

## Innovation processes in the dynamics of social change\*

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### The dominance of economic viewpoints and considerations

Any kind of innovation is embedded in larger systems: Broad concepts of culture (the “Western”, “African”, or “Asian culture”, etc.) and societies, in particular world regions, dominated by cultural styles and ways of living, create specific “cultures of innovation” and “innovation cultures” at the same time<sup>1</sup>. Existing socio-economic structures provide the background to innovation cultures, encompassing “innovation regimes” significant in certain regional or national “innovation systems”<sup>2</sup> which in turn produce certain “innovation patterns”. Innovation patterns represent in different density and combination various types of innovation that may be distinguished e.g. as innovations in technology, organisations, and in the social sphere.

Specific types and patterns emerge when comparing the occurrence of innovations among regions and over time. At present innovations in technology (increasingly deriving from scientific research) attract more attention, receive more funding, and are preferably welcomed compared to innovations in society at large. Furthermore, many improvements in social relations or enhanced social cohesion do not yet receive common acknowledgement as “innovations”. Obviously we live in a society favouring technological innovations, which play the first role in innovation patterns, getting hold of most support by appropriate innovation regimes established in the frameworks of more or less effective innovation systems. This is the case because of the persistent dominance of the economy compared to other components in most contemporary societies. Thus we may say that current western societies are signified by an *innovation culture under economic dominance*.

However, is there a single economic command? And if so, where did it come from?

More than 200 years of industrial development and expansion of what was labelled “The great transformation” by Karl Polanyi (1944)<sup>3</sup> led to the current debates concerning globalisation and the accelerated demand for innovation in an ever growing economy.

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<sup>1</sup> For discussion of these terms cf. further down, chapter 5.

<sup>2</sup> Lundvall, 1992; Godoe, 2000; Heidenreich, 2002; Heidenreich/Krauss, 2003

<sup>3</sup> In his comprehensive analysis of the “system of market economy”, Polanyi argues that in the wake of industrialisation and capitalism, the economy became external to society. It is coherent in this logic, to exclude social costs, depletion of natural resources and properties of future generations from accountancy and balance sheets of business corporations.

To different degrees and with diverse results, states, multi-national corporations, political leaders and a multitude of institutional networks have tried out experiments with radical free markets (from the historical “Manchester capitalism” on to unguided economies in some countries or periods after the collapse of the soviet empire in the 1990ies), communism (state-owned economy, production and welfare plans), and tamed capitalism (social or eco-social market economy, building on welfare systems and regulations). As a matter of fact, it seems that in any such case, in either region of the world, a great variety of political systems may work for better or worse over some time. Yet a common denominator appears to permeate all variations: The preponderance of the economy. At the same time the world is in need to uphold social values besides mere economic values such as productivity and profit. The functioning of the economy is indispensable, but so are cohesion and solidarity in society, ethics, and sustainable interaction with nature.

When searching for sociological alternatives to economic pre-occupation, deterministic prioritisation of economics over social and cultural structure (as in the Marxist “historic-materialistic laws”) must be rejected. But modern economic thought also seems dedicated mostly to the notion of “economy first” – and only thereafter social issues, cultural development and ecological challenges may be dealt with. Neo-liberals sometimes are closer to philosophical principles of communism than they would ever admit.

If economic prosperity – over and above defined within the closed shop of capitalism – is accepted as the sole basis for societal progress, development becomes feasible only in linear stages, pre-conditioned by the economic system. Under such conditions, as can be noted more or less globally, social achievements necessarily need to be postponed whenever fear of economic regress is raised.

How to understand the discrepancy between economic progress and social disasters? How come, that increasing wealth concomitantly produces increasing poverty? And why happens escalating decoupling between economic growth and welfare even in wealthy economies? (cf. Figure 1)

K. Polanyi (1944) aimed to explain the discrepancy between slow social improvements that came along with fast industrial development and extensive human exploitation at the same time.

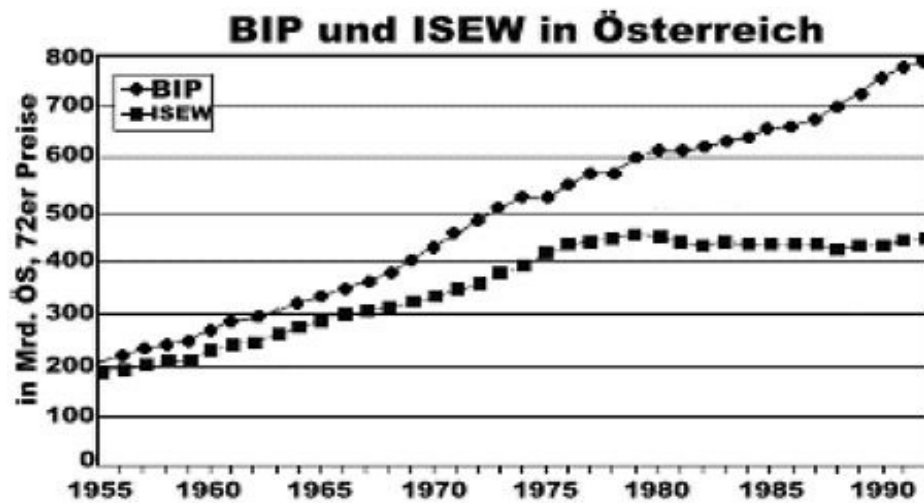
According to Polanyi, in the “system of market economy”, economy is external to society.

Consequently, social activities and measures increasingly depend on economic pursuit. People become socially de-rooted, society loses control over unleashed capital in globally liberated markets and their impact. As long as the understanding of innovation remains confined to the notion of an asset in economy, innovation as such can not be regarded as “social”, humane or a facilitator of human development – it would always depend just as well on the result of economic operations that might be stimulated by the innovative product or process.

### Figure 1: Wealthier economy delivers less additional welfare

GDP compared to ISEW (Index of Sustainable Economic Welfare),  
the case of Austria

Source: Stockhammer et al., 1995



## 2. The concept of innovation and its career in brief

„Innovation“ without prefix usually is considered any new product or process, based on superior technology or re-combination of technologies, leading to economic success in existing or new markets. Innovation plays a major role in public debates and policies aiming at economic growth in the so-called knowledge based information society<sup>4</sup>. In this context innovation is delineated as an ultimate outcome of knowledge utilisation, following knowledge production by science and research, technology development, prototyping and other forms to implement results of processes driven by creativity. Due to incremental use of scientific methods, modern society vastly has enlarged the horizon of opportunities to provide mankind with tools, nutrition and extremely productive machinery that may contribute to increasing security and wealth as well as to risks which might go beyond control. This is why innovation is a source of hope and positive expectations, as well as a trigger to some controversies over what aims and what means are involved with innovation.

<sup>4</sup> In the zoo of terms indicating changes in contemporary society a new variation of the connexion between knowledge and economy has been created again in recent years, focusing on biotechnology and sustainable development: the “Knowledge-based Bio-economy” (EC 2004, 2007). As with “Information Society”, innovation and knowledge processing in fact are top priorities for developments in this realm. Even more so, knowledge and processes of knowledge implementation are used to describe another label of current or, rather, anticipated social realities, the “Learning society”: „The learning society puts knowledge at the core of society with a new mode of production and consumption where knowledge is the predominant source of value-added with new rules of governance and distribution. The learning society increases people’s degrees of freedom by giving people more effective means for using their competencies.“ Irish EU Presidency, 2004

Actually, by and by and depending on the variety of stakeholder groupings promoting innovation in their interest, some distinct forms of innovation may be identified, ranging in principle from innovations based on technologies to innovations deriving from *social facts*<sup>5</sup>. Not every form of innovation is the result of consecutive stages of knowledge creation and knowledge implementation. Innovation may likewise build on existing old, traditional, or general knowledge – far from specialised or scientific quality – and derive from its combination with technologies and organisational change<sup>6</sup> in unpredictable and discontinuous actions in a great variety of sectors in society (e.g. in science, technology, economy, institutions, social and political measures).

The term innovation has become increasingly fashionable since the 1960s (E. Rogers 1962; R. Nelson/E. Phelps 1966). However, in particular Joseph Schumpeter pioneered the concept and analysis of its relevance earlier, when stating „innovation is a process by which new products and techniques are introduced into the economic system“ (1949, p. 149f.). Schumpeter’s perception of innovation as a process of „creative destruction“ obviously was confined to the world of enterprises, markets and technologies. Moreover, in the original presentation of the idea of creative destruction (Schumpeter, 1942) he even did not use the term „innovation“ (albeit he had analysed various forms of innovation already in 1934). He wrote of „mutation“ and identified „*creative destruction*“ as the *core competence of capitalism*: „The opening up of new markets, foreign or domestic, and the organizational development from the craft shop and factory to such concerns as U.S. Steel illustrate the same process of industrial mutation ... that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in.“ (Schumpeter, 1975 [orig. 1942]; p. 82)

Following a period of more than fifty years of perpetual expansion of capitalism (under the auspices of competition, innovation, and globalisation), it takes no wonder that innovation still appears to belong primarily to economic theory and debate about new products, technologies, and business organisation. „Innovation coaching“, as offered nowadays by many business consultants, overwhelmingly aims at accelerating the pace of identifying new market opportunities and to provide new products or services by companies that want to outstrip their competitors.

However, when the role of innovations in technology was identified as being relevant to economic progress, the full potential of the concept for long time remained untapped. During the 1950s

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<sup>5</sup> "The first and fundamental rule [of sociology] is to consider social facts as things ... a social fact is every way of acting which is capable of exercising an external constraint upon the individual", Durkheim, 1895

<sup>6</sup> Current topics in organisation development such as the role of “change agents” can be found in scientific literature dating back to the early 1970s. Barr Greenfield, 1973, considered organisations as “social inventions”, and their flexibility or resistance to *change being less determined by structures, than by perceptions of reality* by individuals in the organisation, *and their acceptance of new ideas* that could be achieved by *social action*.

innovation generally was regarded a mere theoretical concept with little practical relevance to the pre-dominant “hands-on economy” and crafts. Thus technological innovation neither seemed very urgent nor to require special attention and targeted funding. Schumpeter’s theory was useful to explain why and how innovation emerged – yet it was regarded to occur anyway and no particular policy appeared to be required<sup>7</sup>.

In the aftermath of World War II and the shattering experience of the apocalyptic reality tests of the atomic bomb at Hiroshima and Nagasaki in August 1945, the world was concerned with understanding the power and impact of science. Economic growth accrued from reconstruction and originated in economies that were more or less under national control, and – in Western Europe – disposed to expeditious achievements of the „European Recovery Program“ (Marshall Plan)<sup>8</sup>. Under such preconditions utilisation of science though was not irrelevant<sup>9</sup>. But usage of science, research and scientific methods still was far from its current reputation as being indispensable to secure employment and economic growth in first place.

Instead of promoting science, research and innovation, debates mounted over the issue of how to cope with the impact of science on culture in general. Most explicit – and with towering influence in public opinion and philosophical writings – these topics were addressed by C. P. Snow (1959) in his as famous as controversial writing on „The two cultures“. Snow complained about manifold gaps, chasms, and menaces „the West“ or „the entire world“ were confronted with. The one he became most famous to denote, was the lack of mutual understanding between the „literary“ and the „scientific“ intellectuals. It seems that Snow, facing the “Sputnik shock”<sup>10</sup>, simply feared that the

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<sup>7</sup> Until now the widespread perception of social development is very much alike: “Social innovation” either is perceived as irrelevant due to the assumption that social progress takes place anyway (unless obstructed), or it is seen overshadowed by “innovation” (meaning innovation in technology and industry) that provides the essence of change by new products or production processes. Yet economists, consultants or politicians who accept this dependency of social developments on technology and economic headway, should also accept that their view is similar to the classical basis-superstructure hypothesis elaborated by Karl Marx back in the 19<sup>th</sup> century.

<sup>8</sup> [http://www.trumanlibrary.org/whistlestop/study\\_collections/marshall/large/index.php](http://www.trumanlibrary.org/whistlestop/study_collections/marshall/large/index.php) (original US documents) <http://www.germany.info/relauncch/culture/history/marshall.htm> (a German view on the Marshall Plan, EN) <http://aeiou.iicm.tugraz.at/aeiou.encyclop.m/m261146.htm;internal&action=setlanguage.action?LANGUAGE=en> (the Marshall Plan in Austria; link to ERP-Fund provided; EN); for current developments concerning EU and the world: [http://www.globalmarshallplan.org/index\\_eng.html](http://www.globalmarshallplan.org/index_eng.html)

<sup>9</sup> The fundamental change of science and its relevance did take place in a gradual pace, even though – when looking back only some decades – the difference to many centuries of slow development is striking; cf. Derek de Solla Price, 1963

<sup>10</sup> On October 4, 1957, the Soviet Union launched „Sputnik I“ (“Companion”), the first man-made satellite in orbit; on November 3, 1957, Sputnik II was launched with the dog Laika on board (who also became the first victim in space, since she died already after a couple of hours because of overheating and stress). The Western world, in particular the US, was shocked by such demonstrations of superiority in space technology. After all, this also was the time when the two super powers of the world blew up H-bombs every now and then to seemingly balance the world by threat and horror. Fear arose in “the West”, that to outflank the USA in rockets and space might signal preponderance of the Soviet Union also in other domains of technology, science, and perhaps also in economic prospects. Thus the term „Sputnik shock“ was coined immediately in the Western super power (that had just accommodated with the self-esteem of being the strongest, fastest and most influential power around the world), indicating obvious anxiety to become inferior.

Western world might lose the „systems competition“ (which vanished since the 1990s) between communism and capitalism, because of the Western world’s cultural luxury to allow a divide between the „scientific“ and the „traditional literary culture“. His gap-and-gulf-thesis stipulates a conflict between the traditional, humanities based concept where scientific methods are embedded in language and culture, and the newer, science based concept, where *scientific methods appear* to exist external to social meaning and *unbiased by culture*. Such speculations meanwhile became falsified by scientific as well as by socio-economic and political developments. Capitalism has won, and – far more important – scientific research proved that actually *every* system learns and no processes exist that remain unaffected by its environs: The human society as such, sectors and parts of the society (e.g. science and technology, economics, certain communities), on to even cells and genes. (A. Agrawal, 2001)

Arguments concerning the putative antagonism between “culture” and “science” remained in the foreground as long as economic growth was high without special aid by science. Low acceptance of the concept of innovation as a tool to stimulate economic development was concurrent to the existence of other dominant drivers of economic development until the decade of the 1960s: Infrastructure had to be re-built, basic goods and services earned high rates of returns on investment, increasing employment boosted purchasing power and thus high growth rates of expanding economies. Trends of this kind became meeker by the late 1960s and early 1970s. The so-called “First” world (mainly industrialised countries in North America and Western Europe) experienced a slow-down of economic growth and an end to the short period of full employment – a situation which had been regarded in widespread notions kind of miraculous anyway (“*Wirtschaftswunder*”). New drivers had to be found taking seat in order to prevent economic stagnation.

In search for perspectives leading beyond the shocks of the 1970s (threatening shortage of resources as identified by D. Meadows et al. , 1972, and the initial sharp increase of oil prices, 1974), proposals for solutions became popular that were based on the thrust of innovation. Based on statistical observations by N. Kondratieff (1926), which had revealed cycles of a duration between 40 and 60 years from one major wave of technological innovation in industrial development to the next one since the early 19<sup>th</sup> century, G. Mensch (1975) gave advice to look out for new “*basic innovations*”. Even before the so-called first oil-price shock of 1974, D. Meadows et al. (1972) indicated that the petrochemical cycle was over its peak and about to decline. Economic prospects seemed gloomy and no remedy in sight. As a matter of fact, at this time G. Mensch could not know that only a short decade later the Personal Computer (PC) would lead into a new cycle on the basis of information and

communication technologies<sup>11</sup>, sparking off a real revolution of options in business, work and the economy at large.

Innovation entered the stage in a totally new act displaying the potential of an economy whose core feature is *not scarcity* (of goods and resources relevant to support life in traditional terms of ensuring reproduction), but *management of improving living conditions*. It comes without surprise that this change first was noticed in the USA. However, John Galbraith's (1958) assertions<sup>12</sup> came true little later for all industrialised countries, and until today for the world economy as such – notwithstanding the fact that discrepancies between rich and poor never have been more staggering than today. Under such circumstances the concept of innovation gained relevance in a broader sense when authors like Rogers (1962), Nelson (1968) and Mensch (1975) established close relations between innovation and socio-economic development in general, transcending Schumpeter's notion of innovation being aligned rather narrowly with the behaviour of entrepreneurs and business activities.

More recent developments and increasingly sophisticated uses of the term innovation framed it to emerge as a key asset for economics, and led to the concept of (regional, national, sectoral) *innovation systems*. Initiation of innovation by research, promotion, dissemination, and control of innovation became very relevant features in economic theory and management practices alike. In addition, since international comparison gained relevance in the global economy, exercises aiming at benchmarking, studies concerning the development and prospects of innovation and science systems, and of the impact of measures supporting research and innovation emerged as important tools to guide decision making on corporate, regional, national and international levels<sup>13</sup>.

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<sup>11</sup> This is regarded the fifth of such cycles counted after the first one driven by the steam engine (1800-1850), the second one based on steel and railroads (1850-1900), the third one (electrical and chemical engineering, 1900-1950), and the fourth one (oil and cars, 1950-1990). For detailed information cf. Nefiodow, 2001. Current observations provide evidence that the upcoming next cycle may be named the knowledge-based bio-economy (EC 2004, 2007), utilising innovations in biotechnology, renewable resources and knowledge processing.

<sup>12</sup> Galbraith asserts that the conventional wisdom of economic thinking in the United States is based in nineteenth-century European economic theory and is no longer suited to the unprecedented phenomenon of mass affluence achieved by the American society in the twentieth century. He criticises the overemphasis on high rates of production as a measure of economic prosperity, suggesting that other factors may be of greater importance. (e-notes, Nov. 7, 2006: <http://www.enotes.com/affluent-society/print>)

<sup>13</sup> cf. Freeman, 1987; Lundvall, 1992; Freeman, 1995; Nelson, 1993; Patel/Pavitt, 1994; Edquist, 1997; Etzkowitz, 2002; Polt/Zinöcker, 2002; den Hertog/Bergman/Charles, 2003; Grupp, 2006 – a sample of authors selected out of a still mounting multitude of publications on innovation, science and innovation systems; please also check e.g. the Innovation TrendChart on Innovation Policy in Europe at <http://trendchart.cordis.lu/> and the European Innovation Scoreboard (EIS) reports at <http://cordis.europa.eu/innovation-smes/scoreboard/>

### 3. Innovation embedded in culture

It is worth noting that at the same time in the late 1940s, when Schumpeter described innovation as an economic process, another author explicitly addressed “changes or novelties of rites, techniques, costumes, manners and mores” as innovation (H. Kallen 1949, p. 58). Deliberately having in mind cultural changes and social processes, Kallen did *not* link this concept to economy and technology. Looking at these two notions of innovation – the Schumpeterian innovation as a term related to economics, and Kallen’s innovation as a term indicating social and cultural changes – one may wonder why both were kept so clearly separated. In addition, in the years to follow one was accepted and gets a lot of attention up until today, whereas the other seems fallen into oblivion. Given the fact of radical alterations of social, economic, and cultural developments in the course of globalisation, it may turn out most adjutant to *recall the cultural notion of innovation*, and to promote a concept capable to encompass innovation in economy and innovation in society at the same time.

The prevalence of the technological notion of innovation – together with the criterion „success in markets“ – is due to the fact that in the 20<sup>th</sup> century technology was of paramount importance to profit and prosperity at large. In contrast, when taking into account a comprehensive view, innovation includes all products and processes of human action, artefacts, machinery etc. as mentioned above. By extending the definition to „all targeted and methodical changes which create new techniques that become widely accepted“ (Schneider, 2006; 57; my translation), social and organisational considerations are being accounted for amendatory to the usually pre-dominant technological and economic aspects of innovation. On this basis the term *innovation comprises* just as well rules of *decision making, acts of law, certain procedures* to solve social issues, the *establishment of new organisations and institutions* that seem suitable to facilitate remedy in a better way than previous measures or inherited precepts.

The significance of innovation is culturally embedded. This is why it makes sense to discuss „cultures of innovation“ and „innovation cultures“: *Cultures of innovation* denote and compare existing cultures with diverse adherence and capacities to breed innovation<sup>14</sup>. Highlighting a different focus, *innovation cultures* indicate moulds or processes of innovation that can be distinguished by a variety

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<sup>14</sup> However, appearance as more or less innovative culture should not immediately be appreciated to indicate reliable ranking of countries (regions, communities ...), because the units compared may rely on most different qualities of innovation cultures. In this case the characteristics of their innovations differ too much to be comparable on a linear scale. Distinct cultural impact on innovation (its emergence, dissemination, appreciation etc.) can be observed when comparing e.g. European societies in diverse historic eras, such as contemporary “information society”, the “industrial society”, or medieval times. At present, existing African, American, European and Asian cultures (or, more general: “East-West”; or, in more detail: young and old, men and women, sub-cultures etc.) likewise differ concerning the take-up and readiness towards innovation – and, in addition, display varieties of innovation patterns.



of stakeholders, procedures applied, intentions involved, and more such conditions which guide the emergence and diffusion of innovations<sup>15</sup>.

It is obvious that during the late 20th century industrial societies crossed a threshold of development, where innovation became a planned and targeted venture, making it an increasingly relevant asset of economic development. Time has come now to further establish innovation as a relevant feature in contemporary culture, involving *modes of innovation cultures* (and awareness thereof) in different sectors of industry, nations, and world regions.

The concept of innovation is broadening, taking into account sometimes non-technological aspects of innovations that do not primarily aim at economic output, or – to address it more explicitly – profits. The more innovation attracts attention and seemingly occupies the focus of many different measures and policies to spur economic development and competitiveness, it becomes clear that such indicators only tell part of the story: As innovation gained relevance over time, and since it attracts attention as a critical agent of change in all – public and private – sectors, society cannot afford to perceive innovation only as being attached to the economic sphere of life. The higher the total value of innovation, the less it seems recommendable to ignore the social and cultural relevance of innovation in general.

In the wake of extremely far reaching impacts of new technologies since the middle of the 20<sup>th</sup> century (atomic bomb, nuclear power plants, air and other transportation systems, computer and new media, bio-technology, genomics ...) two major responses shed light on the traditionally one-sided concept of innovation:

- Since the late 1960s methods and organisations were introduced aiming at *Technology Assessment* (TA). A path-breaking establishment was the Office of Technology Assessment of the U.S. Congress, founded 1972, and closed 1995. (<http://www.wws.princeton.edu/ota/>) After being blamed initially by many promoters of technological innovations as „technology arrestment“, nowadays many public and private organisations apply varieties of TA-methodologies in planning and foresight-processes concerning major technological developments.
- Stimulated by the sweeping success of ICT (information and communication technologies) and the internet, „*user-involvement*“ became a relevant topic in research and technology development, affecting of course also concepts and strategies related to innovation. Many

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<sup>15</sup> It is of major significance, what *kind of innovation* is being preferred or supported to address a particular issue in society. E.g. to remedy the problem of increasing energy consumption: Solutions required may be based on innovative technologies (again ranging from, say ethanol production, increasing use of solar panels, on to the instalment of nuclear power plants), or on innovative logistics or life styles. Other examples are fighting poverty (sending machinery, or providing new agricultural techniques, education etc.), or slimming (to combat overweight either by reliance on pharmaceuticals or through adoption of new behaviour) etc.

research programmes of the EU require that users shall be included in technology development processes, hoping that this may provide better information on user requirements and thus less failed innovations. Increasingly high-tech companies apply the so-called „lead-user“ concept and prove that users in fact contribute to numerous and important innovations. Some go further and build up external communities to use their knowledge and expertise to find solutions concerning issues that could not be resolved by own R&D departments. (<http://innocentive.com>)

Yet even from this point of view, innovation still is considered under the assumption that its prime and undisputed function is to act as a major force to guide economic progress, advancing higher turnovers, productivity and revenues. (cf. Franke et al., 2006) Much less so it is noted that innovation also may be conducive to improve social systems, be it by melioration of „manners and mores“, by “institution building”, or by improvement of public services. For example eGovernment demonstrates the urgent need to consider – as a principle – innovation in a comprehensive way: It is new technology that makes eGovernment an option, but in order to make such innovation function, *organisational and technological innovations* in public authorities – and upgrading the relationship between (public) service providers and (private) clients – need to be established. Such innovation may include “ground rules” for public sector information policies (Burkert/Weiss, 2004; 332f.), that means to establish social innovations *prior* to the implementation of technological innovations. Innovations in technology have social repercussions, and innovations in the social setting often are required to gear up for successful implementation and utilisation of innovative technologies.

Summarizing, two deficiencies may still be noticed in regnant innovation concepts:

- *Regarding pre-conditions* and the variety of innovations, so far inadequate analytical competence has been applied to the socio-cultural embedding of technological innovations. The same is true regarding the fact that *social* innovations may occur without technology as well as by incorporation and utilisation of technological components.
- *Concerning results* of innovation processes, too little attention is being paid to the fact that innovations in technology – in particular when they turn out to be very successful in markets – may have underestimated or sometimes simply ignored negative effects in respect to social, cultural or environmental fields.

Though slowly and in almost indiscernible steps of more or less tacit consent, theorists and practitioners of innovation begin to accept a comprehensive view on innovation, less slanted toward economy and technology. After some decades of rather fragmented perceptions, in recent years stakeholders, researchers and parts of the general public more openly turn to social and cultural

issues in innovation – at the same time not neglecting the relevance of technology and economy in society. (cf. Wieland, 2006)

Concluding, innovation does *not* depend on *either* one *or* another culture. *Culture matters in various degrees* when it comes to answer the question of which types and what kind of impact of innovations we may expect, depending on time, region, and stakeholders involved in processes of change – be it in society, technology, or politics.

#### **4. Innovation and social change**

In November 1989 the Berlin Wall ceased to function, the „velvet revolution“ occurred in Czechoslovakia, other political regimes on to Romania tipped over within weeks, the unification of Germany followed suit only one year after. The Soviet Union collapsed by the turn of the year 1991, yet e.g. the Baltic States became sovereign before, still under Gorbachev. The Czech Republic and Slovakia were separated in peace, whereas the dissolution of Yugoslavia ended in a nightmare of cruel wars between Croatia and Serbia, in Bosnia-Herzegovina and in Kosovo. However, Europe never ever had seen any comparable dramatic change of political systems, re-formation of economies and structures of power in such a short time without warfare spreading across the continent. On top of these astonishing developments the European Union of 15 Member States (as of 1995) managed to establish itself as a world economic player, with the Euro implemented 2002. Membership was extended to 25 states by May 2004, and to 27 by January 2007. Of the twelve new members since 2004, three have been former republics of the Soviet Union, six belonged to the Warsaw Pact, and one emerged from former Yugoslavia.

Taking into account the magnitude of these transitions – affecting individuals and societies, political institutions, European and world economies, and in particular regional and national cultures – it seems appropriate to ask for the relevance and role of „innovation“ in relation to social change in general. How much weight accords to innovation, in terms of new products and improved technological processes, compared to major innovations in living and working conditions of several hundred millions of people in Europe and world-wide<sup>16</sup>? It might be tempting to attach all major changes – as often said: “in the end” – to “new technologies” and thus to innovations in products and services. Yet obviously such an assumption falls short of political and social facts, and does not account for their real relevance and the need for differentiation. It also ignores the impact of social frameworks, education, mind-sets etc. on the development of technologies as such<sup>17</sup>. Already

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<sup>16</sup> Thereby it must be noted, that – as is the case with innovations in technology – social innovation neither always, nor necessarily implies social or economic benefits to those affected.

<sup>17</sup> Cf. D. MacKenzie and J. Wajcman, 1999

Nelson/Phelps (1966, 70) referred to requirements of a dynamic economy: “To put the hypothesis simply, educated people make good innovators, so that education speeds up the process of technological diffusion”.

More recently, Castells (2001, 36) addressed social pre-conditions and environments influencing the development of complex technologies: „Technological systems are socially produced. Social production is culturally informed. The Internet is no exception. The culture of the producers of the Internet shaped the medium. These producers were, at the same time, its early users.” Thus a main task to improve the conceptualisation of innovation is to broaden its scope – in theory as well as concerning applications – beyond products and processes assisted by implementation and development of technologies.

Remarkable coherence can be found in various forms of innovation, ranging from innovations in technological processes, products and services, on to innovations in social institutions, organisations and behaviour, when reflecting features of innovations in the light of the theory of social action: Innovation cultures, specific patterns of innovation, and even single innovations of different types commonly play a role in *social action*. According to Max Weber (1947, 88<sup>18</sup>) the core of social action is *constituted by purpose* (or “meaning”), *and reference to “others”*. Mostly the purpose or subjective meaning incorporated in innovation is to provide resolution to old or new challenges that should be met faster, easier or more sustainable than by traditional or competing new methods. Relationship towards “others” may address other individuals as well as social groups, organisations, economic sectors, or “social institutions” (e.g. marriage). In contemporary wording, and in the context of innovation, we may denominate “others” as respective *stakeholders* (along a production line, in markets, in educational systems etc.), whereby the most significant separation can be identified according to their position as *producers or consumers of innovations* (products, processes, organisations, behaviour etc.).

There might be an argument opposing this theoretical approach concerning the roles of “producers” and “consumers” in social action related to innovation. It seems clear that in particular innovators, individuals, organisations or social groups that try to promote and disseminate innovations, have a certain purpose in mind and need to address external other individuals, target groups, or the general public. Yet on the other hand, if we look at recipients of innovations in their role as consumers, their parameters of reference in the take-up of an innovation (be it a new product, procedure, rules in decision making or whatever) may lack the orientation towards others – and thus the quality of “social action” as defined.

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<sup>18</sup> „Action is social in so far as, by virtue of the subjective meaning attached to it by the acting individual (or individuals), it takes account of the behaviour of others and is thereby orientated in its course.“

On the side of the producer any measure involved is geared towards “others”. The product must be competitive, p.r. activities and advertising is required, and even if the core purpose is nothing but boosting profits, such an innovation possesses the quality of social action: It has to be secured that investment is not lost (i.e. market research is required from the beginning), and improving profits means higher shareholder value – thus the innovation serves the interest of shareholders<sup>19</sup>. There is always a direct connection to “parties” (individuals, interest groupings, ...) external to the originator(s) of an innovation. No matter of what kind of “subjective meaning” (e.g. “I want to become rich”, “revenues will enable me to help the poor”, “more people will be allowed to participate in modern society”, “larger markets will stimulate growth”, etc.) is prevalent, the quality of “social action” is attached to the process of innovation development and dissemination<sup>20</sup>.

On the side of consumers the situation may differ. In spite of the fact that currently “Prosumer” relations<sup>21</sup> exist in many sectors and systems, many consumers obviously are fond of innovations only if they fit their individualistic or self-centred interests: To buy cheap, to save efforts, to leverage social prestige, or to impress neighbours. It may be a borderline case if somebody actually buys the newest product just for impression management, even if he or she eventually cannot afford it. However, the relationship between the “other” (neighbours, colleagues at work, relatives ...) and the innovation at stake remains indirect. In such cases “social action” is constituted by the behaviour of taking the risk of expenditure in order to impress ones social environment, whereby innovation is no necessary criterion.

Nevertheless innovation may be embodied in social action of consumers. This may apply to buying a car with innovative technology (e.g. a hybrid engine), a decision which may be motivated by the intention to gradually detach the economy from its carbon (oil) dependency. Market success of

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<sup>19</sup> If, for example, innovation in logistics or concerning the production of TV sets (or of any other consumer good) is driven solely by rationalisation and cost-effectiveness, it may lead to lower prices and extended markets or market shares. Thereby the innovation meets the interest of the investor(s), yet it also may please consumers.

<sup>20</sup> It may need emphasis to clearly distinguish “social action” from the strong notion of “caring” that usually is aligned with the term “social”. In this context, the technical term “social action” does not mean the same as “to act socially” (in the sense of taking care of somebody or aiming to improve welfare). Such connotations *may* be included, but the overall focus lies on action that is related to any other part of the society – no matter who earns benefits resulting from such action. Economically social action may deliver benefits to the “other”, or selfish earnings absorbed by the originator. Selfishness does not avert the quality of social action, as long as social relations are maintained.

<sup>21</sup> Taking into account the blurring roles of producers and consumers, A. Toffler, 1980, merged the two terms in one. In historic development of the industrial society, production of stocks for growing markets was more and more separated from small production to satisfy one owns needs. Fewer people were able to produce ever more for a growing number of consumers (which holds true for industry, yet even more so for farming and agriculture). At present, so Toffler’s argument may be summarised, in highly developed markets mass production of standardised products approaches saturation. Businesses need to initiate mass production of customised products. To reach a high degree of customisation, consumers increasingly are invited to take part in the production process, mainly specifying design requirements and quite often simply via internet (“crowd-sourcing”). All in all current developments favour a new dimension of consumer involvement aiming at user-led innovation processes. (s. Franke, von Hippel, Schreier, 2006) The new facets of manifold roles of consumers (i.e. “prosumers”) are in line with the general trend towards an increasingly individualised society.

consumer products that provide benefits in terms of social and environmental sustainability (like regional and fair trade products) is based on collective consumer behaviour that explicitly aims to support working and living conditions of “third parties” (other than commerce and consumer), such as farmers and production workers. In many such cases consumers accept higher prices in order to support the intended purpose of the innovation (actually to advance social welfare). In doing so, these consumers behave different compared to self-centred consumers, whose motives might be attributed to low disposable income as well as to a seemingly fashionable attitude of behaving stingy<sup>22</sup>.

Two conclusions can be drawn from the significance of social action concerning *innovation and its relation to social change*:

- *Innovation* in products, technologies, principles of organisation, in law, customs, rites, or practices of many kinds may be distinguished by the fact whether or not they possess properties of social action or not. Social action always is related to social change at large, thus many (but not all) innovations can be regarded as *components of social change*.
- Conversely, if *social change* e.g. increases or diminishes the fraction of the society that may be regarded rather selfish (other adjectives may be inserted here as well), the types and prevalence of particular innovations will vary as well. Social change owns the *potential* to assert impact on innovation, and *to promote or to obstruct certain “innovation cultures”*.

Summarising, the inter-relation between social change and innovation may be used to distinguish social and technological innovation in a very specific way: *Social innovation* always is a component and involved with generic developments subsumed under the term “social change”<sup>23</sup>. Some other forms of innovation – not the least *innovation in technology* – may have no direct or complete relationship to social change. However, based on indirect or time-shifted effects, some interaction between social change and innovation may accrue, even if primarily there was no explicit ambition to provoke social change by the technological product or process created. On the other hand, social change may lead to innovations in technology because of the emergence of a new potential or novel requirements resulting for instance from the ageing of the society.

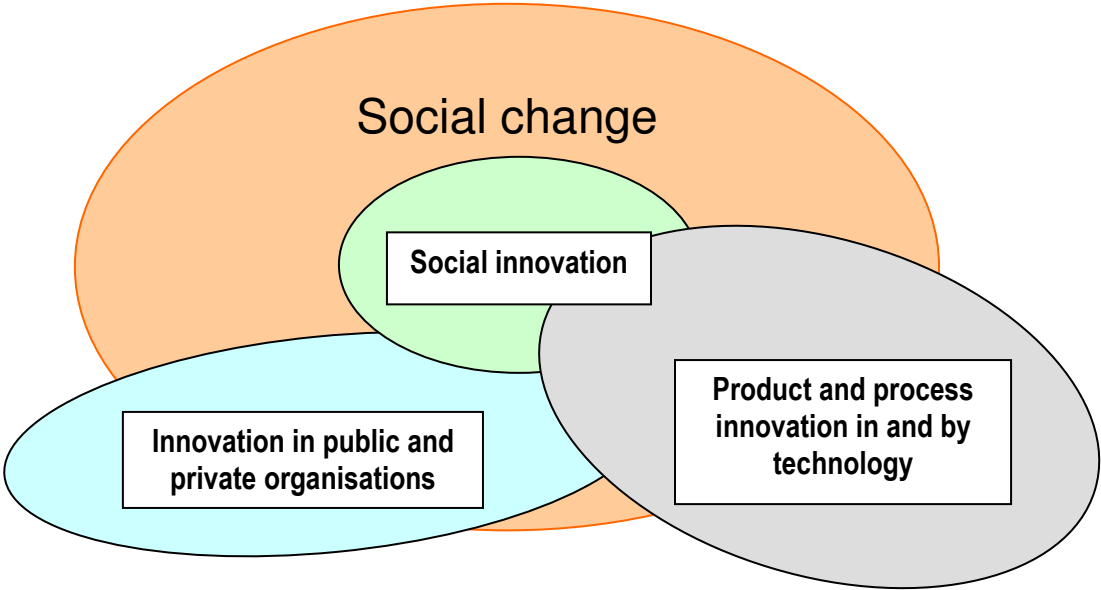
In schematic exemplification the relations discussed here, are presented in Figures 2 and 3.

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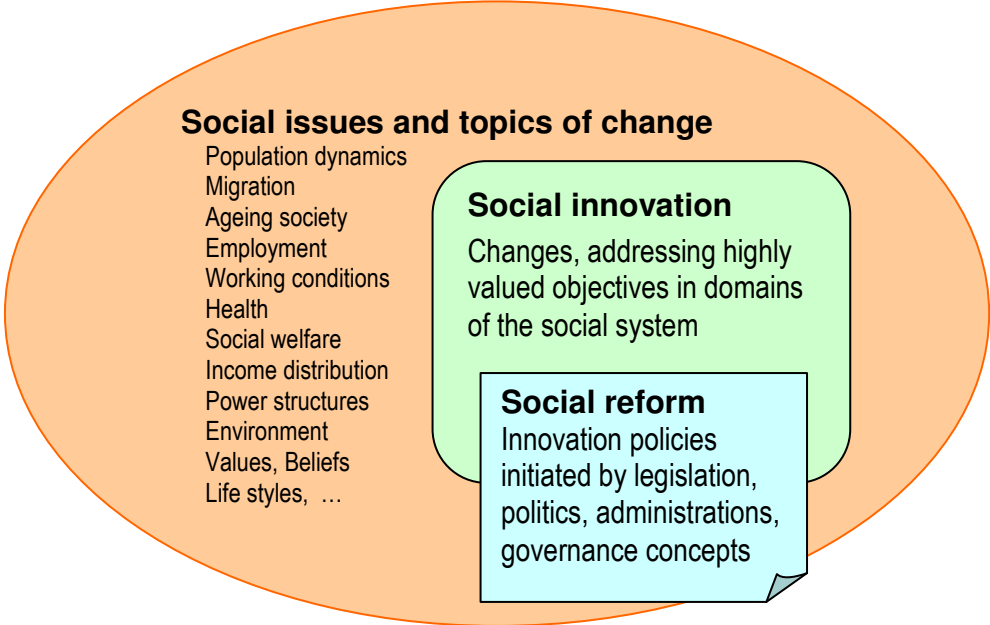
<sup>22</sup> In Austria since years a major trading company advertises products by excessively using the slogan “*Geiz ist geil!*”, which may be translated by mere wording to “stinginess is cool”. Yet more appropriate to better catch the content of the proclaimed sense would be “Greed is groovy”.

<sup>23</sup> In social sciences and humanities, particularly in sociology, the term “social change” is most prominent. In literature please see vicegeral for the many: Haferkamp, Smelser, 1992

**Figure 2: Concurrence of different forms of innovation with social change**



**Figure 3: Social Innovation – a component of social change**



## 5. Social innovation: Part of Cultures of Innovation and of Innovation Cultures

Innovation in general may occur in the forms of

- new products, processes, and services that are based on new technologies or on a re-combination of technologies, provided by private or public, commercial or not-for-profit enterprises; and
- the establishment, invention or adoption of measures, policies and rules concerning decision making processes in formal and informal social relations and organisations of any kind in all societal domains.

However, innovations address different objectives and stages in various processes of change and developments in the society and its sub-systems (education, RTD-policies, industry, financial systems from stock exchange to taxation etc.). Therefore in some circumstances it makes sense to choose a certain focus of surveys, research and eventually proposals for innovative activities, highlighting for example particular technologies as such, process innovations in certain areas of technological developments, product innovations, or social innovations (and within this category e.g. innovations concerning social security issues, participatory decision making, regional governance systems, and many more features of social innovations).

The goal here is not to denote „social innovation“ as totally or in principle different from „technological innovation“. On the contrary, evidence and arguments are compiled to promote a common understanding, based on the observation that in any part of social, economic and technological developments change is going on all the time. Nevertheless, innovation and its advancement by science in general, involving ideas and pre-existing knowledge as well as financial resources and funds in particular is required. In addition, relevant improvement of innovation policies may be expected if measures were not outmost concentrated on economically profitable innovations anymore.

Social innovation meets social challenges. However, to become innovative an idea which addresses existing or emerging social issues does not in any instance necessitate to be new. Common knowledge in a new combination with adequate attributes may suffice. Yet there is another pre-condition, which is indispensable to make proposals and attempts becoming an innovation: Newly invented or newly combined methods and measures must satisfy



expectations of stakeholders involved. Their needs are to be dealt with in a more appropriate way than by other concepts (existing services, products, or procedures – including, of course, factual ignorance of demands). If in such a process a social idea evolves into a social innovation, it helps to remedy challenges in the society which may be new, did not yet receive adequate treatment, or perhaps not even any response. Beyond dealing with a concrete social issue, social innovations in general contribute to adaptations and further development of many forms of governance.

As globalisation progresses, social innovations gain increasing relevance to almost any area of contemporary society. Socio-scientific analysis, the design, and practical application of social innovations not only impact the shaping and trends in the sector of NPOs and the civil society. It affects public administration, political institutions, social partners, the business sector and institutions of social partnership as well. This is why it becomes a matter of pressing urgency to join intellectual and other resources to make „social innovation“ a topic as accepted and relevant as economically and technologically based innovations<sup>24</sup>.

Innovation has been classified by Schumpeter (1934) in five categories (cited in OECD/EUROSTAT, 2005, p. 29).

- Introduction of new products
- Introduction of new methods of production
- Opening of new markets
- Development of new sources of supply for raw materials or other inputs
- Creation of new market structure in an industry

OECD/EUROSTAT (2005) still stick very close to this notation when providing guidelines for collecting and analysing data on innovation. Actually it is recommended to just use four categories, of which all are meant to measure only innovation pursued by enterprises:

- Product innovation
- Process innovation
- Organisational innovation on company level
- Marketing innovation on company level

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<sup>24</sup> “Surprisingly little is known about social innovation compared to the vast amount of research into innovation in business and science”. The Young Foundation, 2006, p. 5

Currently indicators measuring innovation increasingly include selected non-technological components of innovation, such as organisational and marketing innovations, factors related to human resources, intellectual property, development of demand, and public support of innovation. All these amendments of indicators are geared to better assess economic impact of innovations, reflecting the concept of innovation as a driver of economic development and growth. Such improvements of assessment tools and statistics are appropriate to meliorate the accuracy of measuring economic impact of a variety of innovations. Yet measurement remains fragmentary, as it does not include social innovations beyond their economic relevance<sup>25</sup>.

Social innovations are “socially effective rules governing activities and practices that differ compared to previously known schemes” (Gillwald, 1999, p. 1; my translation). Neither from sociological, nor from an economical viewpoint innovation theory, innovation research, innovation management and innovation promotion should further neglect the relevance of this part of social change. It has economic impact too, be it a direct result influencing economic behaviour or productivity, or indirectly by preparing grounds for economic activities and success in the future. A few examples of social innovations with major economic impact are listed in Table 1.

**Table 1: Social innovation in highly relevant areas of social development – of which one is technology**

Areas of social relevance	Examples of social innovations
Work and employment	<ul style="list-style-type: none"> <li>• Shop stewards, trade unions, collective agreements, social partnership, ...</li> </ul>
Education and training	<ul style="list-style-type: none"> <li>• Compulsory schooling, pedagogical concepts, didactics, technology enhanced learning, micro-learning, ...</li> </ul>
Technology and machinery	<ul style="list-style-type: none"> <li>• Norms, enforcement of standards, drivers licence, traffic lights and rules, technology assessment, ...</li> </ul>
Democracy and politics	<ul style="list-style-type: none"> <li>• The state as a juridical person, (general) right of voting, constitutions, administration and control mechanisms, ...</li> </ul>
Social systems and health	<ul style="list-style-type: none"> <li>• Social security systems in general, various principles of financing (tax, insurance), hospitals, care, ...</li> </ul>

<sup>25</sup> Sources for information: Portal to EIS (European Innovation Scoreboard) at <http://trendchart.cordis.europa.eu/> Download of the most recent “European Innovation Scoreboard 2006” and the report on “Innovation Statistics for the European Service Sector”: <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=5&parentID=51> Methodological considerations: <http://trendchart.cordis.lu/reports/documents/EIS2005MethodologyReport.pdf>

A holistic concept of innovation will contribute to bridging the gap between high-speed amplification of technological potentials and comparatively fragile societal developments. Resolution may be initiated by reversing the under-utilisation of knowledge in contemporary societies, emphatically labelled “the global knowledge-based information society”. The creation, provision, and implementation of applicable indicators extending the ascertainment of socio-economic, cultural, and technological development processes require joint efforts in science and innovation research. The currently dominating concepts of innovation – even in most elaborated forms – still remain too narrow in scope. The emergence of the „Information Society“ (versus „Industrial Society“; cf. Figure 4) and of the „Mode 2 Knowledge Production“<sup>26</sup> make it inevitable to particularly consider the role of “knowledge” in innovation processes under a more comprehensive perspective.

Knowledge has been important to human development and the production of goods and services at any time of history. Yet science, scientific methods, proof and approval of results became increasingly relevant ever since Galileo Galilei first attempted to provide scientific knowledge in popular language to a broad public („*Dialogus*“). As part of the unfolding of the „Industrial Society“ scientific research and technological applications of scientifically generated knowledge increasingly contribute to the production of wealth as well as to the imminent necessity to reduce the squandering of natural resources. A new challenge arose: It became a prerequisite of further development to acquire, store and process unprecedented amounts and new forms of information<sup>27</sup>. In the post-industrial era of the „Information Society“ scientific knowledge production using multiple sources of information equals the importance of traditionally accounted factors of production (soil, labour, capital). The „knowledge based Information Society“ not only requires *more* knowledge and more science, it implements a *new mode of knowledge production* in science. The inherited so called „Mode 1“ of science may be summarised as „the complex of ideas, methods, values and norms that has grown up to control the diffusion of the Newtonian model of science to more and more fields of enquiry and ensure its compliance with what is considered sound scientific practice“<sup>28</sup>. The formation and production of new knowledge requires *more* science

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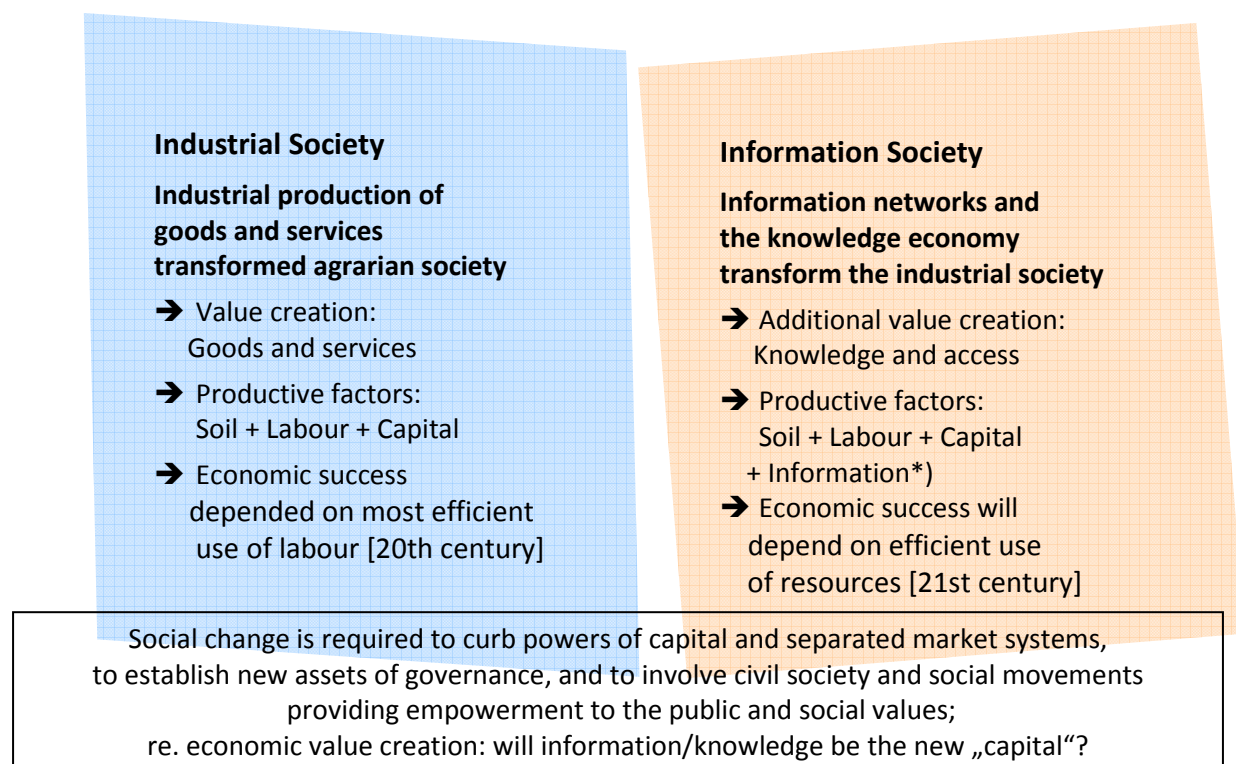
<sup>26</sup> M. Gibbons et al., 1994

<sup>27</sup> „The information society ... is not so much the result of any recent social change as of increases begun more than a century ago in the speed of material processing“. J. Beniger, 1986; p. vii

<sup>28</sup> M. Gibbons et al., 1994; p. 167

and scientific methods, but is *less* under control of scientists: Knowledge increasingly becomes an asset produced „on demand“, involving stakeholders beyond science and funding agencies. Knowledge production relies on the collaboration of scientists from a variety of disciplines with practitioners and „users“. In Mode 2, science provides „knowledge production carried out in the context of application and marked by trans-disciplinarity, heterogeneity, organisational heterarchy and transience, social accountability and reflexivity, and quality control which emphasises context- and use-dependence, results from the parallel expansion of knowledge producers and users in society“<sup>29</sup>.

**Figure 4: Economy and society in transition**



\*) Adding „information“ or „knowledge“ (preliminary terms) to the productive factors represents a factor with increasing, yet until now inappropriately measured effect. In order to exactly identify and measure *the new productive assets* of the „knowledge based information society“ it will become necessary to clarify what will serve as the „capital“ of the 21st century.

New scientific approaches are required,

- taking into consideration the decreasing „real economy capital“ versus increasing „fiscal transaction meta-capital“ (constraining the total of capital invested in the real economy and its productivity); and
- researching the equivalent to what is considered currently „capital“ (aiming at definition and measurement).

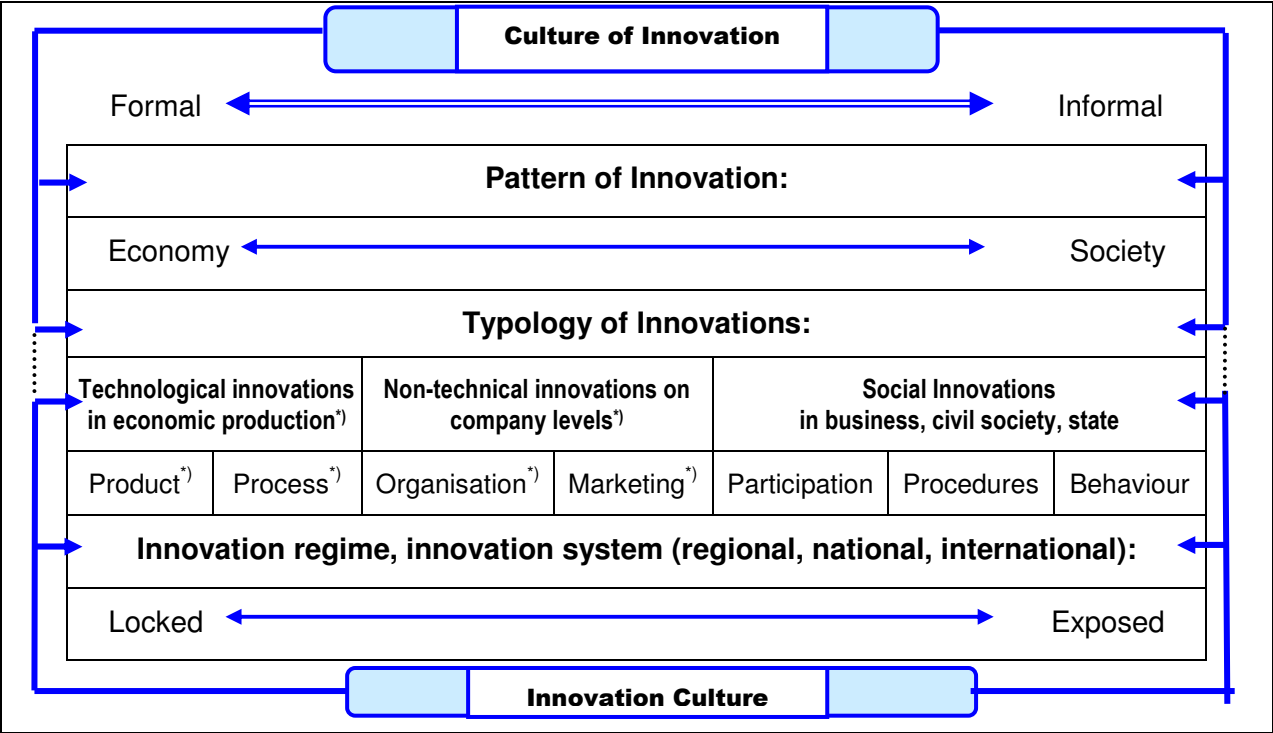
*Bridging the gaps* between structures of industrial and information society requires new ways of working, learning, re-organisation, institution building – all major topics of social innovation.

<sup>29</sup> M. Gibbons et al., 1994; p. 167; cf. also H. Nowotny, P. Scott, M. Gibbons, 2004

In fact there are many more innovative powers at work than just great numbers of products and service technologies. “Cultures of Innovation” (announcing the innovative *potential* of culture) and “Innovation Cultures” (indicating particular *modes* the instalment of innovations take on under specified socio-economic conditions) encompass social innovations along with other types of innovation. Yet at the same time they are subject to modification in the wake of social change.

When discussing innovation in the context of „culture“, one may first of all think of cultures inheriting innovation as a necessity to sustain the condition of the existing social fabric and ways of living. But novel technologies belong to culture as well as procedures and rules in decision making or the creation of new organisations.

**Figure 5: The variability of “Cultures of Innovation” and “Innovation Cultures”**



\*) Types of innovations addressed by the Oslo Manual (OECD/EUROSTAT, 2005

In Figure 5 some variables of dynamics occurring in the inter-relation between the more general “culture of innovation” (favouring more or less, or broadly different concepts of innovation), and the rather specific “innovation culture” (favouring particular innovation regimes and producing characteristic types of innovation), are sketched out. A certain “culture of innovation” may be denoted e.g. as primarily “formal” (embodied in the

economy and state institutions, with access to funding and systemic development), or “informal”<sup>30</sup>. “Patterns of innovation” may be distinguished regarding their functionality to primarily stimulate economic productivity, or to improve social cohesion. “Innovation regimes” also may vary, most significantly between being rather strict, consistent and sustaining for long time (“locked”), or being more open and governing responses to changes in the environment (“exposed”). Moulded by these variables appears an alterable typology of more or less dominant and effective innovations.

## 6. Innovation and social change in “sediments” of the society

Innovation is a process – no singular event – often resulting from most successful traditions (cf. G. Mensch, 1975), and not at all always depending on the creation of sparkling new ideas. The latter, certainly being no obstacle to innovation processes, may be required. However, many innovative ideas seem very clear from the beginning, but arrays of change-resisting factors may prevent realisation for long time. Major examples in the social sphere are democracy and principles of justice as formulated in the “Declaration of Human Rights” (United Nations, 1948). Yet also technologies may take long time from invention to innovation, to great extent depending on existing social structures, prevalent modes of behaviour, and originalities of ongoing social change<sup>31</sup>. Above all it is wide-spread common sense that the pace of product cycles providing innovative products and process technologies accelerates<sup>32</sup>.

The process of accomplishing success in innovation is constituted by typical stages of development, starting with the identification of needs, building up attention and efforts

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<sup>30</sup> „According to Heidenreich’s definition (2001) ,cultures of innovation’ are relatively stable modes of reflection, behaviour and social organization, directed towards ,modernization’ or ,development’. They are often based on shared values and fulfil important roles of orientation, motivation, coordination, and legitimization, concerning the actual performance of innovation processes. Therefore, *their investigation enhances the quality of prognosis of social actions*” (my emphasis), Kohnert, 2006; p. 7. Kohnert goes on to conduct an analysis of innovation cultures based on a threefold differentiation: Between the formal and informal sectors of economy, taking into account local and transnational social spaces, and along different social strata.

<sup>31</sup> For a new study on the diffusion of innovations in relation to growth and social change cf. Fokas, 2007

<sup>32</sup> The internet became a world-wide „machine” (i.e. a socio-technical system) within short compared to the much slower implementation of telephone networks. Such comparisons usually only count calendar years. This applies to the diffusion of transport infrastructures (canals, railways, telegraphs, roads), as analysed by A. Grübler, 1990, and concerning energy systems Grübler and Nakicenovic, 1990; Grübler, Nakicenovic, Victor, 1999. Actually a crucial difference might be revealed if years of labour invested would be counted. It would be most informative to conduct several such case studies to highlight ratios of efforts and outcome. E.g developing the atomic bomb in the US in the framework of the “Manhattan-Project” (1942-1945) consumed the efforts of about 125.000 years of labour invested (W. Bijker et al., 1987). A recent study (R. Norris, 2007) reveals that the Manhattan Project employed more than 130.000 people of which thousands were highly skilled scientific experts and many more engineers.

involving some kind of creativity (to find new solutions or suitable combinations of under-utilised methods or knowledge), leading to invention, followed by acceptance and diffusion.

Most cited characteristics of diffusion and utilisation, indicated by groups who adopt (at a certain time) or reject innovation (“traditionalists”), are (E. Rogers, 1962):

- Innovators
- Early adopters
- Early majority
- Late majority
- Traditionalists

Success of innovation processes rather is exceptional, not the general rule following an invention, thus studying *innovation failures* is worth research efforts too (R. Bauer, 2006). It takes time to overcome impediments, sometimes explicit obstruction, and – most likely – lack of suitable environment in material and cultural sense (cf. H.-J. Braun, 1983; 1992).

From sociological point of view it definitely is rewarding to research accretion, emergence and dissemination processes of innovation. To make it even more challenging – and, as hoped, also more productive – the distinct pace, insecure predictability in range and depth of social change as such and of the impact of innovation may be addressed from a perhaps unusual angle.

It may be a novel topic to include in such considerations not only the spreading of innovation in the population and various societal sectors. Innovative changes occur not only by time-linear dissemination and adoption. I hypothesise that cultural impact of innovation, as well as cultural sources of innovation, will become visible by looking at “sediment” layers of society and the structures within these layers. Like sediments in geology, society has layers that differ in terms of historic duration and resistance against change: A top level of easy-to-change material environment (including technology) rests on a layer of power structures, based on communication codes and nodes, and further down on myths and more or less archaic patterns of emotions (the layer which until now seems least intruded by technology).

In an overview the hypothesis is presented in Table 2, indicating four major “sediments” and denoting most relevant contents within these layers by keywords.

**Table 2: „Sediments“ in society, likely to fast or slow change, and more or less dependency on technology:**

- The surface (the material ambience of society):
  - Tools, devices, machinery of all kinds, infrastructure, exploitation of renewable and non-renewable resources, application of technologies with increasing returns or decreasing returns (B. Arthur, 1984) ...
    - ⇒ subject to very fast change, most dependent on technology and therefore the prime area to develop and apply innovations in technology.
- The social fabric (social networks, relations and norms, law):
  - Institutions, modes of production, social welfare systems, political powers, democracy, local governance as well as governance beyond the nation state ...
    - ⇒ subject to fast change (globalisation) and at present times already and increasingly dependent on technology (but less than the material environment).
- Underlying concepts (customs, informal rules, communication patterns):
  - Modernity, individual freedom and moral values, information and communication, knowledge production, solidarity in local and global “territories” (social ties, economic ties), identities (local, regional, global; time), religions (churches), ...
    - ⇒ subject to permanent, in the past rather slow change, currently growing dependence on technological facilities at the expense of social relations.
- The bottom line (culture<sup>33</sup>, myths, emotions):
  - Cultural meaning, (religious) beliefs, myths, ritualised patterns of behaviour, emotions, feelings of love and hate, spirit, spiritual leadership, hope and fear ...
    - ⇒ subject to slow change (very long cycles), persistent despite external challenges, so far least but not negligible impact of technologies (considering pharmaceuticals, forthcoming genetic engineering).

Observations and theoretical approaches considered strengthen the argument that the usually narrow notion of innovation as a mere factor of relevance for economic progress should be extended towards a more comprehensive understanding of innovation processes.

Thereby two major directions shall be highlighted in conclusion:

- In a holistic perspective, innovation is not restricted to the economic sphere, it actually appears embedded in multiple cultural contexts and the broad scope of social, technological *and* economic changes at large.

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<sup>33</sup> Culture consists of „those aspects in life that facilitate the comprehension of relationships between individuals, between groups, between ideas”, Rao/Walton, 2004; or, in another definition, including notions of *social action*: “Culture is a dynamically interactive and developing socio-psychic system. At any point in time the culture of a community is engaged in a joint production of meaning”, M. Douglas, 2002



- In accordance with the historic and cultural foundations of social structures, innovations in layers of societal sediments occur at different speed and in diverse forms – more or less influenced by technology.

Criteria to understand, and indicators to measure processes of innovation thus need much more specification and range than those currently used in the “Oslo Manual” (OECD/EUROSTAT, 2007) or the EIS (European Innovation Scoreboard). Research should be initiated to address the *broader scope of innovation* on the one hand, and on the other hand to take into account the multitude of – admitted and limited – *innovations in deep layers of the society* which are more persistent to change and technology than are material ambience and economy of the society.

In social change innovation plays a role, yet taking part in the dynamic and complex processes of social change, innovation is driven as well as acting as a driving power. This is why innovation is far from being just an aspect of technology and economic operations, as it is usually denoted. Moreover, innovation is socially constructed (in many cases, but not in any instance, involving composites of technological and scientific origin), and has impact on social life, institutions and many other developments in society – making it imperative to gradually establish an integral view on innovation in order to better govern the social embedding of innovation.

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