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Towards the social meaning of innovation.

Establishing a distinct object for sociology by Functional Analysis

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Inhaltsverzeichnis

1 The innovation problem of sociology.....	4
2 Changing the meaning of the concept of innovation.....	6
3 Empirical problems of innovation research.....	11
4 Functional-analytic résumé: Innovation as a convincing promise against blind evolution.....	16
5 Empirical observation of the constitution of innovation.....	20
6 References.....	25

1 The innovation problem of sociology

With respect to innovation research, sociology is presented with the challenge of making a distinct contribution (Braun-Thürmann 2005: 5). Despite numerous attempts, such a contribution has yet to be achieved. This paper indicates that with respect to the terminological reflection as well as the methodological foundation, two deficits cause this situation. The following argument suggests that both problems are only solvable when they are approached simultaneously.

Considering the amount of research concerning innovation raises the question whether sociology distinctly contributed to it or not. Besides a few attempts on the commonly named social innovations as a form of innovation, contributions lack originality.¹ In most cases, sociology lives off of imported economic theories. Sociology still limits itself to machine-technical artifacts and only dabbles in solutions for political problems. Moreover, – inspired by Ogburn's cultural lag-hypotheses (1922) – it does so without estimating user behavior against new technology and its consequences or describing its conditions of origin and possible optimizations. For this purpose, sociology conducts organizational case studies and comparisons within and between industrial sectors closely related to the economy. Based on the figure of the entrepreneur's close link to innovation, sociologists and psychologists alike have searched for a particular type of person that acts as an innovator within and outside organizations. From these perspectives, sociology only follows managerial and economic interests, yet its own question falls from view. Indeed, only the reference to the possibility of social order enables sociology to gain a – purportedly – useful and original perspective on innovation (Braun-Thürmann/John 2010).

Thus, innovation must be approached by sociology as a social phenomenon, which is established by society. Consequently, sociological innovation research must seek a distinct notion; otherwise it has no concrete object. Relying on purely redundant assertions that innovation exists solely to describe its prerequisites, characteristics and consequences (as economics already does) is insufficient. Rather, it is worthwhile to ask how innovation comes into being in the first place, and how innovation becomes a social phenomenon for society as a whole instead of only for the economy. For the necessary research, an innovation concept is needed which functions as an object; a meaning that can withstand empirical observations without avoiding them.

Following this task, a methodological problem must also be solved. This primarily entails how to observe the social construction of innovation with the help of theory and methods that always must establish their objects themselves. How is it possible to learn more about the object of interest than is already known? How can sociology establish an original perspective on innovation?

¹ This is one possible interpretation of Blättel-Mink's compendium of innovation research (2010).

Traditional sociological research raises doubts on whether it has said anything distinctive about the phenomenon. This is because research analyzes its prerequisites or consequences, and begins either too early or too late. Thus, it fails to clarify its object. Furthermore, research attempting to define innovation on the basis of differences like product and process or its basal or incremental characteristics also fails to apply its object. The more focused the lens is, the more blurred the borders become. Therefore, other differences also fail to define what innovations are. In the end, this question has no need to be answered, because it is already determined by society. However, the ultimate question remains unanswered: How are such innovations determined? In this way, the observation problem moves over to the competence area of science, hence sociology. Here, however, the problem of the observation of innovations can be determined. This is, namely, in which way the observation remains open (despite its constitutional characteristic) so that insights are possible beyond simply paraphrasing redundancies.

Problems with the object as well as with the methodological base of sociological innovation research are only conjointly solvable. Only then can one ascertain, with the help of the empirical instruments, how the object constructed by theory interacts with the socially constructed object. Only by controlling the interrelation between theory and empirical observation (with the help of methodology) can one determine how the innovation phenomenon generates socially relevant evidence.

For this purpose, retrospection on two different concerns is necessary. This primarily regards the object and the methodological base of the empirical research. About the object: in terms of being an indicator of business cycles, at the beginning of its current terminological career innovation was more of an instrument than an object of empirical observation. In this capacity innovation served as a marker and as an explanation for the cyclical change of the economy. Both the indicator and the objective are inherent to Schumpeter's idea of innovation and are associated with the figure of the entrepreneur. Because of this, to this day ambiguously defined problems and aims exist. The economical exploitation of machine artifacts is still the center of interest of an innovation boom that spans over three decades. It is high time that sociology strives after its very own term against this trend.

Following up sociological considerations of innovations as solutions to social problems (Zapf 1989, Gillwald 2000), where innovations are a means for solutions as well as causes for problems, innovations are explicitly understood as specific problem-solution-relations. Because of their contingent yet highly variable forms – as hinted by diffusion research– statements about the term and the constitution of innovation relevant for social theory are only accessible by comparative research. This concerns the methodological problem as well as the corresponding retrospection. In comparisons, innovation serves as a specific viewpoint of problem-solution-relations. Functional analysis has the ability to organize these comparisons in a particular way. Although many sociologists shelved it in the course of the

criticism against Parsons, during the 1960s and 1970s it was further discussed mainly in the shadow of Luhmann's system theory.

With the help of functional analysis, it is possible to reflect the constructive role of theories and methods concerning the constitution of the observed object. Functional analysis can be used as a methodology because it provides a reflexive and thus controllable frame for empirical research. This frame facilitates general statements about innovation as a social phenomenon in respect to factual and social categories – the references and relations of the compared innovations (Rammert 2010). Thus, on the one hand, innovations appear as an ex-ante and contra-inductive decision for the (re-)production of structures via planning within the limits of social-cultural evolution. On the other hand, innovation is a product of an ex-post valuation. This aspect will be demonstrated by an empirical example of the comparison of the meaning of innovation benchmark contests in Germany and of international patent litigation. From the perspective on innovation as an entrepreneurial objective and a valuation-indicator, a particular sociological field of research on social change opens up. By this means, sociology can finally emancipate itself from economical innovation research. Instead of producing episodic descriptions of successful enterprises, deducting optimizations for businesses or warning about the obstacles of machine-technical products, sociology can exert an analysis of the social constitution of innovation in society.

2 Changing the meaning of the concept of innovation

Innovation has become an emblematic term for recent modernity. It seems to be not only appropriate but also virtually demanded in every factual and social context. Today, this dominant practice produces persuasive power, making the term innovation inevitable. This also means that persuasive power does not derive simply from the term itself. As innovation has been used in more and more factual and social contexts, its substantiating meaning has been lost. However, the semantic history of the term innovation cannot only be described as a process of voidance or a degeneration provoked by its excessive use. The substantial voidance is the prerequisite as well as the result of a change of meaning from an ex-post mark of economic change to a manifold high value term indicating the future of society.

The roots of the current notion of innovation reach back to Bacon's note in his essay in 1625 (see John 2013). Every naturally occurring change during the course of time produces new qualities. Because time alters things for the worse, man must hinder the decay by way of his own creativity. In this sense, innovation represents newness for Bacon. It provides improvements against the relentless decay. This kind of utility, however, must be sanctified with fortune against predominant skepticism.² Innovation,

² This means, fortune is provoked by daring to strive for newness. This already hints at the entrepreneur which was

meaning an improving newness, though pertinent in the English-speaking world for a long time, was still never as relevant as it is today. Instead, newness was associated mostly with progress until its possibility was increasingly rejected in the 19th century. Progress became a “Bewegungsbegriff” (concept of movement) (Koselleck 1989: 374) and the then fresh idea of evolution partially kept its meaning. However, this left a vacancy for an emphatic affirmation of newness and confidence in the future. Only the search for the reasons of the turbulent economic change at the end of the 19th century prepared the ground for a term with such a meaning – innovation. The classical economic theory and its equilibrium model could not explain the discontinuous development of economy of crisis and boom. Nevertheless, at the beginning of the 20th century the form of volatile development had diverse duration with wavelike regularity.³ In his first classic of 1911 Schumpeter (1987a: 100) defined new combinations of “vorhandener Dinge und Kräfte” (existing things and forces) as the key driver of business cycles. Such combinations can be goods, production methods, sales markets, sources of raw materials and resources as well as the resulting impact on existing monopolies. Therefore, changed modes of production cause the discontinuity of economic development fostering social change. (Schumpeter 1987b). This not only depends on the combinations, but on implementation against existing solutions. That is why Schumpeter repeatedly stressed the difference between invention as the actual combination and innovation as its implementation on the market.⁴

Schumpeter's idea of new combinations (which he called “innovation” from the middle of the 1920s as influenced by English discussions) essentially pointed at those elements associated with innovation today. First, the phenomenon of innovation includes all aspects of production and, from where it refers to the whole society also concerns economy. Innovation is conceptualized without factual limits. Second, innovation is clearly distinct from the mere appearance of newness. Schumpeter ascribed a particular role to the entrepreneur and, from the 1940s onwards, to the collective entrepreneurial management. Unlike the administrators keeping the businesses ticking, the entrepreneur interrupts normal operations.

However, Schumpeter was mainly interested in the explanation of the sporadic economic development from a historical perspective. He asked for the marginal conditions of business cycles and their results. In contrast, the identification of the decisive innovation was not that important. In the end, it was a successful combination by chance. It derives from a reservoir of possible combinations, which could

ascribed the task of innovation by Schumpeter 300 years later.

³ Statistical analysis only became possible once enough data was available. Before the 19th century, these data were not collected in a regular manner (Osterhammel 2009: 57 ff.). In his opus magnum of 1939, Schumpeter (2010) named the diverse waves after the respective pioneers Kitchin, Jugler and Kondratieff.

⁴ For example, Schumpeter (2000: 266) emphasized in a letter to Gilfillian that, invention differs from innovation by the „emergence in the practice of economic life, in new ways of doing things, and it is only the latter that matter for my problem“. See also Schumpeter 2010: 92, Footnote 11.

not be implemented at that time. The scarcity of resources as an obstacle for normal production and the availability of cheap credits were crucial factors for Schumpeter. In this situation, alternative combinations relevant for production and for the market could prevail.

Until the end of the 1970s, politics and economy showed only slight interest in innovation (McCrow 2008: 587). Based on the economy crisis after 1929, Keynes' ideas about counter-cyclical policy overshadowed Schumpeter's thoughts about business cycles and innovation. This was because they provided hardly any opportunities for immediate policies of economic action. The economic policy, which began as liberal in (Western-) Europe and the USA during the restructuring after World War II, was superseded by a policy inspired by the neoclassical interpretation of Keynesian ideas from 1960 on. This new policy coincided with a rising optimism in governance. The entrepreneurial qualities of the firms' management were rarely a topic. It was rather discussed in regards to good administration.

However, from the end of the 1960s on, the economic-political order of fiscal stable regulations, the state-supported and demand-orientation of the economy along with the corresponding ever-expanding welfare state had plunged into a crisis. This was due to the beginning of globalization, the increasing scarcity of resources and problems of financing social welfare.⁵ Since the beginning of the 1980s, there has been a massive change of economic policy, first in the USA and then in Great Britain. Instead of sustaining demand, supply is now supported. Thereby the public spending ratio was reduced, taxes were cut, and welfare was restricted. Policy intended to stimulate the economy or growth and prosperity by limiting the state interventions.⁶ This animated the modification of economy from industrial production to services. This modification was, namely, from the chemistry, steel and coal industries to informational technology. The commonly named neo-liberal economic policy was formed by those liberal economic theories of the Vienna School that already followed Schumpeter's evolutionary theory of business cycles. The change of the economic regime from a demand to a supply orientation helped the idea of innovation become popular. Since then, economics and politics have shared the same interests though with different emphasis. The older assumption that state inventions do not contribute to the economic dynamic and social change as much as technological innovations came to the forefront.⁷ Since the end of the 1960s, the Organisation for Economic Co-operation and Development (OECD) has reminded politics regularly of the thesis of the technological deficit of (Western-) Europe (Godin 2002). At the same time, the OECD has made efforts to survey research and development (R&D) performance of leading industrial countries. Ranking produced by the help of these data has

⁵ Meidner and Hedborg (1984) present an eloquent example of the restructuring of the Swedish welfare state in the 1970s.

⁶ Harvey (1990) saw the measures for the prosperity-driven increase of workforce demand, incomes as well as tax revenue as signs of "voodoo-economics", especially the tax cutting and the provision of cheap credits.

⁷ Ogburn's thesis (1922) says technological and social inventions drive social change. However, opposes Schumpeter's concept of innovation.

been considered to provide reasons for political decisions to increase R&D expenditures. It was assumed that higher expenditures for the sciences and research would result in more inventions. These, in turn, will be realized as better products causing a boom and increased prosperity. In this regard, the task of the state is not the redistribution of wealth. Indeed, in the end, this only slows down the economic dynamic. Instead, public good should be provided as inducements and conditions for the stimulation of the private sector. The markets activated this way should carefully consider the broad participation in the prosperity. A long ranging relief of welfare state costs and wealth growth seemed to hold out in hopes of “sharing the wealth”.

Thus, since the 1980s, innovations have been understood and treated as products causing booms. However, in accordance with the OECD, the economy and politics alike perpetuated inventions as the nucleus of innovations. Inventions and innovations are similar in requesting constraint-free spaces. Management should not see itself only as administration whose rationality has been doubted for some time (March/Simon 1958). Rather the structural arrangement of business organizations took priority. Since then, above all the reduction of hierarchy to enable autonomous creativity was a decisive issue.⁸

Now, management should act as an entrepreneur, as Drucker (1986) demanded in the beginning of the “Schumpeter-renaissance”⁹. Management should look at unexpected events and social trends and perceive them as opportunities rather than disturbances. However, Drucker introduced the entrepreneur who does not look for innovations in order to establish them in organizations and at the market. Instead, Drucker’s entrepreneur should innovatively observe, using the unexpected coincidence of several conditions as alternatives for change. Although Drucker was a highly popular author of management books, this idea closely linked to Schumpeter's idea of innovation was scarcely continued. Competition for consumer attention, which is short-lived under the conditions of supply-oriented markets, results in a linear thought about the practices of innovation. Since then, innovation has become a compact concept indicating new products, where new is assumed to be better. The management objective is now to become the dominant supplier by such innovations. Consequently, the economy must produce new products, which will act as attractive offers.

Under the terms of these conditions, the decentralized free space represents the organizational prerequisite of enterprises, as Drucker (1946) had already explained as part of his early description of General Motors' organizational structure. Extensive and centrally controlled organizations have little potential for innovations, because it is often limited by the endeavor to persist. However, to better persevere under the conditions of the supply-oriented economic regime, firms should provide

⁸ The body of literature has grown enormously since the 1980s. Thereby distinct topics defined the discussion in a manner of increasingly changing trends (Kieser 1996). At the same time, like those of the rationality postulate, the critique of organizations stripped of their hierarchies has been on the rise.

⁹ Brombach (1981) coined this term.

resources for innovative initiatives instead. These innovation initiatives will help to overcome the structural moment of inertia. This is precisely the task of the state of monetarist-neoliberal oriented politics: The state should provide public goods for private use by means of structural policy. Tax privileges for R&D activities should support entrepreneurial activities within the scope of the “triple-helix” of politics, economy and science (Leydesdorff 2000). However, in the end politics are focused on the exploitation of R&D' results. This caused a semantic change of the term innovation. Now it mostly means only the realization of machine-technical artifacts. This is a problem for innovation research, because it limits the capacity to look at the full picture. Concerning theories of social change, not least Ogburn's, this limiting orientation was notably rejected in the discussion of German social scientists. One argument emphasizes that concerning innovations, one should put social practices on one level with machine-technical artifacts (Zapf 1989, Gillwald 2000). Other authors determine that social innovations are the general form of innovations, where machine-technical artifacts are only a special and rather inferior form (Howald/Schwarz 2010). From an even more radical perspective, innovations appear in general as social phenomena, which are constructed as such by society (Aderhold/John 2005, Braun-Thürmann/John 2010, Rammert 2010). This critique has been unexpectedly compounded by the current expectation of innovations in all areas of society, even in those, which are explicitly non-economical.¹⁰ The expanding expectation of innovation in every social area results in an erosion of its meaning. Innovation changed from a “Leitwort” (key word) of cyclical analysis to a political and economic “Hochwertbegriff” (high value term) which caused a use that eliminates boundaries. In the end, innovation degenerated to a “Plastikwort” (plastic word).¹¹ However, plastic words are anything but ineffective. Freed from a particular, differentiating meaning, they develop a pull effect as a concept of movements¹². Precisely because no one can say what innovation actually means, one can expect it everywhere and hope that the “new as the better” will cause prosperity and happiness. Based on this essential assumption, the current concept of innovation points at structural disruptions enforced by entrepreneurs. These are geared towards establishing alternative structural continuities in all areas of society. This aspect was already part of Schumpeter's innovation concept. However, it was accompanied by other aspects, which moved to the background. Since its popularization, the meaning of innovation has been limited to a future orientation. Schumpeter was mainly concerned with the economic analysis of past business cycles with the aim to reconstruct the evolutionary change. Today, the main concern of innovation is the allocation of resources for the new and better by planning. Schumpeter used innovation as the retrospective indication of the success of a

¹⁰ Aghamanoukjan (2012) describes this expectation of social services pressured by politics to be innovative to obtain subsidies. Gröschner (2013) discusses innovative competence as a basic objective of the curriculum for teacher's training.

¹¹ “Leitwort” and “Hochwertbegriff” are analytic concepts of political linguistics (Dieckmann 2005). “Plastikwort” was introduced by Pörksen (1988), who critically discusses the consequences of the excessive use of trendy terms.

¹² “Bewegungsbegriff” (Koselleck 1989: 374).

particular combination. However, today innovation is the expected success of a plan's objective. Instead of exploring the past, it is only about defining the future. Because innovation is first a promise for something better, and insofar it is a promise for success, this definition still needs affirmation in the present. Ultimately, it lacks factual evidence. Thus, one demands affirmation for all sorts of aims with the help of innovation. Nevertheless, innovation is solidified as a conceptual shell, providing an aura for the indicated object or process suggesting affirmation.

The usual concept of innovation is not only cut short and over-simplified; it is also a newly outfitted belief in a successful progression of enduring improvement. However, how can such a cloudy concept be effective while referring to everything and providing only a vague hope? Is it possible to gain a better understanding of innovation by empirical observations? How does one characterize innovation? Alternatively, is innovation rather about a creative reception of problematic situations, like Drucker said? Is it necessary to shift the perspective on innovation from a substantial to a functional question, from “what is it” to “how is it possible and how does it happen”?

3 Empirical problems of innovation research

Innovation is primarily observed by statistical data nowadays. Indeed, the modern concept of innovation took on its shape when new combinations were related to economic cycles by means of statistical data. Obviously, it is not enough to consider inventions and novelties already established since the middle of the 19th century as patents.

Looking at existing discussions scrutinizing business cycles, Kondratieff (1926) explained the regular appearance of long waves of economic prosperity by several factors. These factors, changed techniques, war and revolution, market extensions as well as the changing amount of gold were direct results of problematic economic development. They are to be understood as economic needs and results. However, Kondratieff virtually ignored the concept of innovation.¹³

Therefore, Schumpeter was the first to introduce innovation to the discussion about business cycles. He described in detail this relationship in his magnum opus “Business Cycles” of 1939 (Schumpeter 2010). When they become the trigger for a boom, new combinations are innovations. Neither the entrepreneur nor new combinations alone were enough for that effect. Thus, Schumpeter also understood innovation as an endogenous event of economic processes. It starts a new business cycle by successfully establishing a new combination of production factors. Nevertheless, an ultimate contingent combination depends on several fundamental prerequisites to become an innovation. These prerequisites define the business cycle. To show the typical course of business cycles, Schumpeter

¹³ Although Kondratieff (1928: 5, footnote 5 and 6) knew the relevant papers of Schumpeter.

draws on economic data of about 160 years. He used this data for statistical analysis to describe the cycles concerning resource crisis, dynamics of firms, and the availability of investment means by low price credit. Insofar innovation was mainly a means for Schumpeter's interest in business cycles.

As already noticed above, Schumpeter's idea did not gain wide attention until the beginning of the 1980s. Only a few and rather marginal attempts referred to innovation. This was due to other, more influential economic theories and ideas, which were proved useful. However, when the optimism in governance of the period after World War II came to its limits in the mid-1960s, the reaction, in keeping with the times, was ambivalent. The crisis caused a critique, which demanded even more competencies from governance. In this moment the OECD diagnosed the perils of a technological lack and economical marginalization of (Western-) Europe in regard to the USA and Asia for the first time. It has been a recurrent theme ever since. This thesis becomes evident with the help of the analysis of economic indices. Thereby the OECD observes states for their innovativeness. An input-output-model is the base for this analysis. It assumes that the amount of R&D expenditures directly affects the technological capacities. The OECD drew up several instruction manuals for comprehensive surveys.¹⁴ By this, the OECD answers to new theoretical concepts and critiques, legitimizing its actual research practices in an ongoing manner. However, the R&D expenditures on the level of national states remain the essential data. As a result, the input-side is mainly compared. The analysis of the output-side focused on the technological products and processes in the beginning. In the meantime, implementation and commercialization have been taken into account (OECD/Statistical Office of the European Communities 1997: 9). Thus, diffusion complements the concept of innovation now surveyed by marketing activities (OECD/Statistical Office of the European Communities 2005). Nevertheless, many innovation activities in the service and public sector are missing.

National entities of firms are the basic sampling units. Certainly this contravenes the assumptions about the global knowledge economy, if namely multinational relations within or between organizations are ignored.¹⁵ The authors of the manuals also state, that surveying marketing activities is not enough to depict diffusion as a part of the innovation process in an appropriate way. What is more, statistical surveys are somewhat behind concerning the dynamic knowledge based economy (Room 2005:142, OECD/Statistical Office of the European Communities 2005: 129).

The manual's authors acknowledge all the limitations of the usual innovation surveys: the focus is on technical products, the perspective on units at the national level, and the preference of the input-side.

¹⁴ The fifth edition of the Frascati manual was published in 2002. The third edition of the Oslo manual was published in 2005. The latter takes the output aspects more into account than the former.

¹⁵ Albeit international co-operations and networks outside of particular R&D-divisions develop many novelties (Box 2008: 41 f.). Room (2005: 152 f.) noticed correspondingly, that multinational firms „undertake the lion's share of industrial innovations and dominate the intangible assets of the new economy“.

Nevertheless, these limitations are legitimized on research pragmatic grounds like the limited possibilities of modeling and availability of data. In the end, the OECD statistics do not inform about innovation or innovativeness of the compared nation states, but mainly about the efforts to make a particular kind of innovation possible. However, one can gain an impression by the perception of the actual political recipients. Indeed this is the only truly interesting information. It is discussed as the „Gross domestic expenditure on R&D“ (GERD). It is an apparently unachievable (and therefore in a way magical) goal to reach a GERD of three percent. The EU and its member states have declared this as the tangible task for the future yet again.¹⁶

There are several similar statistic-driven comparisons besides such political intended survey projects with limited interests. They all have to cope with the same difficulties.¹⁷ Since the 1980s, social-scientific innovation research has produced many surveys and studies. The interest of this research feeds mainly on a concept of innovation which focuses on the economic exploitation of technical artifacts. The questions concern particular economic problems as well as problems of organizational structure. Innovation activities are compared between different sectors and branches, the influence of the size of organizations is analyzed, and the usefulness of networks is discussed. Further questions concern the importance of the availability of particular resources, as well as the relation between control and freedom in organizations. The questions typically take on a range of perspectives between organizational science and business administration. Likewise research on the meaning of technique for social change aims at innovation.

However, it is typical for this kind of research that its interest is primarily or even solely limited to the prerequisites and consequences of innovation. This is not only due to the research's intention in the context of exploitation, but the research's object escape from the direct observation. Schumpeter did not perceive this problem, nor historically oriented research.¹⁸ However, if an object should be observed as an innovation in the present, one can never be sure about it. This is even truer if the object is a goal of planning. Ultimately, innovation objects can be differentiated in three ways: innovation can refer to products or processes, they can have subjective or objective characteristics, and they can be radical or incremental. Nevertheless, these differences cannot be rationalized by empirical observations (Reichert 1994: 24 f.). Radical innovations derive from incremental ones, which can cause radical impacts in the long run. Objective innovations need subjective appraisals just as subjective estimations need objects. Innovative products are the results of innovative processes, which – again – are intended

¹⁶ The USA reached the margin of a GERD with three percent in the early 1960s. Since then, the OECD assumes this as the ideal margin (Godin 2009: 90), despite lacking proof of its practicality. The European Commission has taken this for granted for some time now (see European Council 2000 and the declaration “Europe 2020” at http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/targets/index_de.htm, 14.3.12).

¹⁷ See for example Schubert et al (2013).

¹⁸ In this regard even the oxymoron “failed innovation” seems to be possible (Bauer 2006). Admittedly, it cannot satisfy the expectations of a discriminating innovation concept (see John 2012 and the following discussion).

by products. The differences collapse when differentiated.¹⁹ Thus, these differences are approached with skepticism. The situation is similar with the popular differences between technical and social innovation. The factual references of innovation are differentiated in a way, which is based on an inadequate concept of technique pointing only at artifacts.²⁰ Because of this, this difference is only a new edition of the difference of product and process, where processes primarily point at human actions. In factual regard, there is obviously no sufficient differentiation to describe innovations.

This is also true for improvement as the usual attribute of innovation. The assumed improvement by innovation indicates an increased usefulness – really just a better solution. The increased usefulness can be interpreted as a source of social attractiveness and commitment: The better will succeed by its multiplied use. On the one hand, this idea is still driven by a demand orientation, which no longer exists. On the other hand, this idea assumes a utopian homogeneity of society. The increased usefulness presupposes a constant problem for the demand, which is better answered by alternative solutions turning out an innovation in this way. However, no solved problem – if it could be better solved – can claim to be of such social universality and conformity. This can be easily understood by Schumpeter's explanation of creative destruction, which accompanies innovation. The ambivalence becomes obvious, even if one looks only at those phenomena labeled as innovation because of their usefulness.²¹ However, for the success of new solutions, it is of more importance that new, solvable problems are created as well.²²

Nevertheless, innovation makes it possible to observe the disruption of the continuous course of time. Innovations introduce a differentiation in present between the past and the future. Thus, it is not hard to describe the situation before and after. This is done by historical research as well as by most innovation research analyzing the prerequisites and effects of innovation. This is the reason why innovation is often approached as novelty.²³ Thereby innovation research also has the paradox of simultaneity, which is typical for differentiating boarder concepts (as demonstrated for factual references). Innovation as novelty does not differentiate between past and future, but between old and

¹⁹ However, this is true for the different possibilities of combination, suggested by Schumpeter. They are also not observable as sole manifestations of innovation, but they are connected to each other.

²⁰ Technique shapes into a form by very different media. It can be a rule, regulation or provision; it can be a procedure or an apparatus. Therefore, writing or marching are techniques as well as streets, rails, cars or rockets. Technique can be described as a unit of closely linked elements. Only equal elements can be changed in this relation, otherwise the unit will change or be destroyed (see Rammert 1998).

²¹ This is clearly demonstrated by Ogburn's table of social inventions (1933: 162), which nowadays – without any doubt – would be considered mostly for innovations. This table includes besides „Bonus to wage earners“, „Civil service system“, „Research institute“ or „Company union“ and „Patents“ also the „Klu-Klux-Klan“.

²² The technical superiority is hardly important. This is demonstrated by numerous investigations in the establishment of particular technical artifacts which became standards, like the keyboard layout, the VHS-format for video cassettes or the Walkman. Examples like the Walkman of 1979 or the iPad of 2010 show that the success of such supply depends on the creation of needs and problems like an „environment“ of external yet controllable links and apps. For Berkun (2007) this is one example of the myths of innovation.

²³ Schumpeter (1987c) also used novelty as a synonym for innovation.

new. Thereby it appears on the side of new. However, where it is the means to indicate a difference between the past and the future, innovation as novelty is limited to the present. The actual novelty did not exist in the past and it will not exist in the future, because either it had not yet existed or it is already old. The present always changes the future into the past. The observation also happens only in the present thereby executing this change as well. Thus, this moment of change actually cannot be observed. Novelty can only be noticed by a retrospective view either as a historical fact or by a prospective view as a plan's aim. Even then, novelty, not to mention innovation, is noticed: numerous new products have always been introduced onto the market, and most disappear quickly.²⁴ Furthermore, novelty differentiates the known from the unknown while differentiating the old from the new and the past from the future. Therefore, novelty (and thus innovation) is characterized by a moment of surprise, which happens only before the contrast between the expected and the unexpected.²⁵

Differences rub against innovation as a surprising novelty, while contradictory references contribute to the occurrence of the phenomenon. Thus, innovation results from an observation paradox in temporal regards. Starting at this insight the problems in factual regard can be explained as well. Processes and products are prerequisites as well as effects for each other. For example, legal rules enable the production of particular products, which simultaneously force particular legal rules.²⁶ Looking at Schumpeter, one has to ask, how the alternative combinations marked as innovations can be limited so that they could be observed as a distinct object. The prerequisites and effects of these innovative objects are also not easy to define. However, these are not only problems of science and actual innovation research, but of society as well: What does it mean to talk about innovation, how does it make sense at all? Is it enough to look at the structures of firms or entrepreneurial networks; is it enough to investigate so-called national innovation systems like the triple helix? Should society as a whole, along with the value preferences of consumers, be the references for innovation research?²⁷

The numerous books on management, business administration and organizational structure, with their referencing and illustrating tales about the success of innovative enterprises, do not even ask such questions. These innovation objects remain vague (e.g. Douthwaite 2002), otherwise decisions in organizations would not be possible. However, the accurate limitation of the innovation objects, their prerequisites and effects do not matter for this kind of research. Rather, the performative quality of organizations like a successfully differentiating self-presentation in regard to the competitors (see Bhidé

²⁴ Every year up to 8.000 new products are introduced onto the German food market. At the end of the year up to 90 percent can no longer be found on the shelves.

²⁵ Surprisingly, innovation comes strangely close to wit (Freud 1985: 217), if both provoke positive emotions.

²⁶ This can be studied by the discussion about copyright. For a basic discussion, see Simonis (1999).

²⁷ The user-oriented innovation research (von Hippel 1988) together with marketing-oriented economists try to do so. They also present only examples from a retrospective view as proof for their hypotheses. However, the user of future innovations cannot be identified this way. Instead, they should be included into a "democratic" development process (von Hippel 2005). This is accompanied by a marketing interest in the relations of enterprises and consumers mainly inspired by Toeffler's "prosumer" (Hellmann 2010).

2000: 68), or the establishment of alternative practices in everyday-life due to changed legal rules are more interesting.²⁸

In the end, the empirical object innovation is omitted by the research whether by proclamation of a future aim or by confirmation of a past event. These vague assertions on occasion ultimately provide sufficient reason for the true intention of the research. Mostly it is about organizational development rather than innovation. This unsatisfying situation of innovation research prompts the question whether looking at innovation objects is appropriate at all. If sociological innovation research is actually interested in the production of innovation, it should explicitly ask how innovation came into existence as a social phenomenon, and which problems are solved thereby in society.

4 Functional-analytic résumé: Innovation as a convincing promise against blind evolution

The discussion about innovation indicates an interest in social change, albeit overshadowed by a dominant economic perspective. However, the discussion about social innovations complementing or superseding the dominant view on technological machine innovations has led to a common understanding about the relevance of such innovations. Nevertheless, this discussion cannot waive the hint of growth (Howaldt/Schwarz 2010: 39, Hubert 2011). In accordance with this assumption, research attempts to uncover the prerequisites of innovation and to verify the effects on the wealth of the investigated national contexts. For this purpose, a distinct innovation concept is not needed in the end. Anyhow, it cannot be observed in the temporal regard and cannot be defined by its factual references. However, the surprising momentum of innovation points at a universal factual difference, namely between sameness and otherness.²⁹ This corresponds closely to the difference between the expected more of the same, and the unexpected, which represents the otherness.

This difference is not enough to cause such a universal commitment to an innovation phenomenon that it no longer needs mediation. Still, it appears only as one possibility among other possibilities. Exactly one possibility has to be selected by decision valuing this one as better than the others. However, this decision always is informed by bounded rationality. Thus, the innovation phenomenon appears only for a part of society as good, better or useful. These distinctions are hardly reliable. Instead, the difference between normal and deviant is more appropriate in a social regard.³⁰ Yet again, this difference corresponds closely to the difference induced by surprise. Now it is socially interpreted as referring to the normative structure of society. Thus, this reference points at social change.

²⁸ For empirical examples from several practice fields of consumption see John/Rückert-John/Jaeger-Erben (2014).

²⁹ Rammert (2010) differentiates sameness from novelty. However, the latter is only observable in temporal regards. Thus, the factual difference between sameness and otherness is suggested.

³⁰ This differentiation can also be found in Rammert (2010).

By the means of innovation, it is possible to mark social change. Without marks, it would not be noticed. Only then can one differentiate before and after and subsequently name past and present. It cannot be observed – as already pointed out – because the border between these temporal horizons is produced by the ever-changing present. The mark manifests itself as an object only if it is projected by a retrospective view into the past or by a prospective view into the future. Then such marks can be differentiated as new and old ones.

Like all differences, those induced by innovations have a paradox characteristic. A differentiating object simultaneously must refer to both sides of the difference, while positioning itself on one side. Innovation points at the side, which is deviant, contrary and new. The differentiating object cannot take on this position by itself. It is appointed to this position by an ex-post evaluation as an innovation. In the present of this evaluation the innovation is at least no longer new, less contrary, though perhaps still deviant. Because the difference as such is not observable, the indication as innovation causes the surprise effect.

Paradoxes can be accessed for observation by converting them into other differences. Admittedly, the paradoxes do not disappear. The observation of these paradox phenomena with their infinite and therefore unproductive information overload, can be limited in such a way that the phenomena can be adequately described.

Functional analysis is suggested as a methodological path to de-paradoxification as a way to eradicate the paradox characteristic of the innovation phenomenon. Functional analysis is a methodology or an “analytic strategy” (Anderson 2000: XIII f.). Thus, it is not a methodical instrument of observations. Functional Analysis must be conceived as a bridge mediating theoretical and empirical observations (Stichweh 1996). By methodology, it is possible to explain how on the one hand an object of observation is constituted by the observation itself, and how on the other hand this object provides surprising insights. This concept of Functional Analysis should not be mistaken for the method originated from the anthropology of Malinowski and Radcliffe-Brown. The critique of the method along with the controversy about Parsons' theory urged the Functional Analysis into its role as methodology or analytic strategy. The most important adjustment concerns the concept of function.³¹ Hereby the function should not be understood as the last purpose. Indeed, this is caused by referring to the establishing problems. Following Cassirer (2000), the function indicates a relationship between elements, which withstands the test of the actual order of relevant phenomena. This relationship can be sociologically conceived as a relationship between problems and solutions, whereby no mono-causal nexus can be assumed. Just as a problem can be solved by many solutions; a solution can be caused by many problems. The multiplicity of causal relations was already empirically observed in the form of

³¹ For an overview of the change of Functional Analysis in the context of its critique, see John (2010).

paradox or highly complex innovation phenomena. The multiplicity must be focused by a perspective of constant observation. This perspective is the problem viewpoint from where the observer looks at the phenomenon. The observer indicates the problem viewpoint as the base of the empirical research results. This enables other observers to critically understand the results by reconstructing them or to criticize the problem view point by an alternative one. The purpose of the problem viewpoint itself is to compare the problem-solution-relations truly being observed. Thereby the function of this elemental relationship can be analyzed as well as its functioning in terms of the auto-logical reproduction. This analysis can then be ordered on problem levels.³²

Social change imposes itself as problem viewpoint for the observations of innovation phenomena. Because innovation has been treated as a mark or means of social change, this has been a tradition as long as innovation has been discussed with regard to evolutionary theory.³³ Evolution as a general scheme of change is characterized by three elements: variation, selection and retention (or re-stabilization). Paradox innovation phenomena can be observed with the help of this distinction.³⁴ The three evolutionary functions emphasize the retention of structure under the conditions of change. The change-causing moments stem from external events. They negate the structure as a set of expectations within the horizon of possibilities disturbing its reproduction. The enduring structural irritations cause variations of operations and special events making up the frame for expectations. They are manifold because of the surplus of meaning, which is provoked, not the least of which is the irritation. Because established expectations become mere alternatives, this strains the structural reproduction. Thus, the variations push towards selection. Usually the moment is perceived as a disturbance or crisis, when the structure loses its normality and must be selected anew. However, Drucker (1986) argued that such disturbances should be interpreted as opportunities to be used systematically. In his opinion, this is the essence of the innovative attitude of entrepreneurs. By understanding disturbances as chances, one can face change with ambition. The alternatives caused by variation provide no information about their sustainability. Thus, the selection of future elements to form the present alternatives does not depend on the history of the variations. In any case, change will happen, even if the new element is similar to the old one. This selective decision benefits innovation, if it is „kontrainduktiv“ (contra-inductive) (Luhmann 2005c: 433 f.), namely if the decision made is contrary to the primacy structural redundancy. At this point, structural change is not yet decided. The selection might cause irritation elsewhere, starting evolutionary cascades, which will respond to the first observed structure. This adds up to co-evolution. It is precisely in these polycontextual relations of society that the selected element is proved by re-stabilization as the new one. The newly selected element is still valid in the indeterminable future.

³² Mainly Luhmann (see 2005a, b, 1973) repeatedly pointed this out.

³³ The discussion about innovation only pushed the evolutionary economy (see Nelson/Winter 1982 and the contributions to England 1995 for example).

³⁴ For a more detailed discussion, see John (2005 and 2010: 87 ff.).

This evolutionary function, primarily treated as diffusion (Rogers 1962), results in sustainable, enduring and perceivable structural change.³⁵

By Functional Analysis, innovation will be assigned a position within the differentiating reference network of the three evolutionary functions and in respect to their different roles for the structural reproduction. The position will concern the equilibrium of variety and redundancy, and will be assigned by comparing the problem-solution-relationship to uncover their equality. Within the evolutionary scheme variation points to the reproducing operations, selection points to the expected elements like structure and re-stabilizing points to the relations of the structure to its environment. Variation is caused by an irritation that occurs by the differentiation between relevance and irrelevance. Because of variation, an element must be selected while all other alternatives are neglected. Finally, the structural stability must be confirmed concerning the complex environment or the evolutionary process will start anew. At every stage of the evolutionary scheme rejection or continuation are possible. Continuation as a relevant operation, selected element and stable structural linkages within the evolutionary scheme should be labeled as innovation.

What the innovative moments of the evolutionary scheme share is that they each indicate the respective continuation concerning operations, elements and linkages. This continuation is not irrelevant, nor is it rejected. Indeed, innovation is temporal continuation of the indicated object because of the capability to draw social commitment. Thus, the main aspect of innovation as structural continuation is the assertion of success. Success appears now as the intrinsic value (“Eigenwert”) of innovation (John 2012).³⁶ Only because of the inherent difference performed on the base of the intrinsic value does the concept of innovation make it now possible to observe distinct objects in a robust way. Therefore, a starting point is gained to trace the inferential construction (Brandom 2000) of specific objects as innovation by means of factual references and social relations (Rammert 2010). This reconstruction also outlines the order of problem levels according to the empirical design of Functional Analysis. However, in this first attempt innovation gains contours as a social phenomenon. This social phenomenon acquires objective proof as an inferential and confirmed knot within a referential context. Thereby it becomes clear that innovation must be selected contrary to the redundancy of existing structures and contrary to the blind operating evolution. The selection of innovation must be either a retrospective description or (today mainly) as an aim of a plan. These decisions are first and foremost practices of indication. As time goes on, they demand more decisions and reasoning to confirm them

³⁵ Such structural changes are not only mere adaptations or adjustments, but re-stabilization. This is observable in economic organizations (Dolata 2009) or for reforms or institutional arrangements (Coburn 2003) in regard to factual (transformative capacity or depth), temporal (sustainability) and social aspects (socioeconomic adaptability or spread and shift in reform ownership). It is then a transformation, revolutionizing the transformed as well as the transformer (Baecker 1998: 50 ff.).

³⁶ The intrinsic value meaning “Eigenwert” can also be translated as “own-value” in respect to von Foerster (1976).

in the future. The questions are actually pointing at innovations as social phenomena are: How are innovations made? How are elements combined to establish forms so that can obtain permanent and sustainable commitment?

5 Empirical observation of the constitution of innovation

The categorical definition of the innovation phenomenon will be tested by two current innovation topics: a benchmark “TOP 100” and a patent litigation in the IT-sector. Both topics refer explicitly to innovation. However, looking closer the reference appears less convincing. This raises the question as to how both topics support the innovation phenomenon.

The event “TOP 100” originated as a ranking of firms in Stuttgart published in 1993.³⁷ The benchmarking “TOP 100” is a national contest in Germany for the “most innovative medium-sized enterprise”. Well-known partnering organizations, economic-political research institutes, jurors of business consulting, science and economy, a prominent mentor as well as a team of Vienna University of Economics and Business (WU) for the evaluation, confirm the reputation of this contest. Every mid-sized firm can participate in one of three classes according to its actual size. The first of three steps is the evaluation of the participating firms as “Qualifier” by the team of WU economic scientists. If the firms qualify for the next step as “Finalist” they will be questioned more in detail to enter the circle of “TOP 100” as the last step. The benefits are the award “TOP 100”, the description of the firm in the annually published book about the results of the benchmarking, advertisements in print media at the corresponding website and finally an invitation for the meeting of all “TOP 100” finalists. Additionally, the participants can order a more detailed benchmarking as well as consulting. Benchmarking objectives are the meaning and the kind of innovation management, learning about climate and reform orientations, the importance of marketing as well as the output of new products.³⁸

First and foremost, the contest is about the firm's innovativeness. The firm's virtue of innovativeness, which is already part of its self-description, is honored. This attribute of self-description obtrudes itself as the problem viewpoint of the Functional Analysis of the benchmarking “TOP 100”, because the organizers already highlighted innovativeness. The benchmarking can be interpreted as a solution. Because the firms enlist for the contest themselves, their motivating problems remain obscure. Thereby the benchmarking appears as a product constituting a problem for the organizers as well as for the suppliers. Accordingly, the organizer, like every other supplier suggests problems, which encouraged the firms to participate in the contest. Under the heading “benefits” it is stated that the benchmarking helps to estimate the firm's performance. The title “TOP 100” elicits trust from customers and business partners. It fosters the company's good reputation and acts as a pull strategy for attracting

³⁷ See at www.top100.de and the information by the conducting firm at www.compamedia.de.

³⁸ The objectives are subject to change according to current topics (cf. John 2009).

other professionals and networking opportunities with experts. Firms in need of such benefits not least because of the problem areas they reveal, should actually be ineligible to enter according to the benchmarking contest's criteria. Indeed, they could not be able to be innovative at all. The firms already must have a market overview to know their own position. They already must enjoy the confidence of customers and business partners, and therefore the corresponding reputation. They must already effectively pull in professionals, be part of networks, as well as continue to learn and increase their skill sets. These features and the comprising attribute "innovativeness" can still be increased, thus one can always become better. This is precisely the purpose of the benchmarking contest "TOP 100". The improvement of innovativeness is achieved by the evaluation of the self-description of firms considering themselves to be innovative. In this respect, the benchmarking seems to a tautological re-description. Ultimately, the benchmarking "TOP 100" has no informational value. This would be possible in the event of failure, which is a possibility during the benchmarking process. Of course, this possibility of failure is not why organizers encourage firms to participate.

However, self-description needs confirmation via the description by others. The descriptions by those within the relevant environment seem to be insufficient for the participants of the benchmarking contest. The self-description of an innovative firm obviously needs a corresponding description on a certificate with the title "most innovative medium-sized enterprise". This objectifies the confirmation of the self-description: compliance elicits trust, reputation is obtained by the reference to the benchmarking contest, a like-minded network lacking practical relevance (and therefore rather without contradictions) confirms the self-description as an innovative firm by other innovative firms.

It is common to mention patents in the same breath as innovation. However, patents are not innovations, but a means to claim property rights for inventions to protect them against unauthorized use by third parties. Most patents are not visible as patents, because either they are only of minor importance or they are of not market relevance. Because innovations are hard to observe, patents serve as indicators for the possibility of innovations, namely they are treated as signs of innovativeness.³⁹ Nevertheless, the meaning of patents for innovation is vague, their role as a means awarding the attribute "innovative" and the virtue "innovativeness" can be observed by patent litigation. Because the rights attested by a patent are claimed by patent litigation, they constitute the solutions under the problem viewpoint innovativeness. Yet again, it is debatable exactly which problem is treated by this.

Patents have been means of competition and as such objects of litigation since their establishment in the mid-19th century (Moser 2013). Overall, patent litigation has increased since the 1990s.⁴⁰ Today the

³⁹ However the assumption of a linear relation between the R&D-input (scientists) and -output (patents) lacks evidence (<http://www.faz.net/-hx6-7mb73>, 12.2.14).

⁴⁰ Above all German patent courts profited by this development with 900 new cases annually compared to 54 in British courts in 2011 (<http://www.faz.net/-gqe-6y1ax>, 28.2.12).

IT-sector stands out in regard to patent litigation, with three quarter of all cases referring to software and business methods (S&BM) patents (Hall/Harhoff 2013). Science, politics and mass media pay a lot of attention to these litigations, though only one percent in Europe and up to two percent of all US-patents become patent infringement suits.⁴¹ S&BM patents are not only interesting because they are the most frequent cases of patent litigation. They are the most frequent cases because they are almost exclusively of a cumulative form. This means they imperatively have to refer to older inventions and products. Thus, they are based on the reification of combined knowledge in particular. This is partially the reason for the importance ascribed to these patents. The actual value of S&BM patents has hardly been estimated. Patents, only of marginal value upon first glance, can prove themselves as crucial in wider relations. Therefore, such patents often obtain their actual value by patent litigation.⁴²

Under the conditions of the supply oriented market regime in the competition for customers, it is obviously important for a firm to be armed with patents.⁴³ In this way patents become weapons in an „arms race“ (Boldrin/Levin 2013) the effects of which, though it tends to be a „zero sum game“ (Hall/Harhoff 2013: 35)⁴⁴, should not be underestimated. Therefore patents are a relatively temporary “monopoly right” for the exploitation of inventions rather than property rights. This is often expressed as adjudicated prohibitions of sale of products of a competitor. The litigation cases between SCO and several Linux distributors or between Samsung and Apple are examples of this. The tenacity of the parties at enmity suing and countersuing each other indicates that crowding out cannot be organized this way at a global market. It is only an expansive zero sum game.

Patents are means to control the affiliations and conjunctions that can turn an invention into an innovation. The problem solved by patent litigation according to the problem viewpoint of innovation concerns the customers as a scarce good. In the end, they are the means to realize the affiliations and conjunctions. Under the conditions of a globalized supply economy, the attention of customers must be drawn to a firm’s own products instead to rival products of competitors. The products are successful only when they are sustained with sufficient demand on the market. Looking at innovation as the problem-viewpoint, patents become a means for the competition for attracting and keeping customers by patent litigation.⁴⁵

⁴¹ In the light of the small amount of patent litigation, one could deem them and the subsequent discussion as exaggerated. Such discussion include: whether patents are detrimental or beneficial for innovation practices, which patent systems have the best or decreasing effects, as well as whether open innovation and public patents are the best methods to protect and use inventions or not. In the following, it will be shown that patent litigation deals with something more than just limits of use.

⁴² Motorola was sued for violation of (rather) old patents for SMS in 2013 (<http://heise.de/-1849619>, 25.4.13).

⁴³ Google safeguarded itself against Microsoft and Apple by acquiring Motorola and its patents for mobile communication in 2013 (<http://heise.de/-1857199>, 6.5.13). The acquisition of Nokia by Microsoft in 2013/4 was not only to obtain a hardware trademark (<http://heise.de/-2225268>, 16.6.2014).

⁴⁴ A prime example is the global patent litigation between Apple and Samsung, which is limited to the USA, the most important free market for mobile communication (<http://www.faz.net/-gqi-7sfhq>, 6.8.14).

⁴⁵ Choosing another problem-perspective of patents, namely profit and sharing profits of competitors come into view. For

Sales prohibition and painful financial penalties can be administered by successfully claiming patents against claims by others. Thereby the monopoly effect of innovation can be simulated as described by Schumpeter. Simultaneously, the claiming of patents is a symbolic policy. The monopolist is not only the pioneer but at the same time can exploit the aura of innovation, namely the promise for enduring sustainability.

This helps products to appear as true innovations, drawing on the commitment of scarce customers.⁴⁶ Thereby innovation has signaling effects on investors: the return on R&D investments also organized by patent litigation is reassuring (Taylor/Wagner/Zablitz 2012). When an enterprise is able to confirm innovativeness by a third party, this ensures the attention of the scarce customers and investors.

Comparing both previously outlined topics, it becomes clear that the relations between problems and their solutions are equivalent: Both serve as a confirmation of innovativeness. Subsequently, this points at product and process as innovations, and with good reason.

The benchmarking “TOP 100” is a certification, which should confirm the self-description of a firm as an innovative enterprise. The confirmation concerns products as well as processes because the certificate develops a halo effect. It transfers the attribute “innovative” onto the whole company. Ultimately, patent litigation is about the defining power of the market. Patents confirmed as legitimate by patent litigation legally enforce prohibitions and penalties. Thus, the position as an innovating pioneer is confirmed as well. Only the pioneer is imitated. By comparison, the function of the different topic, the benchmarking organized as a contest and the patent litigation can be uncovered: it pulls in the commitment and attention of scarce customers by confirmed self-descriptions. Admittedly, it becomes also clear that the chosen problem viewpoint co-determines this functional relation. Another viewpoint moves other problems for the investigated solutions in the foreground. This could be deficient marketing capacities for benchmarking or insufficient profit shares of the exploits from inventions for patent litigation. However, in this case both topics would provide no equivalent problem-solution-relation.

By the chosen perspective both investigation topics clarify how the virtue innovativeness is socially produced as the prerequisite for labeling as innovation. This means, the reproduction of the innovation phenomenon can be observed by the functioning of innovation. For this purpose, one can employ the evolutionary scheme. Every function is realized by inferences of the known with the unknown, of the new with the old, by references acquiring information of disturbances. From this, variation can be conceived as deviant but possible. Only then can they be acknowledged as alternatives to be proved

example by license fees, which Microsoft obtains by every sold mobile phone run by Android-OS (<http://heise.de/-2041485>, 7.11.13).

⁴⁶ Today Apple in particular succeeds in the game of technically mediocre products arousing huge public attention, e.g. at the introduction of the Apple Watch (<http://heise.de/-2388957>, 11.9.14).

sufficient in regard to the existing structure. This way, decisions can be made against the primacy of structural redundancy. In this respect however, innovations as targets for planning and reform remain only promises. It is up to inferential references and relations to provoke connections to the relevant environment. Otherwise the change will be rejected and fail – suggesting then that perhaps the change never was an innovation. By the example of the patents, which become litigation cases, one can study how the attracting innovation is not only produced by marketing and sales strategies but also how the legal system is utilized for this purpose.

Insofar it is insufficient to understand the concept of innovation only as a manifestation of machine artifacts. With the help of a genuine sociological perspective it becomes clear that innovations are made by a manifold network of references, whereby patents and benchmarking play an important role. Innovation appears to be a socially constructed phenomenon. Because of its fundamental future orientation, the task of confirming innovation's significance as a hope for success is a formidable one.

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