

## RENEWING AND NEW TYPES OF INNOVATION

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### Abstract

*This article assesses efforts to develop “open innovation”. First, open innovation is put in the framework of knowledge society. It is shown that the term open innovation refers to such different cases that it is better to assess them separately. Chesbrough’s “open innovation”, the “lead user” conception, the idea of “commons-based-peer-production” and “interactive value production” is shortly explored. “Incertitude” is overviewed as basic background that urges societal praxis to turn to open innovation. At the end the article, referring to an expert material worked out for the EC DG Research, called with abbreviation TEKSS, turns interest to extending open innovation by integrating concerned groups as innovation partners as engagement, i.e. as partners through the whole innovation process.*

Keywords: *innovation; users; production; knowledge*

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Technological innovation becomes perhaps the very central strategic factor for economic development in knowledge society. From the economic point of view, to renew technological innovation capability (say by utilizing synergies from converging technological development) becomes central to the worldwide competition for competitiveness. There is a worldwide competition in finding new organizational forms, types of innovation too. Inventing new forms of innovation are central to this competition for competitiveness on the second level. This “innovation in innovation”, “reinventing innovation” is the topic of our recent presentation, from the perspectives of corporate economics, including organization sociology and of socio-politics.

We enumerate several factors in knowledge society that are especially important in this context:

1. There is a rapid change in the weight of service embodied, rendered possibly by new products with the turn of economy towards “service economy”.
2. There is a progressing individualization (partly customization) of products.
3. Production becomes knowledge mediated on qualitatively higher level in a self-reinforcing dynamic than in mass production and products become knowledge-rich. With this, there is a shift in the role of the human agent among the production factors and a shift from the importance of the knowledge pool to the (reflexive) learning, innovation capability.
4. Knowledge is distributed and the worldwide distributed knowledge is potentially incomparably richer knowledge resource than the knowledge-pool inside the firm. Hence, in its tendency, knowledge and innovation capability outside the firm is becoming the main resource for innovation.

5. Innovation is made in a world of radical uncertainty and turbulence. So it is increasingly impossible to know in advance what sort of knowledge, where will be needed in the dynamics of the innovation process and who will be able to really contribute to innovation. Hence the importance of flexible networking in an open space for innovation aims grows in an accelerated way.
6. There is a decisive challenge in developing clever relation to future, actually to the open structure of any future in a radical information uncertainty and turbulent environment. This means that to be able to be successful, reflexive, adaptive, and anticipatory, the structuration is needed in order to realize co-evolutionary relation to the actors' radically uncertain and turbulent environment. In terms of cognitive tools that turn can be expressed as a decisive turn from prognostic efforts to foresight-based road-mapping.
7. There is an emerging turn from producer dominated innovation inside the firms to open it to innovation in networks and further new forms as an answer to the challenge to meet the distributed knowledge potential and the growing consumer awareness and power under conditions of turbulence and uncertainty.
8. To raise firms' adaptive accommodation there is a shift to integrate flexible organizational forms into the working of firms like project-type organization within the firms and with the innovation system there is a shift in the weight of SMEs in realizing innovation.
9. A user (whether a firm, organization, a group, a community or individuals) is becoming essential value producer as co-producer of innovation.

These phenomena indicate the growing complexity of the societal and economic dynamic. This may lead to one sort of definition of globalization. Globalization, from this respect, realizes a "densely interactive" systems dynamic through co-evolution of its constituents.

## **Chesbrough on open innovation**

It is worthwhile to begin this overview of some emerging new types of innovation with Chesbrough's first very successful and most popular book on "open innovation".<sup>1</sup>

Starting point for Chesbrough was the stylized fact of "closed innovation". This is the "fact" that industry based on mass production concentrated innovation to the R&D labs of big firms. Each big firm realized solutions for its innovation needs by its own research lab. Innovation got institutionalized into the hierarchical mechanism of the firm. Innovation competition was expected to win by extending the R&D capacities within the firm. The preservation of this autonomous working was identified as the criteria of the success. Extended intellectual property right (IPR) institution provided for securing this autonomous functioning.

Chesbrough shows how this mechanism got challenged toward the end of the 20th century and gave place to an open innovation. Chesbrough points to two different issues. The first is that we call the systematic and unavoidable production of early evolutionary variants in any innovation process, the production of evolutionary excess. It "opened" the "closed" type of innovation through release of excess ideas for the utilization of them outside the (mother) firm. This way the evolutionary excess turns from loss into economic gain.

The second issue is the opening of the walls of the firm for utilization of the innovation potential outside, by stepping in connection with other firms. This makes part of the networking tendencies among firms. As experience quickly showed, relying on exploitation of outer innovation potential became decisive advantage in different sectors of industry because it grew the efficiency so much. Working of this innovation commerce is based on securing IPR. Utilization of the innovation potential outside has

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<sup>1</sup> Henry CHESBROUGH, *Open Innovation*. Boston, MA: Harvard Business School Press 2000.

a necessary restructuring effect on the working of the R&D lab inside the firm. The most important is that the lab got an innovation brokering function, that connects the firms outside and its (mother)firm.

As Chesbrough concludes, this opening has been leading to constructing a worldwide market for innovations. This process led to stable innovation networks among firms. With Reichwald and Piller we can say that this type of cooperation in networks subsumed cooperation as a tool and a technique to making the firm's individual way to raise effectiveness and efficiency of "manufacturer dominated" innovation.<sup>2</sup>

With this two obviously very different cases we feel necessary to put the question already if the new term open innovation is not more than a collector term, based on the common indicator that every case gathered and subsumed under that term has the common feature that it is different from the "closed" type of innovation but not much more in common. That means, in case we do not want to get trapped in an approach to an open innovation that will mostly lead to unsubstantial generalizations only, there is a very important preliminary methodological work first to clearly make the needed differentiations among those forms of innovation that are usually referred to by literature as cases for "open innovation". This would need to develop several systems of characteristics that we are unable to realize it in this presentation. But we enumerated and differentiated already intuitively between two types of open innovation. These are, first, utilizing evolutionary excess, and second, engaging in looking for outer innovation resources for the mother firm. We shall continue this enumeration by pointing to a further open innovation type realized by user/consumer integration into the innovation dynamic.

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<sup>2</sup> Ralf REICHWALD – Frank PILLER, *Interaktive Wertschöpfung*. Wiesbaden: Betriebswirtschaftlicher Verlag Dr. Th. Gabler 2006.

### On “lead users”<sup>3</sup>

Perhaps uniquely important pioneer researcher of this phenomenon was von Hippel. According to von Hippel, “lead users” are those users who are being ahead of the majority of users in their population with respect to an important market trend and expect whatever sort of high benefit from some sort of innovation.<sup>4</sup> This is a useful definition but we think it should be modified in respect to requirements of a (more consequent) evolutionary perspective. It seems the role of variation production and selection is valid for the working of “lead users”, too. Seen this way, lead users realize the potential able to initiate something that may crystallize into a new trend. So, many lead users won’t be followed by masses to realize some virtuous circle as a trend, they will fail. Then, lead users are special agents having a specific role in initiation of new trends that may be more complicated than it is shown by von Hippel. New dominant populations may really emerge in close relation to some of them realizing an exemplar and paradigm bounded relation by the followers but we think that masses typically realize something different from the lead users’ perspective. Typically, they do not simply realize the same extreme needs. Instead, they add their variants to the story. They mostly change extreme models into forms that may serve for establishing trends while the pioneering models may not. Nevertheless, they may systematically realize innovative integration of users with the producers. Von Hippel seems to have envisioned a division of users into an active and a passive group and too much copying relation in his model of user integration.

It seems that some basic stylized, general observation is valid. According to this wide masses of users—both firms and individual consumers—are able to innovate for their own needs. Based on different examples where

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<sup>3</sup> To be “lead user” is a role. “Lead users” may be firms or living persons, groups, etc.

<sup>4</sup> Eric Von HIPPEL, *Democratization of Innovation*. Cambridge, MA: MIT Press 2005.

customers participate quite naturally in innovation it is possible that cooperation may become typical in the different “sequences” of innovation that not only include involvement in design but perhaps even making new product ideas too. Many new types of informal and formal cooperation and new types of firms emerge that specialize on utilizing innovative ideas of possible customers.

There is an “information asymmetry” between producers and users. Explanation for the rapidly growing user involvement into product and service innovation has to give an account of the economic, more widely the societal reasons that make worthwhile to solve the “information asymmetry” challenge for the agents, the users and the producers by user involvement in innovation. The “information asymmetry” challenge is to be seen together with the problem of “stickiness” of the sorts of information users may have. (“Stickiness” comes partly from the “tacitness” of the knowledge needed for innovation.) Overcoming this information asymmetry and stickiness by user involvement may lead to classical effects in terms of raising cost efficiency for the firms but first of all to new effects in terms of efficacy, i.e. enhanced appropriateness of products for (individualized) users. Von Hippel demonstrates: a new type of division of labour is emerging. This is based in partitioning into need-information-intensive and solution-information-intensive subtasks.<sup>5</sup> As Reichwald and Piller explicate the user integration, even possible dominance by users seems especially important in the innovation phase while dominance of producers remains for the production phase. With this integration, a new mechanism of the working of industry and a new business model is needed.<sup>6</sup>

Users have been developing innovation communities in the cases investigated. These innovation communities may unify users as well as institutionalize user-producer interactions. These communities give an informal institutional background to the new form of innovation. Access

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<sup>5</sup> Von HIPPEL, *Democratization of Innovation*, p. 16.

<sup>6</sup> REICHWALD – PILLER, *Interaktive Wertschöpfung*, p. 41–54.

to innovations may occur through the “free revealing” by the innovators, providing for a new commons this way. Von Hippel recognizes that users’ ability to innovate is improving radically and rapidly. The explanation he gives refers to technicalities: rapidly improving quality of computer software and hardware, improved access to easy-to-use tools, access to innovation commons that continuously get richer. We think that the quickly developing, accelerating, diversifying collective learning process through emerging user and innovation communities has the same explanatory importance. Concerning the assessment of this recent learning process it is to take into account that user integration does not proceed in vacuum but in an arena where ideology of the necessarily passive user (contrasted to the expert producer), legacy of a different division of labour, legal and political regulations non-favorable for user integration dominate. Nevertheless, old, established big firms frequently give way to user integration into the product innovation and brand new firms make quick career by specializing in serving for user initiated innovations. According to von Hippel there are different possibilities for producers in supporting user innovations:

1. Manufacturers can realize the production of user-developed innovations for general commercial scale.
2. Manufacturers can develop and sell kits of product-design tools useful for user innovators and/or can provide for “product platforms” to ease users’ innovations.
3. Manufacturers can develop and sell complementary products or services to user-developed innovations.<sup>7</sup>

Von Hippel gives the somewhat bombastic name “democratization of innovation” to the emerging process. It is to be seen that the “democratization” of the innovation process von Hippel speaks of is a rapidly growing, scarcely known but more and more needed economic potential. It is “democratization” because, this way, “consumers get what they really need

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<sup>7</sup> *Ibid.*, p. 126.

according to their individualized needs.”<sup>8</sup> Further, consumer integration into the innovation process rebalances the earlier one sided producer dominance. New organizational forms, innovation communities realized by integration of producers and consumers provide for a sustained dialogue of equals. Von Hippel claims that democratization occurs because mass availability is the tendency concerning ICT tools and this easy availability will mobilize capabilities in masses. Innovation will be, he thinks, also easier because competent use of ICT, that is needed, will require less and less skill and training. We have to confront this claim with actual experiences that the needed efforts to make people skilled in competent use of new ICT generations show a different tendency. It should be a conscious task to turn this tendency.

### **Commons-based-peer-production, interactive value creation**

Let us shortly comment on the creation of new commons by “free revealing”. While networked production by firms is some sort of market and intellectual property right (IPR) based on a new innovation mode, open source software utilization may be made this way as well as in a different way, by “free revealing”. The difference in legal regulation refers to what is called “commons-based-peer-production”.<sup>9</sup> We can recognize a quickly growing process in which “commons-based-peer-production” gets importance in the economy. “Commons-based-peer-production” is the utilization of a special sort of cooperation by joining a dynamic community committed to use value production without the mediating role of market relations among the members. It leads to a common knowledge-base and a cooperative working form for its members. ICT potential serves as essential enabling technology to its development. Engaged in this sort

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<sup>8</sup> *Ibid.*, p. 17.

<sup>9</sup> Yochai BENKLER, “Coase’s Penguin, or, Linux and the Nature of the Firm.” *The Yale Law Journal*, 112, 2002, no. 3, p. 369–446.

of cooperation one can freely use the commons as resource but commits itself to simultaneously make free his own modifications for the commons, contributing this way to enriching of the commons. This specificity is reinforced by its “irregular”, informal “legal” regulation. Instead of realization of informal collective property rights (IPR), creation of some General Public License (GPL or copy-left) is expected to regulate inventive cooperation. Economic advantage may be coming from the sinking “information opportunity costs”, the advantage to find the best person in a (perhaps world-wide) sample or from scale-effects by specialization. It may also come from a special type of labour realized by it. “Commons-based-peer-production” may provide for the decisive advantage for innovative thinking and cooperation among the agents who realize it. Because it unifies collaborators that freely join the community it may be advantageous for creative problem handlings that start with “problem-posing” (we consciously use the term introduced by the radical educator Paulo Freire) and do not necessarily start from problems given. If “commons-based-peer-production” realizes a cooperation of agents having rather different knowledge bases then finding radical reformulations of problems or radical solutions to them may become more probable.

For the classical tenet on the essential outer regulation of the interaction of selfish agents, “commons-based-peer-production” seems paradoxical in terms of organization, both the motivation and coordination forms, in its informal legal regulation of the access to the knowledge base and in a number of further points. Benkler especially emphasizes the advantage of freedom in problem identification and problem solution as a motivating factor. Among different motivation efforts are furthermore the possibility to find best solutions for the agents’ individual needs, the satisfaction that the joining a creative community may bring with itself, the freedom of entering and leaving a community.<sup>10</sup> One “paradox” of “commons-based-

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<sup>10</sup> *Ibid.*, p. 380.

peer-production” is its readiness for “freely-revealing”. As von Hippel assesses, this may be the best for the innovator, or the only available option in an inimical, on individual possession based competitive environment. Beside these motivations, that express instrumental rationality, the most important motivation may be the consciousness of joining a free self-organizing community. Another “paradox” with the “commons-based-peer-production” is that this organization form seems, for the classical observer, somewhat or even very much chaotic”. Understanding of the advantages of this “somewhat anarchistic” way of organization is to find through the self-organization perspective, how this type of organization may work as a reflexively realized unification of variation and selection production that results both in flexibility and robustness. There are some essential pre-conditions for the working of commons-based-peer-production”. These are, as Reischwald and Piller enumerate, appropriate number of actors, modularity, granularity, low transaction costs.<sup>11</sup>

Clearly, we are witnessing a radically new form of organization of innovative activities here. It is but natural that some authors express a great enthusiasm for the economic possibilities of “commons-based-peer-production” and add great socio-political expectations to it, too. They concentrate on the promises. In this respect it is likely that “commons-based-peer-production” will go through several expectation cycles. It is evident that “commons-based-peer-production” has its, at least recently, economic limits and weaknesses. They reside partly in its own construction specificities, partly in the friction problems with the market-based, dominant economic environment. One of these friction problems is the possible enduring undersupply of the production mode in time. That means that there is always a possibility that some only take out of but do not feed back into the commons and provide with this a vicious circle. It seems that an accompanying SWOT assessment may help to make more

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<sup>11</sup> REICHWALD – PILLER, *Interaktive Wertschöpfung*, p. 58.

balanced assessment even when expectation cycles are impossible to fully put an end because they have their essential function.

According to recent estimations, “commons-based-peer-production” seems to have the potential to complement the recent, dominant modes of innovation. It is unable to supersede them but forms of coexistence multiply. This has organizational science and corporate economics reasons. But “commons-based-peer-production” as new form of innovation based on enabling ICT basis is still just emerging. It is quite rational to anticipate that it may bring numerous surprises in its further development.

Reichwald and Piller introduce the term “interactive value creation” (*Interaktive Wertschöpfung*) through value-creation partnership for this new type of innovation. In contrast to mass production based on stability of the “solution space” value-creation partnership is partnership for opening the “solution space”.<sup>12</sup>

Some words seem unavoidable on ICT and WEB as enabling technology and their relation to “open source” innovation. ICT and WEB can give technological basis, provide for tools and medium for different sorts of innovative communities. There is interaction between the technological basis and the type of innovation to realize on that basis. “Commons-based-peer-production” overlaps very strongly with “open source innovation”. Recently Web 2.0 (the term coined by Tim O’Reilly in 2004) refers to a second generation of web-based communities and hosted services aiming to facilitate collaboration and sharing between users. It focuses on end-users considering them as co-developers in a process characterized by open communication and decentralization of authority leading to the understanding of the web as participation platform, the “participatory Web”.

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<sup>12</sup> REICHWALD – PILLER, *Interaktive Wertschöpfung*, p. 41.

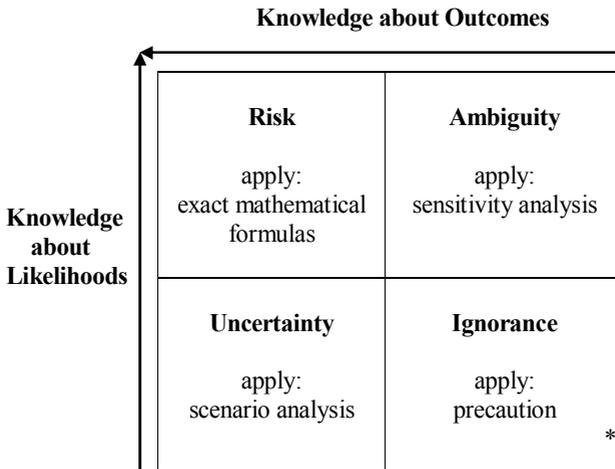
**What sort of uncertainty do we face in the emerging societal and economic dynamics?**

There is a clear historical shift and multiplication of innovation forms. This shift and multiplication is essentially to be seen as an experimental answer to the new uncertainty that surrounds innovation in the emerging world of “dense interaction”, of complexity. There is a challenge for understanding and action in this emerging world in terms of (self)-reflexivity. This means that the accomplished question entails a double feed-back and is curiosity about what the human agent intends to be in a “densely interacting”, complex dynamic of which himself is a part of. (There are different types of uncertainty, see below please. Theoretically all of them have an essential role for decisions. They were recognized by some economists nearly a century ago. They “only” work in the recent economy incomparably stronger. When they were identified a century ago they were not reflexively framed. This way they seemed to be problems in the outer world surrounding us, problems to answer by the *homo economicus*.) It is worthwhile to give a short overview of this multitude of uncertainties. One can say that the so called “quadrature of suicide”, where we have simultaneous uncertainty of technological and economic requirements for new products or services becomes many dimensional by including uncertainty of the social, cultural, legal dimensions and the interaction of all of them. (NB! This overall uncertainty caused “dense interaction” and the changing self-reflection of the human agent is simultaneously potential for value creation and destruction.) Environmentalist Andy Stirling summarizes the new uncertainty situation as follows:<sup>13</sup> instead of well calculable risks, in the new historical situation, one is typically confronted with “incertitude”. “Incetitude” is a summarizing name for calculable risk, unknown, incalculable probability of possible events, of ambiguity and ignorance

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<sup>13</sup> Andrew STIRLING, “On Science and Precaution in the Management of Technological Risk,” An ESTO Project Report, Sevilla 1999.

together. Ambiguity means that we identify the possible coming events in contradictory ways by different observers. It is less the problem of uncertainty about the future existence of these events but much more the effect of “contradictory certainty” that makes the essence of democratic societies, based on essential value-plurality. Ignorance (possibility of effects of which I do not know that I do not know), that was identified a category relevant for economy already nearly a century ago becomes unavoidable under conditions of “dense interaction”. It leads to “genuine, non-predictable surprises”. Emergence and quick recent development of research tools such as “horizon scanning” show that the importance of scanning ignorance is becoming conscious. “Incertitude” in real situations typically may be some combination of these ideal-typical cases. See them in graphic representation below:



Source: (Andrew Stirling 1999)

A comparison in outlines may help to understand what sorts of differences have been becoming dominant in the last hundred years.

1. Starting point may be, in ideal typical, stylized terms, the dominance of stable, gradually and relatively slowly changing relations. Producers know what users need (*cum grano salis*: users' needs have always been somewhat sticky info and typically they co-evolve with their possible solution) and know what and how to produce to meet needs in large market segments ("economy of scale and scope"). Quantitative risk calculation may be satisfying for practical purposes. Processes with unknown probability, emergence of unexpected events, especially ignorance may be typically omitted from rationally accounting for the uncertainty. (As examples for exception one has to think of sudden, unexpected bankruptcies or incalculable natural disasters.) When exceptions occurred, it was reasonable to expect the return to long, non-disturbed dynamic. Prognosis, planning and control worked quite well and corrections on them could be appropriately made on them. "A few sizes fit all" strategy could be followed. Radical innovations were rather rare in comparison to the recent dynamic. When it became historically unavoidable, entering in networked relations by producers could essentially contribute to restoring stability by providing among others, for a somehow predictable flow of innovations. Dominant role of this type of durable networking is providing for stabilization, for safety.
2. Recent "state" is already a highly turbulent "innovation society". Complexity, non-linearity has been becoming essential, enduring factors. The multiplicity of uncertainty problems, the full content of "incertitude" is becoming the typical case. Adaptive accommodation, developing co-evolutionary relation to the evolutionary nature of the dynamics of which we are a part of is the challenge that only leaves place for the prognosis, planning and control mechanism in more exceptional cases. Networking is becoming essential but mostly for providing for new, earlier non-expected innovation possibilities. Flexible networking as basic organization form gets weight in an accelerated

manner to provide for systematically opening space for “genuine surprises” to realize them as innovations. Experimenting with systematically opening space for processes and results that realize in the field of non-calculable probability and of ignorance become typical actions. It is to expect that these experiments systematically become critical topics for assessments from different value perspectives. This latest means that these new phenomena, including such sorts of innovations will be systematically becoming objects of critical reflection from many types of value commitments, say in religious terms or generational differences. It is most important to mention that precaution gets its necessary place with these experimentations.

### **New types of innovation and socio-political expectations**

New innovation forms redistribute agency and knowledge. From the socio-political perspective they redistribute power too. By narrowing interest to the economic perspective a “boundary work” is made that way that socio-political characteristics of the “economic” phenomena won’t be taken into account. Now we go back to these characteristics. It is important to do this for understanding the possible connections to, implications on new innovation forms and the socio-political dimension of the complex, economic and societal dynamics.

As we saw, von Hippel calls the dynamics “democratization of innovation”. What does this have in common with some sort of political democracy? The answer seems rather simple. Doing innovation in a “democratized” form has similar “logic”, structure as the participative political democracy. This structure is constructing and reinforcing a participative dialogue as the medium for living together. This may seem rather unimportant for “purely” economic considerations. But working in different sectors of society based on the same logic can and will mutually reinforce each other in the measure of growing density of interaction. This

is the background behind such recognitions and guesses that formulate correlation between political practices, such as the more participative democracy in some Nordic countries and their innovation potential. These recognitions belong to the topic of innovation systems if they are widely taken, together with the whole social milieu that serves for embedding for economy.

### **Interactive value-production with concerned people**

“Open innovation” considerations mostly have a special focus. They look first of all for new ways to accelerate the innovation process. “Commons-based-peer-production” approaches may be conscientious about looking for new directions for the innovation process, satisfaction with the working and the use value aimed at are on the highest place. What about the possible role of “concerned people”? (Environmentalists are a case for “concernedness”.) Innovation in the industrial society typically followed the so called “two-track” way. Producers innovated and innovations were attacked by “concerned” people. Constructive technology assessment in The Netherlands and Denmark showed in a pioneering way how important and fruitful is to realize systematic co-operation between innovators and their critics in interest of a sustainable development. Systematic inclusion of “concerned people” in innovation already from idea generation makes innovation socially robust. Trusted by the DG Research of the EC an expert group recently wrote an important manifesto on turning to a Regime of Collective Experimentation.<sup>14</sup>

Creativity was subsumed under discipline in the historical period of dominance of mass production mechanism. The non-equilibrium characteristic of Innovation society may enforce ongoing strive for innovation that needs ongoing efforts on liberating creativity and develop-

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<sup>14</sup> Ulrike FELT, *Taking Knowledge Society Seriously*. Brussels: DG for Research 2007.

ing that sort of discipline that can appropriately serve for this. It seems recognition of this need is much behind the challenge the pressure of the globalizing dynamic already realizes. This is unfortunately especially true with the still typical education with its concentration on acquiring a “big bulk of reliable knowledge” learned in a disciplined way through ramming in techniques that mostly prepares to life as if we still lived in society of mass production.

### **Summary**

The article enumerates some decisive features of knowledge society and assesses efforts to develop an “open innovation”. First it argues that the term open innovation does refer to such different cases that it is better to assess them separately. It assesses Chesbrough’s cases for open innovation, the “lead user” conception and uncovers some of its weaknesses. Further it assesses the “commons-based-peer-production”. It argues that the tasks to develop new types of innovation is to be assessed by relating this task to the “incertitude” that becomes manifest in societal praxis. It closes by referring to the recent material of an expert group on Taking Knowledge Society Seriously that suggest “reinventing” innovation by integrating “concerned groups” as innovation partners.

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