The citizen-innovator

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ABSTRACT

A growing body of literature investigates the role of users in innovation processes of new products. This essay examines whether it is feasible to transfer and adapt these findings from the context of corporate product innovation to public innovations in infrastructure, policy, ordinances, etc. Based on the shortcomings of conventional market research, as acknowledged in the literature on user-innovators, the paper develops a conceptual framework of the mechanisms that operate when citizen-innovators are at work. This model identifies different ontological and epistemological assumptions behind expert-driven and participatory innovation processes, thus informing both, the debate on user- and citizen-innovators. Finally, this framework is assessed in light of empirical information from a case study of participatory infrastructure development.

Introduction

A number of new software applications, products for handicapped people, or sports equipment, to name just the most prominent examples, have been developed by technically savvy users, catering to their non-mainstream needs, which would remain unmet by off-the-shelf products. These "user-innovators" (e.g. Franke and Shah, 2002, p. 6) have been in the spotlight of numerous empirical studies and recent publications that analyse this phenomenon and try to distill lessons on how to harness these creative potentials. It is the general aim of this article to assess the feasibility of transferring these findings from the context of corporate product innovation to public innovations in infrastructure, policy, ordinances, etc. and to investigate the role of "citizen-innovators" for their design. What makes such an assessment particularly interesting is the positive experience of companies with user-modified or user-developed products in terms of customer satisfaction and reclamation rates, competitive edge, reputation and investment sureness – all criteria well known to public officers in analogous manifestations.

From Passive Consumers to Lead Users

The story of Philips' CD-I, Apple's Newton, Sony's BetaMax and some less spectacular cases are often mentioned in marketing textbooks as corroboration that ignoring the customer's voice in the development process of new products can lead to expensive product failures (cf. Rosen, Schroeder and Purinton, 1998). Therefore, attempts to learn about the needs and preferences of potential customers have spread to all corporate headquarters. This quest for a maximally transparent clientele typically involves various techniques, ranging from conventional telephone interviews to sophisticated data mining operations about shopping patterns that are electronically recorded by means of shopper "loyalty" cards. Often, the consumer as thinking and reflecting sovereign and possible source of previously unthought ideas, however, remains silent "Kaufvieh" – purchasing cattle as the Germans say. In the ensuing phase, engineers and designers hide in their laboratories and studios until they deliver what market researchers have identified as desirable. Then it is time to employ appropriate promotional techniques to disseminate the message: "The day we've all been waiting for has finally arrived" (Poremsky, 2003, ¶ 1).

What fuels all these activities is a set of positivistic assumptions about how the world, including customers, function(s) and how we can know about it or them. In methodological parlance, market research is based upon the ontological position that consumers with their needs and preferences exist "out there" as a given reality[1]. The corresponding epistemology claims that we can gauge and represent this reality by means of elaborate survey methods. Constructivists would, of course, object to this view but even if we adjourn these qualms for some paragraphs, another important problem lingers: The heterogeneity of user needs that derives from the fact "that perfection is in the eye of each beholder" (Franke and Hippel, 2002, p. 25) and that all of them have their "idiosyncratic needs" (ibid. p. 28). The typical strategy to cope with this diversity of every-day life practices (cf. De Certeau, 1984) is to "explore average user needs in a few market segments and develop products and services suited to the average user in each segment" (Franke and Hippel, 2002, p. 25). Avantgarde Post-Fordist companies even try to cater to "markets of one" where every item is tailored to the specification of a single customer. But radical innovations are not to be expected from this approach because even the clients of Dell, which has often been portrayed as a showcase of this "mass customization" paradigm, can only choose from a pre-defined array of available components.

These reasons – and the fact that not very many products are yet customizable – makes technically savvy people creative. An impressive number of cases has been observed where novel ideas and products were developed by "lead users" for their own non-standard needs (von Hippel, 1988). The history of the personal computer, for example, is full of intriguing stories of teenage tinkerers pushing the limits of technological progress in a suburban garage. Recent publications on these user innovators cover examples from sports equipment (Franke and Shah, 2003), open source software (Franke and von Hippel, 2002), the automobile sector (Henkel and Sander, 2003), solar collectors (Ornetzeder, 2002) and others (see list of references). Scholars at the forefront of this strand of research have recently established a virtual home for their community of interest at <http://userinnovation.mit.edu/>. A number of them report that creative users not only design innovative prototypes for their own non-standard (yet pre-existing) desires but that their playful experimentation often leads to genuinely new forms of uses. New sports disciplines such as "Boardercross" have emerged because creative individuals or groups developed new artefacts that cater to a previously non-existing need (cf. Franke and Shah, 2003). In other words, the "proper" usage of an artefact can develop synchronously with the nascent artefact – they can co-evolve.

Conventional market research is, in principle, unable to effectuate such results, which is why a growing number of companies try to establish "cooperations with customers [and to] turn their passive role into an increasingly active and creative one" (Henkel and Sander, 2003, p. 7). Oliver Wendell Holmes, one of the fathers of American Pragmatism, has already employed a similar argument in his substantiation of free speech: "We do not permit the free expression of ideas because some individual might have the right one [... but] because we need the resources of the whole group to get us the ideas we need. (cited in Menand, 2001, p. 431). Attempts to harness this logic of participatory design in the context of product development began in the 1970s as computer professionals "worked with union members at a locomotive repair shop, a daily newspaper, a metalworking plant, and a department store ... to develop systems that most effectively promoted the quality of work life" (Kuhn and Winograd, 1996, p. 290). A well known example is the UTOPIA project, a collaboration of the Nordic Graphic Workers' Union and a group of Scandinavian researchers. "Their objective was to develop worker-friendly tools for use in newspaper graphic design [resulting in new] software that anticipated today's desktop publishing tools, sustained worker creativity, and reduced workplace turf conflicts." (Fiorilli and Sclove, 1997). Today, the *Virtual Innovation Agency* of BMW encourages ordinary citizens to submit ideas for "unusual innovations" (BMW Group, 2004) through a web-based portal. Similar cases of proactive user-involvement in the design process are the *Volvo Concept Lab* (www.conceptlabvolvo.com) or the *Sun Developer Community* (developer.java.sun.com/developer/community/). The reason why these companies employ this strategy of "collective invention" (Meyer, 2003) is that it is more productive than

conventional approaches. (As a side-effect, it is also more democratic than the traditional expert-centered design process.)

Public entities, like companies, also hope that their "products" meet the needs and acceptance of their citizens – be they traffic infrastructures, safety measures, waste collection schemes, or public transport systems. If they succeed, people will adopt them into their daily routines in the sense intended by the "designers," i.e. politicians, planners, etc. But they can also fail. Unlike in the context of consumer products, citizens cannot simply modify public policies or infrastructures and they cannot simply create a prototype of their ideal, say, sewer system. But they can vote with their ballot and with their feet. They can decide *not* to use infrastructures or *not* to use them in the way they were meant. After turning a two-way road into a one-way street, for example, automobilists often display enormously innovative potentials in finding alternative routes through narrow backstreets. Transportation planners might, of course, block this evasive reaction with additional measures but there is always a next move on the part of the citizen.

Latour (1992, p. 251) coined the term "programs and antiprograms of action" for the two halves of this ceaseless interaction between designers and users of technologies or infrastructures. Pfaffenberger (1991, ¶ 10) similarly describes these phenomena as "technological drama, ... to emphasize the performative nature of technological 'statements' and 'counterstatements'." These authors belong to the research tradition *Science and Technology studies* (STS), whose members emphasize and analyse the highly dynamic "interactions between the spheres of the social and the technical" (Rohracher and Ornetzeder, 2002, p. 74). If we take the findings from countless STS studies seriously, we have to acknowledge that the ultimate power to predict whether or not strategies to introduce new products or new infrastructural measures will work, resides in a dialogue between those who provide and those who react to technologies and infrastructures; that is, between the supply- and the demand side, designers and users, politicians and citizens.

Articulation facilitates the discovery of constructedness
It appears reasonable to conclude that user input is desirable not only in the context of product innovations but also policy and infrastructure innovations. This postulate is far from being new but most often it is fed by normative democratic considerations, whereas in the case at hand it is largely pragmatic. The profit-oriented entities mentioned above invite genuine user input not for charitable but quite hard-headed reasons: They want to harness the creativity fermenting in designer-user dialogues. A probabilistic explanation for this phenomenon is based on the fact that the sheer number of thinking heads, combined with an organized attentiveness even to those who are not used to proclaim their thoughts at every occasion, increases the likeliness of new ideas to surface. Unfortunately, the role of citizens in policy and infrastructure design processes is mostly confined to commenting or voting on preconceived drafts. Citizens are, in other words, often consulted after the arrow has left the bow. Thus, an important chance for radical innovations is thrown away and the search process remains in a symptom-cure mode. Nevertheless, genuine participation, even at a late phase, can still trigger substantial incremental innovations.

Another pragmatic mechanism of participation can only bear fruit if citizens are involved very early on. It rests primarily on what I have called above "co-evolution" between artefacts and their usage. This effect can only happen when providers/designers and users/citizens engage in meaningful conversation about the socially desired direction of progress and the corresponding definition of problems. Joseph Stiglitz alluded to similar issues in his 2001 Nobel lecture as he stressed that "development represents a ... fundamental transformation of society, including a change in 'preferences' and attitudes, an ... abandonment of many traditional ways of thinking" (p. 49). This is not a case for the "new man" or for collective asceticism for the sake of some greater good. The argument here is that a meaningful dialogue can help the participants to discover that many of our preferences and attitudes are contingent upon the current – but historically grown – technological,

political and infrastructural circumstances[2]. Shove (2003, p. 9) emphasises in this regard that preferences and needs are "sociotechnically configued" and accordingly not at all "stable and taken for granted [but rather] immensely malleable."

For example, the typical U.S.-American suburban dweller does not waste one hour per day commuting to work because he or she loves being stuck in traffic jams but because a complex set of factors has led to dispersed settlement forms, a spatial separation of work and home, and living room-style cars: The frontier ideology of the early settlers, the value of private property for the founding fathers, the urban planning paradigm of the Athens Charter, home construction subsidies to WWII veterans, lobbyism by the automobile industry and a host of others. We are often impelled by external circumstances and regard them as absolutely normal because we have grown up with them. They are always already there when we make our decisions. Rarely do we reflect upon these "given" circumstances – a phenomenon Winner calls "technological somnambulism" (1977, p. 315). But if we engage in serious dialogue between those who design, provide, organize and maintain these circumstances and those whose behavior and daily decisions are a reaction to them, we might discover their constructedness and hence their malleability.

When public or governmental organizations learn to look through the eyes of citizens and to appreciate their situation, they may find that their situation is an intended or often unintended function of previous policy decisions. As a corollary, the citizens' situation can hardly be changed simply by resounding awareness campaigns. It is, for example, of no avail to exhort people to use public transport if this would entail to leave home 40 minutes earlier, to struggle with an obfuscating tariff system, to pay a lot of money at a grubby ticket machine (coins only) and to inhale the body odor of strangers on a bucking ride. For many people this is not a feasible option as long as the expectable traffic jam is under 45 minutes, gasoline prices under six dollars per gallon, and buses perceived as under-class mode of transportation. And who wants to blame them? As long as the provider does not improve the situation, the argument goes, hardly anyone wants to be the first one to make a heroic choice – even if one could assume that increased usage would lead to more investments and to an overall improvement of the public transport system. The classical prisoners' dilemma (cf. Taylor, 1976) manifests itself in a first mover disadvantage.

But once the providers learn that people would be willing to do A under the condition B, this might be the beginning of a strategic partnership. The same holds vice versa: To pick up the transportation example, it is not an uncommon argument of providers that they would actually offer more frequent services, invest in modern coaches and cleaner premises if the current services were used more intensively. But for now, they take the current lack of enthusiastic ridership as an indication of a general public disinclination against public transport. But this is where the vicious cycle begins and why users and providers keep shifting the responsibility for the first step back and forth between each other. When citizens learn to view the world from the perspective of the provider they may gain an appreciation of their constraints and possibilities. And if they learn that the provider would be willing to do B if the citizens did A, this could be the other half of a strategic partnership.

This effect is most powerful if people find out that they are not alone with their impression that circumstances force them to do what they don't really want to do[3]. I found one of my colleagues, who drives an SUV despite her environmental convictions, in such a predicament. She asserted that she used to drive a compact car, until SUVs became so prevalent that she was afraid of being overlooked in traffic with her little car: "Eventually I had to upgrade" ("J. Smith," personal communication 03-07-2002). These are cases where "the 'technological tail' [is] beginning to wag the 'human dog'" (Pippin, 1995, p. 44). As long as everybody grumbles in private about such seemingly unchangeable situations, the first mover inertia takes its toll. Only a clear articulation of one's situation in front of others can potentially reveal it as a collective experience and only then can people join forces to tame the tail. This, then, would be a terrific innovation born out of the

articulation of a change-worthy situation that everybody thought can't be changed. Every participating citizen is thus actually not an innovator by him-/herself but a *co*-innovator with many others.

The ontology and epistemology of the citizen-innovator
Neoliberal theorists might retort that this whole argument is a dispensable academic exercise because the free market is already there to bring the supply- and demand-side to an optimal equilibrium through its "invisible hand." This agent is said to be operating "when the interactions of many self-interested individuals ... lead to an outcome where society is better off than before" (Seeraj, 2004, ¶ 1). The strength of this argument, however, quickly erodes upon the observation that although the market has been operating for quite some time it has apparently not managed to create this paradisiac state. In another round of retort, neoliberals might argue that the market has not been as unfettered as it should have been in order to hold sway (cf. Postrel, 1998). This may have been the case, indeed, but even a completely unconstrained market is never able to effectuate what dialogue and coordination can. The reason for this inherent shortcoming is its foundation on a Descartean, Lockean, or Hobbesian notion of society as the sum of "self-interested atomistic individuals rationally pursuing their distinctive self-interests in a context of other individuals pursuing their own interests"(Geyer and Rihani, 2000, ¶ 19). In this view, individuals follow their innate best self-interest in the same way as Newton's apples follow the force of gravity to their "only right" place. This idea, Barber (1984, p. 36) argues,

> *...produces a conception of political liberty as entirely passive. Freedom is associated with the unperturbedness of the inertial body, with the motionlessness of the inertial frame itself... The modern liberal appears to regard it as a republican ideal: man at rest, inactive, nonparticipating, isolated, uninterfered with, privatized, and thus free.*

What is at the center of the debate about the citizen (co-)innovator, then, is the "true" "nature" (both in deliberate quotation marks) of human beings and of the human society. The assumption that human beings are machine-like entities, programmed to pursue a mission of personal interest, is one type of ontology, a kind of belief about the most fundamental characteristics of reality. The constructivist assumption that humans literally create, shape and adjust their personal and collective world, including their behavior, in engagement with others is another one. The latter position describes "citizens as participants in a collective project" (Moore and Brand, 2003, p. 7) where the whole is more than the sum of its individual parts. While no ontology can ever be proved nor disproved, they can turn out more or less useful as pragmatists like John Dewey, William James, or Richard Rorty would argue. For them, "ideas are ... tools – like forks and knives and microchips – that people devise to cope with the world in which they find themselves" (Menand, 2001, p. 360). From such a pragmatist position, I would argue that even the perfect representation of private interests in public space does not realize all human potentials because human beings, unlike apples, possess the natural capability to communicate and thus to develop, articulate, and pursue a collective and synergistic self-interest.

Both ontological positions entail different epistemologies[4], that is, pertinent ways to procure knowledge about reality. According to the positivist epistemology, the absolute reality that supposedly exists "out there" can be gauged by means of elaborate measurements as applied in conventional market research. Constructivists would argue that *because* there is not fixed reality out there, one cannot simply measure it; but one can interact with the realities people construct. Therefore, the epistemology of constructivism is transactional and subjectivist, which means that the investigator and the object of investigation are "interactively linked so that the findings are literally created as the investigation proceeds" (Guba and Lincoln, 1994, p. 111). "The investigation" in the context at hand is not an academic undertaking but the dialogue between and among users and providers of policies and infrastructures that allows previously unspoken constructions, i.e. new

realities, to emerge. This synergistic effect is, in principle, not achievable through exclusive market mechanism because they can only identify and cater to the needs of individuals or groups of individuals. This is the epistemological blind spot of the invisible hand. Or, in polemical parlance: Synergistic effects are invisible to the invisible hand. They can only be realized through dialogue and coordination, which is "a far more complex and rewarding kind of public talk" (Moore and Brand, 2003, p. 7) than the haggling between atomistic interests of sellers and purchasers. In light of these considerations, it seems fair to conclude that a constructivist stance is more useful for understanding and harnessing the phenomenon of both the user- and the citizen-innovator.

Citizen-innovators in action
The citizen-co-innovation process can be facilitated and organized by public bodies such as city governments but it does not have to be so. The case of Brucker Land (www.bruckerland.info) is an example of an innovation process that was developed and implemented by citizens alone without any government intervention. This organization was established in 1994 by citizens who shared the impression that the ever-more industrialized and globalized system for the production and distribution of agricultural products is partly responsible for the deterioration of certain economic, social, and ecological parameters in their county and beyond. Applying a reciprocal logic, they were convinced that a strategy "From the County, For the County" would cure or at least mitigate those ills. In order to put this slogan into action, they created a strategic alliance of farmers, food producers – mostly bakers and butchers – environmentalists, church representatives, and consumers. Together they founded the "Brucker Land Ltd." This entity serves as a broker between the farmers, food producers, and consumers of Fürstenfeldbruck County. It provides a set of legally binding production and processing criteria and controls their compliance. Products that meet these criteria receive the legally protected Brucker Land logo and are sold in most food retail stores and almost all supermarkets in Fürstenfeldbruck County.

The results are impressive: In 2001, the array of products available included 40 different types of bread and a great variety of other baked products, wheat, rye, and spelt flour, durum semolina, potatoes, milk, cheese, rapeseed oil, eggs, honey, pasta, beer, apple juice, meat, and numerous types of sausages. In numbers for exemplary products: 800 tons of grain, 240,000 liters of milk and 100,000 liters of rapeseed oil were sold among the 191,000 inhabitants of the county.

The analysis of this success shows that it was only possible due to the massive participation of all affected parties. Thus, the farmers, who were not genuinely inclined to follow orthodox organic production stipulations, learned that consumers often follow the opinions of environmental groups concerning the credibility of healthy agricultural products; and especially so in the post-food-scandals era in Europe. The environmental groups would have preferred a strict ecologically oriented production regime but found that such products would only reach a marginal number of people and that the overall pesticide-reduction effect is actually larger with a compromise-scheme that would be accepted by both, enough farmers and enough customers. The latter learned about the constraints of modern farming realities and thus came to demand rigorous, yet realistic control mechanisms and a fair and transparent pricing scheme. The bakers wanted the flour to meet certain physical criteria in order to be able to handle it in their machines. This, in turn, affected the growing method, which had an impact on the yield per acre and on the price and thus triggered new responses from the customers. In sum, the development process of Brucker Land was one highly complex, recursive and dynamic dialogue. All participants had to articulate their interests, fears, hopes, and their possible commitment if the others did this and that. Every single move led to adjustments of other parameters until a workable – not a perfect – balance was found. Obviously, it would have been impossible to determine this balance through conventional market research techniques. Brucker Land is thus an impressive example of citizen-co-innovation in action.

Conclusion

Citizen empowerment, the overarching issue of this special edition of the Innovation Journal, can have the flavor of a charitable deed, when a piece of power is granted to subordinates by mercy of those who possess it all. This notion would misconceive the enormous productive potentials that can be realized when citizens are empowered or, rather, when citizens are given a forum to discover the constructedness of their current situation. This is by far different from simply "milking" the creativity of citizens that can be swept aside if it is not in line with the plans of the powerful elite. And in this sense, harnessing the citizen-innovator phenomenon is indeed a kind of transfer of power: The power to be heard and the power to co-design. The willingness to share power, however, is merely a necessary condition of citizen-driven innovations, not a sufficient one. What is also needed is a professional and impartial facilitation of such a process. Researchers of the user-innovation phenomenon are trying to identify the most productive strategies in the context of product development and it will certainly be useful to assess the transferability of their findings again.

About the Author:

Ralf Brand Ph.D During his studies in geography and political science, Ralf Brand Ph.D, completed numerous internships with, among others, environmental grassroots organizations, consulting companies, a national sustainability lobby organization, and a foreign aid project in the Philippines. Brand also co-founded a scientific academy for sustainable development, which he represented at the United Nations' General Assembly in 1997 ("Rio +5"). In addition, he was deputy leader of a national project focused on the relationship between lifestyles and sustainability. As a result, he was appointed to the Local Agenda 21 Council of the Bavarian Government. After earning a Diploma (~ MA) in 1998, he worked as research fellow in a sociological project to investigate the use of telematics for regional sustainable development. Brand recounts that on strikingly many occasions he encountered advocates of two competing dogmas within the sustainability debate: "technological fixes" and "heroic behavior." During his doctoral studies in Community and Regional Planning at the University of Texas at Austin he investigated the structure (rather: construction) of this discourse from an STS perspective (Science and Technology Studies) and arrived at a more holistic approach to sustainable development: A synchronization of technical and social change through strategic participation or, in other words, a co-evolution of the supply- and demand-side of policies and technologies. He see his particular research niche in transferring this concept from the level of buildings, where it originated, to urban and regional settings, to identify culturally appropriate forms of governance required to realize co-evolutionary potentials, and to test and improve the applicability of this knowledge through "reflexive consulting." Brand has presented his empirical findings and ideas at numerous international conferences. He has also published a host of book chapters and journal articles on a range of aspects of sustainable development. Most recently, he examined the implications of the co-evolution hypothesis for the education of sustainability engineers, he investigated various historical cases of (un-)successful co-evolution, and he is currently working on a book with EARTHSCAN, a practitioner's guide for co-evolutionary sustainable development in urban and regional settings. Brand is working for the German consulting company *Sustainability Performance Group,* which specializes in the effective and efficient delivery of public sustainable services. More information can be found on Brand's website at <www.b-r-a-n-d.de>.

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[1]This is what Healy (2004) calls the "representational" mode of knowledge production because knowledge is understood as (possibly exact) re-presentation of this given reality.

[2]And these "constructed" preferences are what conventional market research identifies.

[3]I heard the most insightful thoughts on this mechanism in a lecture by Franz Josef Radermacher in 1998 at the Catholic University of Eichstätt, Germany. I therefore suggest referring to this problem as the Radermacher dilemma.

[4]In its final consequence, the constructivist paradigm does actually not really make the traditional distinction between ontology and epistemology (cf. Guba and Lincoln, 1994 p. 111) because the things one desires to know about are only developed in their knowable manifestation during and through the process of inquiry.