
Fragmental Differentiation and the Practice of Innovation

Why Is There an Ever-Increasing Number of Fields of Innovation?

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1 Innovation Processes in Contemporary Society

If there is one imperative that can qualify as a hegemonic principle guiding action in contemporary society, it is the call for innovation.¹ If we look at current debates about change in society, we can see a preference for the new and a demand for innovation that is no longer confined to economic, scientific, and technological developments alone. Today, modern societies' orientation toward growth, progress, and technological innovation has spread to a wide range of different areas. Under conditions of globalization, climate change, and digitization, this orientation has transformed into an intensive, strategic quest for opportunities for innovation across all social domains. This 'new spirit'² of innovation has also suffused the political realm, the religious sphere, the arts, and the conduct of everyday life.

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- 1 The imperative that "you must change your life" (Sloterdijk 2013) is in line with this but is less clearly defined. The "duality of the desire to be creative and the imperative to be creative: ... One *wants* to be and *is expected* to be creative" (Reckwitz 2012: 10, our translation) is a much more accurate description yet emphasizes the genealogy and aesthetic roots of the bourgeois model of creativity while failing to pay due attention to the social dynamics of innovation that emerge in the field of tension between institutionalized differences and points of reference on the one hand and the manifold referencing practices of reflexive innovation on the other.
 - 2 As opposed to Boltanski and Chiapello (2005), whose analysis can be seen as evidence of a *broadening* of the spirit of capitalism, what we are concerned with here is

Germany's energy transition, the *Energiewende*, for instance, is of course not just about maintaining prosperity or making optimal use of available resources. It also comes with expectations that the transition of a leading industrial nation such as Germany to renewable energy sources will turn out to involve a political innovation in its modes of governance³ and a cultural innovation in its patterns of urban mobility,⁴ which together will receive recognition in the international arena, be copied in other regions and cities, and be adopted by other collective actors. Looking at the transformation of industrial manufacturing toward the digitally connected and software-based modes of production and distribution discussed under the headline of 'industry 4.0,' we can see that the value of these innovations is not assessed on the basis of economic success alone but also on grounds of its potential to reinvigorate Germany's economic role in Europe and promote new co-production and consumption practices. The debate on the 'digitization' of music, film, and print is ultimately not only about technical innovation and its desirable and undesirable economic consequences. The keywords that surface in this debate—such as 'cultural flat rate,' 'sharing economy,' and 'piracy'—indicate that it also revolves around the question as to whether this development also lays the groundwork for a social innovation of shared ownership and a legal innovation in regard to copyrights, property rights, and open access. In addition to this shift from manufacturer-oriented to consumer-oriented or even collaborative types of innovation, processes of cultural reorientation toward 'creative industries' or an 'experience economy' are also increasingly perceived as innovation.⁵

At least in current public debates on the future society, the focus on innovation is ubiquitous and plays a guiding role, although—and because—the concept is semantically open to a variety of different interpretations and uses.⁶ That which is,

the *spreading* of a 'new spirit of innovation' to non-economic areas—similar to Max Weber's rationalization thesis.

- 3 See, for instance, Köppel's chapter (this volume) on Germany's *Energiewende* and Voß's chapter (this volume) on innovation in governance.
- 4 Gebelein et al. (this volume) and Christmann et al. (this volume) discuss examples of such new patterns of mobility such as 'flash mobs,' 'urban gardening,' or 'pioneers of space.'
- 5 On the opening up of innovation to users or creative professionals, see von Hippel (1988, 2005), Kleemann et al. (2009), Hutter et al. (2015), as well as Hutter (this volume), Liebl (this volume), and Picot and Hopf (this volume); on industry 4.0, see Hirsch-Kreinsen (2014), and on the transformation of the music industry, Dolata (2008).
- 6 On the semantics of innovation, see Knoblauch (this volume), and on its normative nature, see Schubert (this volume).

temporally, perceived to be ‘new’ (compared to something that is characterized as already existent, outdated, or at least as old); materially, viewed to be ‘distinctive’ (compared to something that appears to be of the same kind); and, socially, considered to be ‘deviant’ (compared to an implicit state of normality that is always also defined in relation to the deviant)⁷ is valued, promoted, and showcased. A closer look reveals that this is not really a preference for any specific thing that is new, distinctive, or deviant but rather a general preference for newness, distinctiveness, and deviance as such. Apart from this purely discursive orientation toward the new, the practices and processes of innovation also tend to be geared more toward the principle of innovation *as such* than toward economic success or scientific and technological optimization *per se*. The principle of innovation is inherent to the paradoxical expectation that, compared to an already favorable situation in the present, ‘endless renewal’⁸ will pave the way for an even better future position in and beyond one’s own field. This shift from an emphasis on, for instance, innovation guided by a purely economic cost-benefit rationale toward reflexive innovation that has economic but also other, very different points of reference is a characteristic feature of action among the parties involved in the distributed processes and interactive networks of innovation. Moreover, this shift also increasingly applies to the institutional forms that are utilized in the attempts to pursue these more comprehensive innovations as well as coordinate and, in conflictual processes, reconcile the various value orientations and interests involved, for instance, by means of open forums or corporative platforms, regional innovation networks, or European research clusters. In terms of the ‘rules of the game’⁹ underlying innovation processes, this favors a preference for types of organization, institutional structures, and regulations that are assumed to be quicker and quantitatively more productive in creating the new as a raw material for future innovations and are also thought to facilitate identifying the new early on and to be effective in establishing it. This fosters a preference for the *reflexive institutionalization* of innovation processes.¹⁰

In this way, the alignment of social processes along meticulously differentiated lines of unequivocal economic, scientific, or technological criteria and guiding distinctions is replaced in contemporary society by a more general, open, and un-

7 For a detailed account, see Rammert (2010: 29ff.).

8 Thus the title of a cultural-philosophical study in the line of Wittgenstein and Adorno on the understanding of the new and the ‘paradigm of novelty’ in the modern aesthetics of music (cf. ‘Endlose Erneuerung,’ Dierks 2015: 193).

9 Wittgenstein 1999: 47 e.

10 Cf., among others, Powell et al. (1996), Rammert (2000, 2006: 265ff.) and Windeler (this volume).

specific orientation toward innovation as such: On the one hand, the focus on whatever is new, distinctive, and deviant has supplanted the classic, clear-cut orientation toward economic productivity, technological effectiveness, and gains in scientific knowledge. On the other hand, the prerequisites and conditions of producing innovation itself have been geared toward *continuous* innovation or, in other words, toward the innovation of innovation.

The empirical study of innovation processes in and across various social spheres in light of the specific structural, semantic, and practical conditions therefore becomes a key task for social science research that seeks to understand the changes in and the nature of contemporary society (cf. Hutter et al. 2015). However, the social sciences so far are conceptually utterly ill equipped for this purpose, and this in two respects: For one, in spite of all attempts over the past few decades to expand the concept of innovation, innovation research has remained the domain of economics. For two, attempts to introduce alternative concepts in areas as different as politics and planning or art and culture mostly rely on a strategy of adding particular criteria—such as a preference for social welfare, sustainability, diversity, or aesthetic design—to economic and technological ones so as to identify and assess innovation. This procedure only rudimentarily does justice to the ubiquity and reflexivity of innovation processes in contemporary society. An adequate interpretation and diagnosis of contemporary innovation society therefore not only requires a concept of innovation that is able to overcome the narrow conception of innovation as economic innovation but also calls for a broader concept that is able to capture empirically the great variety of innovation and, by comparing processes of innovation, is capable of appropriately understanding the peculiarities of contemporary society: What accounts for the emergence of an ever-increasing number and variety of fields of innovation? The answer to this question is given below via a twofold theoretical approach that has been developed in a dialogue between the two authors and by reflecting on theories of social differentiation, reflexive modernization, and variants of a theory of practice. This theoretical approach seeks to grasp the transformation toward a *reflexive innovation regime* as a recursive relationship between fragmental differentiation and the situational practice of innovation.

This chapter addresses the consequences of such a concept of innovation¹¹ for a program of comparative social scientific research. It begins with the search for

11 A two-stage concept of innovation provides a means of distinguishing between novelty and innovation—and also between dimensions and by degree (see the chapters by Baur et al. and Christmann et al., this volume)—and of taking into account the relations between heterogeneous elements—objects, practices, concepts—as well as different

a conceptual basis for comparing processes of innovation (2). Are political innovations sufficiently different from those in the arts, and legal innovations from the ones that we are accustomed to dealing with in the domains of science and technology? Are theories of differentiation that adopt a macro-structural perspective on society capable of guiding us in distinguishing fields of innovation according to social spheres?¹² Or is it rather that the empirical study of reflexive innovation must precede making those conceptual distinctions? In its second part (3), the chapter draws on the preliminary results of some of the empirical projects conducted as part of the DFG Research Training Group *Innovation Society Today: The Reflexive Creation of Novelty* to argue that it is precisely the bypassing and bridging of differences specific to these social spheres that represents a key feature of innovation processes today.

The third part of this chapter (4) addresses this specific feature of innovation processes and zeroes in on the question of how we might get a conceptual and empirical grasp on the reflexivity of innovation. If we—in accordance with Ulrich Beck’s interpretation of “the second modernity as the ‘age of side effects’...” (Beck 2008: 19)—conceive of the tendency to bypass and bridge differences specific to social spheres as a characteristic feature of ‘reflexive modernization’ (Beck et al. 1994), then we must also understand it as an unintended side effect of increasing differentiation. If, on the basis of this initial understanding, we conceive of this tendency in a further sense—and in line with Anthony Giddens’ view of ‘radical modernity’ (Giddens 1990)—as a consequence and driver of growing reflexivity and knowledge on the part of actors, then we must go one step further and take the increase in references seriously as an empirical macro phenomenon, while at the same time comprehending it as one way in which individual actors practically cope with the changed conditions of establishing and disseminating innovations. In a third sense, then, the reflexivity of innovation is a consequence of *practical reflexivity*: The analysis of the actual practices in innovation processes—and this

references, all of which account for the diversity of socially effective evaluation practices and regimes of valuation (Rammert 2010: 45f.).

- 12 In the following, we will conceptually distinguish between ‘social spheres’ of society and ‘social fields’ of innovation *in* society. We will speak of social spheres whenever we are referring to clear and unambiguous references—to the social systems of economy, politics, or the arts—that are assumed, implied, or drawn on in the emerging social fields of innovation. What we have in mind when we speak of these social fields is the realm of possibilities and potential links on the basis of which references are selected and enacted, sometimes reproducing the dominant point of reference, sometimes mixing several references, and sometimes initiating a new path of creating an innovation field. For a slightly different approach to path creation, see Garud and Karnøe (2001).

is the thesis proposed in the fourth section (5) of this chapter—is of such key importance for an understanding of contemporary society because it allows us to investigate a new form of social coordination that is simply not clearly aligned along distinctive social spheres but relies on the situational creation, practical combination, and reflexive mediation of heterogeneous fields of innovation. In our outlook (6), we therefore sketch the outlines of a research program that revolves around the emerging shift in the primary principles of differentiation at the macro level towards fragmentation, heterogeneous combination, and practical reflexivity. New fields of innovation—to answer the question posed in the title of this chapter—emerge and establish themselves in reflexive acts of doing innovation that further both the fragmentation of social spheres and the situational proliferation of points of reference and valuation.

2 Differentiation of Fields of Innovation and the Diffusion of the Reflexive Innovation Paradigm

Both the ability and the need to pose the question about what constitutes ‘the new and improved’ in the arts, in politics, or in law in terms of innovation are rather recent developments. For as long as the economy primarily represented the realm of innovation and—assisted by economics—provided the framework of reference for innovation discourse, innovation practice, and the institutional order of innovation processes, the differences and commonalities between innovations were not an issue. But as innovations began to mushroom in all parts of contemporary society over the past few decades, scholars started to ask whether the processes of innovation observed in various fields are comparable and in which respects it makes a difference which references and guiding orientations are employed in judging and justifying them. We can identify three different explanations for this change:

- *First*, economic innovation research—which up until three decades ago had focused on business enterprises and the core areas of industrial production—as well as management practices and innovation policy based on this research expanded their knowledge and areas of activity to an extent that transcended the immediate boundaries of the economic sphere. Step by step, the institutional environment itself, the links between non-economic actors such as researchers and sponsors, mediators and user groups, and other factors in the environment became objects of economic innovation. New developments in science, law, and politics, such as the creation of technology transfer organizations and

technology parks, patenting and standardization practices,¹³ or policies to promote regional networking and cluster formation, were selected and advanced depending on whether they represented infrastructural innovations that could be expected to contribute to successful economic innovation. This involved transferring the rationale and model of economic innovation to other spheres that seem to lag behind in terms of their ability for self-renewal and their contribution to innovation at the macro level (*economization and hegemonic expansion thesis*).¹⁴

- *Second*, the expansive push toward economic innovation has resulted in pressure to innovate that is both ubiquitous in discourse and efficacious in practice. It has grown into a general innovation imperative across all spheres of society, which not only mutually observe one another but also exchange their respective services. This has resulted not only in an inflationary use of the vocabulary of innovation, mostly for the purpose of normative justification, but also in an analytically remarkable conceptual shift that points to reflexive processes of self-renewal. Creative interventions and transgressions of boundaries are not only labeled as ‘innovations’ for the purpose of good publicity but, in the new light of their significance for social change, are also perceived, practically developed, and promoted as a type of non-economic innovation in their own right: Fundamental reforms of the telecommunication sector are understood as innovations in private-public partnerships. The turnaround in energy policy towards renewable energy is an innovation in international relations. Climate projects or shifts in political instruments from legislation and taxation to installing new ‘mechanisms’ and ‘markets’ for pollution rights are innovations in governance. The mixing of media and genres results in aesthetic innovations. Creative interventions in neighborhoods are innovations in urban policy. Performative transgressions of boundaries between science, art, and corporate culture are both organizational and market innovations, and the search for new forms for the presentation of knowledge in artistic practices is understood as an innovation in science. This can be grasped in terms of the theory of ‘reflexive modernization’ as problems resulting from functional differentiation (Beck 1992) that can no longer be solved in accordance with the logic of the respective social sphere or a dominant economic order but allow for a variety of potential references in

13 Cf. Blind and Gauch 2009.

14 For an overview of the thesis of the economization of other social spheres from the perspective of social theory, see Schimank and Volkmann (2012); on the continuous expansion, see, among others, von Hippel (2005) and the contributions by economists and sociologists in Fagerberg et al. (2005) and Hage and Meeus (2006).

the process of establishing fields of innovation. Compared to the extremes of reinforcing either the orientation toward the institutionalized guiding principle or a reorientation toward an alternative dominant guiding principle, a mix of various principles that serve as points of reference is becoming more common and gaining significance. What have frequently been described as phenomena of de-differentiation and de-institutionalization or even as a ‘new obscurity’ (Habermas: *Neue Unübersichtlichkeit*) can be analyzed positively as the formation of a ‘fragmental’ social order (Rammert 2006: 258ff.) in which references are recombined and reconfigured depending on the specific field in question (*fragmental differentiation and mixed, multi-referential self-renewal thesis*).¹⁵

- *Third*, a change in ways of life and types of subjectivity can be seen as the source of a new innovation culture: Growing individualization unleashes affective potentials for manifold forms of self-realization. This transformation becomes apparent in a discursive shift from an ascetic and economically calculating subject to a hedonistic one who relishes the pleasures of life and engages in creative activities. What once began as an aesthetic deviation from ‘classicism’ in small segments and circles of the arts—for instance, in the form of ‘romanticism,’ ‘expressionism,’ or ‘surrealism’—and what was explored as new ways of living, working, and enjoying life in the niches of alternative protest cultures and lifestyles currently seems to be condensing into and establishing itself, through media, imitation, and strategic dissemination, as a new model of expressive and creative subjectivity that is in line with the social ‘regime of the new as aesthetic stimulus’ (Reckwitz, this volume) in late modernity (*changing discourse and dispositifs thesis*).¹⁶

These three attempts to explain the obvious increase in the significance of the innovation phenomenon and the effective expansion of the zones of innovation are not mutually exclusive. Rather, they can be complemented so that it is still possible to identify a common principle despite the variety of fields of innovation (cf. Rammert 2014). There is ample evidence suggesting that the emergence of a reflexive mode of social order—one which, time and again, generates new, situational fields of innovation on the boundaries of and between formerly stable social spheres—is

15 Cf. the critical discussion and advancement of the theory of social differentiation by Schimank (1985, 2011), Knorr-Cetina (1992), Nassehi (2004), Schützeichel (2011), and Lindemann (2011).

16 On the cultural and historical changes in the 1970s toward expressive and aesthetic orientations in the conduct of everyday life, cf. Schulze (1992) and Reichhardt (2014); on changing discourse and dispositifs, Bröckling (2004) and Reckwitz (2012).

itself the result of problems ensuing from increased social differentiation. Reflexive innovation then would not solely be a manifestation of a rhetoric of innovation or an expression of the increased dominance of economic orientations but would reflect a process of switching to a form of social coordination not based on stable and substantial orientations guiding action in the various social spheres but rather precisely on the situational creation, practical mixing, and reflexive mediation of heterogeneous points of reference in fields of innovation. The heightened attention to innovation would then have to be understood as an expression and driver of this reflexive form of social coordination.

3 Innovation Practice and the Bypassing of Field-Specific Differences

We can assume innovation to be reflexive—for one, because those involved in processes of innovation must also take the various conditions of innovative action into account, both prospectively and retrospectively; and, for another, because, in the processes of change, they refer to the familiar or assumed mechanisms of creating and disseminating the new in very different spheres in a more or less strategic manner. This renders innovation in contemporary society a paradoxical object for all involved, including those who would conduct social scientific research of innovation. This is because reflexive innovation assumes, at the practical, discursive, and institutional level, the ability to distinguish social spheres or, at the very least, specific fields of innovation. At the same time, it is precisely the reflexive reference to the familiar or assumed mechanisms that continuously relates and bridges the fields of innovation, thereby undermining the ability to distinguish between them. For those involved in innovation, this means that their innovative action is based on the assumed and habitually ingrained ‘logics’ associated with specific social spheres such as the economy, arts, politics, and so forth, whereas the taken-for-granted nature and reliability of these logics is gradually eroded precisely in the process of those actors taking a reflexive and strategic stance in utilizing them. For social scientific research on innovation this means that, in exploring the reasons for and consequences of reflexive innovation, it must adopt a comparative approach and ask about the different relations and references that make it possible to take a reflexive stance in different fields of innovation in the first place. At the same time, it systematically directs attention to cases that raise doubts as to whether the logic of innovation fields specific to the respective social spheres can be considered reliable and taken for granted.

When one engages in a comparative analysis of innovation processes,¹⁷ this inevitably raises the issue of selecting a framework for comparison. Although focusing on social spheres and asking, for instance, how processes of innovation in science are different from those in the economy, in politics, or in the arts might seem to be the obvious choice, this option lulls us into a misleading sense of treading safe ground. Such a focus in fact relies on the assumption that the differences that are deemed relevant from a macro-structural perspective on society also have institutional, discursive, and practical consequences so that the expansion of the innovation imperative does indeed occur only within the confines of the social spheres that account for the important differences between innovation processes. However, this is highly unlikely because of the reflexive nature of innovation in contemporary society. Those involved in innovation must take into consideration—practically, discursively, and institutionally—the conditions and consequences of innovative action and, for this purpose, must draw on heterogeneous parameters of reference depending on the situation and in a strategic manner. It seems to lie in the logic of reflexive innovation that the differences specific to the fields in question are brought into play time and again but at the same time are virtually constantly bypassed.

For the purpose of illustrating what this means precisely, it is helpful to take a look at two of the case studies conducted over the past few years as part of the DFG Research Training Group *Innovation Society Today: The Reflexive Creation of Novelty*. What makes these cases so interesting in this context is that, in the course of systematic empirical analysis, they defied repeated attempts to get a grasp on them in terms of the research question outlined in the umbrella proposal (Hutter et al., this volume). This applies first and foremost to the studies with a focus on a specific social sphere, for instance, the one addressing the ‘clean development mechanism’ (CDM) as an example of specific innovation processes in the sphere of politics and regulation. Once the innovation process involved in the emergence and design of the largest-scale instrument for global climate protection was subjected to closer empirical scrutiny, this regulatory instrument turned out to be the product of a negotiation process between practitioners with different perspectives, the result of a ‘sequence of experimentation and problematization’ (Schroth 2014a: 10). The clean development mechanism has been “tested and developed in various experiments, in various places, and in various ways” (Schroth 2014b: 19, our translation). In the process, it has changed continuously and in relation to the specific references made by those involved:

17 On the expansion of the methodological toolbox for the purpose of approaching innovation empirically and from a comparative perspective, cf. Jungmann et al. (2015).

Initially it was an energy efficiency project, which was developed bilaterally and the regulation of which was the responsibility of the World Bank, the Norwegian climate fund, and a Mexican public authority. (...) With the US forest projects, compensation projects became objects of climate politics. (...) With USIJI similar de-contextualized greenhouse gas compensation projects became an object of politics, and private actors and NGOs were politically authorized to pursue climate protection activities. (...) Starting with AIJ, and increasingly so in regard to CDM, counter-factual emissions reductions became the object of climate politics (ibid.: 21, our translation).

Such instances of the empirical objects of research evading the grasp of the defined categories of differentiation is particularly striking in the projects geared toward the systematic comparison of innovation practices within or across social spheres. For instance, a comparison of innovation processes in science and the arts focused on the empirical analysis of two different objects, one of which was designed and constructed in the context of an art installation and the other in a robotics laboratory. While both, each in its own specific way, were identified and labelled as a 'novelty,' the comparison reveals that both cases involve a similar sequence of 'configurative moments' (Stubbe 2015: 120): At the point of presentation—under the aspect of 'rendering imagined objects'—both the art installation and the robotic hand are situationally created and specified through particular arrangements, body movements, and accompanying stories; at other times—under the aspect of 'material referencing'—characteristics of the objects that remain hidden in the situation or are merely of a potential nature are indicated by reference to their specific materiality: "The robotic hand, just as the media installation, not only materialises the present state of what is, but must be regarded as an agent within its own construction as novelty, as its material evokes thoughts of what could be" (ibid.: 124). Moreover, in neither of the two cases did the interviewees make any mention—neither explicitly nor as a generalizable pattern of assessment—of the configured objects in and of themselves representing a 'novelty.' Rather, the parameters of reference against which the installation and the hand qualified as new objects were situational and context-specific: they were different in the workshop and in the laboratory than at an exhibition or a conference and different again when explained to an innovation researcher from the social sciences than in a conversation with colleagues, competitors, or visitors who just so happened to pass by.

This allows us to draw two conclusions: The first conclusion is that the cases under study could be *exceptional* in that the failure to empirically correspond with the assumed differences on the basis of which they were chosen has its roots in particular features of these cases. This, however, is not very likely since the innovation processes investigated in a number of other case studies conducted as part of the Research Training Group display a similar tendency to withstand anal-

ysis along the lines of the assumed differences associated with the specific social spheres. For instance, one might look for particularities in technical innovation processes in the field of electro-mobility and discover experimental mobility cultures and an ideology of electro-mobility (Stock 2015); or one might investigate innovation processes in the field of artistic interventions in the public sphere and find that they are interwoven with heterogeneous references to urban planning, civic involvement, and cultural funding (Landau and Mohr 2015). The alternative explanation could be that the cases are *not exceptional* at all but that the research question was developed on the assumption of differentiated social spheres, and the practices, discourses, and regimes of innovation that one encounters constantly transcend these very lines of differentiation. This leads us to the second conclusion that we must assume that innovation has not simply become a general rhetorical formula. Rather, in contemporary society, innovation has become reflexive—not always explicitly and not in the speech acts of those involved but in the actual practice of what they do.

4 Reflexivization of Innovation and the Increase in References

Once such a variety of innovations in so many different areas becomes an issue of practical and theoretical concern, the traditional definitions of innovation no longer suffice. On the one hand, the precisely operationalized and strongly substantialist definition in innovation economics is too narrow and one-sided as innovation involves more than the technical efficiency of new factor combinations and their assessment in terms of strictly economic efficiency. On the other hand, a relativistic strategy of defining innovation along the lines of innovation sociology that were to fully rely on the perceptions of those involved would open the floodgates for labeling a new phenomenon of any kind as an innovation, be it a marginally improved product, a passing fashion, or some smart marketing gimmick.¹⁸

18 Of course, fashion can be the starting point of a social innovation. Only once creations take hold in new constellations—along with other references—while transcending the narrow field of fashionable apparel to acquire some long-term impact do they cease to be just seasonal novelties and gain the status of innovations in the conduct of everyday life. This hardly applies to changing dress lengths but all the more so to the practice of women wearing trousers since the 1960s all the way to today's business pantsuits with references to the emancipation of and equal opportunities for women. This corresponds with the conceptual distinction between 'fashion' and 'model' (cf. Esposito 2003). See also the shifts toward innovation-oriented marketing (Liebl, this volume).

What is called for first of all is a concept that does not define innovation a priori in terms of a physical product, a social practice, or a cultural idea, but that is open to empirically exploring all elements and their possible relations. What has hitherto frequently been perceived in a rather simplified fashion as a technical, social, or cultural innovation could then be identified as an innovative constellation, each determined in different ways, and that can involve material and technical artifacts, differently organized practices, as well as new cultural models of usage.¹⁹ When we adopt such a perspective, artifacts, practices, or discourses can take a leading or critical role in some cases or lag behind in others. Once telephone technology—including the devices and networks for voice transmission and reception—was invented, there was a need, for instance, for concepts of usage other than telegraphy and mass reception as well as new business models such as leasing and a subscription system for it to become established as a social and cultural innovation (cf. Rammert 1990). Conversely, ‘social inventions’ (Ogburn 1964), scientific ideas, or artistic visions require objects that complement and specify the new constellation. For instance, organizing childcare in kindergartens requires toys, furniture, and spaces just as the practice of ‘urban gardening’ needs other types of gardening and cultivation techniques that can be applied to walls, roofs, boxes, and in combination with aquariums and greenhouses. Theoretical concepts such as the ‘gentle grip’ in robotics or an imagined arrangement that makes movements visible in new media artworks depend on a set of experimental mechanisms and materials as well (cf. Stubbe 2015).

This relational concept is not sufficient to distinguish inventions and simple novelties from innovations with long-term social effects. Innovations are novelties that, in a second step, are complemented by references that regulate the communication of a novelty as representing an innovation, the acceptance of such a claim as legitimate, the addition of this innovation to the stock of knowledge, and its institutionalization in practice. Conceptually, an innovation *of something*, which we have determined to be a constellation of objects, practices, and models in relation to a previously existing one, must be complemented by an innovation *toward something* that we are able to observe as a parameter of reference for the evaluation, justification, and diffusion of the innovation in the field in question. For instance, the focus on economic profit has been the prevalent parameter of reference since Schumpeter formulated the economic theory of innovation (cf. Schumpeter 1934).

19 Cultural models can include distinct ‘visions of function and use’ (computers for accounting, writing, or gaming) or new ‘concepts of engineering and design’ (telecommunication as ‘one-way transport,’ as ‘one-to-many communication,’ or as ‘two-way media’) (Rammert 2002: 178f.).

Schumpeter's innovation in economic theory shifted the perspective, temporally and in terms of content, from an allocation of resources geared toward short-term optimizing to novelties and recombinations of production factors that have a long-term impact. Market penetration, income from patents and licenses, return on investment, and other indicators confirm the still dominant focus on commercial success.²⁰

If we look at other differentiated social spheres for principles similar to the ones that have proven successful in the economic sphere, we should be able to find references that function according to a comparable inner logic of their own. Following Max Weber would direct our attention to the pursuit of power in the sphere of politics, the pursuit of true knowledge in the sphere of science, the pursuit of that which accords with the law in jurisprudence, the pursuit of beauty in the arts, and the pursuit of sensual fulfillment in eroticism. In accordance with Luhmann, we could add up to another twelve self-referentially closed social subsystems such as the military, mass communication, education, health, sports, and the family (Schimank 2005: 154). What can be plausibly inferred from a theoretical point of view and can roughly be observed empirically in regard to the dominant criteria of orientation and selection in the context of the respective institutions and organizations also seems to apply, at first glance, with respect to the order of references for innovation at the macro level. Innovations in politics are guided by the reference of gaining power, be it by means of new bottom-up participation or legitimation procedures or new top-down types of policies and modes of governance; innovations in the arts distinguish themselves from new fashions according to the reference that they give rise to unprecedented aesthetic sensations.

However, our empirical case studies raise doubts about these neatly aligned guiding references associated with the social spheres. As indicated above, there is not really an abundance of evidence supporting the supposed unity and purity of references: Must regulatory innovation in accordance with Basel III to prevent the next banking crisis be seen as being more an innovation of the banking system guided by economic criteria or more an innovation in the capacity for political intervention in the economy guided by the desire to reclaim the power to act (cf. Jöstingmeier 2015)? When a new format or even a new genre such as 'jazz jam' or 'poetry slam' spreads from the sphere of the arts to science and mass communication, in terms of which references are we to describe the nature of this innovation (cf. Hill 2014)? If we can detect no significant difference in the orientations involved in creating new scientific devices and artistic installations but rather find similar

20 For a self-critical view of these indicators, see Smith (2005) and for a critical outside perspective, Braun-Thürmann (2012) and Bormann et al. (2012).

combinations of scientific-technical and aesthetic references, then what value does the dominant reference have as a means of distinction (cf. Stubbe 2015)? And if electro-mobility is to be rendered an object of innovation research, does it represent a scientific-technological innovation (e.g., in terms of developing battery technology and the architecture of complex socio-technical systems), an economic innovation (e.g., in terms of developing profitable business models for manufacturers and operators), a political innovation (toward a fundamental restructuring of mobility and energy provision), or an environmental innovation (toward sustainable mobility and lifestyles)? Or perhaps it is a mix of all of these, an innovation regime based on multi-referential orientations (cf. Stock 2015; Wentland 2014)?

One thing is evident: the number of references has increased, and not only on account of the increase in the number of differentiated spheres in society. Rather, the reflexivization of innovation seems to be the underlying driving force. One way that this can be understood is along the lines of the theory of reflexive modernization as an unintended side effect of the growth dynamics and autonomy of social subsystems (cf. Beck and Lau 2005). This reflexivity can be identified at the social-structural level (Beck and Holzer 2004: 165f.). It becomes apparent in the altered self-descriptions of the subsystems (e.g., the economy or science), in which additional references have been incorporated, yet not in the form of rules that determine when to stop but rather in terms of deceleration and balancing systems. We can interpret the current expanded self-descriptions of economic innovation as 'sustainable innovation' or 'social innovation' and of scientific innovation as 'responsible science and innovation' (RSI) as signs of this kind of reflexivity.²¹

The second type of reflexivization concerns the increase in reflection and knowledge on the part of actors who adopt a creative stance toward reflexive modernization and its consequences. We assume that this is a much more powerful source driving the increase in references and fields in which the 'reflexive creation of novelty' (Hutter et al. 2015) takes place and thus marks a point to begin our search for the conditions that account for the successful establishment and

21 The European Commission, which has recently labelled the European Union as an 'innovation union,' defined the concept of 'responsive innovation' in its Horizon 2020 action program as follows: RSI, or 'responsible research and innovation' (RRI), "means that societal actors work together during the whole research and innovation process in order to better align the process and its outcomes with the values, needs and expectations of European Society" (European Commission 2012: 3). More precisely, RSI is "a transparent interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products" (von Schomberg 2012: 50).

diffusion of innovation at the macro level. A variety of fields are evolving below the macro level because actors can draw on *given* references in an existing field as well as create and establish *new* references by combining existing ones in new ways. They follow neither a ‘logic’ of continuous functional differentiation at the level of subsystems nor a ‘logic’ in accordance with Bourdieu’s fields of practice. It is rather that these fields of innovation evolve on the margins of and between social spheres in processes in which individuals, groups, and organizations engage in communication, cooperation, or conflict, centered on an opportunity or a problem, thus creating a field of collaboration, a conflict arena, or a common platform for action. Moreover, they also emerge at different levels of action in the form of intermediary institutions, transversal ‘interstitial arenas’ (Shinn 2006: 315), heterogeneous innovation networks (Powell et al. 1996), or other mixed communication settings²² that cut across the various levels of action. As the second type of reflexivization is both a reproductive and a creative response to the problems of the first type, we can hold that it not only increases the possibilities and combinations of guiding references but at the same time creates an awareness of the variety of fields and levels for the practice of innovation.

5 Practical Reflexivity and the Situational Creation of Fields

Innovation research of a sort that is capable of transcending the narrow confines of innovation economics and is not content with merely attempting to compare economic, political, or cultural processes of innovation can also conceive of reflexivity in a third way. Once we adjust the sociological analysis to a ‘flight above the clouds’ (Luhmann 1995: 1), the reflexivity of innovation turns out to be, fully in line with Beck’s reflexive modernization, a side effect of enhanced differentiation. If we direct our attention to the specific performance of the actors involved in innovation, the reflexivization of innovation must be understood as tactical and strategic—and at times creative and playful—acts of interrelating assumed and implied guiding principles. Yet if we turn to the ‘ongoing accomplishment’ (Gar-

22 Early examples of this are ‘mediating bodies’ such as ‘value engineering teams,’ ‘scientific councils,’ ‘round table talks,’ and ‘project groups’ in firms, which mediate between the different guiding ‘rationalities’ in four distinctly ‘figured’ settings of corporate product innovation as a ‘reflexive self-binding mode of controlling consequences’ (Rammert 1988: 188f.), and ‘conversation circles,’ which, in the case of pharmaceutical patent law, serve to establish a ‘structural coupling’ between the economic and legal system (Hutter 1989: 94). For a current overview, see Mölders 2012: 488ff.

finkel 1967: VII) of innovation, the other two types of reflexivity appear to be a consequence of practical reflexivity: “an unavoidable feature of the way actions (...) are performed, made sense of and incorporated into social settings” (Lynch 2000: 26f.). Since acts of innovation—as any other practice—are always performed at a specific location and by heterogeneous but nevertheless specific individuals, they are invariably indexical, which is to say that the constitutive activities cannot be grasped and interpreted, neither by those involved nor by sociological observers, without taking the specific conditions in which they are performed into consideration. For instance, glossy brochures might mention that the discovery tours in the district of Wesel in North Rhine-Westphalia—which represent artistic interventions in the public sphere in which the towns and villages in the surrounding area of a West-German city are visited by foot, bike, or bus as part of the *Urbane Künste Ruhr* project (Ruhr Urban Arts; cf. Mohr 2013)—are not tourist attractions but an art initiative for the purpose of cultivating a greater appreciation for local expertise. The tour begins to unfold once a resident stands beside one of the highways and speaks of home. The ambiguous, intertextual, and hybrid references that render ‘postwar modernity’ accessible to experience are not inherent to the concept of home that he is referring to nor are they innate to highways; they are cited and interwoven with one another only in the course of the actual tour. They are indexical, inescapable.

Drawing on Schütz’s thesis of the ‘suppression of the primes’ (Schütz 1964: 21), Garfinkel developed a praxeological concept of reflexivity by further elaborating and expanding on the idea of indexicality that was formulated in linguistics primarily to get a grasp on the logic of deictic expressions (here, there, then, now, you, I). The interpretation of an occurrence in accordance with an a priori typified world is not a matter of individual inclination but is itself rather the outcome of the practical efforts of the heterogeneous range of people involved to ‘remedy’²³ indexical expressions—which is, however, never really accomplished and thus leads to ever-recurring attempts to do so. This happens as part of the activities themselves that constitute this practice: “[...] the activities whereby members produce and manage settings of organized everyday affairs are identical with members’ procedures for making those settings ‘accountable’” (Garfinkel 1967: 1).

Whatever practice is collectively performed by whomever, the heterogeneous assortment of people involved in accomplishing the practice employ the same

23 “Wherever and by whomever practical sociological reasoning is done, it seeks to remedy the indexical properties of practical discourse; it does so in the interest of demonstrating the rational accountability of everyday activities” (Garfinkel and Sacks 1970: 339).

means in *representing* it as they do in *producing* it. They do not have to explicitly state that the process of tinkering with the various installations in the robotics laboratory or the arrangements of the art installation involves figurational acts of configuring something that can later be displayed, tested, and described. They represent this through the same activities in which they engage in producing it. When they comment on their activities in the process, when they explain, demonstrate, and explicate what they are doing while they are doing it, then it is not this that constitutes the reflexivity of practice; such commentary are rather (additional)—acts of reflexivity (see also Passoth and Rowland 2014: 479; Reckwitz 2009: 177; on reflexivity as a characteristic feature of communicative action, see Knoblauch, this volume). Practical reflexivity is actually rather ‘uninteresting’ (Eickelpasch 1982: 16ff.); it is an inherent, inevitable part of everyday practice.

In the context of innovation and the creation of the new, it is exactly this uninteresting reflexivity of practice that actually becomes quite interesting. This is because the attempt to ‘remedy’ the situatedness of relevant activities operates on the basis of those involved referring to something that is known but not explicated. This something is a backdrop of anticipated orientations and meanings—“collective systems of meaning that remain implicit and unconscious” (Reckwitz 2009: 172, our translation)—that, by necessity, must stay vague and unspecified. In this way, from moment to moment, a collectively valid backdrop of social order is positioned, adjusted, and readjusted, thereby providing a framework of meaning to make sense of a practice beyond the specific local acts that constitute it.²⁴ The principles guiding action, such as those of the economy, the political, the arts, but also those principles underlying conventions, value systems, or only temporary agreements, do not structure events ‘behind the backs’ of those involved. It is rather that the actors bring them into play, sometimes more or less explicitly, sometimes vaguely, but always in ways that are effective in practice. To do so, the parties involved continuously and situationally construct new fields of potential references. This works, although not always reliably, provided that they can refer to the existent, the uniform, the well-known—that is, to a state of normality, albeit only an assumed one. As a matter of course, practical reflexivity then operates on the basis of more or less clearly defined guiding principles, against the backdrop of which things can be interpreted. It is precisely this that no longer works in cre-

24 “Limiting oneself to the narrow context of what is observable” (Nassehi 2006: 459, our translation) by no means implies that directing attention to concrete practice poses any fundamental conflict for an awareness of the translocal order of empirical settings; the issue here is rather that collective patterns of meaning, cultural codes, and social order are all perceived only as other specific practices, which are referred to in specific situations (cf. also Passoth 2011).

ating the new: The preference for the new, the unknown, the different, the deviant virtually forces one to refer to the familiar while at the same time relegating it to the status of being no longer relevant. In the context of creating the new, practical reflexivity means that the mechanisms and methods of creating and representing the new must invariably draw on an assumed system of order and at the same time transcend it—and this applies both in regard to the relations that are to be established and the references drawn upon.

The consequences of the two-stage concept of innovation outlined above, which makes it possible to distinguish novelty from innovation, become particularly evident when we look at innovation in practice. What already applies to the practical process of creating the new, of producing new relations between heterogeneous elements, has much greater consequences when it comes to the practical process of establishing the references that render new an innovation since only those novelties qualify as an innovation that become successfully established in society. However, in ongoing practice, the establishment of an innovation in society is always only a vague and open-ended possibility. The artistic interventions in the public sphere in the context of the *Urbane Künste Ruhr* project create “an awareness of the hidden potentials of the Ruhr region—the many vacancies in the inner cities, vast old industrial wasteland, or unused courtyards” (Mohr 2013, our translation); and, in the process of planning and implementation, they are always a potentially successful instrument of citizen involvement that can be copied and applied again, even though they are currently not yet realized. The experimental forms of mobility that have evolved around the already existing modes of electro-mobility are potential manifestations of a new mobility culture and a new energy future as are the various projections of the future that have grown around these forms and which are all woven into culturally specific narratives of mobility, even though this new culture and future, too, are presently not a reality.²⁵

In the act of innovating, innovation is present as a proposal, as a novelty that could potentially be socially established. Yet which particular relations and references are given significance in specific innovation processes is neither clear nor uncontroversial: both are exactly the things that are coordinated in the act of innovating. For this purpose, those involved in processes of innovation construct fields of innovation that require determining the possibilities, limitations, and impossibilities of those relations and references that are considered to be potentially relevant. To do so, fields of innovation are aligned along the long-familiar major lines of differentiation such as the economic, the political, or the arts. But they

25 This applies as much to the practices of decision-makers in businesses and politics as it does to the practices of users, holdouts, and enthusiastic pioneers.

also bring new combinations and mixtures of such guiding principles into play that, if they prove to be useful, can serve to bridge the gaps between pieces of long-established knowledge. Fields of innovation can also be constructed so that the new, the other, and the deviant come into conflict with a whole range of existing guiding principles to a degree that new relations and references emerge and become established. For all the focus on the new and on exploring new relations, the fields constructed in the acts of innovating and in which references can be found are heterogeneous but not arbitrary. If we take a bird's-eye view, we see a rampant growth of fields of innovation offering a range of alternative references, fields that overlap, and fields that are combined with or pitted against one another, and must be coordinated and brought to life. Currently, this can be observed particularly well in the relation between climate research and energy policy or between the automotive industry and Germany's electro-mobility policy.

In this way, the analysis of innovation directs attention to a type of social coordination that is simply not geared toward clearly defined and distinctive social spheres but rather—transgressing the usual boundaries—toward situationally creating, practically combining, and reflexively mediating guiding principles that already exist, are assumed to exist, or are newly composed. The act of innovating is a virtually prototypical practice that builds bridges, makes connections, and combines that which is different while it also creates arenas of negotiation, conflict, and demarcation.

Once we adopt a view informed by a greater awareness of reflexive innovation, we notice that the case studies conducted in the context of the Research Training Group by no means simply fail to correspond with the clear-cut boundaries of social spheres; they are neither merely exceptional empirical instances of an innovation practice that is otherwise neatly sorted along the lines of the guiding distinctions of the economic, the political, and the arts, nor are there signs of dedifferentiation or that these references are becoming irrelevant. Rather, an approach to innovation research that investigates empirically the different relations and heterogeneous references that are produced, cited, and combined with and pitted against one another in the concrete practice of innovation provides insight into a form of social coordination that, depending on the situation, brings into play—again and again, in new and variable ways—both established references (of the economic, the political, or the arts) and occasionally even completely new ones in order to position something as entirely new and innovative.

It is precisely this focus on the new of whatever kind, which can be highlighted as that which is to be preferred over the already existent, the usual, the well-known, or some state of normality, let alone over the outdated, that renders innovation such a consequential form of coordination in contemporary society. Commitment to the

new does not equate to complete openness and ‘anything goes.’ On the contrary, what it involves is a *commitment to variability*—the variability of that which has been proposed, established, and stabilized. A greater orientation toward the new demands a reflexive practice of innovation.

6 Fragmental Differentiation and the Practice of Innovation

The picture that is emerging at the end of these considerations is this: For the design of a research program that focuses on the practice and processes of innovation as a means of diagnosing contemporary society, observations of how differentiation at the macro level is changing its form are just as relevant as observations of the practices and orientations within and between the different fields.

The functional form of differentiation of guiding principles, communication media, and self-referential subsystems, which systems theorists in particular have identified as being the characteristic feature of modern societies, has gradually changed since the 1970s—not least in the course of recurring contact with changes on the ground, ‘below the clouds,’ and in critical contact with other observers operating at similar altitudes. In contrast to the focus on four functions and subsystems in Parsons’ theory of society, Luhmann went on to radicalize and open up systems theory so as to allow for the emergence of new guiding distinctions and a larger number of subsystems in response to unsettling, pressing problems. In adopting the view ‘from the ground,’ the various researchers who collaborated in a research network with Ulrich Beck (cf. Beck and Lau 2004) seem to have taken the highly detailed maps and separation rules for the planning of flight routes seriously but were increasingly forced to take note of the practices of deviating from expected paths, transcending boundaries, and engaging in improvisation. Beck’s ‘theory and empirical reality of reflexive modernization’ is able to demonstrate the limits of the functionally specified criteria of rationality that are operative in a range of social spheres—from economy, science, and politics to intimate and familial relationships—when it comes to applying them to address their own side effects. In regard to this ‘reflexivity of side effects,’ Beck and Lau observe, for instance, a ‘logic’ of ‘both one and the other’ as opposed to a code of ‘either/or’ and call for developing “complex reflexive solutions, (...) which do greater justice to the new uncertainties and ambivalences that pervade the macro and micro spheres alike” (Beck and Lau 2005: 114, our translation). What they describe as a mix of the basic principles of first modernity and the basic institutions of second modernity, we would describe from a vantage point that is more forward-looking, directed toward

novelty, and more open to the variety of innovative practices. The reasons for this are both empirical and a matter of research strategy: A ‘both-one-and-the-other’ approach to research on the logic of first and second modernity fails to do justice to the new especially. A sociology that proceeds in this manner “is doomed to turn into an ‘antique shop of industrial society’ if it attempts to apply the concepts of first modernity to second modernity” (Reckwitz 2009: 170, our translation)—and this holds for sociology of innovation research as well. The objective should be to develop concepts for ‘the next society,’ which, as Baecker has demonstrated by using the focus on ‘projects’ as an example, must come to terms with forms of coordination that utilize the systems of order of first modernity yet systematically transcend them. “All function systems of modern society,” Baecker argues (2007: 172, our translation), “are suitable models for this but are now combined into the most unlikely projects so that, although politics and economy, art and education, science and religion can still be distinguished, one must nevertheless acknowledge that in social movements, civic involvement, the conspiracy against the art market, and the belief in science one can only be separated from the other at the expense of the project.” We have attempted to demonstrate that the focus on innovation in contemporary society is of a similar nature.

In our view, there is much to be said for a shift in the primacy of social differentiation toward a kind of ‘fragmental differentiation’ (Rammert 2006: 258ff.), the specifics of which have already been spelled out in detail elsewhere in terms of the transformation of science, industry, and politics representing a ‘post-Schumpeterian mode of innovation’ (Rammert 2000: 157ff.). Just as the primacy of functional differentiation in modern society has not resulted in the disappearance of segmented and hierarchical forms of social organization, the novel forms of fragmental differentiation will not fully displace the principles of functional differentiation. The adjective ‘fragmental’ implies a pragmatic opening up and mixing of functionally neatly separated guiding references and self-referential social spheres. It confronts the separate, parallel existence of differentiated spheres with fields and levels that are intertwined and overlap but, in spite of this apparent ‘muddledness,’ form an order that is reproduced in social practice. The fragmental regime does not operate on the basis of only one single refined parameter of reference or code but incorporates others as well. Via imitation and habitualization, this multi-referential orientation can congeal into local, field-specific codes that are commonly applied in the medium term and are composed of a reflexive mix of several other codes. The *fragmental* does not primarily follow a logic of abstract categorization and cartography along *functional* lines—like a political, economic, or climate map—but instead follows concrete, mixed movements: for instance, of people, media, and weapons to define and demarcate politico-geostrategic fields; or of money, patents,

and brain drain to determine economic-scientific fields. The basic principle is not an endless process of subdividing entities into distinct and ever-more specialized units as in the case of functional differentiation; it proceeds more along the lines of the mechanisms of ‘fractal distinction’ and ‘fractal differentiation’ (Abbott 2001: 21f.), in which differentiation resembles a process of bifurcation that, after division and conflict, reincorporates parts of the subdued entity. In this way, the theory of fragmented differentiation, modeled after the design of fractal geometry, is able to reconstruct the references that emerge in the fragmented fields, in mixed combinations or refined to various degrees, as the re-emerging and reutilized guiding distinctions of functional differentiation.

According to the reading we are proposing here, the attention toward innovation in contemporary society enhanced in this way would be misinterpreted as being nothing more than a rhetorical intensification of the imperative of novelty in modernity. We would also be mistaken in viewing it as being merely an expression of the cultural preference for creativity, which has gained prevalence since the end of late modernity. Although both seem to be the case, it is not only the greater orientation toward *newness*—driving the numbers in the pool of imagined variants to heights that become difficult to keep track of—that can be grasped as a manifestation and driver of fragmental differentiation but first and foremost the reflexive orientation toward *innovation*, which is invariably geared toward the situational selection of promising new combinations of objects, projects, and practices—once defined as material relations—as well as toward potential fit with various social references. The increased orientation toward innovation is a manifestation of a transition of the primacy of differentiation at the macro level of society; together with a number of other forms of coordination that are gaining significance, it is indicative of the shortcomings of neatly separated lines of orientation. The more or less neatly sorted guiding principles of the economic, the political, law, science, and the arts that first modernity has institutionalized in enterprises, political parties, law firms, research institutes, and galleries and museums have not disappeared: not “all that is solid melts into air.”²⁶

But the greater orientation toward innovation *as such*—and not toward profitability, truth, or aesthetics—finds expression in the fact that contemporary society has a need for coordination between, beyond, and below these guiding principles. This need for coordination is also the driver of this transition to fragmental differentiation because, in the case of innovation, practical reflexivity virtually compels us to constantly reposition the guiding distinctions of functional differentiation: as being combinable, outdated, renewable, transgressable, or ignorable. The greater

26 Marx and Engels 1998: 38f.

drive toward *continuous* innovation disrupts habits, crosses established boundaries, mixes guiding references, and spreads to all spheres of society. It necessitates a reflexive practice of innovation and fragmental bifurcation, which gives rise to ever more fields of innovation; a reflexive practice of innovation is a new form of social coordination that brings us closer to the next type of society.

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