Society – Technology – People

Theory-Interviews on the relationship between societal and technological change.

Interview with Prof. Dr. Joachim Renn

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

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

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

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

Who is driving technological change and social division of labour?

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

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

How are drivers and consequences of technological change connected?

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

What measures can be taken to steer technological change?

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

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