Designing economic interactions

M. Six Silberman[*]

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Abstract

1 Objective

Mankoff et al. [1], following Blevis [2], suggest that "sustainability can and should be a central focus of [the field of human computer] interaction." I wish here to assert that the converse is also true: human-computer interaction ought to be a primary concern for anyone interested in bringing about 'transitions to sustainability' at any scale. Specifically, I wish to explore the role played by informatic systems in mediating microeconomic decision making and the potential for systems thus implicated to facilitate the development of sustainable practices by the introduction of novel economic logics.

2 Sustainability and approaches to unsustainability

Serageldin [3] observes that a definition of sustainability predicated on an unambiguous definition of "needs" (as in the Brundtland Report [4]) is "impossible to operationalize." An alternative definition [5] views sustainability as opportunity: "Sustainability is to leave future generations with as many opportunities as we ourselves had, if not more." This 'opportunity' is measured in terms of capital stock of various kinds (produced assets, natural capital, human capital, and social capital), and it is understood that "the idea of depleting capital to create an income stream is unacceptable, because income based on capital depletion is unsustainable." [6] This definition allows us to ask rigorously whether a given set of practices 'is sustainable' or not, and it has become increasingly clear in the last several decades that the answer to this question, when formulated on a global scale, is 'no.' As one indicator, consider one finding of the Millennium Ecosystem Assessment [7], which notes that recent "net gains in human well-being...have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of

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[*]Arts Computation Engineering, University of California, Irvine. six@factorialthree.org.

poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems."

There are at least three reasons to suspect that existing sociotechnical regimes and logics are inadequate to the task to facilitating a transition to sustainability.

First: conventional assumptions about continued economic growth that undergird policymaking in most 'developed' nations lead to a high discount rate; that is, future benefits are discounted heavily against current costs [8].

Second: nonexclusive use of the coercive power that constitutes the state's single unique resource is available for purchase by groups that are sufficiently well-organized. Stigler [9] argues that in the United States, large firms tend to be somewhat better organized than small firms and much better organized than individuals, and therefore that large firms tend to be able to "utilize the state" to procure regulation to improve their profitability at a cost to citizens.

Third: existing sociotechnical regimes rely heavily on the market mechanism to allocate resources. For the market to allocate resources efficiently, however, the classical assumption of perfect information must be satisfied. Greenwald and Stiglitz [10] have shown that this assumption is not satisfied in real economies, that externalities are pervasive, and that markets alone do not yield Pareto-efficient outcomes.

The adoption of a high discount rate in both policymaking and private sector decision-making leads to an inability to plan beyond the short term. The ability of large firms to organize collectively to purchase regulation that increases their short-term profitability at the expense of poorly organized citizens impedes regulators' ability to regulate, and tends to align government's interests with the short-term interests of the private sector. Finally, exclusive reliance on the market mechanism as a means for allocating resources leads to an inability to develop and test new logics of allocating resources that could facilitate a transition to sustainability.

3   Notes toward an experimental political economy

ICTs provide a platform for experimentation with novel logics for organizing collective action and allocating resources (under which I include 'labor', 'attention', and 'time'). In the 'virtual' organization, information architecture is enterprise architecture, and interaction design conditions and constrains the relations of individuals, processes, technologies, and techniques within the organization (and their relations to others outside it). Similarly, in the 'virtual' economy, information architecture is economic architecture and interaction design is the design of economic decision-making.[1] To the extent that barriers to practicing information architecture and interaction design have fallen with the costs of the requisite hardware and software tools and the complexity of operating them, we find ourselves presented with a new

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[1]I use 'virtual' to indicate relations in which the primary activity is the manipulation of abstract representations rather than physical objects, and 'presence' is understood not physically but in a fashion mediated by complex technosocial infrastructures.

opportunity: the opportunity to design systems and logics for shaping economic decision making.

Here I take 'economic decisions' to indicate decisions pertaining to the allocation of resources. I will briefly examine one case in which a shared information environment has acted as a platform for the deployment of non-financial logics in economic decision making. In both cases the logic introduced is a logic of social accountability. This is a substantive shift away from the predominant logic in contemporary economic life, which is financial: in most economic decision making, the answer to the question 'To whom should I give this head of cabbage?' is, 'Whoever will give you the most money for it.' The introduction of other, primarily social, considerations into economic decision making between strangers is a novel phenomenon, facilitated by ICTs and the increased accessibility of economic design as a terrain of practice.

couchsurfing.com is a web application conceived and designed to provide free accommodations to travelers. The site describes three "safety features" that are architected into the system: "verification [...] gives members the option to confirm their identity and physical location"; "references" are comments about "CouchSurfing experiences" that users (generically called "CouchSurfers", or, to distinguish between a user requesting a couch and users offering them in any particular interaction, "surfers" and "hosts") leave on one another's profiles; and "vouches", which function as somewhat complex indicators of a historical, recursively derived trust that bears a resemblance simultaneously to Arendt's notion of *auctoritas* [15]; the mechanism by which money is created by a central banking system and loaned to other banks; and the certificate-authority model in public key infrastructure.

Verification (of name and physical location) is an external process that involves the CouchSurfer's credit card. References and vouches are internal interactions designed to communicate trust between CouchSurfers. From an architectural perspective, references are similar to blog comments or wall posts in a social networking site. The animating impulse *behind* references, however, is different: CouchSurfers are encouraged to use references "to communicate to the general CouchSurfing population about the kind of experiences they have had with a host or guest in an honest and respectful way" [12]. There is a lengthy FAQ/how-to page on the site dedicated to a discussion of what constitutes a good reference, when it is appropriate to write a negative reference, when not to leave a reference, and so on [12]. The set of references left on a surfer's profile constitutes a qualitative historical record that others can use to decide whether or not to host or stay with them. This historical record and the continued practice of its maintenance by all CouchSurfers serves as one means for ensuring adherence to stated community norms.

The vouching system is more sophisticated. It acts as a system of historically and recursively derived trustworthiness:

> When someone is vouched for, it signifies an elevated level of trust in the community. The only way to become vouched for is to be extremely trusted by someone who has been vouched for by three other members. You must know each other in the real world. If you are a trusted friend, the vouched member can vouch for you. Once you have been vouched for three times, you can in turn vouch for

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members you sincerely believe to be trustworthy. [13]

One may ask: who were the first three 'vouching authorities'?

> In version 2.0 [after the loss of the entire CouchSurfing database in June 2006], we had to start the vouching system over from scratch and the first people to be vouched for are the CouchSurfing core team of Admins. They were able to vouch for people that they knew well and felt were trustworthy. From there it branched out into the community. [13]

This problematic but pragmatic decision highlights the intersection of political power with technical access and proficiency within communities whose interactions are substantially mediated by technical systems. The decision carries strong consequences: the trust graph is tree-like (hierarchical and rooted; the minimal trust graph *is* a tree) rather than decentralized, so if an intermediate node in the tree is removed (for example, for a breach of trust), any number of its 'child' nodes can find themselves suddenly bereft of sufficient derived trust. This paroxysm can cascade all the way down to the 'leaves', disabling the system of its ability to verify trustworthiness reliably.[2] In a more decentralized model—like that in PGP v2's 'web of trust', for example—a cascading failure is not as likely to result from a random removal, as the macro-scale graph is a power network [14].

While verifications provide an indication of external 'validity' of some sort, and references provide a richly textured qualitative history of micro-scale interactions, the vouching system positions each surfer in relation to a boolean metric ('vouched for? yes/no'), the history and authority of which is derived ultimately from the "core team" of CouchSurfing administrators. Arendt writes:

> The word *auctoritas* derives from the verb *augere*, "augment," and what authority or those in authority constantly augment is the foundation. Those endowed with authority were the elders, the Senate or the *patres*, who had obtained it by descent and by transmission (tradition) from those who had laid the foundations for all things to come, the ancestors, whom the Romans therefore called the *maiores*. The authority of the living was always derivative, depending upon the *auctores imperii Romani conditoresque*, as Pliny puts it, upon the authority of the founders, who no longer were among the living. Authority, in contradistinction to power (*potestas*), had its roots in the past, but this past was no less present in the actual life of the city than the power and strength of the living. [15] (121-22)

Auctoritas in CouchSurfing is conferred, denied, verified, and enacted through the user interface, and recorded and preserved in the database 'underneath' it. The technical details of interface and database thus shape the political and economic life of the network; that is, inform, constrain, and otherwise shape decisions about the allocation of material resources with tangible and immediate effects on lived experience and well-being.

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[2]Note that this is exactly the kind of cascading failure that has brought the global financial system to the brink of collapse in recent months, and has impelled the various central banks to 'inject' capital (i.e., 'trust') *directly* into banks at lower levels in the tree to whom they would not usually lend.

4   Some research trajectories

Greenfield [16], in discussing ubiquitous computing systems, notes that "many issues are decided at the level of architecture, and therefore do not admit any substantive recourse in real time." The same is true of many web applications; further, it is not always immediately obvious when 'decisions' are made, or what constitutes a decision. It is well known that CouchSurfers who have been vouched for, for example, are displayed more prominently in search results; the details of this ranking are unknown, however. Even if the codebase were publicly accessible (as in open source projects), the implementation would remain a point of political contestation. The economic and political implications of interface design in these contexts suggest the importance of resisting design discourses that urge designers to make interfaces 'intuitive' and 'user-friendly'—i.e., to hide the messy technical details from the 'user' (see e.g., [17] for a coherent analysis). One research trajectory that departs from these observations takes as its task the design of systems which are 'accountable' to the human 'subjects' whose interactions are shaped by their underlying (programmed) logics.

Parallel to this trajectory is one which asks what new design paradigms like agile development, values-centered design, and participatory design might look like when conceived not merely as approaches to designing products but as approaches to designing processes, enterprise architectures, and ultimately economic logics and political economies. Irani's [18] work collecting statements from workers in Amazon's Mechanical Turk system should dispel any fantasy that power relations cannot be coded into interactions or information architectures.

A third trajectory takes as its task the construction of new informatic systems for managing the distribution and allocation of resources (including labor) outside of existing organizational forms (the firm, the state, the university, the union). Benkler [19], Mehta [20], and others chronicle the emergence of voluntarism as a scalable economic logic in certain types of work. The emergence of this logic has had substantial implications for the nonprofit sector and for party-based political action, especially in the United States, but it remains to be seen whether it can become self-reproducing. Self-reproduction being the necessary condition for a new resource allocation logic to serve as an alternative to existing logics that reinforce sociotechnical regimes tied to unsustainable practices and accountable to rapidly obsolescing organizational forms, the question for designers of economic interactions is whether such a logic can be developed and deployed. A practice-oriented research program in experimental political economy will seek to answer this question.

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