status on the ride-sharing group; commonfare.net shows her the number of times he has given people rides in the past, as well as the number of rides provided by the group as a whole. She sees he has already given a dozen other people rides on this basis, and decides that she is safe to go with him.

In the meantime, Lana's friend in Zagreb has replied saying that she can stay with her. Now all she needs to do is prepare for the interview. She starts researching the TV network's shows. It's not the network she would most want to work for – its programming is dominated by soaps, and is supposed to target a young female audience. Lana would prefer to work for a company that airs documentaries and investigative journalism, exposing the corruption that she and her friends feel is endemic to the Croatian system. She also begins to wonder what the network is like as an employer. She goes back to commonfare.net and uses the "employer search" facility to see if there is any information available; she finds data on the network's business ethics and, to her relief, it does not seem to be particularly bad. She leaves an indication that the facility has been helpful to her; commonfare.net counts this as an increase in the value of the commonfare. After a certain period, commonfare.net reports the total increase in value of the commonfare and users and groups are informed about the extra value, which will be distributed among them on the basis of their actions and relationships that contributed to its creation. Because Kristjan's group now has a new connection to Lana, it will benefit; and because Lana opened up this possibility, she will benefit too.

Saturday morning arrives and Lana gets a lift to the food cooperative with her mother. There she meets Kristjan and helps him load the van with boxes containing bottles and jars of pickled vegetables and preserves. The drive to Zagreb goes smoothly; they chat about life, and discover they have similar tastes in music as they listen to the same radio station. Lana helps Kristjan unload the produce at the market before setting off to her friend's apartment. On her way, she uses her mobile phone to register the completion of the ride on commonfare.net. The number of successful interactions that commonefare.net shows on Kristjan's profile on the ride-share group increases by one.

Later, when she and her friend chat over coffee, Lana realises that her drive with Kristjan has had a bigger impact on her than she first thought. She and her friend have been talking about the cooperative model and whether it could be used for other types of work, which did not produce material goods such as pickles. If it could, perhaps that would offer a way round the problem of getting jobs in existing companies, and the nepotism and clientelism that they feel are the real determinants of who gets work. Lana resolves to get in touch with Kristjan and find out more about the cooperative model.

MARIAM'S SCENARIO: FOOTBALL BOOTS AND FRIENDSHIP

Mariam and her friends are having tea together after the Dutch class they attend at the local community centre. The conversation turns towards their children, who are in school right now. One of them is talking about her son, who has made it into the school's football team. She is very proud of him. Mariam sighs – her own son is a real football fanatic who follows AFC Ajax and spends every spare minute playing football with his friends. She knows how much it would mean to him to be able to try out for the school team, but she cannot afford to buy him a pair of proper football boots.

Then Sharifa, who has recently been to visit friends in The Hague, starts talking about a new community group she came across while she was there. Apparently this group has been set up to help people help each other: Sharifa says her friends in The Hague had visited something called the commonKiosk and had found there a freecycling system where they had been able to pick up a few things their own kids wanted. Sharifa tells Mariam that the group has a website called commonfare.net. They both connect to the site on their phones, and Sharifa helps Mariam navigate to the freecycling page. Mariam enters "football boots" in the search field and is excited to find three listings – she clicks on each in turn, but unfortunately none of them are in her son's size. Then Sharifa suggests she sign up for alerts for items like this – Mariam thinks that's a great idea and does so.

Later that day, after the kids have gone to bed, Mariam spends some time looking around commonfare.net. She thinks the information about state benefits on the platform looks really useful, and wishes she had known about it while she was trying to apply for financial support. She reads about the site's practice of paying registered users a basic income in a digital currency – she is not sure about what this means, and is a bit wary of registering on a site that none of her friends are already on.

A week later, Mariam receives an alert from commonfare.net. More football boots have been listed – she checks them out and, to her delight, they are not only the right size, they are also listed as being available to pick up in the Amsterdam commonKiosk. Mariam had not known there was one! She clicks on the link and finds the Kiosk's location and opening hours: it is open that day, during school hours, making it easy for her to go without having to arrange care for the kids. She goes back to the freecycle page and clicks on the icon to send a message indicating she would like the boots. In less than an hour, she is at the commonKiosk: the boots are in good condition so she takes them. Noor, who is the Kiosk's facilitator today, uses the commonfare.net freecycle page to record a successful interaction: commonfare.net considers this as a contribution which increases the total value of the commonfare. After a while, the system will inform the freecycle group of the total increase as a result of their contributions, and will calculate a reward on this basis. Noor will also receive recognition and reward for her time facilitating at the commonKiosk. In fct, this is only the second time that Noor has facilitated a session, having received an invitation from the platform to do so after she had made several contributions to the freecycle group's activities, including donations, acquisitions and contributions to their group discussion forum.

Mariam chats with Noor for a while, finding out more about commonfare.net. She asks about who runs it: "We do!" answers Noor. Mariam really enjoys meeting Noor, and later that night, decides to register on commonfare.net so that she can keep in touch with her. She has also been thinking about what she might put into the freecycle system: her son is now out playing football in his new boots, and she wants someone else to benefit from the system in the same way they have. She goes to bed thinking about how she will persuade more of her friends to participate in commonfare.net, and how that might strengthen their own community and offer new opportunities to make connections with nice people like Noor.

TOMI'S SCENARIO:

FROM FOOD FOR THOUGHT TO FOOD AS BUSINESS

Tomi Janković is an undergraduate student of Philosophy at Zagreb University. He is also passionate about good food as his family used to own one of the best small restaurants in Zagreb. It was a typical family-run restaurant, using produce from his grandparents' smallholdings on the outskirts of the city. Unfortunately, the restaurant closed during the years of war in the region. Indeed, Tomi chose to study philosophy as he has always been interested in the mysteries of human nature, being born in a country facing the tragedies and hurdles of a civil war, and growing up during reconstruction of both material infrastructure and the national identity of the Croatian people. Moreover, he has always dreamt to reopen the family restaurant one day, as a sign of respect to his forefathers who started the enterprise and also to show his parents that their working class efforts to allow him to be the first in his family to go to university would bring concrete results. As one of his favourite philosophers is Michel Foucault, Tomi thinks that food is something more than mere calories everybody has to ingest three times a day, if lucky enough, to maintain one's physical body. For Tomi, food is a technology of the self and he really thinks that this definition of food by Foucault is literally true, especially after he downloaded copies of books by one of the best cooks in the world, the Catalan chef Ferran Adria', and learned about his molecular cuisine.

In his free time outside his part-time job and academic commitments, Tomi is active a couple of days a week on a new decentralised social network named Commonfare. As Tomi has always been a conscious netizen, he never engaged much on social networks like Facebook and Twitter. But unlike most social networks, Commonfare offers ways to build cooperation and community, and to enhance personal growth, rather than commodify it, and he was pleased to discover about its existence a few months ago thanks to his friend Goran who sent him the link. After an initial suspicion that Commonfare was like all other social networks, he was thrilled to find out that the comonfare.net community encouraged practical action and mutual support. He was also delighted to find the site was much more than a social media platform, providing access to information about all sorts of useful things such as support for education and housing, and cultural events in the region. He bookmarks a notice for a public talk on the Croatia's recent history by an academic he admires and whom he knows uses a Foucauldian approach.

Tomi thinks for a bit and realises he could actively help others by sharing his skills. He begins to interact with some high school students, whom he motivates to do their chemistry homework homework by telling them about molecular cuisine. Commonfare.net recognizes this as interactions the contribute to the commonfare. After a while, Tomi is informed by the site of the value of the commonfare and the amount he has contributed to it; he is rewarded in commonshare, the sites alternative currency. Tomi gains more commonshare as he takes part in a business management course run by other Commonfare members in Zagreb, who deliver important entrepreneurial skills that Tomi hopes to apply in his venture to reopen the family restaurant in the future. This training is recognised as a contribution to the commonfare by Commonfare.net, and the group of Commonfare members who arranged and provided it are also rewarded with commonshare.

Although Tomi loves his country, he is not confident that he will be able to be successful in Zagreb as Croatia is experiencing hard economic times since the crisis in 2008. Therefore, although it is a bitter thought for him, he has been considering moving to Germany and opening a restaurant there, convinced by the fact that high level Croatian cuisine is not so widespread in Germany. He is not afraid to dream big as he considers himself a hard worker. Then one night, he receives a feed from the Commonfare platform where he reads that a local ethical bank, Ebanka, started a partnership with Commonfare. Tomi almost falls off his chair when he read that the bank is going to include commonfare capital in its credit rating indexes for loans to young entrepreneurs (from 20 to 35 years old). Tomi calls his girlfriend to tell her about this news and to inform her that - as he has almost finished his degree - he is going to apply to Ebanka for a loan to open a restaurant in Zagreb and repay his student debt. Tomi goes to sleep that night already planning to propose a partnership to Pelegrini, the Best Restaurant in Croatia in 2016.

Fig. 23

5. SUMMARY AND CONCLUSIONS

The research described in this report has provided several insights into both potential social dynamic mechanisms for commonfare.net and the experiences and attitudes of some of the participants in the pilot activities.

This research has been focused towards informing the development of reputation and reward systems and the development and implementation of a digital currency with which to provide a Basic Income within the platform.

The four main strands of empirical research were: a survey of existing, conventional reputation systems (section 2.1.1-2.1.6); a partial ethnography of existing discussion forums associated with online support groups for people experiencing unemployment and financial problems (section 2.1.7); in-depth interviews with potential commonfare.net participants in the pilot sites (section 2.2); and a trial co-design and implementation of a digital currency system within the Italian pilot context (section 2.3).

The main findings of these different types of field research can be summarised as follows:

- Reputation systems are common features of transactional/trading sites and expert Q&A sites, but less frequently feature on community support sites.
- Conventional reputation systems are almost always based on a highly individualistic, acquisitive model which effectively commoditises "reputation" and risks hollowing out cooperation and trust at the human level. Such systems seem to be philosophically at odds with the principles cooperation and contribution to the common good inherent to a commonfare approach.
- Those experiencing PIE conditions in the target groups at the pilot sites have varied experiences and aspirations, but there are some commonalities in terms of values and relationships. In particular, relationships with the State, bureaucracy and the corporate world seemed to be widely perceived as negative or, at best, neutral through irrelevance; and qualities such as independence and dignity are highly valued.
- Social capital in the form of family and friendship ties is critical to many people's management of precarity, as is a sense of social contribution or vocation. Users of commonfare.net are as likely to be seeking affective support and a sense of community as practical help.
- In general, PIE conditions are likely to be associated with stress, anxiety and depression. We therefore need to avoid creating yet another sphere (that of online reputation) in which people can experience poverty and precarity.
- The co-design and trial of a digital currency system in a community at the Milan site showed how effective this process can be in meeting a group of users' needs; however it also raised questions about how to transfer and grow this tailor-made system to less well-defined groups with less well-defined tasks to complete and be rewarded for.

All these factors seemed to suggest that we should move away from conventional notions of individual and accumulating reputation, towards a system where reward is for interactions that contribute to the building of the commonfare. This will be particularly important given the intention to convert "reputation" (or better, commonfare contribution) metrics into digital currency. We have thus started to move away from referring to a reputation system, and instead towards the idea of a contribution system.

At the same time as this empirical research effort was under way, WP3 team members at CN-FBK explored possible mechanisms for creating and encouraging dynamics within the commonfare.net network that might lead to growth and sustainability, for example by optimizing information diffusion and opportunities to create supportive social connections. These, together with ways in which measurements of social network densities and flows might be used to measure commonfare contribution, to understand the digital currency flows and to look for instances of misbehaviour or platform manipulation/currency abuse, are presented in Chapter 3. When brought together with the findings from the empirical research, this work opens up possibilities for re-thinking activity metric and for better integrating all these functions of the platform (contribution systems, digital currency circulation and social dynamics analysis).

The key ideas emerging from all these areas of research were used to inform the creation of six personas and associated scenarios, presented in Chapter 4. These personas and scenarios will be further used for the design and associated work which will be present in the second deliverable of WP3 (D3.2).

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