Innovation is a Cat With a Long Tail
or
Innovation Journalism as an Essential Element in the New Endogenous Theory of Growth

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European economies suffer from what the Commission of The European Communities in 1995 dubbed as the *European technology paradox:* Europe excels in scientific research, but there seems to be a partial failure in translating the new technological knowledge in commercial success. The proposed remedy for the situation is expressed in the twin ideas of *innovation society* and its *innovation economy*. Innovation economy has in its core a dynamics that in terms of the so called new growth theory (NGT) is called *endogenous growth*. It is based on the idea of knowledge being a "non-rival good", i.e. with relatively little extra cost, knowledge can multiply like a plant and it can therefore be used by several agents at the same time. That makes possible "increasing returns".

It is claimed in this article that this dynamics is only possible on the condition of effective and efficient communication. That portraits the process of innovation diffusion as the critical element in any innovation economy. It also defines the central focus of innovation journalism. In this paper innovation diffusion is seen as a cascade, where innovation output of each level becomes innovation input for the subsequent level. Users of innovation are seen as co-innovators, which effectively forces us to describe all innovations as multi-layered knowledge/know-how structures.

Some implications of this view for innovation journalism are discussed.

1 The European Technology Paradox

European economies suffer from what the Commission of The European Communities in 1995 dubbed as the *European technology paradox:* Europe excels in scientific research, but there seems to be a partial failure in translating the new technological knowledge in commercial success (Commission of The European Communities 1995)[1]. The proposed remedy for the situation is expressed in the twin ideas of *innovation society* and its *innovation economy*. Innovation society is a

[1] **Commission of The European Communities (1995):** Green paper on Innovation (COM(95) 688 final, Brussels, 59 pages).

social organization that is strongly and consciously future-oriented and is geared toward harnessing the whole innovation potential of its people. Innovation economy has in its core a dynamics that in terms of the so called new growth theory (NGT) is called *endogenous growth*.

The phrase "endogenous growth" is used by several authors since the late 1980'ies to express the idea that economic growth is an outcome of some internal processes of the economic system rather than some outside influences upon it. The theory is often associated with Paul Romer of Stanford University (e.g. Romer 1990, 1994)[2].

According to Romer we must distinguish between "ideas" and "things". While things are always rival goods, ideas usually aren't. This is to say that information differs from most other types of production inputs, like money, in the sense that many people can use it at the same time and with relatively little extra cost, knowledge can multiply like a plant. That makes possible *increasing returns*.

Although inventions and discoveries made in an economy may seem to be exogenous inputs into the economic process in the same sense as nuggets of gold found by a gold-digger, Romer points out that the aggregate rate of discovery is endogenous. Although gold nuggets and diamonds are found in alluvial deposits where they have been positioned by geological forces outside human control, in the end the organization of miners, their vision, inventiveness, knowledge, know-how and technology determine the success of the mining town. That is an important idea, and forces our attention upon institutions and other factors that either support innovation or impede it. It is the task of society to lay the table for innovative companies by developing institutions, and as a reward it hopes to get positive *externalities*, or spillover effects flowing out of the new knowledge and know-how. In NGT, they are the crucial growth factor of national economies.

2 Technological complementarities

Carlaw and Lipsey (e.g. Lipsey 2000, 2001, Carlaw and Lipsey 2001)[3] have claimed that it is not positive externalities but "technological complementarities"

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[2] **Romer, Paul M. (1990):** Endogenous Technological Change, Journal of Political Economy, Vol. 98, No. 5, 71-102.; **Romer, Paul M. (1994):** The Origins of Endogenous Growth. (The Journal of Economic Perspectives, Vol. 8, Issue 1, Winter 1994, 3-22).

[3] **Lipsey Richard G. (2000):** Some implications of endogenous technological change for technology policies in developing countries (available on the internet at http://www.sfu.ca/~rlipsey/etc.pdf) ; **Lipsey Richard G. (2001):** The Productivity Paradox: A Case of the Emperor's New Clothes. (A paper presented in the conference *Policies for the New Economy*, Montreal June 26-27, 2001, 14 pages); **Carlaw, Kenneth I. & Richard G. Lipsey (2001):** Externalities versus Technological Complementarities: A model of GPT-driven, sustained growth (A Paper Presented in the Conference in Honour of the 20th Anniversary of Nelson and Winter's Book *An Evolutionary Theory Of Economic Change* Aalborg Denmark, 12-15 June 2001, 57 pages.)

that form the basis of economic growth. They say that technologies, especially general purpose technologies (GPT) such as electricity,

> *"...expand the space of possible inventions and innovations, creating myriad new opportunities for profitable capital investments, which in turn create other new opportunities, and so on in a chain reaction that stretches over decades, even centuries".*

Old and new technologies produce together more than each would have accomplished alone, thus opening to each other some new avenues of development.

> *"So... the technological complementarities... have been a major (we would say the major) source of growth over, at least, the last three centuries (Carlaw & Lipsey 2001)."*

Although Carlaw and Lipsey apparently treat technological complementarities as something quite else than positive externalities, they can be seen as a special type of externalities created by the organic growth of technologies building upon each other. Why complementarities imply growth, is easy to see. It is a logical outcome in a system whose number of elements and their potential combinations increases.

So, take any technology before a new GPT is launched. Let's denote it with T_p (p for "previous").Then $A\{T_p\}$ is the class of marketable artifacts produced using that technology. Introducing a new GPT (say microprocessor) increases the number of logically possible artifacts hugely (as computing power becomes ubiquitous and all gadgets can be modified to include processor technology). We move from $A_p = A\{T_p\}$ to $A_n = A\{T_p\}, A\{T_n\}, A\{T_p, T_n\}$, where $\{T_n\}$ (n for "new"), represents the new types of artifacts only made possible by the new technology and $\{T_p, T_n\}$ represents the old-type artifacts where some old technology is replaced with the new.

Now, let's introduce another new technology T_m. We get the situation $A_m = A\{T_p\}, A\{T_p, T_n\}, A\{T_p, T_m\}, A\{T_p, T_n, T_m\}, A\{T_n\}, A\{T_m\}, A\{T_m, T_n\}$, where $A\{T_p, T_n\}, A\{T_p, T_m\}$and $A\{T_p, T_n, T_m\}$ refer to various old-type products that are modernized using the new technologies and $A\{T_n\}, A\{T_m\}$ and $A\{T_m, T_n\}$ are new product classes that only now have become possible.

Of course not all logically possible combinations of old and new technologies are technologically or commercially viable, but it is more than compensated by the fact that in modern markets most artifacts are produced in numerous (sometimes in hundreds or even thousands of) slightly different models and varieties. Therefore, with each new technology we see a huge increase in the number of possible artifacts and artifact classes. And most of what we have here is what Carlaw and Lipsey would call technological complementarities with T_n and T_m interacting with each other and T_p. That is the fundamental source of growth in innovation

economy, making possible a vibrant industrial activity, steady stream of new marketable products and efficiency gains[4].

Electricity is the prime example of a GPT that has made possible a huge number of goods that have little by little replaced old pre-electricity technology. The process has taken more than a century and is not ready yet. There are still tools and appliances that in principle could be made electric. Another equally good example would be synthetic plastics (see e.g. Pinch & Bijker 1987)[5]. When the bakelite process was made public in 1909, probably no one realized what it would mean economically and technologically worldwide. In the beginning bakelite was not even a commercially viable competitor as the celluloid process was cheaper. In 1918, however, huge war reserves of phenol (needed in the bakelite process) were dumped into the market, lowering the cost and making bakelite commercially competitive. This created the market, opened avenues of product and process development, and led to omnipresence of synthetic plastics today. The number of various products that have since been designed to include plastics must be in billions, literally, and many of them would never have been produced if this cheap and versatile material had not been available.

A similar process is currently happening with microprocessors. Twenty years ago, when the processor was still young, it would have been difficult to believe that today we are beginning to have processors in our clothes and even in our bodies. Processors are becoming ubiquitous in the same way as electronics and plastics did.

However, historical analysis of technological complementarities shows that they do not automatically produce rapid increases in productivity, not even strong GPT's, like ICT. Sometimes it takes decades, even centuries for a new technology to show its whole potential. Often, in the early phase of its adoption, an innovation may even decrease productivity due to the cost of the learning process and various glitches of juvenile technology. It also takes time for positive *network effects* to show up. In times of technological transformation, network effects and synergies based on old technologies are vanishing and the network effects that ultimately will be built on the replacing new technology are not yet there. It is even possible that a new technology will not increase absolute productivity at all. In such a case,

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[4] Of course there is growth of markets and sales volumes, too, but it appears that in the new global dynamics the production of mature and mass-marketable goods has a strong tendency to move to countries where labor is cheaper than in the old industrialized, aging West. Thus, in many product groups growth of market volume is only available as a source of growth in the early phases of product life cycle, before the production matures and is transferred. Then a new product is needed to keep going on. Thus, we are getting the role of a nursery for new products, with mass production happening elsewhere. This surfing on a rising tide of new innovations is the essence of innovation economy, and needs a constant stream of innovations to feed the economy machine.

[5] **Pinch, Trevor & Wiebe E. Bijker (1987):** The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other (in Bijker, Hughes & Pinch 1989, 17-50).

> *"...the social advantage of the new technology over the old is... in the future path of returns. With the opportunities created by the new technology for further technological innovations that stretch over future decades, the actual rate of return may hold constant instead of falling as it would if technology had remained static" (Carlaw & Lipsey 2001).*

There are always several of these technological/economic mega-transformations going on at the same time, in different phases. Very few technological or commercial innovations have ever been separate from these big trends. Most individual technological innovations are part of some large process whereby a GPT is diffusing through society, replacing some old technologies and producing some novel gadgets or solutions to problems and challenges that were not there before the GPT redefined the horizon.

Parallel to this movement we have institutional development, both in business and in society in general, which always accompanies technological change.

3 Innovation as a knowledge/know-how structure

In the case of electricity, the real impact on productivity and thus economic growth was not made by the innovation itself or by manufacturing electronic appliances, but by taking the technology into wide use. This is a crucial distinction that is often overlooked, with sad consequences. Electricity became important only as it transformed practices. And that is even more generally true: it is not their creation and subsequent production that make innovations important, but their wide use.

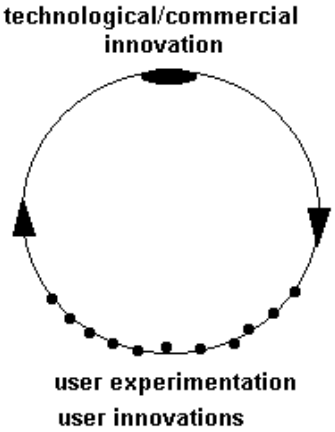
Of course, we don't have one without the other, but the policy implications for innovation journalism are clear: although a technological transformation begins with the birth of some new technology, it is only made important by its diffusion into society and good penetration.

This suggests two quite different approaches for innovation journalism. Should it be oriented toward 1) the conditions and acts of innovation-creation or toward 2) the process of innovation-diffusion and subsequent use?

It is crucial to realize that the technological innovation that produced a new marketable product is only the first in a long series of innovations that any technological transformation in society demands: for the diffusion to take place we need millions upon millions of individual or collective *user innovations*. For a user to embrace a new technology and restructure his user processes to suit it is an innovation itself. User innovations are preceded by *user experiments* when the user tries to find the special way of using the product that suits his needs best. As innovations are always introduced into a setting where they interact with old technologies, it is here where most *technological complementarities* of the new technology are found and realized.

This *user experimentation*, which has in fact always been there, is nowadays more and more often taken into conscious use by pioneering companies who are even developing tool-kits for key users to facilitate their experimentation and subsequent communication of their ideas back to the company (see e.g. v. Hippel 2005, Thomke and v. Hippel 2006)[6]. In software industry this has created the open source -movement, the gist of which is precisely that there is a huge creative potential in the user end of the process, and recognizing that can benefit all parties.

Richard Langlois (2001)[7] refers to modern consumption theory that sees end consumers of commercial products as *co-producers* who create basic utility for themselves, their families, organizations or other communities from various inputs, like their own work, knowledge, know-how, available raw materials, and technology. This view has the additional merit of reminding us of the often overlooked part of economy, namely household work. Its value to economy is seldom calculated, but it forms the steady foundation that makes possible much of what is seen as the "real economy". According to some writers this "second economy" may comprise as much as 45-50 % of GNP even in industrialized countries. The efficiency of this co-production is a major factor in any national economy. In fact, much of what is called consumption is in fact investments or production inputs into the second economy.



To diffuse through society every technological/commercial innovation needs a huge number of user innovations. It is all too easy to overlook the importance of the user end of innovation process.

[6] **Hippel, Eric von (2005):** Democratizing Innovation. (The MIT Press, Cambridge Mass.); **Thomke, Stefan & Eric v. Hippel (2006):** Customers as Innovators: A New Way to Create Value. (Harvard Business Reviw OnPoint, Executive Edition, Spring 2006, 64-74.)

[7] **Langlois, Richard N. (2001):** Knowledge, consumption, and endogenous growth (J. Evol. Econ. 2001 11: 77-93).

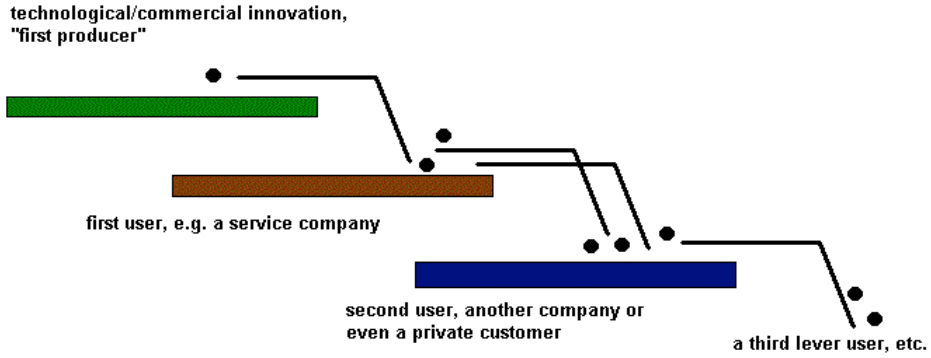
The co-production that is hidden in what is usually called consumption requires a fair amount of skills and a *knowledge structure* that must be compatible with other knowledge structures in society. This is to say, for example, that as firms and public organizations take computer technology into use, also *household producers* meet related demands and challenges. Computer proficiency in work makes it easier to adapt one's own household to computer/internet era, but the influence goes also the other way around. People, who are accustomed to computer technology at home, are more ready to adapt to it at work, too.

So, we are led back to the old dilemma, whether *producer push* or *user pull* is more crucial in a technological transformation process and, hence, innovation economy, where technological transformation has become the norm.

The wise thing, naturally, is not to see these two as somehow opposite or competing processes. It is e.g. well known in Finland that demand pull created by public service organizations, banks and the like, made financially possible the development activity that created the current situation where banking in Finland is one of the most computerized in the world. Already in 1980ies there was huge activity in banks putting the new technology into use, but also at homes where the possibility of using banking services from one's own living room was well received. For every innovation by software developers[8], *user companies* (in this case banks) added their own even more numerous innovations in application of software, organization and service concept and finally also the end users of these services (in this case bank customers, which include private citizens and still other business companies) came to add theirs. In this case end user innovations were about personal life management, or personal ways to use computerized banking services as part of one's economy management, or company level solutions of payment, purchasing and other financial activities. Some companies even developed new business models based on the newly available electronic money-transaction possibilities. Thus we have the e-business of today. At all levels of this diffusion chain there were both demand pull and producer push effects – and innovations.

Thus, innovation diffusion is regularly a multi-layered process, a cascade where the *innovation-output* of one layer serves as an *innovation-input* for the next level. In most cases, no clear-cut distinction is possible between users and producers of innovations. There is innovation in all stages of diffusion, all steps of the innovation cascade. The more complicated and "deep cutting" the product, the more it is so.

[8] Software is here seen as new technology.



In innovation cascade the innovation-output of previous level serves as input into the next level

Although it is common to speak only of the *first-producer innovations*, there is no justification whatsoever for forgetting this innovative activity that happens below the level of the first producer. Technological complementarities are not only sought and found in the initial first-producer phase, but also and perhaps especially at all later levels of the innovation cascade. The real impact on the national economy is in fact made there, at those levels of the cascade where the original innovation is put into use, itself an innovative process. Innovative first-producer companies may create the most intelligent products ever, but if they are not put into creative use at the lower levels of the innovation cascade, they don't leave many footprints in national economy.

We have here a view of innovation, not as a once-and-for-all invention made by some creative person or company, but as a many-layered *knowledge/know-how structure*. In addition to the original first-producer innovations that comprise the virgin idea or product, also the subsequent co-innovations that comprise the process of putting the original idea or product into use, are part of the new technology and the new product. Thus, **innovation is like a cat with an unexpectedly long tail.** If that is not understood and all institutional support is concentrated on the first-producer end, you step on the cat's tail and you are in danger of entering the situation where most Western economies today in fact are: there is excellent activity in the ultimate first-producer end, but all other layers of the innovation's knowledge/know-how structure, and all other steps of its diffusion cascade, are neglected.

Here we have finally entered the realm of innovation journalism. We are in the position to ask, what does innovation economy with its growth imperative mean from the innovation journalistic point of view. The answer is at once obvious: especially if innovation activity is seen from the point of view of national economy as in this article, the most important task of innovation journalism can not be anything else but to support the process of innovation diffusion as best it can, in its entirety. But what does that mean in practice?

4 Innovation journalism: whose point of view?

On the basis of the discussion above, a number of questions must be asked and answered by innovation journalists. I present here a few:

4.1 Audience

Who is the intended reader of an injo[9] story? If it is just a business-man or an engineer in an innovative company, then innovation journalism has condemned itself to special publications with economy and technology beat and a corresponding audience. That is, of course, an option, but then the project of innovation journalism is reduced to getting some more technology content to business magazines and some more business content to technology magazines, a minor adjustment that does not wake up great feelings for or against. Good technology stories have always assessed also the business aspect and good business stories have always been aware of the technology part. But good journalism is always a minority, so it is always good to remind of it.

If innovation journalism wants to reach to the general audience, the matter becomes quite different. Then the next question must be: what is the important content that injo may convey to its lay readers? What is it used for?

4.2 Use

The role of an ordinary person or an ordinary user company or organization in the national innovation economy is one of a *co-innovator* or *user-innovator*, who tries new solutions in the context of his own organization, own business, or private household economy, to keep abreast of the general development. She wants to be more efficient, to earn more, to have a better life, or what ever motivations various private citizens or other users might have.

For her meticulous coverage of the slightest movements by some key companies and precise technological specifications of their new products are mostly irrelevant and therefore uninteresting. They are not going to invest in these companies. They are not going to do anything very technical, because there are professionals to do that. Rather they need critical and reliable *user-information* of much more general level about how they could apply this new technology, how others have done it, with what success, etc. They need the user point of view, which is more or less the opposite of what business/ economy/ technology journalism mostly is today.

[9] Injo = innovation journalism, for brevity

Good innovation journalism facilitates innovation diffusion (or rejection) and influences the process by circling back the experience and needs of users to product designers.

In my data[10] by far most innovation writing is very elitist. Stories are written from the point of view of politicians, company managers and engineers, i.e. either political elite or *first-producers* of innovation. Outside specialist magazines, stories with user focus or user point of view are few and even then the angle is not utilized to the full. Therefore it is usually difficult to imagine what might be the possible use of these stories to any ordinary reader. This being so, it may be that not many ordinary users of technology ever read them at all (why would they?) and the audience is mainly restricted to the same types of people who appear in the stories.

A curious detail, though, is that women's magazines have a huge number of injo stories and they are almost exclusively written from the user point of view. The theme of these stories is always personal life-management where some innovation is offered as remedy. The problems are self-centered and often narcissistic and all more general technological, economic, social, cultural or political aspects of innovations, new technology or society are systematically forgotten. The reader is wrapped in her atomistic and consumerist self, which is pampered as true femininity, and thus she is rendered non-citizen. This kind of "journalism" sadly reinforces old gender roles where technology and politics are seen as something outside the female sphere of interest and influence.

4.3 Developments abroad

From the point of view of a first-producer, all professional media, industrial cluster networks and informal networks of peers are an important channel of information. Some use them better, some are less skilled, but for all alike, technology development and trends outside their own networks receive very little attention.

At the national level this points to the need of good coverage of technology trends in comparable foreign countries. It is no use inventing wheel time after time in different countries, and it would be very wise to be aware of emerging technology trends or perhaps problems, as early as possible. In my research data coverage of technological developments and trends abroad is even in the best of media very scant up to the point that it may be a problem to the national economy.

Technology, in itself, is not patriotic. You may take advantage of, say, Russian or Chinese technology, as well as American, but only if you are aware of it. Fantastic things are done in China these days, but to my knowledge not a single Western media even scratches the surface of it. The Chinese, however, can read a lot of what is done in the West. We never surprise them. Therefore they will surprise us many times in the years to come.

[10] The material consists of almost 1000 media stories in a number of Finnish newspapers, magazines and TV news broadcasts.

4.4 Social innovations and other social/cultural aspects

All technological change implies changes in relative social/economic positions of different groups of people (defined by gender differences, geographic differences, age differences, education, occupation and the like) and it shapes our future extensively. Therefore technological development is politically laden and it should be analyzed as such.

However, in my research material, technological change is mostly treated as if it were a law-like natural phenomenon and thus outside the sphere of political and other partisan interests. In this view, economy is driven by autonomous technological change that may have social consequences but usually not social/ political motivation and definitely no social/ political responsibility attached. This *technological determinism* is a political position taken by those who either fail to see the political/ social/ cultural nature of technology or who are so firmly on the socially/ economically winning side that they do not want to acknowledge the existence of losers and the legitimacy of their position.

However, we all know that technological choices have social consequences, and there are case studies proving that sometimes technology has been intentionally used to attain political/ social goals[11]. Technology is also shaped by social/ cultural factors (e.g. household technology is often designed in view of a certain gender-based division of labor).

Even when this is not the case, the social nature of technology makes it a social concern, if not for engineers or entrepreneurs, at least for society who supports economic and technological activity in many ways. It may be asked, for example, if it is in national interests to support certain technology or not, or on what terms, and in that assessment social concerns must figure along with economic and technical views and visions, which only seldom appears to be the case. It appears that some technologies are recognized as politically laden (e.g. energy technology and sometimes transport technology), but some (e.g. mobile technology) are not.

This must be a misunderstanding or reflect poor analysis. Energy technology is made politically interesting because energy decisions affect people (location of power stations, environmental concerns, etc.) AND society pays part of the bill. Is this not the case with all technology? What technology does not affect people? What technology is not subsidized by society in myriad ways?

This should be an important concern for innovation journalists. What it means in practice should be analyzed in each case separately. I have the strong feeling that in many cases journalists might be surprised by their own analyses, should they ever be made.

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[11] E.g**. MacKenzie, Donald & Judy Wajcman 1985**: The Social Shaping of Technology, second edition 1999, Open University Press, Maidenhead, Phil.

4.5 Soft sectors

A related observation in my research material is that in media discussion certain industries and technologies figure heavily and some are almost forgotten. This does not always reflect the real importance of these industries or technologies in national economy. I just take one example: In Finland the development of productivity in services will probably be the key factor in our future economic success or failure. Therefore covering and discussing innovation activity in services would be good innovation journalism indeed. However, it is almost non-existent or in any case very scant. When we have it, it is in most cases about national level structural developments. Yet it is in individual organizations and firms, where economic results are made and where innovations are needed and put into use. Covering this activity would give people in other organizations good ideas and examples to help them with their own development needs.

Current huge emphasis in media on all things ICT and forgetting most other sectors of economy, is a disservice to readers and economy alike. Innovation journalism has a historic chance of fixing this problem, but it appears that even in this conference new information technology and its innovations dominate discussion. Shame on us.

4.6 Future orientation

From the discussion above it should be quite obvious that I see future orientation as the essence and backbone of innovation journalism[12]. It follows naturally from my view of innovation journalism as the crucially needed journalism of change. When change has become the only constant in society, journalists should adapt their work methods accordingly, turn their attention to change as a general phenomenon, the primary manifestation and tool of which innovations are.

In my own research I define innovation journalism so broadly as to include all journalism, what ever the subject, if it has a conscious future orientation. It does not matter, whether we speak of technological innovations or whether we are more interested in social innovations: in both cases it is about future development paths. For future is very *path dependent* both in technology and in society in general. The solutions, be they technical or social, of today, define paths of future development. Although it may not be impossible to reverse or adjust a path later, it may be very difficult. If, for example, we invest very heavily in hydrogen technology in the decades to come, the sheer size of the needed infra-structural investments binds us for a century or so to come. Or if we adopt one technological standard today, that closes out some other standards and development paths.

[12] Emphasis on future is evident also in **Uskali, Turo (2005)**: Paying Attention to Weak Signals - The Key Concept for Innovation Journalism. Innovation Journalism Vol.1 No.1, May 3 2004; and **Jyrki Alkio's (2006)** article How to Write about the Future? in this year's conference, which can be found in this same volume.

In fact, in our research program we are trying to develop innovation journalistic news criteria that take consciously this point of view: what makes a story journalistically important can not be based upon what has been important in the past. In innovation journalism things become important in relation to some future horizon. So, the basic innovation journalistic task is to recognize the makers of future.

4.7 The definition and scope of innovation journalism

In our conference last year I proposed to define innovation journalism in much broader terms[13] than has been customary in our small innovation journalistic community (e.g. Nordfors 2003, 2004, 2004b)[14]. I claimed that although the initiative to develop innovation-oriented journalism is an important and extremely timely innovation itself and as such worth all praise, seeing innovation journalism as only business journalism spiced with some technology view (like in Nordfors, Kreis & Sandred 2005)[15] , will not add much essentially new to what is done in journalism today when it is done well. We can do better than that, for the real poverty of business reporting is elsewhere.

I claimed that in order to have some real impact on journalistic practices innovation journalism should include social, cultural, political, and even artistic innovations as well. Instead of or at least in addition to individual innovative commercially marketable products it should look at the processes of change and contexts of innovation in economy. That is because the concept of innovation has deeply changed during the last years as scholars in social science and even policy makers have gradually realized that the traditional linear models of innovation are essentially flawed. Innovation is very seldom a *producer push* -type phenomenon,

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[13] For that discussion, see **Kauhanen (2005)**: Innovation is much more than business and technology. Proceedings of the 2nd Conference on Innovation Journalism, Stanford University, April 2005. Available on internet at www.innovationjournalism.org.

[14] **Nordfors, David (2003)**: The Concept of Innovation Journalism and a Programme for Developing it, VINNOVA Information VI 2003:5, ISSN 1650-3120, Oct. 2003. Also published in Innovation Journalism, Vol. 1 No. 1, May 2004. Available on the internet at http://www.innovationjournalism.org/archive/INJO-1-1.pdf.

Nordfors, David (2004): Why We Need Innovation Journalism, and Where It May Have a Market. (First Conference on Innovation Journalism. Conference Papers. Innovation Journalism Vol 1 No 3, May 3 2004, 14 pages.).

Nordfors, David (2004b): Innovation Journalism. Presentation in The Competitiveness Institute's 7th Global Conference Building Innovative Clusters for Competitive Advantage, September 27 - October 1 2004, Ottawa, Canada. The presentation slides are available on the internet at http://www.competitiveness.org/article/view/235/1/61/.

[15] **Nordfors, David A., Daniel R. Kreiss & Jan Sandred (2005):** Introducing an Innovation Journalism Index. Benchmarking the Swedish Market. (Innovation Journalism, Vol. 2, No. 5, May 02, 2005, 23 pages. http://www.innovationjournalism.org/archive/INJO-2-5.pdf

but as I have outlined earlier in this paper, it is a much more complicated process, the success of which is crucially dependent on what happens in the so called user end. In fact, clearcut distinctions between innovators and users do not bear scrutiny.

When writing of innovations we deal with "wholesale development" of society, its *future work* in its entirety. Drawing boundaries around technological development as if it were autonomous is artificial. AnnaLee Saxenian of Berkeley in his recent very deep study (Saxenian 2006)[16] has analyzed the reasons why some technology regions in the world have prospered and some not, and her analysis shows convincingly how e.g. ethnic networks of innovator-entrepreneurs and their personal ties to Silicon Valley companies have played a crucial role. That is a good example of the kind of things that are missed if the wider social context of innovation is deemed uninteresting by innovation journalists. For most European economies at least, the crucial issue today is not the dearth of media information about new companies and their new products but the need to maintain and sharpen our edge in global competition. That suggests a bit more analytic and perhaps economy (and not company or product) oriented approach to innovation journalism as well.

I also expressed the concern that restricting the concept of innovation journalism to technology and economy, which the narrow definition effectively does, closes the doors of innovation journalism to all other journalists that are not of those beats, i.e. majority of them. I repeat the concern here. My experience from Finland during the two years of the Finnish innovation journalism program convinces me that innovation journalism as a genre will probably not develop and survive if it is not accepted that it can be much more than business and technology journalism just a bit mixed.

5 Acknowledgements

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6 Summary

In this article it is claimed that the so called new endogenous theory of growth, which in some formulation is behind most discussions of innovation society,

[16] **Saxenian, AnnaLee (2006):** The New Argonauts. Regional Advantage in a Global Economy. Harvard Univ. Press, Cambridge, Mass., 2006, 424 pages.

necessarily suggests that innovations make their impact only in and through the process of innovation diffusion, which therefore attains the central role in innovation economy. That makes issues related to innovation diffusion the staple food of innovation journalism.

A view is presented where innovation process is seen as a cascade, where the innovation output of the previous level is seen as innovation input at the next level. At each level, also in the user end of the cascade, additional innovations are needed to put the first-producer innovation in use. Thus users of innovation become co-innovators, which forces us to see innovations as multi-layered knowledge/know-how structures where user innovations are included in addition to the original first-producer innovation or idea. Some implications of this view for innovation journalism are discussed.

The focus of this paper is on national economy.

Innovation journalism is defined as including all fields of journalism with future orientation, whether there is technological innovation included or not. Thus social, cultural, political and even artistic innovations are seen as legitimate and important prey for innovation journalists.

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