Norms, infrastructures, goals, and needs

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ABSTRACT

Many norms influence our everyday decisions. For most of us, social norms unrelated to environmental concerns are stronger influences than environmentally related norms. People who consistently prioritize environmental concerns in their everyday lives risk social censure. For the processes leading to environmental damage to be substantively addressed, it must be possible for many people to consistently prioritize environmental concerns in everyday life while remaining effective social actors. In this note I explore how information systems designers might support a norm of *sufficiency* in place of the now-dominant 'macro' norm of indefinite economic growth and the corresponding 'micro' norm of ceaseless personal productivity.

INTRODUCTION

Why have we come to this conference? Many of us have flown here despite our interests in environmental issues and our awareness of air travel's disproportionate contribution to global climate destabilization. We have come to see old friends, meet people, have good conversations, and hear about new ideas. Some of us have come to explore a new city. Some of us are looking for jobs; some for new collaborators. We have come, roughly, because we are researchers, and going to conferences is what researchers *do*. Research is a series of conversations, and the best conversations are face-to-face. It's possible that iterated conversations of exactly this nature are what make social change possible. But few of us, I suspect, have come here because we are deeply convinced that, on balance, our being here will yield substantive progress in addressing environmental issues. We have come because if we didn't come, we wouldn't be doing our jobs as researchers properly. If we stopped going to conferences entirely, we might not get tenure or promotion. We might lose our jobs. We might lose our homes. What would our families do, some of whom depend on us *not* losing our jobs? What would our friends say? Our parents and siblings? The mentors and colleagues who helped us get here?

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So we have come. We have come despite our interests in environmental issues and our awareness that in coming here we are in all likelihood acting against those interests. We hope that something good will come out of this meeting, something that will some day make up for our share of the carbon dioxide spewed into the sky by the airliner we rode in on. But I doubt it will be controversial to say that for most of us, in coming here we are influenced mainly by social norms that have little to do with environmental issues.

This is not an indictment or criticism. I am here too, after all. There are costs associated with ignoring social norms. These are relatively short-term, easily imagined, and often quite personal. In contrast, the costs of ecologically unsustainable practices are relatively long term, not easily imagined, and generally collective. As a result we tend to follow norms, even when we know they are at odds with our environmental concerns.

I propose that to understand how to help us all escape the unsustainable practices we sometimes appear trapped in, we might do well to investigate norms. How do they arise? How are they resisted? How do they change?

NORMS AND INFRASTRUCTURE

In this note I will limit my exploration of these questions to the relation between norms and technology, with a particular view to the implications of this relationship for environmental issues.[1] What is normal or expected is constrained by what is possible, and further by what is reasonable. Technological affordances—or, perhaps more accurately, personal and collective capabilities technologically augmented—are major factors in determining what is possible and reasonable.

For example, if I have a sick friend 60 miles away, nobody would be surprised by my visiting her, given that individually I have access to a car and collectively we maintain a highway system designed for us all to drive cars on. Without access to a car—supposing, say, I have only a bicycle, and public

[1] In this note I use the phrases "environmental issues," "environmental damage," and "environmental concerns." These denote broadly and roughly the phenomena associated with the phrase "global environmental change"—e.g., climate destabilization, sea level rise, degradation of ecosystems and their services, biodiversity loss, scarce or inequitably distributed freshwater and food, deforestation, desertification, oceanic acidification, peaking oil production, and rising energy costs. There is too much literature on these topics to cite here, but broadly relevant scientific overviews of some of these topics can be found in [1], [2], [3], and [4], and in the journal *Global Environmental Change: Human and Policy Dimensions*.

transportation along the route is out of my budget, ineffective, or nonexistent—it's still possible for me to travel 60 miles, but it's a rather more demanding proposition, and therefore less reasonable. Few of us expect our friends to travel 60 miles by bicycle to help us in times of need, but I doubt many of us would hesitate to make the trip by car, or, perhaps more importantly, to feel upset if a close friend declined to drive 60 miles for us on environmental grounds.

Especially relevant to norms, via our collective ideas about what is reasonable, is technology that is taken for granted—that is, infrastructure.[2] Suppose the next time you told somebody, "Email it to me," they were to reply, "I don't do email." You might stare at them blankly for a few moments. It's not really reasonable for any of us to not "do email"—many of us are employed by institutions that in fact require us to maintain access to an email inbox and check it regularly. In general, part of our difficulty in shifting away from ecologically unsustainable practices is that many of us secure our livelihoods by enacting professional roles that, normally performed, require use of ecologically damaging infrastructures.

One common response to this predicament is to accept that the infrastructures are required and to try to change them to be less ecologically damaging. Because infrastructures are modular and their components have different structural characteristics, there are easier and more difficult ways to change an infrastructure. (For example, the properties of the cars on a road network may be more easily changed than the locations of the roads.) On observing that the existence of environmental limits suggests we ought to use fewer resources in our everyday activities, one might suggest replacing the more easily replaced components of an infrastructure with components that perform the same function with fewer inputs; for example, replacing gas-guzzling cars with fuel-efficient cars, or regular toilets with dual-flush toilets.

This is reasonable but is complicated by "rebound effects."[3] This term describes a situation in which increased efficiency of production or operation lowers the price of a good or service, thereby increasing demand for that good or service or another and offsetting the reduction in total resource use that would otherwise have followed the increase in efficiency.[4]

The proximate cause of a rebound effect is the increase in production or operation efficiency. But its final cause is only visible if we enlarge the scope of analysis.

GOALS: INDEFINITE GROWTH VERSUS SUFFICIENCY

Consider the pool game 8-ball, in which one player attempts to sink all the striped balls (and then the 8-ball) before the other player sinks all the solid color balls (and the 8-ball). Each player is constrained to strike the cue ball with the cue. The cue ball must strike a ball "belonging" to the active player before hitting any balls belonging to the other player, or the active player will suffer a penalty. This set of rules, in light of the geomtery of the pool table, the balls, and the cue, yields particular dynamics and a particular gameplay experience. Now suppose we change the goal of the game while leaving the other rules fixed: suppose each player must sink the *other* player's balls while still first striking their own with the cue ball. That is, the "striped" player must strike the striped balls with the cue ball, but their goal is to sink all the solid color balls (and then the 8-ball). The dynamics of this game are utterly different to those of traditional 8-ball. In fact, it is fundamentally a different game, despite the fact that the players, equipment, and rules remain unchanged.

This admittedly somewhat tortured example illustrates the importance of goals in explaining the behavior of systems and their components.[5] In a "systems view" on economic activity, the final cause of a rebound effect is the dominance of the norm of growth—the idea that the quantity of economic activity should grow indefinitely. This norm has been widely criticized in light of environmental concerns.[6] Growth without limit is not sustainable in a world characterized by finite nonrenewable resources, finite capacity to absorb waste, and finite regeneration rates for renewable resources. "Growth for the sake of growth," observed the environmental writer Edward Abbey, "is the economic ideology of the cancer cell."

The "micro" counterpart to the norm of indefinite economic growth is the "micro" norm of personal productivity, which has come in for similar criticism—appropriately enough, on

[2] I confess here to using the term "infrastructure" to denote, roughly, "those tools which are fairly transparent for most people we know about," but in following the caution provided by Star and Ruhleder [6] (pp. 113-114) hasten to confirm that my interpretation of what counts as infrastructure is exactly relational; one person's or group's taken-for-granted infrastructure is another's object of analysis or even struggle. Gregory Bateson's injunction that "what can be studied is always a relationship or an infinite regress of relationships, never a 'thing'" appears as a central, recurring reminder in now-canonical work by Leigh Star on the study of infrastructure in sociotechnical systems; this instruction shapes my thinking on infrastructure. Star's work has foregrounded a variety of "dimensions" of infrastructure, in particular its embeddedness, transparency, and scope; its connection with membership in particular communities of practice and their conventions; its embodiment of standards; the constraint of its development by what already exists; its tendency to become visible upon breakdown; and its tendency to change incrementally and modularly rather than rapidly and globally (e.g., [6], [7]). I see this perspective as consistent with the notion of nested open systems "without absolute boundary on a priori definition" ([6], p. 113), a resemblance that Star herself alluded to ([7], n. 1, p. 389).

[3] I have written about rebound effects in sustainable HCI elsewhere [8], [9], [10]; the text that follows is adapted from a note prepared with Sam Kaufman for a previous CHI workshop [11].

[4] Rebound can manifest directly as an "income effect," in which the increased efficiency of a particular device drives down the cost of obtaining some amount of functionality (or, in economic terms, achieving some utility) from the device, encouraging the user to use it more. For example, the increased fuel efficiency of hybrid cars may encourage more driving (a 2009 insurance industry study found this to be the case [12]), or an increase in refrigerator efficiency may lead to an increase in the number of refrigerators or their size [13]. Rebound can also manifest indirectly as a "secondary effect," in which household consumption of *other* goods and services increases as a result of increased real income or purchasing power [14]. For example, a device that increases a household's awareness of energy consumption and thus saves the household money frees up that money for other purchases, which may occasion greenhouse gas emissions.

[5] For more on goals in systems, see [15] and [16] (pp. 161-162).

[6] The criticisms are too numerous to cite, but for typical formulations from ecological economics, from which the perspective developed here has drawn much inspiration, see [17] and [18].

the grounds of its unsustainability in light of the limits of the human organism.

An investigation into the historical origins of these norms is omitted here, although the interested reader could do worse than begin with the sociologist Max Weber's classic study *The Protestant Ethic and the Spirit of Capitalism*. It seems reasonable in any case to propose that a norm of *sufficiency* is more appropriate to a culture that has come into full view of the ecological limits to its growth than the norms of indefinite growth and productivity.

While the norm of growth implies that the quantity of economic activity should grow and the norm of productivity implies that time is best spent "productively" (that is, roughly speaking, on tasks contributing to economic growth) and that the highest goal of technology design is to increase users' productive output and efficiency, the norm of sufficiency implies that economic activity ought not to increase without limit, for its own sake, but only so long as it serves the fulfillment of human needs.

Similarly, while the norms of growth and productivity imply that our expenses should expand to consume (or exceed) our incomes, and that our incomes and therefore our expenses should be as large as possible, the norm of sufficiency proposes that we need not maximize our incomes and our consumption but that consumption is not an end in itself but a means to the greater end of fulfillment of human needs, and further that earning income is only one means among several to the end of consumption.

The ambiguity of the term "needs" has troubled sustainability discourse since the definition of sustainable development as "meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs" [19]. In 1996, for example, Ismail Serageldin, then VP for Environmentally and Socially Sustainble Development at the World Bank, wrote, "this definition is philosophically attractive but raises difficult operational questions. The meaning of 'needs' is fairly clear for the poor and starving, but what does it mean for a family that already has two cars, three televisions, and two VCRs? And yet it is precisely this latter type of family that will consume more than 80 percent of the world's income this year" [20]. I omit here a discussion of how to operationalize the term "sustainability," but in the context of the norm of sufficiency I propose that we focus on those needs that are most important. This does not mean only survival needs; i.e., food and shelter. For example, the "capability approach" to human development elaborated by Martha Nussbaum and Amartya Sen proposes that certain human capabilities are central. Their approach develops the categories of life; bodily health; bodily integrity; senses, imagination, and thought; emotions; practical reason; affiliation; relationships with other species; play; and control over one's environment.[7] The economist Manfred Max-Neef proposed a list of "fundamental human needs" that resonates well with the capability approach.[8] The particular list and its detailed interpretation is not essential for our discussion; the norm of sufficiency merely proposes that the proper aim of individual and collective life is the fulfillment of finite, broadly relevant (if not universal) *needs* in favor of culturally idiosyncratic, arbitrarily extensible *wants*.

Some support for a norm of sufficiency exists in industrialized nations, and has at least since the 1960s,[9] and the contemporary economic climate and the growing awareness of ecological limts have no doubt contributed to its spread. But it is far from dominant. One way technologists might contribute to substantively addressing environmental issues is by supporting the growth (ironic though it may sound) of a norm of sufficiency.

The plausible role of information technology in supporting uptake of a norm of sufficiency may seem limited, especially in view of how integral information technologies have been in the proliferation of "busyness" and the support of the norms of growth and productivity.[10] Further, the production, maintenance, and disposal of the components of our present information infrastructures occasion, directly and indirectly, great environmental damage. But at least one clear role for information systems design, broadly conceived, can be seen if we consider the everyday problems faced by someone adopting the norm of sufficiency.

SUPPORTING SUFFICIENCY: MAPPING ALTERNATIVES

The norm of sufficiency suggests that we use only what we need. This can mean many things. For example, if we need to eat something, we can choose between locally grown food and food transported to us over thousands of miles. In choosing locally grown food we choose to use less oil. If we need clothing we can buy used clothing, or new clothing we expect to last a long time, over new clothing designed without longevity in mind. In making such a choice we choose to use fewer materials. If we need a ladder, we can buy one or borrow one. In choosing to borrow one we contribute to an overall reduction in the use of materials, and contribute to sharing practices and the valuation of long-lived tools. If we need to go somewhere, we can drive alone or carpool. In carpooling we use less oil. Because many of us are not accustomed to making such choices, we may not know how. Few tools yet exist to assist us. For example, we may not know where to find used clothing that fits our requirements; after fruitless hours at the thrift store, we may give up and go to a department store. We may wish to borrow a ladder, but not know who among our neighbors has one they are willing to share. We may wish to purchase locally grown food, but discover that our local farmers' market is only open while we are at work. We may wish to offer other people the use of empty

[7] The literature on the capability approach is large. For an introduction see [22]. The foundational text may be [23]; more recently, see, e.g., [24] and the *Journal of Human Development and Capabilities*.

[8] Max-Neef's list: subsistence, protection, affection, understanding, participation, idleness, creation, identity, and freedom [25].

[9] The textual touchstone for this norm in the contemporary west may be Duane Elgin's 1981 book *Voluntary Simplicity*. Of course, the norm has existed in human cultures, including subcultures in the west, for thousands of years.

[10] David Levy has produced a body of academic work on this topic; e.g., [26], [27], [28]; in the popular press see, e.g., [29].

seats in our vehicle, but not know to whom the offer should be made, or how.

In view of these information gaps, information systems that represent available resources can help sufficiency-oriented people to develop practices in greater accord with the norm of sufficiency. Lists, maps, or other representations of farmers' markets (as well as neighbors' gardens and trees on public land), used clothes, tools, and extra seats in cars all fall into this category. Some systems in this vein already exist (e.g., SourceMap [30]; OneBusAway [31]; GoodGuide; product certifications like those operated by the Forest Stewardship Council and the Fairtrade Labelling Organizations; Craigslist's rideshare boards and rideshare applications like Zimride and Ridejoy), but few are oriented toward helping users reduce their overall consumption of new products. Growth- and productivity-oriented users can of course use such representations to continue increasing economic activity without attending too assiduously to the relation of that activity to human needs. But these representations can play a substantial role in a broad and heterogeneously mediated discourse on sufficiency, facilitating sharing, the development of robust local economies, and critical reflection on the question of what's truly essential in life.

CONCLUSION

Expanding the scope of analysis to consider the role of infrastructure in shaping norms suggests that we can collectively back away from the norm of indefinite economic growth in stages. At present, we can use the information technologies available to us to attempt to reduce our environmental impacts, while bearing in mind that those technologies themselves occasion substantial environmental damage. As the norm of sufficiency gains traction, and as the collaboration enabled by present information technologies allows us to mitigate the damage we cause through other activities, the question of how those technologies themselves can be rearranged in view of the norm of sufficiency may come to the fore.

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