

**Society – Technology – People****Theory-Interviews on the relationship between societal and technological change.*****Interview with Prof. Dr. Joachim Renn***

This interview was filmed in Münster on 11 June 2018. The interviewer was Thomas Leuchtenmüller. It is part of a BIBB-research project on „Polarisierung von Tätigkeiten in der Wirtschaft 4.0 - Fachkräftequalifikationen und Fachkräftebedarf in der digitalisierten Arbeit von morgen“, funded by BMBF.

More information can be found here: <https://www.bibb.de/de/94825.php>

Provided online by the Federal Institute for Vocational Education and Training (BIBB) - imprint: <https://www.bibb.de/en/65.php>

**1 Where do we find sources for technological change and social division of labour?**

2  
3 A macro-theoretical approach assumes that the transition to modern societies is  
4 characterised by a specific type of differentiation rather than merely by an industrial  
5 revolution which includes new regimes for the technical processing of nature or the  
6 technical processing of communication problems. The basic phenomenon in this regard  
7 is functional differentiation. We can also speak of differentiation of completely distinct  
8 forms of communication. On the one hand, practices related to everyday living and  
9 forms of life are coordinated in a certain way in old societies as well as in present-day  
10 societies via routine actions and habitualised background knowledge. On the other  
11 hand, organisational or even systemic contexts are characterised by the predominant  
12 role played by a formalised, digitalised, and coded section of cultural knowledge.  
13 Innovation, specifically technological innovation, is an exceptional or special case of the  
14 adaptation both of practices and of organised and systematically codified forms of  
15 communication. This is because, for one thing, innovation is a sub-group or subgenus of  
16 variation. But there is always variation. This is the pragmatist aspect. Every action  
17 situation varies the prerequisites according to which the action situation is commenced,  
18 whether this be in a practical, everyday or organisational context. For variations to lead,  
19 for example, to the introduction of new technological regimes across an entire society, it  
20 is necessary for them to be selected at this level or at organisational action levels  
21 beyond the limits of the organisation or of an area of life among alternative new solutions  
22 to problems and then stabilised. It is no coincidence that the vocabulary used relates to  
23 evolution theory—variation, selection, stabilisation, technological stabilisation in  
24 particular. These solutions connect to the material register, to finally address the  
25 question regarding drivers, because technical innovations have originators and inventors  
26 in a certain quotidian sense. And they have entrepreneurs who then implement them.  
27 They can perhaps be attributed to particular creative professions. From a macro  
28 perspective it becomes clear that only with a differentiation arrangement does it become  
29 at all possible for form and impact to be lent to adjustments from practice that are

## Society – Technology – People

Interview with Prof. Dr. Joachim Renn

30 themselves actually improbable. In order for this to occur, therefore, variations need to  
31 be generalised in certain delineable contexts and then transferred out of this context into  
32 a different format within the horizon of the laboratory, the discoverer, the tradesman, the  
33 farmer conducting agricultural experiments or the repairman fiddling around with older  
34 technology. And, to come now to the drivers, this needs to take place or be directed, so  
35 to speak, via societal contexts which are supra-subjective, i.e. no longer attributable to  
36 individual persons. So, a certain degree of ambivalence is inherent in technological  
37 innovation. This essentially consists of the same relationships which, for example, make  
38 it possible in modern societies for new creative solutions to problems to be implemented  
39 in technologies. These provide a dual generalisation. They generalise a solution that has  
40 been achieved or a variation already applied so that this can be deployed again. They  
41 also enable technology within the scope of the production of devices, i.e. a standardised  
42 version of the possible instruments that can be developed, to be mass manufactured  
43 and, for example, be implemented on the market. However, the differentiation which  
44 makes this arrangement possible also acts as a brake to variation. Pragmatically  
45 grounded differentiation theory, compared to older notions of modernisation processes,  
46 emphasises that differentiation means that boundaries of meaning have found their way  
47 into society. In practical, milieu-like horizons, actions, events and persons mean  
48 something quite different and operate in a different way compared, for example, to an  
49 organisational or systemic access. This becomes very clear if we compare practical,  
50 neighbourly or intimate relationships with economic communication. As far as innovation  
51 is concerned, this means that the significance of the solution to the problem alters  
52 because of the way in which the problem is perceived. It needs to be translated.  
53 Innovation thus means a translation established across society from a small variation  
54 that has its origin in a small context and then acts as the solution to a problem. Since  
55 this translation implies a break in significance, because it is stipulated in material  
56 equipment and the ways in which such equipment is used, and because this  
57 translation—i.e. the implementation of the innovation in new contexts—has side effects  
58 which were not foreseeable, it must be particularly emphasised that solutions to  
59 technological problems in the long run are a selective explication, a selective  
60 formalisation of originally embedded and equivocal use variables and creative solutions.  
61 They therefore delineate types of use and also exert scattering side effects which none  
62 of the inventors was able to predict. So the drivers are, from one perspective, those  
63 which have an idea and arrive at a solution. But drivers in the shift from pre-modern to  
64 modern societies are an institutional arrangement within which it becomes possible to  
65 generalise a solution found to a problem in a small context, shape this to the market, for  
66 example, and provide political support. What will happen, especially in application  
67 contexts, i.e. when a technology has been introduced, when whole societies have  
68 adjusted to the internal combustion engine and all its expansions, is that side effects will  
69 be perceived on an ex-post basis and that a reaction will take place in the form of a  
70 display of innovative spirit. Attempts are being made to find new solutions to new  
71 problems which have been instigated by the solutions to old problems. However, to a  
72 certain extent, technological change itself is not the driver. We would have to say that  
73 the driver is the shift in society's response horizon, which makes it possible to react to  
74 technological change in this structure-forming way in the first place. The conservatism of  
75 the living environment of practical routine and the tendency of institutional regimes to  
76 rigidify also need to be taken into account. So technological development has proved its

## Society – Technology – People

Interview with Prof. Dr. Joachim Renn

77 worth and continues to be pursued. It is networked across various boundaries of  
78 meaning in society. Let us take the example of the internal combustion engine, the car.  
79 This is a huge regime which processes fossil fuels. Problems are being solved, and new  
80 solutions are constantly being created. Extra-technical or extra-economic prerequisites  
81 are being established. One example is consumer need. To put this in entirely simple  
82 terms, policy is strengthening or promoting readiness to use a car, at least by dint of the  
83 fact that roads are being built. So we have a certain conservatism on the one side. If you  
84 will, this is a practical and natural conservatism of lifestyle forms. If we factor in the  
85 rigidification of institutional arrangements, in which a certain degree of irreversibility is  
86 inherent when they happen to work, then crisis is the major driver of innovation. This is  
87 effectively the shattering and failure of arrangements and especially the perception of  
88 side effects which were not visible ex-ante. #00:08:44-3#

89

90

### 91 **Who is driving technological change and social division of labour?**

92

93 From a long-term historical perspective and under certain circumstances, it is possible to  
94 differentiate regimes. Politics and the political system were, for example, the driver prior  
95 to the industrial revolution. This also applied during the period when it was ongoing, i.e.  
96 in the 18th century on the basis of scientific innovations that took place in the 16th and  
97 17th centuries. If you will, politics directed the implementation of new problem solutions  
98 of a technological nature. One could even say that this was imposed and forced through  
99 (whereby war and the technology of war are the driving and eventful momentum behind  
100 technological change). Whereas this can perhaps be stated as being typical, striking or  
101 characteristic of the early or initial phase of modernity, the economy later takes over as  
102 the major driver of dissemination and implementation and certainly does so when a  
103 worldwide capitalist system made its breakthrough in the post-war order. There are  
104 various reasons for this, and different side effects. The economy is, of course, the  
105 dominant factor in the institutionalisation of interest in technological change and  
106 therefore also in the increase in the likelihood that technological change will take place  
107 and become established. Firstly, it has an external interest vis-à-vis the problems which  
108 technology is actually supposed to solve. It also has a separate and independent  
109 interest in innovation. From the perspective of the communication form of the economy,  
110 of market socialisation, this tends to be exhibited as an interest in the expansion of  
111 markets and in the increase in dividends. Specific economic innovation is therefore in  
112 the foreground. The aspiration that the economy contributes towards resolving the  
113 allocation problem and therefore acts in the interests of maximising prosperity is  
114 probably expressed in all good conscience. The idea is that it renders a service to the  
115 rest of society by structuring technological change to the market and thus helping to  
116 make it accessible to people. Such an aspiration actually means fulfilling needs which  
117 come from elsewhere, from everyday routine and from the living environment. These  
118 play a major role in terms of legitimising market strategies. Of course, this aspiration  
119 needs to be offset against the fact that efficiency evaluation criteria impressing  
120 monetisation are also transported along with the technologies in a certain sense. We are  
121 familiar with this notion from the old culture industry thesis from critical theory. The idea  
122 is that the culture industry and other forms of capitalised gratification make the excuse  
123 that they are satisfying needs, fulfilling desires and solving problems which come from

## Society – Technology – People

Interview with Prof. Dr. Joachim Renn

124 below, from the consumer. Actually, if we think about it, these needs, desires and  
125 problems are created via the medium of monetised communication in the first place.  
126 Requirements are created. In the case of technological change, this perhaps identifies  
127 an anonymous type of driver which could be termed spinning of, becoming independent  
128 or “self-realisation”. Self-realisation of the value of innovation, self-realisation of the  
129 value of a rise in efficiency behind which, of course, lie specifically economic innovation  
130 formats. Market development and increased dividends would be an example. Naturally,  
131 implementation once more falls into the hands of larger systems which are in a position  
132 to make the necessary financial and temporal resources available. They are able to  
133 instigate programmes which allow sufficient leeway for innovative action in delineated  
134 slots designated for the purpose, interacting, so to speak, within an interaction  
135 framework. The stakeholders involved are, of course, major organisations with  
136 considerable resources at their disposal. Viewed empirically, one example is the social  
137 change of research and development departments. We can also see that the  
138 arrangement between universities and organisations which form the basis of the  
139 economic market structure has changed. This applies both in the case of publicly funded  
140 institutions and with regard to the publicly funded private sector approach which has  
141 long since tended to predominate in the Anglo-Saxon countries. Educational and  
142 research institutions did usually not have an immediate market connection, and many  
143 research and development departments are moving directly to the companies. Many  
144 commissioned research projects still being conducted at the universities can be  
145 interpreted as part of corporate innovation policy. On the one hand, the arrangement  
146 between rather decoupled academic research and scientific technical research and on  
147 the other hand we have practitioners, skilled craft trade workers who know how to deal  
148 with machinery and may stumble upon a brilliant idea. Thirdly, basically, there was the  
149 entrepreneur—the organisation which prepares series production or puts the conditions  
150 in place that will allow series production. The merchantability of what will emerge is  
151 always a calculation here. We also have political stakeholders, in effect governments or  
152 certain sub-departments which have implemented scientific technology and other  
153 support measures. The approach in this regard is ambivalent. On the one hand, the  
154 focus is on user orientation. On the other hand, there is an awareness that no prior  
155 knowledge exists as to which technological procedures or which basic principles of  
156 technological equipment will deliver which effects. This means that scope needs to be  
157 afforded to the freedom of research. This arrangement seems to have become  
158 compacted, and it appears as though the boundaries have been overcome. It is,  
159 however, not necessarily the case that boundaries have actually been overcome.  
160 Science retains the perspective to judge the question of truth as to whether a process  
161 functions or not, whether it obeys the laws of nature or whether it is subject to a different  
162 rationality criterion and whether a technology can really be generalised and be  
163 introduced as standard. In turn, a different rationality applies in respect of whether  
164 something is politically desirable and in respect of associated side effects. Let us take  
165 the example of gene technology and biotechnology. Do we really want all the things  
166 which stem cell research is able to deliver? So, we are able to recognise the differences.  
167 However, we can see that there are circumstances in which no fusion of these  
168 stakeholders or sub-areas can be detected. There is perhaps a different weighting, a  
169 different unequal distribution of opportunities for autonomy and self-regulation.  
170 #00:16:14-7#

171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210

**Which consequences will arise from technological change?**

This comes under the heading of the subjectification of work, the possibility of transforming the conventional obligatory or compulsory nature of paid employment into something like a form of self-fulfilment that is compatible with the added value chain. That is, if the relevant equipment and personality structure is in place. Of course, we also know that side effects of, for example, the unopposed enforceability of the maxim of permanent availability can certainly impact intimate and personal circumstances. This may lead to a shift in the relationship between work commitment and routine on the one hand and private life, reproduction activities or intimacy on the other. People are available at all times, computer or tablet switched on, and work constantly to deal with the e-mails that need attention. Some may like this, others not. It is not possible to give a single response as to the consequences for the world of work, but the first impact will be an exacerbated and different form of social inequality. Naturally enough, the equation that a new reconciliation facilitated by communication technology between subjective requirements of work as a self-effective activity on the one hand and a functionality which is of relevance to the added value chain on the other applies only to a particular segment of the world of work and only to very specific tasks. We only need to consider work at an institute of higher education. In terms of time management and compared with working in a poorly paid manual job from eight until four, there is inequality and an unequal distribution of private, economic and organisational opportunities. This extends beyond the economy to affect administration and politics—to bring organisational and functional requirements and needs down to a common denominator. It may be the case, however, that developments which are, for example, discussed within the context of the subjectification of work or in connection with forms of project management individually tailored to the consumer may lead in a certain direction and result in modifications and rearrangements which can be deployed under the heading of increasing decentralisation. The general mechanisms of standardisation, generalisation and mass dissemination still bear a little of the character of the former Fordist world of work and way of doing business and of mass production. Under certain circumstances, the new products and new technological change have the inherent potential to break down the relationship between inventors, entrepreneurs and policy stakeholders and tear down the barriers and hurdles. They may even promote the instigation of instrumentations via the vehicle of legislative activities because consumers and the new technologies have put this arrangement in motion or have the potential to do so. This process takes place as a side effect of a different kind of arrangement between technical innovation, technical production, and technical reception or application rather than being brought into the arena in a planned way. #00:20:11-3#

211  
212  
213

**How are drivers and consequences of technological change connected?**

## Society – Technology – People

Interview with Prof. Dr. Joachim Renn

214  
215 In entirely general or abstract terms, I would perhaps once again attempt to describe  
216 technologies as a type of general procedures. It thus follows that the same thing applies  
217 to technologies in a specific way as pertains to types of procedures in a general way:  
218 They are explications of something implicit. Implicit in this sense means that action  
219 routines, ways of acting, and methods of working from the past have become habitual  
220 and self-evident and thus sedimented and established via a process of trial and error. If  
221 they have been formulated into rules - explication is important for technology - this is a  
222 point which really has not been addressed so far: Technology does not merely consist of  
223 packaging something into equipment, optimising and standardising a task and building  
224 machines, it also involves a deviation via explicit notation of the underlying rules  
225 governing events and a natural sequence of causal correlations, chemical reactions and  
226 electric control loops and so forth, then the explication of these contexts and of the  
227 method of construction of technical devices is thus implied. I therefore begin by  
228 expressing what I am doing. I then use this expression as a precept or imperative for  
229 what I should do when it is transferred into another context. It takes on a different form  
230 and it is, if you will, translated into requirements made by the machine or equipment on  
231 the persons executing the task. Marx's analysis of abstract work is relevant here. The  
232 worker becomes part of the machine, not vice versa, the machine becoming an  
233 instrument of the worker. This transition correlates with a second mechanism, the  
234 mechanism of generalisation and formatting. It takes on the form of the notation and  
235 then of the equipment and also applies to modern technological regimes such as the  
236 car, the aeroplane, and communication technology. This form, which in turn exists for  
237 reasons of producibility and calculability of the technological regime, brings me back to  
238 the economy, we have to take it into account here. It thus has a standardised form and  
239 becomes a kind of regulation for external contexts and quite different practices; it  
240 dictates that work and life must be conducted in a certain way and not differently. The  
241 generalised form thus needs to be objectified and subsumed in application contexts.  
242 #00:23:09-6#

243

### 244 **What measures can be taken to steer technological change?**

245

246 There are two possibilities as well as, of course, various mixtures of the two. There are  
247 the usual privileged and well resourced and financed entrepreneurs and stakeholders, in  
248 some cases artificially well resourced by financial capitalism, shifting back and forth  
249 assets detached from products and labour markets. If you look at the political scenery,  
250 especially in areas of the world society where the detachment between policy making  
251 and the economy takes on a different form or is less marked, emerging countries like the  
252 Chinese government or China's administration, will have an important role to play in this  
253 regard. Another possibility would involve the decentralising implications of new  
254 technologies, which perhaps genuinely represent a different generation compared to  
255 Fordist methods of production and the mass manufacturing approaches of the early and  
256 second waves of industrialisation. Decentralisation of technologies also leads to  
257 opportunities for contra-application, i.e. the paradoxical use of technologies and  
258 communication technologies, in the sense of Judith Butler that could provide support for  
259 political activity, which is otherwise difficult to organise. Expansions of these  
260 technologies may mean that flash mobs will increasingly be able to shed their ephemeral

## Society – Technology – People

Interview with Prof. Dr. Joachim Renn

261 character. There is no need at this point to fantasise about multitude, but in the area of  
262 normal consumers and end consumers, albeit perhaps unintentionally, technological  
263 instrumentations of everyday life, we may see the creation of further leeway for self-  
264 realisation and reflective experiences cumulating in an increased propensity to articulate  
265 an interest in self-determination, including in respect to dealing with technology. This  
266 also affects decisions regarding various technological options such as decentralised  
267 energy management. Both of the above are possible, as are different mixed forms. My  
268 supposition would be that a predictor of the conclusion to be drawn or even hypotheses  
269 will enable us to move towards determining which of these characteristics is more likely.  
270 The specific nature of the political order in regions of world society is one predictor.  
271 Regions thus have a precedence of the probability of this sort of decentralisation or of  
272 the developments associated with decentralisation, where a higher likelihood exists in  
273 systems which have civic structures for the relationship between economics, politics,  
274 policy administration, and scientific research which are still relatively strongly marked or  
275 which can retain or take on such a characteristic. Most actors are aware of their  
276 opportunities to exert influence, and these have been the object of considerable  
277 analysis. This is connected with implementation research and perhaps also constitutes a  
278 political science thesis: Which policies do we need to pursue in order to achieve this or  
279 that goal? There is perhaps only one thing I would mention at this point, because it could  
280 represent one specific feature of the perspective I am promoting. Ironically, paradoxically  
281 or seemingly paradoxically, there would be one probably underestimated way of gaining  
282 an agenda setting power or at least of gaining substantial access to such a power or of  
283 putting the right prerequisites in place, which is to adopt a strategy which may appear  
284 defensive at first sight by withdrawing from interdependencies and creating venues,  
285 tasks and persons for autonomous variation that is not tied to any particular purpose.