

Critics of behavioral economics typically stress the [rationality](#) of economic agents.<sup>[13]</sup> They contend that experimentally observed behavior has limited application to market situations, as learning opportunities and competition ensure at least a close approximation of rational behavior.

## **Homo-Economicus or Homo-Neticus - Lessons for Economic Theories from Innovation on the Internet.**

As the title suggest this paper is about innovation on the internet and some lessons that might be learned - not only for main-stream neo-classical economics, but also for heterodox economics, especially Marxian/socialist economics. The objective of the paper is twofold:

- a) To discuss the concept of rationality as defined by main stream, neo-classical theory. In particular to show how hard the text-book concept struggles to “master” some empirical facts, which then in this framework are labeled irrational
- b) To outline for the heterodox/Marxian/socialist some perspectives for the economics of socialism, i.e. that user-driven innovation has democratic and consequently socialist aspects.

The distinct but related behavioural and experimental economics<sup>1</sup> – are in fashion. Not without reason for the mainstream concept of rationality – incarnated in the selfish – ethics free (homo economicus) seems to many of us as a rather strange animal. Many find it hard to believe that this type of myopic, ultra-egoistic behaviour is the most efficient motivator of economic development. But on the other hand are we not rational? Don't we

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<sup>1</sup> See

[http://en.wikipedia.org/wiki/Experimental\\_economics](http://en.wikipedia.org/wiki/Experimental_economics)

[http://en.wikipedia.org/wiki/Behavioral\\_economics](http://en.wikipedia.org/wiki/Behavioral_economics)

for a brief overview.

to get the most out of our money, our life? I will argue that there is another model of rational human interaction. This model is not taken from the experimental world of “behavioural” economics, but is based on the real life experiences of the Internet “experiment”. It is a model where there is not separation – or opposition – between “ethics” and rational behaviour. It is a model of innovation that is open, collaborative, and directed toward an evolving vision or goal like the Internet was for the scientific pioneers of the Internet , in itself an example of peer-based, altruistic, vision-inspired innovation. (Refs to co-panelists in here).

This paper originated after having read some of the literature on “user driven innovation” In my opinion it is necessary to outline some alternative theoretical perspectives before going into a more systematic empirical study of how the Internet facilitates user-driven innovation. In my opinion the main stream economic theory that is used as the theoretical framework to discuss the phenomenon of user-driven innovation is build on a set of atomistic, egoistic and *static* principles that makes it ill suited to grasp this highly social, interactive and dynamic phenomenon – Internet assisted user-driven innovation.

User driven innovation is also very interesting for those of us who are interested in forms of society where profit maximization and competition is not the main drivers for social and technological change. The examples of the actual use of the Internet for “user driven innovation” will be more anecdotal, based on data and description in the literature and my own experiences. As far as I know there does not exist any really systematic empirical data on Internet based/assisted innovation processes.

My own experiences are connected primarily to my interest in emission free vehicles, which includes human powered vehicles, but is broader since it includes all non-fossil vehicles, that is not only traditional bikes, but also electric bikes.

## *Democratizing innovation*

The starting point for is of course Eric von Hippel recent book “*Democratizing Innovation*” (2005).<sup>2</sup> This book is the last one in a series of books and articles by the same author related to the “sources of innovation”, which was also the title of von Hippel’s “breakthrough” book “Sources of innovation”. Here Hippel described and discussed the role of users in the making of innovations. Hippel (1988, p. 4) showed that users of a variety of products was either *the* source of innovation or an important source. User in this context is both firms and persons. As Hippel in “Democratizing” (p. 19) points out, the word “consumer” gives an association of passive consumption. This is of course generally correct, but understates that some of us - many of us - in some spheres of life have much more active attitude to the products we use. We sometimes modify them to get them better suited to our needs.

The conventional wisdom that it is the manufacturer that find out what we need and then designs and produces it – is completely overlooking the *social interaction* – that takes place even in an capitalist market economy. As a facilitator the Internet should be well suited as been a vehicle for democratizing innovation. Anecdotal evidence shows that the Internet creates better user-producer links, that it makes possible a creation of a wider – and more customized variety of goods. Hippel points to several studies where the intra-user and user-producer exchange of ideas could only have been mediated through a medium with such low cost – and rich information potential as the Internet.

A recent report written by a group of students at the Technical University of Norway (NTNU) “*User Driven Innovation: When the user makes the difference*” also includes several cases where the Internet have been instrumental for the innovation. For some product categories like extreme outdoor equipment, the users are not only “lead users”, i.e. advanced users giving early and insightful information to the manufacturers R&D department what problems to address – they are practically the developers making

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2 This book is freely downloadable at <http://web.mit.edu/evhippel/www/democ1.htm> under a "Creative Commons License" and is "Dedicated to all who are building the information commons."

modifications and/or extensions to the product that the manufacturer then puts into production.

These developments – based on “virtual” communities of interest - are interesting from various theoretical and policy points of view. One important aspect is the question of alienation, i.e. the phenomenon that the profit motive “perverts” the relationship between the producer and the user of goods and services. Under capitalism many of us – in our role both as consumers and producers (workers) often get the feeling that we get/make an inferior product, less adapted to our real needs (“preferences”) – just because the producer was constrained by short term profit maximization. The producer have to save, have to introduce “fashion” and product differentiation characteristics that to not contribute to satisfy our “real” needs. As consumers we often have no other practical option than to buy this “lousy” product – gruntingly bought it.

For an economist like Karl Marx– a major aspect of how markets worked was clearly the *tension* between the “private”, atomistic labor that had to be socially accepted as “socially necessary labor” through the market. In most Marxian models the problem of how the product get the “socially necessary”, or “socially optimal” *use-value* is not even mentioned<sup>3</sup>. It is clear that Marx and later Marxist like Ernest Mandel clearly saw the capitalist innovation process as a rather wasteful process – a view also confirmed by the little there is of empirical research of this topic. Von Hippel puts it this way: “It is striking that most new products develop and introduced to the market by manufacturers are commercial failures.” The “success rates” are typically found to be between 20-30 % (Hippel, 2005, p. 108). If one could increase that success rate – and probably make “better” products, i.e. more adopted to our real needs, not the need of profit-maximisation this is in itself an argument for that socialism would be a more rational system. There is of course a lot more to say on this topic, but how to stimulate and organise innovation under socialism is a very interesting and imperative question.

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<sup>3</sup> See Rosdolsky (1959) for a critique of such one sided approaches

Innovation mediated or facilitated by the Internet is a topic related, but different from the issue of the Internet as a vehicle for political democratization in sense of democratizing the more strictly political sphere of society, including how political parties and political movements use the Internet. Parties and movements influence the material artefacts around us— including the infrastructure (roads, trains, city- (non) planning) and environmental standards, but seldom individual products, that's where user driven innovation comes in.

### ***The economic literature on user driven innovation***

The literature on “user-driven” innovation is very strongly influenced by main-stream – neo classical – **static equilibrium** - theory. This particular school of economic thought often use of “economic theory” in singular, as if neo-classical theory was “the only theory in Town” is a problem in itself, it excludes the heterodox schools of thought in economics, like evolutionary (Schumpeterian), post-Keynesian, Marxian and feminist economics, just to mention some of them. Main-stream, that is *neo-classical* - economic theory builds on a set of unrealistic premises, perfect information, perfect foresight, that prices, preferences and technology do not change and finally that there is not outside of equilibrium- since that would change the initial endowments. There can be no increasing returns to scale, that is falling unit costs. Which by the way is a central characteristic of software, where development – that is sunk cost is very dominant – and production and distribution costs are very small. Maybe “homo economicus” is the least unrealistic part of this fragile construction. But all theory involve simplification, abstraction and “realisticness” is not by itself any defect. In physics we work with ideal gasses etc. The point here is that the crucial point here is the *static* nature of the model, that is a snapshot, or a stilleben – or “nature mort” as the French call it. The reason why neo-classicals must cling to perfect foresight is that there is no time for learning. In my opinion the main

critique of this perfect “competition”<sup>4</sup> model. One cannot on a general level assume that we do not maximize utility to our best ability. But that ability is constrained by our lack of total information. We do not know what kind of product satisfies a certain need before we have tried one or more alternative – and learning takes time. This means that we do not know all the options (product and services), neither in the short nor long run that we have to choose from. Or to put it another way – in a long perspective altruistic behaviour might be “egoistically” rational, that is rational in the sense of maximising personal and social welfare.

From the work of the historians of economic thought I think we can see that the founding fathers did not want neo-classical theory to be so unrealistic, so utterly static, but this came as a consequence of the fundamental imperative of proving that markets are utterly efficient, that government, unions, taxes and monopolies create “inefficiencies”

<sup>5</sup>mechanism of the atomistic, egoistic nature - theory has great difficulty in handling the “altruistic” nature of interactive activities in general. Since such activities are an important part of Internet use, the – open source movement and community being the most well-known and analysed example – but far from the only one.

My core message is that it is necessary to use other theoretical models/traditions in order to understand such activities in general, and in order to promote such activities, among them also user-driven innovation. These are various ways to actively use the Internet to shape society – by journalism or user driven innovation – to the better for all of us. This is the essence of being a Netizen – a homo Interneticus.

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<sup>4</sup> Competition in quotation marks since the state that perfect “competition” describes has nothing to do with real life competition – a highly dynamic, learning intensive process, where everything change and are consciously changed by the agents themselves, preferences, prices, technology, incomes (initial endowments).

<sup>5</sup> See Currie and Steedman (1990), Ingraio and Israel (1991), Colliot-Thelene (1979)

## **User-driven innovation – an old story**

In “Democratizing Innovation” von Hippel gives several examples of how user driven innovation have been a topic of interest for several economists:

“[Adam] Smith pointed out the importance of “the invention of a great number of machines which facilitate and abridge labor, and enable one man to do the work of many.” He also noted that “a great part of the machines made use of in those manufactures in which labor is most subdivided, were originally the invention of common workmen, who, being each of them employed in some very simple operation, naturally turned their thoughts towards finding out easier and readier methods of performing it.” (Hippel, p.21)

And from the post WWII era:

“Rosenberg (1976) studied the history of the US machine tool industry and found that important and basic machine types like lathes and milling machines were first developed and built by user firms having a strong need for them. Textile manufacturing firms, gun manufacturers and sewing machine manufacturers were important early user-developers of machine tools.” (from Hippel (2005, p. 22)

## **Users as the sources of innovation**

As mentioned in the above, the starting point is von Hippel’s recent book “*Democratizing Innovation*” (2005). Also von Hippel’s first major opus, published in 1988, “Sources of innovation” is downloadable with permission from Oxford University Press. In “Sources of Innovation” von Hippel described and discussed the role of users in the making of innovations von Hippel (1988, p. 4) showed that the users in domains like “Scientific instruments” and “Industrial gas using” the users was either *the* source of innovation or an important source. They had often made important modifications that were many years a head of commercial production. This is of course not surprising, since it is the users have an intimate knowledge of their own needs, the problems with the

equipment etc. This one type of real-life “information” problems that are fundamental – and pose fundamental problems for general equilibrium theory according to Stiglitz (2002)

But in real life those who use a product to satisfy their needs are of course among those best able to propose to the producer improvements that will not only benefit them, but also other users. This is an important fact, because an important way of legitimizing the very high income differentials that still exists in society is that the entrepreneur is a kind of genius that actually invented the product/process.

What case studies shows is that, that picture is much more nuanced to say the least. Bill Gates is one of the richest men on earth, but neither he nor Microsoft are that impressive when it comes to innovation or satisfying users real needs. Most of us can point out clear defects with MS Windows and MS Office – a lot of the good functionality was borrowed or bought from other – poorer inventors. Most of us have felt that the business strategy of Microsoft has always been to price the product as high as possible, too the “pain limit”-. Microsoft has always been experts in creating artificial market segmentation (Home, Academic, Pro, Business Premium, ect) that have technical, cost-based rationale, but segments the market in an optimal way. But these artificial limitations on the low-end segments are just creating problems and make people waste a lot of time on products where very short term profit maximisation clearly dictates how the product is developing. Vista is a good example – an operating system that have so few new real features, quite a few new problems and that is of course why you had a “downgrade to XP” option. The development of Vista must be an example of anti-user innovation. This business strategy has stimulated the open source movement – which is a very systematic effort at collective, well-organized user driven innovation . The point about Microsoft is not that they are particularly bad, but that the logic of capitalist competition very often makes



firm choose a business strategy like Microsoft's<sup>6</sup>. Apple has clearly been more adjusted to user needs all the way, but even they have to try to “lock-in” the customers to their equipment, their software etc. Much more could be said about this, but let me get back to user driven innovation using the bicycle as an example.

### **The bike as an example of user driven innovation**

The bike not only has a past, in an era of climate change it certainly has a future. Most of us has become so used to the ordinary “diamond” frame bicycle that we hardly can think of anything else. But the normal bike is not optimal aerodynamically or ergonomically the best solution. Air resistance is *the* major problem for biking since rolling friction can be made very small. Having a more horizontal body position would reduce air resistance significantly. From the early days of biking there were various “recumbent” designs with or without “fairing” (shield that reduces air resistance). A French inventor, George Mochet constructed and a French cyclist, Francis Fauret rode these “horizontal” bikes to world records. The producers of ordinary bikes, intervened and the recumbent bike was prohibited from professional racing the 1<sup>st</sup> of April 1943 by defining the competition bike with certain standards. The recumbent bike almost died out, but with oil price “shocks” in the seventies and eighties, more interest in environmental issues – the recumbent bike had a renaissance<sup>7</sup>. It is obvious that both the sales of recumbent bikes – and their development was very stimulated by the spread of the Internet. To empirically quantify the importance of the Internet is a difficult and demanding task. But the reason why the recumbent has not become *the* ordinary bike is that it has certain disadvantages<sup>8</sup> like sitting too low, tipping backwards when biking uphill heavily loaded, manoeuvrability in heavy city traffic etc.

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<sup>6</sup> For those who think that Microsofts monopoly as opposed to “perfect” or “free” competition, see my paper “The Text-book Myth of the Monopoly case” presented at Ass. of heterodox economics conference, 2006

<sup>7</sup> [http://en.wikipedia.org/wiki/Recumbent\\_bicycle#History](http://en.wikipedia.org/wiki/Recumbent_bicycle#History).

<sup>8</sup> [http://en.wikipedia.org/wiki/Recumbent\\_bicycle#Disadvantages](http://en.wikipedia.org/wiki/Recumbent_bicycle#Disadvantages)



**Slide 5:**



One solution would be to make a hybrid bike, combining the advantages of the ordinary “diamond frame”, so-called convertible recumbents. The pictures illustrates this idea<sup>9</sup>.

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<sup>9</sup> See also

The convertible is built of standard bicycle parts but with modified frame geometry. Without the Internet – the community of recumbent fans and constructors would not know each other, in a way the Internet making information sharing more “perfect”.

### **Real life and homo economicus**

User-driven innovation points to *other types of motives* for innovative activities that point beyond the “egoistic”, profit/utility maximising behaviour, points towards another truly democratic, ecological, interactive way of organising the the design, development and production of goods and services. It is necessary to underscore that these motives – or incentives as most economists call them are *not* irrational, are only “altruistic” with a very special static model of human behaviour – no learning going on. They are not contrary to long, run sustainable growth and it’s real and final goal more welfare creation. On the contrary, it is only in a myopic profit maximising perspective that these “altruistic” types of behaviour can be considered irrational or sub-optimal. Ordinary economic models (market cross) cannot even be called myopic, since actually they do not have any time dimension, they are static.

I think that for modelling human behaviour a model of what is rational is needed. Indeed most of us have such a model internalized, since we are more satisfied with some parts of our own actions than others, we are more satisfied with the macro-social result of some types of behaviour than others. The point is that a concept of rationality that have a real time perspective, which include that obvious fact that life is a continuous learning process, since we do not have global perfect information.

One obvious aspect of this learning process is that some products – and firms - are failures. If there was anything close to perfect information – no product would be a failure, no firms would go bust. Some of the firms that go bust clearly do so because they

misjudge the real needs of the customers. But often the anarchistic nature of capitalist competition and profit maximisation means that there are too much productive capacity created as everybody tries to be first to market – to create a (quasi-) monopoly, i.e. get the largest possible market shares.

Von Hippel writes:

“It is striking that most new products developed and introduced to the market by manufacturers are commercial failures. Mansfield and Wagner (1975) found the overall probability of success for new industrial products to be only 27 percent. Elrod and Kelman (1987) found an overall probability of success of 26 percent for consumer products. Balachandra and Friar (1997), Poolton and Barclay (1998), and Redmond (1995) found similarly high failure rates in new products commercialized.

Although there clearly is some recycling of knowledge from failed projects to successful ones, much of the investment in product development is highly specific. This high failure rate therefore represents a huge inefficiency in the conversion of R&D investment to useful output, and a corresponding reduction in social welfare.” (Hippel 2005, p. 108)

It is quite clear that increasing the rate of successful products would result in increased welfare production – and this is not taking into consideration successful products that we buy, but actually would have liked to be quite different – like Microsoft windows! Microsoft is a commercial success, but not a welfare success.

### **The great surprise ... sharing information!**

The obvious answer to the failure of firms and products would be to have mechanisms of information sharing, entering into a dialog on how to best develop the product so that it

satisfy our real needs. Often we learn from others what we really need from their experiences. Von Hippel writes:

The empirical finding that users often freely reveal their innovations has been *a major surprise to innovation researchers*. On the face of it, if a user-innovator's proprietary information has value to others, one would think *that the user would strive to prevent free diffusion* rather than help others to free ride on what it has developed at private cost. Nonetheless, it is now very clear that individual users and user firms—and sometimes manufacturers—*often freely reveal detailed information about their innovations*.

The practices visible in “open source” software development were important in bringing this phenomenon to general awareness. In these projects it was clear *policy* that project contributors would routinely and systematically freely reveal code they had developed at private expense. (p. 9, my emph.)

### **An alternative approach – theories of alienation**

In my opinion the reason why this “sharing of information” comes as a surprise to innovation researchers is because the dominant paradigm in economics is utterly static and atomistic. In my opinion the reason why economics uses this specific type of mathematical model is because only under such extreme – non-scientific – conditions can a set of pro-market, neo-liberal “results” be proved mathematically. Main stream theory is a clear example of the SCOT<sup>10</sup> – the **Social Construction Of Theory**. The founding fathers did not want the theory to be that abstract, but every trace of real life had to be weeded out in order to prove these “results”.

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<sup>10</sup> See **Wiebe Bijker**, *Of Bicycles, Bakelites and Bulbs: Toward a Theory of Sociotechnical Change* (Inside Technology Series) (Hardcover), where the SCOT, social construction of technology approach is outlined and illustrated by case studies.

I will here briefly outline an alternative approach, just to show that the question of what kind of theory one approaches the user driven innovation phenomenon with matters. I will use the concept of alienation. Alienation has a long history – originally a religious concept – the tragic fate of man on earth – alienated from the “real” heavenly existence. according to Ernest Mandel (1970). It was a theme in classical Greek/Roman philosophy. In modern times Hegel “secularised” the concept – relating it to “alienated labour” (needs outstrip what labour can produce since it produces new needs) – and as “Entäusserung” – “externalisation”. Marx remoulded the Hegelian concept of alienation ... and pointed to new forms of alienation (state as an hostile institution, loneliness created by a competitive “winner takes all” society) – and separation humans from the means of production, means of **creativity** – a historically new phenomenon.

From this perspective being creative (innovating) **together** is *overcoming* alienation – becoming more human – getting back to the community way of doing things that are “in our genes” – and not as a theoretical surprise.



**The hydrofoil kayak. If you were thinking of developing one, you will find the state of the art on the Internet – and possibilities for sharing of ideas, drawings etc.**

## **For a surprise it is ... for main stream economics.**

One example on how hard mainstream economics struggles to incorporate the “altruistic” (I would say rational) nature of Internet aided user driven innovation , is highlighted in an article from Research Policy 2003 with the title “How communities support innovative activities: an exploration of assistance and sharing among end-users”<sup>11</sup>, authors Nikolaus Franke and Sonali Shah. The case studies in this article are taken from diverse sports communities: sailplanes, canoeing, boardercross, handicapped cycling – but of course there are there are many many more. The origin of such online communities are the “news-groups” on the Internet. Which in the early years were mainly related to ICT, programming, programming languages etc, but over the years (mid eighties to late nineties) expanded exponentially both in quantity and scope. For those of us that have struggled with programming problems and bug-full software, the news-groups were just fantastic. In minutes you could have the solution, or a good hint that saved you for days of desperate debugging. The mutual benefit in such groups are evident. This creates a rationality that the even the most experienced programmers used time to read and respond, because once upon a time they did get advice. No human is all knowing, so we are not experts in all domains. In some domains we are experts (responders) in other domains we are novices that ask for help. With the development of HTML, browsers, FAQ-pages, knowledge banks the new-groups are no longer the only source of help.

But to our innovation researchers seem not to be that familiar with the ideas behind the creation of the Internet. Because to them “... the existence of generalized exchange is somewhat of a puzzle, because any member of the exchange system can free-ride since there is no guarantee of reciprocity (p. 173)”

Not only is that the case but the traditional “egoistic” explanations of “free-revealing” and assistance like:

- Induce further improvements from others (which one then can egoistically benefit from)

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<sup>11</sup> Volume 32, Issue 1, January 2003, Pages 157-178

- Setting my “egoistic” standard – benefitting me more than the others
- Reputation effects
- Low rivalry/competition context

... do not stand up to critical scrutiny – of these successful communities – even when we are talking about products with a clear commercial potential. Frank and Shah find that a cause that is “overlooked” in the traditional theoretical framework is “the fun and enjoyment that arise through engagement in the task and in the community. From this perspective, the individual does not view the participation and contribution as a cost that have to be compensated, rather these activities are enjoyable in and of themselves” (p. 173). This is not surprising from an alienation point of view. Modern life, where most products around us are too often “one size fits all” due to the extreme attention to short term profit maximisation leaves little room in our lives for our creativity, we feel “big business” as an external, foreign and hostile force. By participating in communities of innovation we increase welfare by better products – and we overcome our alienation by shaping the material artefacts around us – and by working together, in stead of the “bellum omnium contra omnes” as Marx once called it - which is not only the ideal of main-stream economics, but also the ethos of our times. The authors further state that ... “competition [among users] decreases the flow of information... a ski manufacturer is likely to be better of monitoring a community of ski fanatics ... than a group of World Cup racers” ... (p. 175) – so competition is not always *the* driving force for innovation/progress, quite the contrary. What is even more “surprising” is that ... “the communities do not appear to operate like traditional reciprocal exchange markets” (p. 171). It is beyond the scope of this paper to discuss how they really work, but overcoming the alienation of - and between user and producer – is certainly a key issue. To develop the critique of main-stream economics is also important as a first step. But in my opinion the Internet based user-driven innovation has important lessons for a socialist economy – what kind of mechanisms to use to make the user-friendly products from the start, how to improve them as users learn about their needs and the how the product relates to them. Let me quickly add that this has a much wider dimension than just design – it has an important political dimension for it should not only be atomistic Internet users



that intervened against the technical irrationalities of capitalism – unions should play an important role. Workers in the laptop industry and mobile phone industry should protest against the charger chaos. Since power cables are standardised on stationary computers – why not on portables? Or to take an example from completely other domain – air traffic. The system of business class, of only return tickets, of APEX tickets – all inflexible, user-hostile and expensive practices was not abolished by union intervention, but by anti-union low price carriers resulting in union busting, degradation of pay and working conditions for airtransport workers world-wide. What if the unions had seen the efficiency gains – and shared them with the users, not allowing the anti-union companies into the air transport business? The unions should have organized a rational sharing of the transportation work to be done, they should have organised a “monopoly” – showing that cooperating workers can run the “business” more efficient than an anarchistic market.

### **Concluding remarks**

I have not touched upon how Internet-based user-driven innovation could be supported – for example by a fraction of the cost of the current “bail-out packages” – yet another example of how resources are systematically wasted under capitalism. There is a range of topics connected to users as “Watch-dogs” for product quality, safety and sustainability – that would be an important role – even in a society where the logic of profit maximisation would not dominate – because technology is always socially constructed and a male, white, high education world view will be too dominating if other points of view are not organised, do not have “voices”.

Anyhow - my main point here was that from heterodox alienation - theory perspective user-driven innovation generally is not a theoretical problem, on the contrary – concrete examples are showing the possibility, the direction to take in order to find a way to make the world we live in more human, less competitive more cooperative, with more welfare, more equality, less lousy products. In short a society where the active and innovative collaborative Netizen – homo Interneticus – and not the egoistic, short-sighted homo economicus is the theoretical and practical role model of the social sciences.

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