

Giuseppe Lugano

***Reconciling Social and Economic Development:
the role of virtual currency in mobile social applications***

Introduction

One of the central issues of the discussion on the Information Society concerns the role that information and communication technology (ICT) has in its development. So far, ICT has been regarded as the engine of processes aiming primarily at producing continuous economic growth. However, the current challenges of globalization push for a shift towards a more sustainable model of society. More than thirty years ago, futurist Herman Kahn (1976) described (p.111) two scenarios of alternative futures based on strategies emphasizing either social or economic growth: the latter would have brought man to “*rapidly depleting the earth’s food, energy and mineral resources, and even running out of space for getting rid of pollution products. [...] most of these problems will not arise in catastrophic form until early in the next century [...] We must change our priorities. In particular, market demand is not the same as need; GNP is not wealth; high technology is not the same as good life*”. Kahn’s call for a shift from economic to social priorities requires action in all domains: mobile social technologies can provide a valuable contribution in this direction, enabling citizens to self-organize, produce and share resources. From the perspective of ICT design this vision corresponds to the goal of investigating suitable platforms and mechanisms supporting everyday social interactions that exploit the networked shape of social structure (Wellman et al., 2003), acknowledge the individualization process of society (Bauman, 2001; Beck and Beck-Gernsheim, 2002) and the liberalization of individual sociability (Fortunati, 2002). Therefore, ICT shall promote a new form of cohesion based on voluntary participation and contribution in social networks.

The relevance of social software in everyday life indicates that the Internet already provides some tools to self-organized communities. On the contrary, mobile devices are still limited in this sense, although walkie-talkies, their true ancestors, offered native group support and public conversations. Surprisingly, the basic and most popular mobile applications, phone calls and text messaging, have been designed only for interpersonal communication. Smartmobs, the mass mobilizations through mobile communication that Rheingold (2002) describes are not interactive, as they usually rely on the forwarding of text messages. As existing services do not scale beyond the small social group (Ling, 2004), it is worth to explore the design requirements for applications enabling mobile social networking. Modern mobile devices represent the ideal technological platform for self-

organizing and coordinating social action in real time and at a large scale: with the turn of the millennium, Smartphones and converging networks transformed mobile phones from communication media to portable multimedia computers. These technical advances offer a unique opportunity to transform mobile devices into powerful tools for social change. Mobile communication research shows phone calls and text messaging have already had a profound impact on society (Katz and Aakhus, 2002; Rheingold, 2002; Fortunati, 2002; Ling, 2004). Tools supporting self-organized communities would empower citizens at an unprecedented scale; this situation could be either considered as an asset for sustainability or as a threat to institutional stability, depending on the governments' willingness in realizing progress investing in the formation of civic-minded citizens.

The ideal candidate platform is Mobile Social Software (MoSoSo), a class of mobile applications whose scope is to support social interaction among interconnected individuals by exploiting the potential of the convergence between media, computer and mobile networks (Lugano, 2007). A key issue of MoSoSo design regards the inclusion of mechanisms to generate revenues as one of the side effects of choices based on social knowledge. A viable approach is to ground MoSoSo design on the network theory of social capital (Lin, 2001). The crucial aspect of this framework is to model properly the processes related to social capital, regarded as resources embedded in the social structure that can be accessed and/or mobilized by social actors for purposive actions. Firstly, the solution needs to address the problem of identifying and assessing the value of possessed and accessible resources. And secondly, to investigate the users' motivation in sharing resources; this issue has been discussed in the context of cooperation in peer-to-peer (p2p) networks from the perspective of computational resources (cpu, storage, network bandwidth). Some approaches introduced the concept of virtual currency (Buttayán and Hubaux, 2002; Zhong et al., 2003; Irwin et al. 2005), which proved to be a suitable mechanism stimulating cooperative behavior. Virtual currency, regarded as unit of exchange for transactions conducted in online gaming environments, is also a building block of virtual economies (Castronova, 2005). In this study, my main goal is to investigate the role of virtual currency systems in MoSoSo, presenting a scenario of application and analyzing its socio-technical design implications.

MoSoSo, virtual currency and environmental friendliness: a scenario

In 1987, Finnish futurist Marja-Liisa Viherä ran for the first time the Communication Camp experience, a laboratory for social innovation (Lugano et al., 2006a). The project, supported by Finnish institutions and enterprises, aimed at studying how to realize the vision of a sustainable model of future society driven by self-organized networks of citizens,

empowered by the synergy between state-of-the-art technology and advanced communication capabilities (Viherä, 1999). One of the social innovations was the use of a fictional currency, the Lecu, earned by means of activities useful to the whole community, such as cleaning or helping others. A key issue concerns which activities to reward and with how many credits. Lecus, used as a unit of exchange to purchase goods and services, relied on a community bank, which distributed the currency and maintained a public database of credits earned by campers. The publicly displayed rankings of the most active campers represented an additional motivation to be more active and acquire reputation in the community.

Similarly, existing social practices can be enhanced by introducing a form of virtual currency at a wider scale manageable with a mobile social application; some countries adopted environmental-friendly habits, such as the fee charged by supermarkets for each sold bottle and can. When customers return items at the recycling point, they draw a receipt for getting the deposit back. Each bottle and can is regarded as a resource with an economic value, typically from 10 to 20 Euro-cents. The monetary reward is a means to reconcile citizens' self-interest and public good. Reputation acquired with virtual currency could represent an alternative or a complement to monetary rewards; the existing bottle and can recycling system could be enhanced as follows: each time that some items are returned at the recycling point, the receipt used to obtain the deposit back could also include a 2D barcode with the amount of virtual credits. Through the phone's camera, the MoSoSo application could process the information and add credits to the user's "virtual wallet". At the same time, the application would update the user profile with information about his "environmental activity". The usefulness of such feature is enabled by the sharing action that makes possible to compile user rankings. In addition to the motivation of standing out in the social group, the highest performances could be awarded by local institutions. This approach is not new, as it is commonly adopted by shops rewarding customers with discounts and special offers based on credits accumulated on their loyalty cards. The main novelty of the suggested approach consists in shifting from a consumer to a sustainable orientation, regarding users as active citizens and innovators rather than passive customers. With some imagination, many other existing practices could be improved through MoSoSo letting citizens counterbalance the negative forces of globalization and supplementing declining welfare states with an emerging welfare society. A flexible MoSoSo application could be used as a standard platform for active citizenship, "*getting citizens on board*" (Reding, 2006).

Virtual currency systems and MoSoSo design

MoSoSo is a class of mobile applications that emerged with the process of digital convergence (Lugano, 2007). The design model for MoSoSo suggested by Lugano et al. (2006b) includes three main levels, corresponding to the individual, social and interface dimensions (Fig.1). A design reconciling the social and economic aspects should support multiple user roles, such as consumer or producer of resources; in addition, social interactions should acknowledge both self-interest and communitarian orientation. Finally, trade-offs in the mobile user experience should be taken into account, allowing for instance either a fully automatic or manual approach.

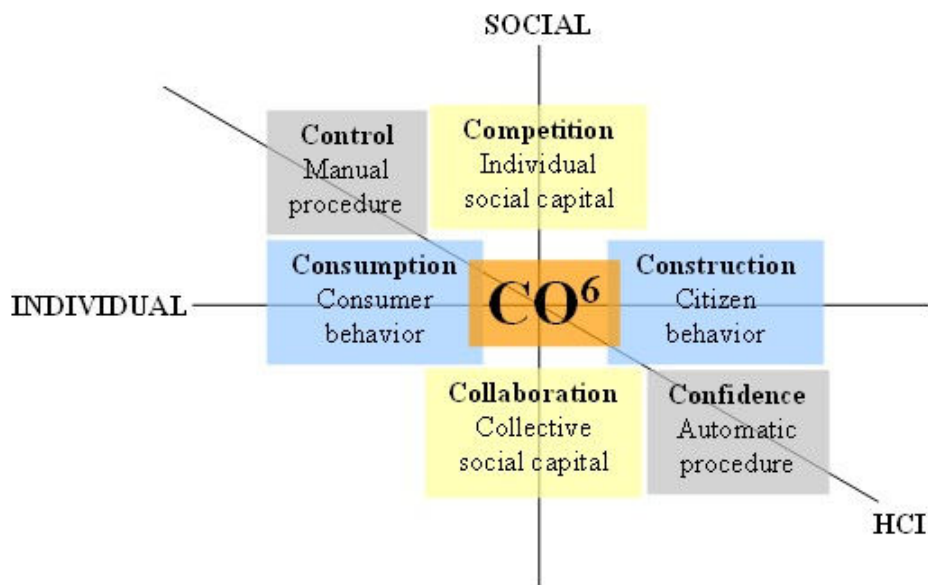


Fig.1: dimensions of MoSoSo design

Technically, the realization of these levels requires implementing the concepts of user profile and mobile social network, the interaction space based on the flow of resources between interconnected users. Although this territory shares some characteristics with virtual worlds, it is strongly related to real contexts and provides the user with an augmented view of reality to be experienced through the mobile interface. The mobile social network has a self-organizing configuration: its nodes come and go and do not rely on the activity of any central authority. On the other hand, nodes contribute differently to the evolution of the social structure through their peculiar properties, such as network size or position. As Lin (2001) observes, these parameters play a key role in accessing social capital: for instance, some resources are associated to the position that the individual occupy in the hierarchy. However, mobile social networks do not have a rigid hierarchical structure, as their shape change according to the

user needs and actions. The dynamic reconfiguration of the user profiles active in a mobile social network is managed by the social layer, which process large streams of contextual data, provided by sensors, by other users or observed directly by the device as behavioral and interactional patterns. The core of this layer is represented by social algorithms, procedures constantly updating the data structures and providing knowledge to the upper layer, which handles the mobile user experience. The reliability of the results follows some trade-offs, such as the choice between a fully-automated, semi-automated and manual approach.

The concept of virtual currency in MoSoSo is crucial as it provides the opportunity of re-creating and extending the economic model of virtual worlds (Castronova, 2005) to the real world taking into account citizens' everyday life rather than avatars' in-game behavior. Technically, each layer of the suggested model is involved: the user profile contains the "*virtual wallet*", the place where virtual currency is stored and secured. The implementation of this concept can follow the guidelines suggested by the p2p literature. Accumulation of virtual currency is managed by a group of social algorithms constantly updating the capital possessed and accessible by the user, modeled as personal and social resources. According to Lin (2001), the former includes human capital, regarded as the set of all possessed material or symbolic goods. The latter group is related to social capital, resources available through network connections. As MoSoSo's exploits social connectivity, the latter group has a higher potential usefulness than the former, which counts only on relying on personal resources. In this context, free-rider behavior is conceived as adding social connections to exploit others' resources and not contributing with one's own resources. Mobile p2p literature based on virtual currency approaches is anchored to the technological perspective, as resources consist of network bandwidth, storage or energy power and cooperation is regarded as forwarding of data packets to the other nodes. These approaches could be analyzed also in terms of personal and social resources: although at low level all types of resources correspond to long lists of 0s and 1s, their use value as a video-clip or a business card is different and highly subjective.

In order to assign proper values, or prices, in terms of virtual currency, it is necessary to preliminarily identify which information can be regarded as a resource. This problem is solved regarding all fields of the user profile as a resource. Even the mobile social network can be included, as the disclosure of the list of contacts implies the potential access to their resources. The price of the resource can be assessed using real-world economic models, for instance considering the amount of similar resources that are available. In addition or as an alternative to this approach, other variables can be taken into account in the transaction, such as the strength of the relationship, reputation, network position and network size. An important trade-off concerns which resources to disclose, with whom and in

which contexts. This purpose should be handled by a privacy management mechanism, regulating the level of visibility of a resource, which can be public, private or restricted only to a limited number of persons. The associations between resources and users should continuously adjust to the situation, for instance through a semi-automated mechanism taking into account user-psychological and social variables (Lugano and Saariluoma, 2007).

REFERENCES

- Bauman, Z. (2001) *The Individualized Society*. Cambridge: Polity.
- Beck, U. & Beck-Gernsheim, E. (2002) *Individualization: Institutionalized Individualism and its Social and Political Consequences*. London: Sage.
- Buttayán, L., Hubaux, J. (2002) Stimulating cooperation in self-organizing mobile ad-hoc networks, *ACM Journal for Mobile Networks (MONET)*, special issue on mobile ad-hoc networks.
- Castronova, E. (2005) *Synthetic worlds: the business and culture of online games*. University of Chicago press.
- Fortunati, L. (2002). The mobile phone: Towards new categories and social relations, *Information, Communication & Society*, 5, 4, pp. 513–528.
- Irwin, D., Chase, J., Grit, L., Yumerefendi, A. (2005) *Self-recharging virtual currency*, In: Proceedings of the ACM SIGCOMM'05 Workshop, Philadelphia (USA).
- Kahn, H. (1976) *Two characteristic current views on technological and economic growth*. In: Leinwand, G. (Ed) *The future – can we design society's future or are we helpless slaves of the past?*. New York: Pocket Books.
- Katz, J.E., Aakhus, (2002) *Perpetual contact: mobile communication, private talk, public performance*, Cambridge University Press.
- Lin, N. (2001) *Social capital: a theory of social structure and action*. Cambridge University Press.
- Ling, R. (2004) *The mobile connection: the cell phone's impact on society*, Morgan Kaufmann.
- Lugano, G., Viherä, M-L., Viukari, L. (2006a) *Towards a network-based civil society: the communications camp paradigm*. In: Proceedings of ICALT 2006, Kerkrada (Holland), pp.1012-1013.

Lugano, G., Kyppö, J., Saariluoma, P. (2006b) *Designing people's interconnections in mobile social networks*. In: Proceedings of InScit 2006, Merida (Spain), pp. 500-504.

Lugano, G. (2007) *Mobile social software: definition, scope and applications*. In: Proceedings of eChallenges 2007, The Hague (Holland), pp. 1434-1441.

Lugano, G., Saariluoma, P. (2007) *To share or not to share: supporting the user decision in mobile social software applications*. In: Proceedings of the UM 2007 conference, Corfu (Greece), pp. 440-444.

Reding, V. (2006) *Strengthening the European Information Society: from talk to action*, i2010 conference "Towards a ubiquitous European Information Society", Helsinki (Finland).

Rheingold, H. (2002) *Smartmobs – the next social revolution*, Basic Books.

Viherä, M.-L. (1999) *People and Information Society. The Citizens' Communication Skills and the Opening of New Prospects for the Civil Society*, Ph.d. Dissertation, Turku School of Economics, Series A-1:1999, 1999.

Wellman, B., Quaan-Haase, A., Boase, J., Chen, W., Hampton, K., Isla de Diaz, I., Miyata, K. (2003) The social affordances of the Internet for networked individualism, *JCMC*, 8, 3.

Zhong, S., Chen, J., Yang, Y.R. (2003) *Sprite: a simple, cheat-proof, credit-based system for mobile ad-hoc networks*, In: Proceedings of IEEE Infocom 2003, San Francisco (USA).