

# Why We Need Innovation Journalism, and Where It May Have a Market

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## *Abstract:*

“Innovation Journalism” is journalism about innovation (which is not the same as “innovative journalism”, which is about innovations in journalism) and covers technical, business, legal and political aspects of innovations and innovation systems. It enhances the public debate through better common knowledge and understanding of innovation issues. In industrial economies, innovation is key. In democracies journalism is key. So in democratic industrial economies journalism dedicated to covering innovation should be key.

Innovation is today probably the main driving force for economic growth in a majority of the OECD countries, and its importance will grow even more in the near future, when an increasing challenge for many countries will be to maintain wealth with an aging population.

A successful innovation system is fundamentally dependent on the interaction and shared knowledge between different professions, such as engineers, business executives, academics, and politicians. Media is a major source of shared knowledge between these actors in the public, private and academic sectors. Here is both a societal need and a market for Innovation Journalism. National, Regional and Sectoral Innovation Systems offer potential target audiences for Innovation Journalism. Regional Innovation Journalism is potentially the largest market, because of the large volume of readers and multitude of innovative regions.

Journalism is a formidable actor in innovation systems, and it can be rewarding for various actors to recognize this fact and look into its mechanism. Economists can benefit by including news media in their models, and journalists can get new insights in who depends on whom for what in the innovation systems, including their own interdependencies with other actors, helping them to obtain fair and independent reporting.

Recognizing and understanding the role of journalism in innovation systems will be rewarding for public policy makers, since the journalists' level of understanding about the reported matters sets the baseline for the level of the public debate and quality of knowledge in society.

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## **The Concept of Innovation Journalism**

“Innovation Journalism” is journalism about innovation (which is not the same as “innovative journalism”, which is about innovations in journalism). Innovation Journalism covers technical, business, legal and political aspects of innovations and innovation systems. Good Innovation Journalism enhances the public debate through better common knowledge and understanding of innovation issues, which is important for society. In industrial economies innovation is key. In democracies journalism is key. So in democratic industrial economies journalism dedicated to covering innovation should be key.

Yet there has not until now existed any recognized discipline or community of Innovation Journalism. There are journalists who cover innovation, but they have not had a community, and “Innovation Journalism” has been an unknown expression<sup>i</sup>. Their coverage of innovation has been attributed to various different disciplines, like business journalism, technology journalism, popular science, political journalism or something else. Innovation journalism is an aggregate of many traditional disciplines, and the cultural rifts between the various disciplines, for example business and technology journalism, have limited the development of best practice in covering innovation journalistically. Business and technology journalists just don’t talk enough or work enough with each other for the aggregation of innovation journalism to take place spontaneously. A community might be necessary in order to bring people together and bridge the gaps.

Our ongoing fellowship program<sup>ii</sup> is testing the possibilities for Innovation Journalism as a practice and a professional community with a name of its own, involving journalists from many different traditional disciplines who are exchanging ideas with each other and comparing professional practices on how to cover innovation. Presently, six Swedish Innovation Journalism fellows are stationed with US hosts, developing their personal skills and networks, while actively interacting through a discussion group. The First Conference on Innovation Journalism at Stanford University Apr 14-16 2004 is a part of the fellowship program.

This paper will present the case for why society needs Innovation Journalism, and where such journalism might find a commercial market. Innovation is already today a main driving force for economic growth in a majority of the OECD countries, and its importance will grow even more in the future. Innovation systems need to be improved, and introducing Innovation Journalism can do this. At the same the innovation systems offer commercial markets for Innovation Journalism. The market opportunity depends on the type of innovation system.

### **Economic growth and the need for innovation in an aging western world.**

Today, all developed industrial economies stand and fall with the capabilities of their industries to commercialize emerging technologies. Success in innovation brings growth and development while failure brings stagnation and economical decay. Leading industries and industrial economies that can’t innovate will not survive. It can even be argued that innovation is the largest contributor to economic growth in many leading economies today.

Economic growth can come from increased input of labor or capital. If more people work more hours or if more capital is invested, then the economy grows.

Economic growth can also come from increased productivity. If people don't work more hours, but work in more efficient ways or for more valuable purposes, then the economy grows, even if no more capital is invested. This is innovation.

Data suggests that innovation is the most important driving force for economic growth in some countries. MFP/TFP<sup>iii</sup> – Multifactor Productivity or Total Factor Productivity – is a metric that indicates innovation. MFP is designed to measure the joint influences on economic growth of technological change, efficiency improvements, returns to scale, reallocation of resources, and other factors<sup>iv</sup>. Innovation is reasonably a major part of the MFP<sup>v</sup>, which has constantly grown during the second half of the 20<sup>th</sup> century. In the United States the MFP has doubled<sup>vi</sup> since 1948. And in many OECD-countries the MFP has now become a more important driver of labor productivity than greater availability of capital per worker<sup>vii</sup>. So it is not the capital or the labor input that is driving growth nowadays, it is the increase in productivity. If the MFP represents innovation, then the majority of the OECD-countries have upgraded their economies from being investment-driven to being innovation-driven.

This is good news. We need innovation, because if labor and capital would be the only sources for growth, then there would not be much light in the end of the tunnel for the European or US economies, where the populations are not growing, but are aging.

Thomas Lindh at the Institute for Future Studies in Sweden has conducted research in demography and growth. His findings should make us concerned: Without structural changes on the labor market (with unchanged productivity per worker, given no change in Swedish immigration or pension policies, and if the quota between working and non-working people should be kept the same as today) Sweden will be lacking prohibitive amounts of working people as from in a few years time and for several decades to come. And Sweden is not worse off than others, perhaps better. Many other countries in Europe and other parts of the world are in a similar situation, and they have considerably lower nativity than Sweden.

There is no way of solving this problem without innovation.

In the majority of OECD countries during 1995-98 the productivity of each worker grew more than the number of workers. In other words, the growth of the economy was driven mainly by optimizing the ways and purposes of peoples' work, not by increasing the headcount of workers. Furthermore, each worker worked fewer hours, and still they were more productive than before<sup>viii</sup>. So it is going the right way, but we will need much more of the good stuff, and in parallel to that we will need to attract more good people.

The low-nativity post-baby boom industrial economies can in principle put their efforts on a massive and systematic import of talented people from other parts of the world, before the baby-boomer pension-age peak. But this will probably not happen, since the labor markets will not offer much opening before that peak. It is difficult to renew the labor market by a one-in one-out procedure in this case, because it is a ketchup bottle situation. Politicians who want to stay in office do well in being more concerned about the lack of work today than the lack of workers tomorrow.

When the lack of workers comes it might be late for an organized recruitment of skilled labor. The need for more skilled labor might well be overshadowed by the need for a massive import of cheap and unskilled labor in order to match the rapidly increasing need for old-age healthcare and home-services with shrinking budgets. This scenario is especially valid for

countries like Sweden, where taxes and employment fees pay a major part of the old-age/healthcare system. The active workforce – the bulk of the tax-payers - will be a shrinking part of the population while the proportion of elderly increases. Who will pay for their healthcare? Cheaper labor is the simplest answer.

The alternative to this bleak scenario is to spend the coming years preparing for maintaining wealth at a lower ratio of working population. This means investing in innovation for increasing labor productivity, and in parallel creating new markets that will create more job opportunities for skilled people, which will enable immigration of new high-income taxpayers before the baby-boom generation reaches the pension-peak.

So during the coming years, the importance of innovation for generating economic growth will grow, and it needs to be integrated into the public discussion.

Business journalism has taught people to discuss the relations between interest rates, currencies and stock prices. Innovation journalism is needed in order to enhance the public debate through better common knowledge and understanding of productivity and innovation issues, including how innovation affects the national economy. We need to discuss how to become more productive.

Innovation does not happen by itself, and it needs more than one person to do it. Innovation is performed by systems of different people and organizations.

### **Definitions of Innovation and Innovation Systems**

In 1934 Joseph Shumpeter<sup>ix</sup> defined economical innovation:

1. Introducing a new product on the market.
2. Introducing a new method of production.
3. Opening a new market
4. Opening a new source of supply of raw materials or half-manufactured goods
5. Creating a new organization of industry

The OECD Oslo Manual from 1995<sup>x</sup> is the generally recognized standard guideline on how to measure innovation. The Oslo Manual focuses on technology driven innovation – by then technology was considered the main source of innovation - which it sorts into products and processes. It says that innovations involve a series of scientific, technological, organizational, financial and commercial activities. And the manual points out that nothing is an innovation before it has been introduced on the market.

In 1997 the OECD followed up the Oslo Manual with “National Innovation Systems”<sup>xi</sup>, which gives an overview of the interactions underlying technological innovation on the national scale. In 1987, Freeman was the first to explicitly use the concept ‘National Innovation System’ which he defined as “ ... *the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies.*”<sup>xii</sup>.

But it is not enough to look at National Innovation Systems. Michael Porter’s work on regional clusters has raised global attention on the importance of regional innovative clusters as driving force for the national innovation systems<sup>xiii</sup>. According to Michael Porter<sup>xiv</sup>, the national business environment in an innovation-driven economy (which is the most advanced and prosperous form of economy) is characterized by a large degree of interaction in clusters.

Sophisticated company strategies in innovation-driven economies require, among other things, a highly skilled workforce, improved infrastructure, and more advanced research institutions. And sophisticated company strategies require increased access to better information, says Porter.

William Miller, founder of the Stanford Office of Technology Licensing, describes how innovative regions have a favorable environment, or “habitat”, for innovation and entrepreneurship<sup>xv</sup>. “Habitat” is an interesting allusion in this case, suggesting that innovation and entrepreneurship comes out of the complexity and quasi-randomness of an ecological system, rather than being a product of well-oiled factory machine.

In Miller’s terms, a habitat is the combination of physical, legal, and social mechanisms that promotes speed in product development and in cross-firm learning about both technical and business issues. Silicon Valley is a habitat for innovation and entrepreneurship, a gathering place for researchers, entrepreneurs, venture capitalists, and skilled workers who turn new ideas into innovative products and services. This special habitat allows the region to adapt to waves of innovation and adjust to economic cycles. It is characterized by

- Knowledge Intensity as the Only Path to Create New High Quality Jobs
- A Work Force with High Quality and Mobility
- A Business Climate that Rewards Risk Taking and Does Not Punish Failure
- An Open Business Environment (not a zero-sum game)
- Collaboration Between Business, Governments, and the Independent Sectors (Labor councils, universities, foundations, etc.)
- Ready Acceptance of Diversity and Youth in Institutions and Networks
- A Venture Capital Industry that Understands High Tech
- Research Institutions and Universities that Interact Effectively With Industry (co-evolution of ideas)
- Presence of modern communications infrastructure
- High Quality of Life in the Community (schools, recreation, health, etc.)

Apart from National Innovation Systems and Regional Innovation Systems, there are also Sectoral Innovation Systems, defined in 1997 by Malerba and Breschi<sup>xvi</sup> as “*the set of heterogeneous agents carrying out market and non-market interactions for the generation, adoption and use of (new and established) technologies and for the creation, production and use of (new and established) products that pertain to a sector (“sectoral products”).*” This stands in contrast to the traditional “industrial sector” that draws a map of industry with sharp boundaries, and groups firms with similar technologies and markets in its categories. A sectoral innovation system involves all kinds of people and companies, matching the concepts of national and regional innovation systems.

Like any other people, people who work in innovation systems need to know what is going on around them. This is why people follow the news. Innovation Journalism offers this news.

### **The need and opportunity for Innovation Journalism**

The Information Economy is an established concept and several economists have stressed the importance of access to better flow of information in economical systems. Nobel prizes in economics have been given to people who have modeled effects of sharing information, or the market forces that depend on that people don’t share information, as in the case of Akerlof,

Spence and Stiglitz who received the Nobel prize in 2001<sup>xvii</sup> for their theories on asymmetric information.

A successful innovation system is fundamentally dependent on the interaction and shared knowledge between different professions, such as engineers, business executives, academics, and politicians. Media is a major source of shared knowledge between these actors in the public, private and academic sectors.

Most people repeat and discuss what is said in the news, so the media is powerful in directing the attention and sometimes the actions of communities. Also, many people who read a news piece feel that the new knowledge is confirmed when someone else talks about it, or when they see it repeated in a different news outlet. What is said in the news has a greater chance of being accepted as a fact. News media sets a baseline for the knowledge level in society.

What's more, the news tells each consumer something more than "This has happened!". It says "This has happened. Now you know that everyone else knows it!". This public announcement of what is shared knowledge has a clear impact on the market, for example on the forces that depend on asymmetric information.

Most people follow news in broadcasts or in print every day, in the United States<sup>xviii</sup> and in Sweden<sup>xix</sup>. The major part of macro and micro-economists probably follow the news, as well as most skilled workers, researchers and those company decision makers who Porter refers to when he outlines the innovation economy. Everyone knows that enormous resources in time, money and human efforts are spent on influencing the content of news media. It is obvious that the news media can set the discussion agenda for the day like no other actor, and sometimes also profoundly affect the stock prices. And still it is not much said about the role of journalism in innovation systems.

Journalism is a formidable actor in innovation systems, and it can be rewarding for various actors to recognize this fact and look into its mechanism. Economists can benefit by including news media in their models, and journalists can get new insights in the structure of "objectivity". The word "objectivity" is used in journalism as a synonym for independence, fairness and other integrity issues that are important for good practice. True objectivity is utopian, and journalists need to know who depends on whom for what in the innovation systems, starting with their own positions, in their quest for fair and independent reporting.

Recognizing and understanding the role of journalism in innovation systems will also be rewarding for public policy makers, since the journalists' level of understanding about the reported matters is of fundamental importance for the level of the public debate and the quality of the shared common knowledge. There are many policy initiatives today for increasing the quality of teaching, but few policy initiatives for increasing the quality of journalism. Considering that each teacher communicates his/her knowledge to hundreds or thousands of people, while each journalist communicates his/her knowledge to hundreds of thousands or millions of people (who furthermore repeat this knowledge to each other in their daily communication), it seems that something is missing in public policy.

The OECD manual on National Innovation Systems stresses that flows of information among people, enterprises and institutions are key to the innovative process, in tandem with the flows of technology. This implicitly states the societal need for Innovation Journalism.

Innovation Systems create value, and people in them can get rich by knowing who needs what, who said what about who, what is cooking, and what to avoid. So the innovation systems should be potential media consumer groups for new producers.

The analysis offered by the OECD manual on the composition of innovation systems can be used for identifying groups of news consumers that Innovation Journalism news producers may target, for suggesting types of interactions to cover in stories and for suggesting strategies to identify experts to interview that the news consumers will appreciate.

Innovation journalism can be a component in existing news media, aimed at increasing the value for existing consumers, for example for today's consumers of business news, technology news, popular science or general daily news.

But innovation journalism can also be the main theme for new news sources that specifically target innovation systems, offering their actors valuable information about each other and other important issues that might affect their system.

National, Regional and Sectoral Innovation Systems offer a variety of potential target audiences for Innovation Journalism.

#### *National Innovation Journalism*

National Innovation Journalism needs to focus on issues of national concern, targeting those who are involved in the national innovation system. Presumably, there are potential groups of news consumers working with finance, law, national economy, academy, public policy and multi-national companies.

The attention of the market forces in innovation-driven economies will have to follow the ongoing shift in the economy from finance to innovation as the dominant driving force for economic growth. In investment-driven economies investments drive innovation. In innovation-driven economies, innovation drives investment.

The actors who lead the markets will move their center-of-attention from finance to innovation, or, in due time, hand over the market leadership to other actors who do so. This process started some decades ago and will continue to develop.

There are business and financial news media with high analytical capacity, like the Swedish *Affärsvärlden*, that have these news consumers as their customers today. This gives them the market opportunity to be the major players of National Innovation Journalism, given that they can integrate business and technology journalism and are interested in broadening their readerships to R&D decision makers. They are moreover usually the best-equipped publications for looking at the feasibility of new business models, which often is in the heart of groundbreaking innovation.

Another flavor of National Innovation Journalism may be offered the popular science media of today, such as the broadly appreciated Swedish publication *Forskning och Framsteg*. Popular Science explains to people how things are, rather than reporting about who said what about who. This approach can be instrumental in offering innovation professionals important background knowledge on how economy, technology, science and politics hang together in innovation systems and processes. Innovation is complex, and today the supply is short of in-

depth knowledge that can be shared by the various actors in innovation systems alike. The concept of Innovation Systems is still pretty unknown, even among the people who are in them, and there is a substantial amount of good research on them that can be popularized.

### *Regional Innovation Journalism*

Regional Innovation Journalism serves regional innovation systems.

Since regional innovative clusters drive the national innovation system, as shown by Porter and others, there is a societal need and a market for Innovation Journalism not only in national and international news media, but also in local news serving an innovative region.

Miller's habitat for innovation and entrepreneurship will offer yet greener pastures with one additional bullet in its list of characteristics:

- Trusted Local News Media that Understands Innovation and Presence of Other News Media that Reach Beyond the Habitat

For example, the Silicon Valley has the San Jose Mercury News – a local newspaper with a high-quality coverage of the innovation system, and the San Francisco Chronicle – one of the largest regional newspapers in the US with a large business and technology newsrooms, which serve the high-tech community in the Valley. By reading the local newspaper every day, the community members know who said what about whom and what goes in their habitat. The news broadcasts opportunities, strengthening collective trends.

Furthermore, Silicon Valley hosts local news offices of nationally important news media, like the Wall Street Journal, or the headquarters of several influential magazines, as Business 2.0 or Wired, ready to put national or global attention on interesting things that happen.

The Silicon Valley would not be nearly as influential and its citizens would be much less conscious about their surroundings without these high-quality news media covering the innovations and the activity in the innovation systems.

Regional innovation journalism is a potential major market for innovation journalism, due to the potentially large number of market opportunities and many work opportunities for innovation journalists. Just looking at printed news media, in 2002 there were no less than 777 morning newspapers in the US<sup>xx</sup>. It is obvious that the number of local newspapers is magnitudes larger than the number of national newspapers. According to the Readership Institute Readership Behavior Scores for 2003, local newspapers penetrate a much higher percentage of the target audience than the national newspapers. Roughly half of the US adult population read a news paper every day, and less than 30% don't read at least one newspaper in a week. What's more, local newspapers readers are better readers<sup>xxi</sup>. There are scores of local newspapers that already are reaching the majority of people working in a regional innovation system, and it seems reasonable that some of them may have good chances to become the innovation news hubs for the regional innovation systems that they are parts of.

The Swedish local newspaper Västerbottens-Kuriren has tested covering innovation industry with good success, pleasing their readership and winning a national prize for their investigative coverage of emerging biotech-industry.

### *Sectoral Innovation Journalism*

Sectoral Innovation Journalism serves sectoral innovation systems.

There are today technology news media that are broadening their technology coverage with news about business, legal and policy issues that are relevant for engineers in the technology industry. If these publications broaden their readership with the professional groups they are expanding their coverage to (in other words, if the people they start writing about start reading their magazine) they will gradually evolve into Sectoral Innovation Journalism publications.

The Swedish publication *Elektroniktidningen* is in this process, having its roots in covering electronic technology for electronic engineers. For some years it has continually expanded its coverage to include related venture capital, legal issues and government R&D policies that affect electronic engineers. Through the new coverage the magazine is also increasingly addressing investors, attorneys and policy makers that are interested in electronics. If and when *Elektroniktidningen's* marketing successfully penetrates these groups it will not only offer excellent innovation journalism, it will also become a Sectoral Innovation Journalistic publication.

Computer Sweden is the largest Swedish computer magazine, a position it earned by consciously targeting a readership of decision makers in the IT industry, introducing IT related business news in an early stage.

Biotech Sweden is probably the first publication that was started with the clear aim of being a Sectoral Innovation Journalism Publication, although the expression "Innovation Journalism" was unknown at the time. According to the founding editor Jan Sandred they mapped and targeted the Swedish biotech sectoral innovation system as its readership from the start, offering them technical, business, legal and political aspects of biotech innovations and the biotech innovation system<sup>xxii</sup>. Biotech Sweden debuted in April 9th 2002. The first issue set an IDG Sweden record for having the highest ad/editorial ratio - more than 40 % - of any of the company's launches<sup>xxiii</sup>. Biotech Sweden was also the fastest growing magazine 2003 in IDG Sweden. The revenue growth was accomplished in a otherwise slow ad market. The November 2003 issue was the largest biotechnology magazine ever produced in Sweden, with 96 pages in total. And the first quarter of fiscal year of 2004 Biotech Sweden increased it's revenues with a record-breaking 125,6 %.<sup>xxiv</sup> This is a powerful demonstration of the commercial potential of Sectoral Innovation Journalism.

By showing that Sectoral Innovation Journalism works commercially, Biotech Sweden also proved a point of interest for the knowledge of Innovation Systems as such. Each publication needs to write for a standard reader who is the personification of the readership. Publications that don't succeed in personifying their readership will not get any readers and they will fail. By succeeding, Biotech Sweden showed that the sectoral innovation system readership can be personified, i.e. that people working in sectoral innovation systems have common interests and want shared knowledge, which is an indication of that the sectoral innovation system can have a common identity, which is the requirement for a self-conscious community.

*Will the Old Dragons or the New Comets capture the markets?*

Today the national business press probably has the largest penetration into the major part of the national innovation systems, the local media have the major penetration into the regional innovation systems and the technology and trade press have the major penetration into the sectoral innovation systems. But this does not mean that they must be the ones who will capture the innovation journalism markets. There are also challenges to overcome.

Publishers are often conservative, and – anyhow in Sweden – the resources for R&D are very small, as are the resources for training employees in new skills and expertise. News media that have both technology and business coverage today might seem to be in a good position to develop innovation journalism. But on the other hand it can be difficult to merge two existing news sections with different cultures into one. Those who don't do it, and who lack sufficient leadership, might get stuck in a situation where the technology and business news desks maintain a strict separation between the topics they cover, in order not to interfere with each other. In such cases, existing news sections for both business and technology might actually make it more difficult to develop innovation journalism.

Judging from the Swedish market, it might be easier for technology news to integrate business in their reporting than it is for business news to include technology, so probably the development of Sectoral Innovation Journalism will come sooner than the other markets.

*Table 1. The Innovation Journalism Fellows and their hosts who have sent them personal invitations to work with innovation journalism*

<b>Innovation Journalism Fellow - Sweden</b>	<b>Host - USA</b>
Adam Edström, Editor-in-Chief, Elektroniktidningen Largest electronics magazine	Robert Friedman, International Editor, Fortune Magazine
Jan Sandred, Founder & Editor, Biotech Sweden Largest biotech magazine	Ken Howe, Business Editor, San Francisco Chronicle
Patric Hadenius, Journalist, Forskning och Framsteg Second largest popular science magazine	Herb Brody, Deputy Editor, MIT Technological Review
Johan Jörgensen, Editor, Affärsvärlden Second largest business weekly	Josh Quittner, Editor, Business 2.0
Magnus Höj, Feature Editor, Computer Sweden Largest Computer Publication (Daily)	Keith Hammonds, Deputy Editor, Fast Company
Marcus Lillkvist, Journalist, Västerbottenskuriren Regional daily newspaper	Steve Yoder, San Francisco Editor, Wall Street Journal

<sup>i</sup> A Google search made on ["innovation journalism"] 21 September 2003 generated zero relevant hits apart from the present fellowship program. In comparison, "business journalism" generated 18400 google-hits and "technology journalism" 5120 hits. (From *The Concept of Innovation Journalism and a Programme for Developing it*. D. Nordfors, VINNOVA Information VI 2003:5, ISSN 1650-3120 (Oct. 2003))

<sup>ii</sup> The blueprint of the "Innovation Journalism" fellowship program is presented in "The Concept of Innovation Journalism and a Programme for Developing it." D. Nordfors, VINNOVA Information VI 2003:5, ISSN 1650-3120 (Oct. 2003). The model for conducting a fellowship program was developed and successfully tested in an earlier project, presented in "Introducing Internet-Enabled Expert Networks in a Country" by D. Nordfors, M. Bajuk, L. Norberg, J. Brinkmann and D. Forbush, *Communications of the ACM*, Nov 2003/Vol. 43, No 11, p. 127-132.

<sup>iii</sup> MFP/TFP – Multi-factoral Productivity/Total Factor Productivity – explains the part of the economic growth that cannot be explained by changes in labor input and investments. If the same amount of work is put in, and no extra investments are added, the increase in productivity must be explained by changes that have made the produce more valuable or have increased the efficiency of producing and selling the produce. In growth theory, TFP is the scaling factor that is multiplied with the total input in the economic system in order to get the output of the system. Growth can be explained by an increase in inputs or an increase in the TFP scaling factor. Multi-Factor Productivity can be seen as a more humble name for Total Factor Productivity, implying that all the factors of productivity might be difficult to obtain.

<sup>iv</sup> Multifactor Productivity Home Page. US Department of Labor <http://www.bls.gov/mfp/home.htm>

<sup>v</sup> Multi-factor productivity measurement helps disentangle the direct growth contributions of labour, capital, intermediate inputs and technology. Caution is however advised in squarely equating MFP with Innovation. Not all technical change translates into MFP growth. Further, in empirical studies, measured MFP growth is not necessarily caused by technological change: other non-technology factors will also be picked up by the residual. (OECD Productivity Manual: A Guide to the Measurement of Industry-Level and Aggregate Productivity Growth. Jul 2001 (ISBN 9264194517))

<sup>vi</sup> US Bureau of Labor Statistics. MFP data 1948-2001.

<sup>vii</sup> OECD "A New Economy? The Changing Role of Innovation and Information Technology in Growth.", OECD Jul 2000. (ISBN 9264182128).

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<sup>viii</sup> Table 1: "Growth and productivity in the Business Sector" from OECD "A New Economy? The Changing Role of Innovation and Information Technology in Growth.", OECD Jul 2000. (ISBN 9264182128). Data from OECD Economic Outlook No 66. Scarpetta et.al. (2000)

<sup>ix</sup> Schumpeter, J., *The Theory of Economic Development*, Harvard University Press, Cambridge, Mass., 1934. Schumpeter's definition of Innovation in economy is (like in this paper) usually presented in a simplified form. Schumpeter's exact definition is the following:

1. The introduction of a new good—that is one with which consumers are not yet familiar—or of a new quality of a good.
2. The introduction of a new method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially.
3. The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
4. The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
5. The carrying out of the new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position

<sup>x</sup> OECD, "The Measurement of Scientific and Technological Activities. Proposed Guidelines for Collecting and Interpreting Technological Innovation Data. Oslo Manual", 2nd edition, DSTI, OECD / European Commission Eurostat, Paris 31 Dec 1995. Innovation is defined in the following way:

"Technological product and process (TPP) innovations comprise implemented technologically new products and processes and significant technological improvements in products and processes. A TPP innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities. The TPP innovating firm is one that has implemented technologically new or significantly technologically improved products or processes during the period under review."

<sup>xi</sup> OECD, "National Innovation Systems", OECD, 1997

<sup>xii</sup> *Technology and Economic Performance: Lessons from Japan*, C. Freeman, Pinter, London. (1987)

<sup>xiii</sup> *Innovative Clusters: Drivers of National Innovation Systems*, OECD, Jun 2001 (ISBN 9264187065)

<sup>xiv</sup> Michael Porter: "Building the Microeconomic Foundations of Prosperity" from the *Global Competitiveness Report 2002-2003*

<sup>xv</sup> Lee, Chong-Moon and William F. Miller, Marguerite Gong Hancock, Henry S. Rowan—Editors. 2000. "The Silicon Valley Edge—A Habitat for Innovation and Entrepreneurship." Stanford University Press

<sup>xvi</sup> Breschi S. Malerba F. (1997), *Sectoral systems of innovation: technological regimes, Schumpeterian dynamics and spatial boundaries* in Edquist C. (ed), *Systems of innovation*, F Pinter, London. Another useful paper available on the web is Franco Malerba: "SECTORAL SYSTEMS OF INNOVATION AND PRODUCTION", DRUID Conference on: National Innovation Systems, Industrial Dynamics and Innovation Policy. (1999).  
[Hhttp://www.druid.dk/conf-papers/conf-papers-attach/malerba.pdf](http://www.druid.dk/conf-papers/conf-papers-attach/malerba.pdf)H

<sup>xvii</sup> The Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel 2001 went to George A. Akerlof, A. Michael Spence, and Joseph E. Stiglitz "for their analyses of markets with asymmetric information" where actors on one side of the market have much better information than those on the other. Borrowers know more than lenders about their repayment prospects, managers and boards know more than shareholders about the firm's profitability, and prospective clients know more than insurance companies about their accident risk. During the 1970s, Akerlof, Spence and Stiglitz laid the foundation for a general theory of markets with asymmetric information. Applications have been abundant, ranging from traditional agricultural markets to modern financial markets. The Laureates' contributions form the core of modern information economics. [Hhttp://www.nobel.se](http://www.nobel.se)H

<sup>xviii</sup> USA: In the adult population, 47 percent read on any given weekday and more than 60 percent read on a typical Sunday. Less than a third (28 percent) say they do not read the local daily

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newspaper in a typical week. Readership Institute (Northwestern University, Evanston, IL, US), National RBS Scores 2003. [Hhttp://readership.org/consumers/rbs/data/rbs\\_2003.pdf](http://readership.org/consumers/rbs/data/rbs_2003.pdf)H

<sup>xix</sup> Four out of five Swedes read a morning newspaper. The average Swede devotes about six hours a day to media consumption including newspapers, magazines, books, radio, TV, CDs, video, and various Internet-distributed content, according to 2002 statistics Nordicom-Sveriges Mediebarometer 2002, Nordicom, Gothenburgs University, Sweden, ISSN1101-4539; [Hhttp://www.nordicom.gu.se](http://www.nordicom.gu.se)H

<sup>xx</sup> Number of newspapers and circulations based on data from E & P; NAA Market and Business Analysis Department, published by Media InfoCenter.  
[Hhttp://www.mediainfocenter.org/newspaper/data/top\\_news\\_volume.asp](http://www.mediainfocenter.org/newspaper/data/top_news_volume.asp)H

<sup>xxi</sup> Readership Institute (Northwestern University, Evanston, IL, US), National RBS Scores 2003.  
[Hhttp://readership.org/consumers/rbs/data/rbs\\_2003.pdf](http://readership.org/consumers/rbs/data/rbs_2003.pdf)H

According to this survey, 68% of the US population reads a local newspaper. For 45% of the Americans, this is the only newspaper they read. Furthermore, the readership (the quality of reading) is several times higher among those who read the local newspaper than among those who only read a national newspaper.

<sup>xxii</sup> The creation of Biotech Sweden is reported “The Business Model of Innovation Journalism” by Jan Sandred (To be presented at the First Conference of Innovation Journalism. Apr 14-16 2004.)

<sup>xxiii</sup> Biotech Sweden first issue record in highest ad/editorial ratio reported in IDG WorldUpdate Volume 32, no 14, 22 april, 2002

<sup>xxiv</sup> Biotech Sweden reported as fastest growing magazine in IDG Sweden by IDG WorldUpdate Volume 33, no 42, 8 december, 2003