

“1 – 7”: THE FUTURE OF INFORMATION ECONOMY

Sectoral macroeconomic development and comparative advantages of regions
with low industrial R & D-activities

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“It will soon come to validity that potatoes are planted at an office desk.” For the French economist Jean Fourastié this vision was “The great hope of the 20th century”, and alike he titled his book published in 1952. In this book he prophesied “an enormous hunger for services” to rise in modern society. The focus of future employment would be directed to the production of these services.

Fourastié based his opinion on a long-time statistical analysis of Colin Clark, an Australian economist. It was Clark who developed the classification of the three basic economic sectors “agriculture” (primary sector), “industry” (secondary sector) and “services” (tertiary sector), which nowadays is all well known to us. The French economist added the forecast that, due to the effect of sciences in the production process, not only primal activities would need a smaller number of employees but the secondary industries as well.

It was in the middle of the 1970-s when this prophecy fulfilled in Germany: The Institute of World-Economy, Kiel, stated that within only three years about 800.000 industrial jobs had been irrevocably lost. This first wave of globalisation preferably grasped the textile and clothing industry. There had been some spectacular shifts of production in the industries of watches and cameras. The term “structural unemployment” was introduced into economic policy debates.

For a long time, particularly the labour unions disavowed this secular trend, but this holds true for a lot of representatives of industrial employers as well. It seems that some of them still doubt today. It was only a small group of politicians who remembered Fourastié. They hoped for a rise of jobs in the third sector, for new jobs in public administration, in trade, banking and insurances.

But this hope had been disappointed very soon at the beginning of the 1980-s. A wave of rationalisation flooded not only fabrication, but offices and administration as well. Employment in transportation, public services and the financial industries showed stagnation or even a downturn, as in trade services. In 1990, Mr. Cartellieri, a member of the board of Deutsche Bank, announced his belief that “banks will be the steel-industry of the 1990-s”. As far as jobs in branches and back-offices are concerned, in the end he was right. Meanwhile even employment in the public services is reverse: in these days, the federal office of statistics reported that between 1995 and 2005 nearly one million jobs have been reduced.

Politicians who had been focussed on industrial economic policies felt themselves confirmed. In their conception, which still is the prevailing idea, the production of innovative technical goods provides for new jobs. Industrial policies have been renamed in “technology policy”. Economic promotion offices in the whole world concentrate on nearly the same fields of supposed future technology: ICT, life-sciences, nanotechnology, renewable energies and, depending upon the specific circumstances of a region, transportation technologies for the air-, automobile- or maritime-industries. The effect is that similar clusters are strived for everywhere, accompanied by merciless regional competition. In the new federal German states the restructuring of the economy called “Aufbau Ost” followed the same patterns as “industrial kernels” had been aspired.

So, had Fourastié been wrong? What has become of his great hope for the 20th century? And what kind of hope may be ours for the jobs in the 21st century?

For Germany, the first hint had been given in 1983 by the German Institute for Economic Research (DIW), Berlin, which had been ordered to work out a special report on structural change. The report stated that between 1973 and 1982 jobs in the service sector had risen by about 1.4 million, which was equivalent to nearly 10%. Absolute increase in healthcare jobs was outstanding. But the most vivid dynamics with more than 300.000 new workers could be found under the strange heading of “other services”.

In this column a lot of different services are listed, such as hotels, pubs and restaurants, private research institutions, sports, arts and literature or not-for-profit organisations. These “other services” all in all accounted for 2.8 million jobs, one of the biggest macroeconomic areas at all! But the enigma became even more mysterious: among the so called “other services”, there was a left-over column of irritating “remaining services” that really caused the job-expansion. The study did not give answers to what should be imagined by these remaining activities. Well, I personally happened to question the author of the study, DIW-researcher Rainer Stäglin, in an interview for the radio-station “Sender Freies Berlin” and the print magazine “Wirtschaftswoche”. “As far as I can take an insight into the data”, he answered, “it seems to be a great diversity of services which might be comprised in the word >>information<<.”

This statement was in consent with an investigation by the OECD published in 1981, titled “Information Activities, Electronics and Telecommunication Technologies – Impact on Growth, Employment and Trade, Volume I.” You can deduct from the heading that this study had been inspired by the impression of many new electronic devices which flooded the markets at that time: BTX in Germany, Minitel in France, being the predecessors of the internet, telecopy, digital typewriters and the first office computers. Nevertheless, the OECD-researchers managed to get an innovative approach to the quality of labour which is connected with the increasing application of these devices. For the first time they systematically divided the three known sectors from a forth sector of informational workforce. Their empirical analysis was directed to nine important industrialised countries and to the quarter of the 20th century from 1950 until 1975. Result: information related labour had dramatically increased, everywhere. In the middle of the 1970-s more than one third of the workers in Western Germany were employed in the information sector. Within every five years the rate of information-workers rose by 2.3%, although the total number of traditional services had increased as well.

The outcome of the study was heavily criticized by representatives of the industry, for the authors had added those information-labourers to the new forth sector which were employed in the traditional three sectors; for instance teachers at public schools, controllers in financial institutes or IT-supervisors in industrial enterprises. On the other hand the information sector was subdivided into subsectors and distinct branches. To be honest, it had been a typology of informational professions. Subsectors were presented as

- information production (to research, to advise, to invent, to measure and so on...)
- information-processing (to manage, to steer, to account, to supervise, to translate ...)
- information-distribution (to teach, to send news, to perform ...)
- information-infrastructure (to install, to run and repair IT-systems ...)

Industrial workers in the electronic industries dealing with the fabrication and mounting of computers and communication devices were not included.

The OECD-concept did not succeed in economic statistics. There was a discussion in Germany in the 1990-s to reform the statistics of services, but the idea did not receive attention. Accordingly, even the latest statistical reports provide little help for measuring the actual size of the quaternary sector. As an example, in the column for transportation and transmission of news we find bicycle-couriers aside with stock exchange reporting. Enterprise-related services show a significant growth, but charwomen, doorkeepers and maintenance staff are mixed up in the same category as the intelligent services of lawyers or data processors. However, sometimes there is a special statistical analysis from which we can derive more intelligence. Such is an official DESTATIS-report that has been published only a few days ago:

“In 2005, all branches of communications in Germany have produced goods and services totalling up to 237 billion Euros. This is a share of 5.9% of the total macroeconomic production and it has been calculated within the framework of the national accounting system.

Companies which produce information and communication technologies such as computers, telephones, mobiles, or audio and video devices are primarily numbered under the heading of “communications”. In 2005 this part amounted to nearly 30% of the whole communication area. Furthermore, there are the services to run these devices, for example to manage telephone or mobile networks or to produce software. They created nearly one half of the total communication values, exactly 46%. The rest of 24% has been supplied by the producers of content, typically editors or broadcasting- and TV-stations. Valued with the level of the year 2000, national production of communication goods has increased until 2005 for 25%.”

As we can see, the origin of the quaternary sector should not only be interpreted as an addition to the traditional sectoral groups. OECD-researchers pointed out that they had found evidence showing a severe change in the macroeconomic division of labour, effecting an overall shift of activities towards information, including services, industry and agriculture themselves. When the crop-farmers in Kansas rise up in the morning, they make an internet-check of the price for wheat-based futures at the Chicago Mercantile Exchange, right before they are going to start their GPS-positioned reaping-machines. Then, shouldn't we commit that Fourastié's vision of agriculture at the desk has become true?

To designate the more practical, manual processes in agriculture, forestry, cattle-breeding and fishing as well as in the raw material industries I want to suggest the term “induction”. I

take it from the latin word “ducere”, expressing >>to lead<< or >>to make a first movement<<, because man extracts basic goods from the natural circulation and introduces them into industrial fabrication or trade. You might also take the term as an abbreviation of “introduction”.

Another example, now to demonstrate the change in industry, may be the enterprise Control Data. At the beginning of the 1980-s, Control Data had been a producer of computers. But soon it made more money with services around computers such as installation and maintenance instead of the assembly of these devices. Later, software development and data processing were added, followed by the development of computer aided training courses not only in computer technology but, for instance, for dental technicians. The courses were offered by Control Data’s own staff and they even taught “How to stay healthy?” or “How to give up smoking” with the help of computer programs. Up to now Control Data changed its core business for many times and the company had been renamed more than once. OECD-economists would not have any difficulties to identify Control Data’s successor Ceridian Incorporation as an information supplier in the fields of human resources.

So, what we see right before us, it’s nothing else than the ongoing division of labour, the basic economic law already having been described by Adam Smith. Activities that formerly had been incorporated in the industrial or agricultural process, as well as in the tertiary sector, are leveraged-out into self-sustaining companies. At least, they offer their core-competences in the free market for a broad range of demand. The increasing international division of labour is the core process and the real secret of what we call “globalisation” today.

Reviewing the development of specialization, we receive a better understanding and definition of distinct actions in the economic circle and the schedule of input-output-relations. Therefore, I think that it is a superior concept to redefine those traditional services which remain after the deduction of information-labour as “inservation”: Inservation is the process of fetching, bringing and distributing goods to those places or subjects where they are needed. Transportation or retail markets belong to the inservation sector, as well as money transfer or some other basic functions in finance. But logistics or the analysis of stock exchange listed companies are distinctively emanating from trade and banking as information-labour.

In the area of health-care, personal services of curing, nursing and healing are part of the inservation sector. But if things concentrate on health advisory or medical diagnose we are in the range of information.

In the respect of macroeconomic vision, I do not want to make a distinction between information and knowledge. Of course, information can stand alone for itself, in data-treasuries, for instance. But it only makes sense in a given context and within the empathy, the interpretation of man, at least in last resort. “Pure” information without “meaning” will only cause a “noise” of data. Man uses information under the application of rules and experience to compose it to knowledge. Taken only for itself, knowledge may be a wonderful treasure for men with contemplative natures, but as a rule information and knowledge are

the pillars of decisions and actions in politics, economy and a wide field of interests in private life.

Beside of this, it is interesting to watch the segmentation of economic sectors effecting a differentiation of social types. The contrariness of peasants and citizens, of industrial workers and intellectuals is well known. But if you are familiar with the banking industry you will probably be able to mark distinctions in the behaviour of the members of the “classic” credit department or in the treasury. I myself belonged to the department of communication and macroeconomics of a private bank in the north of Germany for more than ten years. But one day the head of bank lending said to me: “Well, Mr. Hollweg, I think that you are not a banker – you don’t walk like one should do.”

Bankers, alike the civil servants who are responsible for public development programs, have a lot of difficulties with business models in the service sector in general, not to mention the new business models of information services. It was far until the middle of the 1980-s that software was not sponsored by most of the development programs. Services, perhaps given the exception of craft-services, have principally been excluded from sponsorship very often. And it’s a present-day fact that the risks of traditional business such as construction or real estate accumulate in the loan accounts of the merchant banks. Should I have to say more than only three words: “sub-prime mortgage loans”? But >>God damn<< if you need a banker’s help to finance a private university!

Accordingly, many managers in financial services and in the field of sponsorship programs do not fulfil their tasks to provide the economy with liquidity and to care for its development. In the language of macroeconomics: the mechanism of transmission between the markets for money and capital and, on the other hand, between the markets for information, partly for inservation as well, is severely interrupted. In the USA business is more open minded towards services than in Europe, but most of all the problem holds true especially for Germany.

I can state this by my very own long-time professional experience. Of course, banks have difficulties to finance immaterial goods because they cannot be used as collaterals. But this does not solve the puzzle completely. Nonrecourse loans based upon project assessments have become usual. Once again, a problem of information arises, but now a problem of lacking information to appraise distinct projects in comparison with similar ones in the same sector or to understand the new markets at all. And as entrepreneurs in information branches do not need expensive machines, very often the loan volumes being asked for are relatively small. These small loans don’t yield, and they yield even less compared with expected and unexpected risks. Therefor intensive engagement for exotic business models does not make sense for a private bank.

As a supplier of invisibles, would you be better off with a Savings and Loan partner? In their advertisements these institutes promise to be aside of SME-companies. Hamburger Sparkasse, called HASPA, is Germany’s most important Savings and Loan company. HASPA holds an affiliate company called SME Capital Partner (MBG Mittelständische Beteiligungsgesellschaft). Annual value added in Hamburg is composed by services for more than 70%.

Believe me or not, but MBG-managers on principal have strictly been ordered not to finance any service company at all!

Fortunately, some other examples exist too. In 1996, Vereins- und Westbank and its affiliate investment company Nordinvest – today they are subsidiaries of HypoVereinsbank, - issued the first European mutual investment fund for the investment in internet-shares; the second fund of this kind world-wide. The concept of the fund emphasised the idea of the coming “information society”. But more or less, it still had been a technical concept. Nordinvest had been the frontrunner of a remarkable wave of mutual internet funds of further investment companies. They were an important part of the internet hype and nourished the bold business models of the new economy.

In the meantime, just the same team which had worked out the concept of the first-mover “Nordinternet”-fund reasoned about the transformation of information-societies into knowledge-societies. More and more the media used this term, but the reality behind it remained quite foggy. Karsten Müller, a young and brilliant economist with a degree of Handelshochschule Leipzig, was head of strategic capital market analysis of Vereins- and Westbank. “If there is any truth in the idea of a “knowledge-society” or “knowledge-economy”, he thought, “we must be able to find enterprises that prevailingly earn their money with the production of knowledge. And in case they do so, perhaps they are already listed at a stock exchange anywhere?” Then, maybe this could lead to the creation of an equity investment fund to invest in knowledge companies. The prerequisite constituted in a sufficient number and capitalisation of these enterprises big enough to leave the choice of stock-picking to fund-managers.

Intelligence showed an unbelievable investment-universe with assets of 650-billion-\$, although Microsoft, IBM or Amazon were not among. Most of the target-companies` headquarters were located in the United States, but a few of them were British, of Canadian origin or listed in Australia. Up to this time, the great majority of these companies had been completely unknown to the audience in Germany and even German stock exchange experts had never heard anything of them at all.

Together with his team Karsten Müller identified four sub-branches in knowledge-universe:

- education
- human resources
- knowledge management
- intellectual property

On September 3rd, 2001, the shares of the “Knowledge One Fonds-Nordinvest” have been traded on the Hanseatic Stock Exchange at Hamburg for the very first time. It was the birth of the first public investment fund for the knowledge economy, world-wide.

By an MBO Karsten Müller managed to found a new company of his own called “Knowledge One Fonds AG”, (K1F). K1F was responsible for the independent asset management of the knowledge-fund. Thus, we have just another example for the disentangle of an information or knowledge enterprise from an existing tertiary area. I myself happened to be called to the company as head of corporate and marketing communications.

You all know what happened only 8 days later, at “9/11”, 2001. Stock quotes had been weak since February 2000, but now the market crashed to a long-lasting downturn. Investors were not interested any more to buy funds with sectoral strategies, and a “knowledge fund” even seemed to be quite alike as technology or internet funds. Knowledge One Fonds has not been a story of success, - at least as far as sales are in concern.

Nevertheless, performance had been very convincing. The knowledge fund was among the five best performing public investment funds with world-wide strategies. In any comparison you can think of it was outstanding, too. In the years of crisis 2001/ 2002 investors did not lose as much as in other securities, and in the following upturn 2002/2003 they got their money back relatively soon. The assets of those who had averaged their investments continuously yielded 10% at the beginning of 2003, unbelievable at this time for traditional “value-“ as well as modern “growth”-investors. This effect had been caused by booming quotes of publicly traded education-companies, most of all to mention US-market leader Apollo Group. The price of these shares rocketed into the sky; internet shares would have never kept pace with at any time before. You cannot imagine a better proof of the dynamics of the dawning knowledge economy than this!

As I already told you, these companies and their business models were not very common to German investors. To explain the matter, we researched for corresponding developments in our economy. Being your guest at the European Business School I do not need to stress that we found a growing number of thriving private schools or private colleges. But normally private education is neglected in public discussion and estimated to cover only an unimportant economic niche.

Nothing more could miss the point than this opinion!

Have a look at continuous learning: in this area about 27.000 enterprises have been registered in 2001, accompanied by legions of free-lance trainers estimated up to the number of 600.000. Regarding not-for-public education we open the door to a world of utmost different activities, starting with early-child (even premature!) learning systems up to computer classes for retired seniors. Aside with many forms of present learning schools there are the suppliers of teaching-software, internet-portals, distance-learning, broadcasting education-programs, education-consultants, researchers, publishers of school-books, accreditation-agencies, fairs, the confederations of educational professions – I’d be able to continue this numeration on and on. Tenman*, which is the name of the company founded by myself in 2004, is a consultancy for knowledge enterprises, especially the suppliers of education, to assist them in corporate financing and corporate communications.

The German capital of education enterprises is Stuttgart, followed closely by Hamburg and Berlin.

We can notice a mega-trend with extraordinary dynamics in the combination of education and health, i.e. the qualification of health-care professionals. All the big players in private education compete with each other to grow in this area and to acquire existing institutions.

Promising business models had also been found by the managers of Knowledge One Fonds AG in connection with intellectual property: ARM, for example, a UK-public company. ARM does not produce arms; ARM is the abbreviation of Advanced RISC-Management, and RISC is a system for the design of integrated circuits. The most advanced microchip-layouts are not assembled by well-known producers like Intel or Infineon any more, but by the pure inventors of blueprints as ARM or Nuance. They licence their designs to everyone in the IC-industry.

Another interesting UK-company is BTG British Technology Group. BTG executes research in various fields, but its sole product are patents. BTG researched invented the device for magnetic resonance tomography. They won a Nobel-Prize for it, but they never built a single tomography tube. Industrial companies such as General Electric or Siemens completed the work based on BTG-patents, and for BTG these deals paid-off very well.

Today, big industry itself still remains to be the most important producer of patents. IBM, Philips, Siemens, DuPont, Toyota – they file thousands of patents every year.

Within the framework of this conference we are interested in promising strategies for regional sponsoring of knowledge economies. Focussing on patent production might be challenging in this context. The prevailing opinion argues that regions which do not manage to stimulate technical innovation and patent registrations suffer disadvantages and they show slower growth in the long run.

As far as Germany is concerned there is empirical evidence for this opinion. The Hamburg based HWWA-institute investigated the innovative power of the German federal states. The result discloses differences in patent productivity, typically along a south-north and west-east gradient of long-time growth. Among other indicators the number of patent registrations per 1000 inhabitants of the states has been compared. Bavaria and Baden-Württemberg are first.

On the other hand, Westphalia indisputably is a state with a strong industrial base and with a lot of industrial research, but its position in this ranking is somewhere in the middle. If you want to inquire into the reasons for different patent productivity, you will become aware of the number of Fraunhofer-institutes. In the southern states there are many of them, far more than anywhere else. Fraunhofer research is directed to applied sciences. I dare claiming that the close cooperation between these institutions, regional universities and local industry has formed successful clusters and caused the economical advantage of the south. The list of top-level institutes of applied research in the north is much smaller and they do not fit into the landscape of the regional structures of the industry very well. For instance, no “lighthouse”-laboratory for maritime logistics has settled at the coast. To reach research of excellence in this field, Dortmund is the nearest place you have to travel to.

We may suppose that the advance of the south will accelerate in the near future. Universities in the south of Germany succeeded in the “Initiative of Excellence”, in return they will receive higher grants from the federal government (BMBF) and the German Association of Research (DFG). Four weeks ago (28th of August, 2007) the BMBF announced another donation of 200 million € for the winners in a new competition of the “most successful clusters”.

A study group of the northern confederations of the Economic Council of the CDU (Wirtschaftsrat) has worked on this development in preparation of the Second North-German Economic Conference (Zweiter Norddeutscher Wirtschaftstag) to take place in May 2008. (Two years ago, the first conference pleaded for a better coordination of science policies between the governments of the northern federal states.) I am a member of the preparatory group. In our discussions how to promote innovation I doubt that there is any hope to meet many northern companies with the efficiency in the production of technological knowledge to which the south has proceeded. The distance already has become too big.

Therefore, should we give up our hopes for comparable wealth? – Well, facing the north, I think it will be promising to apply advantages in the tertiary or inservative sector. For centuries the countries at the coast based their economic development on trade. Consequently, the first stock exchange in the world had been founded in the Hanseatic town of Brugge in the middle of the fifteenth century. Merchants joint together in the private house of the businessman Van de Boers to exchange draft and promissory notes or trade contracts. Nowadays world-wide financial markets arose from these modest outsets.

The Knowledge One Fonds AG had to inquire into the markets of patents and the trade of technologies because of the corresponding shares in its portfolio. Resulting intelligence was astonishing, but perhaps it is not surprising to the audience any more: the volume of annual trade in patents and licences world-wide is said to sum up to 250 billion US-Dollars with the potential to reach to the volumes of the overall share or oil markets or maybe to top them.

Patents are a codified form of knowledge. In this form knowledge enjoys legal protection and enforcement. The result is “intellectual property”. Property changes free goods into economic goods which can be separated from their owners and are able to be traded. The nature of these goods is immaterial, invisible. There is evidence of growing importance of these invisibles in the economy. A simple method of measurement, maybe not undisputed, is comparing the capitalisation of public companies with their book value. Ned Davies, a private US-research and auditing company, carried out this investigation and stated that immaterial goods had influenced the total value of the 500 most important public US-companies by 17% in 1975, but invisibles contributed nearly 85% thirty years later in 2005. The valuation of intellectual property therefore has become a growing problem in accounting or in mergers and acquisitions.

Economists trust in markets. “The market” will surely solve these problems. But if the estimates of the economic subjects are too far away from each other, equilibrium will end up in hardly any trade. This is the present state in the market for technologies, i. e. patent trade. Patent assessment takes a lot of time, established systems are expensive and,

nevertheless, they are inaccurate. Due to these imperfections the potentials of patent trading cannot be scooped. Actually, traded volumes dramatically fall short of the turnovers that might be dealt.

Knowledge One Fonds AG had to look out for a new business as sales of its fund were disappointing. The company now headed for an automated IT-based patent valuation system. Experienced specialists of auditing argued this would be impossible. K1F AG set up an affiliate company to realise its goals, IPB-AG (IP-Bewertungs AG), and they asked for the help of a renowned professor, Dr. Walter Mohr. Dr. Mohr teaches mathematics and economic statistics at the University of Applied Sciences Flensburg and he runs a company of his own called Prognosis. Mohr discovered the existence of up-to-date studies on the prices of actual, realised technology sales. Then he looked for relations between prices and certain attributes of patents. He could draw information from the world-wide network of patent data bases, for instance the number of citations in further patent descriptions. Finally, Mohr combined lots of indicators like this and created a weighted model for patent price assessment.

To make a long story short: the system proved a success and was certified by an important auditing company. In the meantime, some German enterprises have specialised in patent estimate. Credit Suisse, Deutsche Bank and other financial institutions tailored closed-end patent funds with the help of these specialists. Patent funds buy patented technologies and hope to profit from sales at higher prices. The first German patent auction located in Munich took place in May of this year, inspired by the example of Ocean Tomo, a company which is the first mover and market leader in US-patent business.

Ocean Tomo became well known by the publishing of a patent share index. This index correlated the numbers of company patents and a rather simple assessment model of patent values with the development of companies' stock quotes. The quotes of patent-based shares outperformed well known US-share indices significantly. Present-day research shows that this holds true for public enterprises in Germany as well. So, we can state that patent valuation systems are able to improve analysis and stock-picking strategies of technology shares.

Automated patent estimates originally had been constructed for the purposes of merchant banking. Banks should accept the technological knowledge of their business clients to serve as collaterals. The idea was that in case of insolvency exploiting blueprints could be much easier than realising used machinery. Using their intellectual property as collaterals companies could be provided with more liquidity than before.

Professor Mohr's method of patent valuation can be applied to the valuation of many different immaterial goods. But basically, there is no difference from the valuation of traditional mercantile goods. In real estate diligent gathering of rent and sales-prices and correlating these data with indicators like locations had been needed for property valuation. These systems are improved continuously. The internet-portal www.zillow.com is just causing a stir today in the USA. Zillow draws information from a giant data base to deliver automated price estimate of properties. For this, we may expect appraising invisibles and trading them in organised markets will also become easier in the near future.

Another field of application is human capital. How to value qualified education? This quest will surely be of interest at a place like the European Business School. Answering it by a simple press on the button has become possible by now. Tenman Prognosys GmbH, a joint venture between Tenman and Professor Mohr's Prognosys Group, has developed a "student loan rating". This automated estimate of career- and income-chances of students is designed to facilitate the granting of unwarranted student loans.

Banks and other financial institutes are interested in the assessment of start-up enterprises. Knowledge and different kinds of immaterial goods seem to be even more important for start-ups than for established enterprises. In my eyes science and finance are not far from forecasting the success of young enterprises. Start-ups could find better conditions, but perhaps it still is a hard way until "knowledge" is accepted as a decisive factor in start-up-ratings.

But let's go back to patents. I already told you about the first patent auction in Germany. It was not successful. Only few patents received offerings at all and it has been reported that prices mismatched the expectations of the organisers. Obviously neither a marketplace nor an auctioneer managed to create a market. For dealing goods with complex attributes you need brokering between supply and demand. Think of real estate brokers or independent financial advisors! The ideas of patent-based loans and prosperous patent trade will remain theoretical without pathfinders from inventors of technology to users.

The problem is: "patent broker" is a profession that does not exist. At least, it does not exist in Germany. However, clever leaders could create it. Its profile unites expertise in business administration, law, engineering and natural-sciences. As nobody will take up studies if there is no chance of employment after having qualified, new institutions or private enterprises would have to be started up in a parallel process, learning by doing. We may suppose that specialisation on distinct fields of technologies will result soon. Patent agencies for the universities of the federal states might be a kind of predecessors, but they suffer from systematic problems. Up to day they have little success. But the European Tec Broker initiative started by the Confederation of German Industry (BDI) is a promising model. Founded in 2003 they managed to build up a European network.

We should look at patent brokers to be international agents rather than local. This business is not about brokering technology from Lower-Saxony to Bremen or from Berlin to a company in Brandenburg. It's about top-level experts connecting patent holders in Australia or South-Africa via Hamburg with users in Finland or Japan. Knowing foreign languages and law are prerequisites, as well as established trade relations. The federal states in the north of Germany hold these assets.

Secondary markets to finance transactions in primary technology trade will follow. Banks will tailor asset-backed-securities out of patent-based loans and different forms of intellectual property. Some time ago pop-star David Bowie securitized the copyrights of his songs. And recently financial products have been issued directed to speculations on the market value of modern art. Markets could focus on trade in these securities. In return they would attract a

lot of highly specialised complementary activities. Which financial centres will be first to discover these opportunities?

Concentrating on trading patents rather than on producing technology contains another economic advantage: required infrastructure-investment is comparably low. Comparative advantages could be changed into solid lead very soon, although today the technology regions in the south still are in advance concerning patent services too. For instance, the German patent and brand office (Deutsches Patent- und Markenamt DPMA) is located in Munich. But a new start-up in Hamburg has just begun to create an innovative patent information system based on publicly available DPMA-data ...

Therefore, economic policies surfing on the new wave of knowledge economy have to construct an infrastructure of great complexity and of complementary services. They do not intend to lead to technological innovation directly but to sponsor corresponding tertiary and quaternary processes. On the other hand, public sponsoring has to be careful not to block the access of private enterprises to promoted markets.

To give a vivid example let us please turn for a moment to the quarrel between the official German weather service and the private weather forecasting company of the renowned specialist Jörg Kachelmann. Meteorological services belong to quaternary services importing in agriculture or in the security of aircraft transportation. The German weather service insists in a monopoly of public warning of heavy storms. Jörg Kachelmann receives data for his forecasting from this agency. Of course, he could not afford to build up a nationwide network of weather stations of his own. But he processes the measuring in a proprietary model and his prognosis often matched reality better than the analysis of his public competitors. The public had been warned by him of gales and flooding while official agents did not see any reason of worry at all. Of course, the opposite occurs too. The federal weather service argues that unofficial storm-warnings should be forbidden because people might panic. The same absurd argument would be used to fight the liberty of the press and apt to lead to Russian circumstances in our country!

Government-owned KfW-Banking Group reasons that because of general market deficiency sponsored student loans were inalienable. But in effect the ability and creativity of the private financial sector to care for even better student loan offers has been obstructed.

Creativity is the keyword that I'd like to examine more closely now. Once again, an example is the best way to illustrate the matter: There are lots of complaints that it is very difficult to mobilise venture capital for German start-ups. In the meantime, Nathan Myhrvold, one of the founders of Microsoft, took a big step ahead. His new company Intellectual Ventures does not invest in inventors, but ...

"Please imagine", Myhrvold says, "you were a banker or venture capitalist and you came to meet an entrepreneur requesting money for an innovation. >>Tell me about your invention<<, you would surely ask him, and the answer was >>I didn't invent anything yet. I need your money to be going to invent something, whatsoever. << >>You'd better come back when you managed to do that<<, you would probably return with a smile or in anger."

In Myhrvold's view, this answer is very short-sighted: "If a person shows the ability to create something new, one should bring him in contact with serious, unsolved problems and assist him to find a solution."

So Myhrvold invests in the individual inventor. The existence of persons with very special talents to invent and improve things cannot be doubted. Dr. Yoshiro Nakamatsu, a Japanese, holds about 3.000 patents in various fields. Patent rolls show that even in the research departments of big industry again and again the same employees are listed as inventors. Professor Mohr stated this fact when he screened voluminous patent portfolios.

More and more the creative talents of man turn into the middle of the economic process. More than on skilled expertise this kind of new economy grounds on emphatic experience, intuitive understanding, genius potentials and artful abilities. Don't believe this was belletrist glossing. Open your eyes! You will realise lots of new business models footing on these talents: Appealing design is an important attribute of commercial goods to succeed in sales. The art-market is booming. Creativity-trainings and meditation-courses are offered everywhere. Music is a mega-business. Do you think it makes sense to classify these areas as information or knowledge? These activities do not address the intellectual capacities of man. They are about native and emotional potentials.

In respect of sectoral classification, how shall we deal with religion? The roman-catholic and Lutheran churches are Germany's most important employers. Church-owned hospitals may be seen as a part of inservation, infant and elementary schools belong to information and knowledge. But what kind of economic good is produced by a priest, a rabbi, a mullah or a guru? Although rationalists may mourn about it, religious feelings claim a wider space in the modern world of the 21st century.

Social-psychology has clearly proved that more than 80% of human decisions are governed by our emotions. So, there is a run to trainings in "emotional intelligence". A year ago, a new magazine titled "emotion" was issued. Managers emphasize the trust in their intuitions and they try to train these abilities. More than 30% of the clinical pictures which Germans uncover to their doctors show physical symptoms although they have psychosomatic causes and can only be cured by influencing the minds of the patients.

If we take closer views to modern business activities they seem to be unusual, astonishing. Have you heard of the "horse-whisperer" Mr. Monty Roberts? He wrote an international bestseller about his ability to get in mental contact with horses. He founded 18 learning-centres located in the whole world to teach riders, animal breeders and zoo-keepers how to discover the same talents within themselves. Recently the TV-stations ARTE and PHOENIX reported of even more unusual and astonishing professions: pet-communicators intrude intuitively into the minds of cats and dogs. Their inspections are helpful for the owners to understand the fears and needs of the animals.

Well, by presenting a plenty of observations I want to express: obviously the patterns of live reveal a fifth sector of the economy. You can grasp it with your hands. I want to define this area with the term "intuition", to divide it from rational, intellectual action. The following description might serve as a common definition: the quintiary sector contains business

activities or enterprises which use or influence non-rational, mental abilities and feelings of creatures. It deals with well-being (not wellness!) instead of wealth.

As economic thinking has been based on the paradigm of rational action and choice, I suppose that I am probably causing a storm of anger among the members of my profession.

But it is not for the first time that our ideas of the economy have been put on their heads. The introduction of "information" into economic processes already did it - in the real sense of the word. The classical ideas of labour-value as well as neoclassical price-theory get in trouble if you ask for the value and the price of information. New answers to this quest are radical: Carl Friedrich von Weizsäcker, a physicist, reduces all physical and economical categories including human labour to the dimension of information.

In the 20th century we have become witnesses of the extension of world-wide financial markets. In the end they superposed or arched real economy. When these markets were at the verge of shifting their characters from tertiary to quaternary John Maynard Keynes developed his famous theory of the dominating function of money- and capital-markets over the markets of goods and labour. Today financial markets are still trading money, but their real currency is "information". Any outbreak of new financial crisis is a proof of the dominance of information and information markets over finance.

Information shifts to expectations. Rational expectations, as economists love to believe. Crash and panic at the exchange markets as well as every-day-trading prove the opposite. The unbelievable diversity of disposable information cannot be processed by human intellectuality any more. Intuition, a native ability acquired by man in the course of evolution and enabling him to synthesize most subtle and inconspicuous impressions, is going to accompany our intellectual forces. Economy is put from the head onto the belly.

I have not been surprised that one of the latest theories on successful trading at financial markets is titled "The Theory of the Wild Beasts". The brilliant author, Kathy K. Sato, does not try to gain advance of information before other market-participants any more. Just the opposite! She tries to find out "where the wind is blowing from" and which classes of assets are in the current trend of unforeseeable market dynamics.

Yet it is difficult to explain the design of intuition-markets, to understand their rules and to find out how they create values and realise them. Perhaps the most interesting hints can be derived from music-markets.

Parallel to intuition, in supplementary as well as in its contrary, cheat arises: nice deceptive appearance, fictitious worlds. The ultimate object of information processing is creating a copy of the real world. Of course, the result is not an exact copy but a superior level of reality with lots of "virtual" realities. They are projections to awake and to please our longings and needs. I want to define the totality of these worlds by the term "imagination". Imagination is the food and the product of our fantasy. Aside from emotion and intellect fantasy is another basic faculty of man. And man is going to coin capital from it rather practically: for instance, if the value of a company is derived from its image instead from its real assets or its intellectual properties.

A little bit friendlier we might speak of “reputation”. A recently published analysis states that 27% of the value of the S&P500-US-companies roots in their reputation. In the economic world of imagination things no longer deal with information about >>what is<< or >>what was<< but >>what should be<<. Its means of production are signs and symbols for the dazzling and the potentiality. Its object of production is the human faculty of creating ideas. Imagination is the sixth sector of economic development and specialisation.

We can clearly realise that the movie-business and all kinds of audiovisual content production should be summed up in the column of virtual worlds, at least if they are telling us tales and stories instead of news. Transitions are floating, of course, but distinction is not impossible. Or would you really plead to number J. K. Rawlings, the author of the Harry-Potter-novels, among the information-workforce, as OECD once suggested?

Computer-games belong to imaginative worlds as well. Their returns already have advanced the movie business. “Games convention”, a big national fair, took place at Leipzig at the end of August. The Imagination-economy will reach its ultimate object when virtual worlds will directly be connected with ours brains instead of being watched on a screen. If this occurs consumers will no longer be able to discern the difference between reality and “otherland” (“Otherland” is the title of a bestselling science-fiction novel written by Ted Williams). Simulation-research and brain-science operate hand in hand. Only some weeks ago a top-level research-institute has been founded in Jülich to conduct intelligence in this conjoint area.

Simulations can serve for very sound industrial purposes. Based on sophisticated information systems automobile- and aircraft-simulators create perfect illusions of driving and flying. Complete fabrication-lines can be simulated, not to mention a new scientific discipline: bio-informatics. Scientists in this area create three-dimensional models of germs in their computers. Then they research for the molecular structure of artificial pharmaceuticals fitting to kill or block the germs –virtually as well. All of these areas show a very high degree of complexity. Accordingly, the progresses of many sciences flow together at this point: new mathematical procedures for the calculation of dynamic systems, general research on complexity and chaos, and naturally the proceedings in construction supercomputers for elite science institutions and of cheaper parallel computing in industry.

The outcome is a new dimension of perception and a new dimension of reality: artificial life. It started as a fuzzy computation program; it was continued with the development of genetic algorithms; they connected informatics and biological genetics – now it escapes from our laboratories. On October 18th, 2006, the following news was spread:

“Hamburg (ots) - Researchers succeeded in creating artificial molecules managing a lot more than only glimmering red and green if they are ordered to. Once the principal is known gene-bricks can be puzzled together alike a construction set to innovative forms of life. Scientists head for tailoring custom-made solitary cell microbes - and in the future organisms of higher complexity.

Synthetic biology manages to inspire our fantasies with the idea of artificial micro organisms transforming sunlight directly into fuel, or of a new kind of intestinal germs which can be used as malaria-antidote – for a small part of former cost.”

Well, this news isn't surprising or completely new. Gene- and biotechnology have already used genetically transformed bacteria for a long time. Without these little helpers the pharmaceutical company formally known as Schering would not have managed producing contraceptives. Discussions about gene-maize or other genetically restructured food are well known. Dispute about patents of living beings is less discussed in the public. The quarrel aroused with the so-called cancer- or "onkomouse". Please remember progress in human reproduction medicine or cloning in animal breeding. It's all going to end up in a growing sector of bio-engineering which I should like to designate as "ingenetics", a foreseeable seventh sector.

Cluster-policies are used to the term "life-sciences". This term is surely useful for the intelligence of conjoint areas, but in my view, it does not lead to precise distinction because the definition merges traditional tertiary health-services with the utmost progressive developments.

I insist in my classification because the original economic question for the nature of value and the prices of goods deriving from it has to be put with urgent intensity at ingenetics: What is the value of life artificially created by man?

Producers translate this question into: income? How to explain the giant gains of companies like Google having been yielded within only very few years by a nearly immaterial product? Before Google, the fast rise of Microsoft surprised the world of business. It seems that specialised sectors allow for new means of receiving income and of new dimensions of the accumulation of wealth. If this holds true establishing and attracting services in the designated sectors is a very yielding prospect for regional economic policies.

Therefor I'd like to summarise:

- Induction
- industry
- inservation
- information
- intuition
- imagination and
- ingenetics

are big steps in the division of labour, a process that will never come to an end. Later generations will get to know step number eight, nine, ten and so on, whilst these steps are disguised for our eyes yet. However, this vision includes a magnitude of potentials for employment and wealth.

Services which formerly had rather been depreciated than estimated advance into the middle of successful economic policies - along with technology.

The problem of principally misunderstanding services is very old. It has been caused by Adam Smith. Smith reasoned services (with the exception of vocational qualification) to lessen wealth, not to enrich it. Nobody will get or stay rich who employs a lot of butlers or who spends his money attending the opera, he argued. Obviously, Smith confounded micro- with macro-level, but his opinion is still causing effect up to present days.

To show this effect let me please tell you of a young scientist from ETH Zurich. He had worked out a study on macroeconomic strategies in the official mission of the Swiss government. The study was presented at a conference of the German Keynes-society that honours me with its membership. The young colleague could not make up his mind to include services into his considerations, although everyone knows the importance of finance for the Swiss economy. Healthcare alone would have had a little chance in his ideas. Former chancellor Dr. Helmut Kohl also preferred neglecting services: "We all cannot shave each other", Kohl repeatedly stressed.

In Reutlingen, today, I want to remind you to an address held by former Prime Minister Lothar Späth. In 1984 Dr. Späth came to visit Germany's first start-up-centre in Berlin. It was located in an assembly-hall of the famous industrial trust company AEG. AEG had closed down its production a few months ago, and now a big part of the hopes for future employment in the divided capital had been laid in young computer- and software companies which had settled there. Späth discouraged these hopes saying: "We should always be aware of the fact that these start-ups are developing means of rationalisation. All in all, these technologies diminish employment instead of increasing it. To balance this effect in our federal state we created and initiated jobs in totally different fields of the economy, for instance thousands of music-teachers. We'd better think >>right<<", he said, "meaning: with the right half of our brains which is responsible for creative thinking."

More than anywhere else in Germany modern services have already been an integrated part of economic policies in your state. I am convinced this fact reveals the other half of your economic secrets. Prominent public and private universities are an important part of this successful story.

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