

## Society – Technology– People

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

### *Interview with Prof. Frédéric Lebaron, PhD*

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

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3 These drivers are numerous and complex. So, to answer this question I need to refer to my basic  
4 theoretical frame, which is very much based and inspired by French sociologist Pierre Bourdieu and  
5 especially the notion of field, social field. So I think the drivers are fields, actually. And I try to explain  
6 what a field is and how a field works and how relations between fields can be the basis or the basic  
7 element of these drivers. So, a field is a social space, relatively autonomous in the society, which has  
8 managed to get a certain level of autonomy, after, for example, a long period of struggles against other  
9 powers, like really just powers or economic powers. And it is a structure composed of humans of course,  
10 composed of actors, agents, which are related to each other, but who share something together, which  
11 is a common goal, a common sense of the game, as Bourdieux states, that is they share of a sort of  
12 libido. Bourdieu says "libido sciendi" in the case of scientists for example, but the libido or kinds of libidi  
13 can be very diverse of course. And they play a similar game together, they compete together, but they're  
14 also cooperating together for the purposes of the field in general. So in the case of technological  
15 development, I would say that many fields are involved in the process and can be described as the main  
16 drivers of the general process of development and organization. That is, of course, obviously the  
17 scientific field which has more and more created links with what we could call a technological field but  
18 both are strongly interrelated now, so that's of course the major field driving the process. But of course  
19 other fields are involved, such as the field of the state, public policies in general, which also functions as  
20 a field with vary factors sharing a goal etc. and of course the economic field. I think, it's the interplay and  
21 the interdependence between these fields and the process of the development of new  
22 interdependences between these fields, which is the main driver in general of the process of  
23 technological development. More specifically, fields are about accumulating capitals, sorts of capitals,  
24 species of capitals, as Bourdieux says. And I mentioned three big fields involved in the general process.  
25 Each of these fields has its own process of capital accumulation and it's at the intersection of the  
26 processes of accumulation of these different fields that emerges something as innovation, technological

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27 new developments, applications in various forms. But it's in terms of balance, that's also a notion that is  
28 interesting, because all those fields are always present if you look at history and the industrial revolution,  
29 I mean the scientific field, the economic field, the state - but the dynamics have clearly moved towards  
30 the economic pole. There is clearly a domination now of the economic pole, of the pole of the market, to  
31 simplify – and in this subfield, subsector, which is a field in itself actually, it's clear that at the moment  
32 the dynamics seem to be, at least in our country, I don't know if you can so much generalize at the global  
33 level, but driven and influencing through consumers and through the expectation of consumption, what  
34 will be the next step, or the next fitting innovation. What is supposed to be the next consumer. It's just a  
35 description, I didn't try to assess normatively the process, but I think the process has some limits, some  
36 backsides at the moment, because it privileges short term, it privileges marketable demand of course, it  
37 privileges some criteria of validation and some specific forms of influence - to take this word, which I  
38 don't use so much, because I think influence is a bit broad category that is difficult to grasp exactly, and  
39 probably at the moment we overestimate the capability of that kind of market-driven system of  
40 innovation to really produce changes that go in the direction of collective well-being, I would say. And I  
41 think this limited view today which is a unidimensional and simplistic - in a sense - view of  
42 interdependencies of the process, is probably the main obstacle to the understanding and to the process  
43 of innovation itself. We're, in a sense, putting the resources, not the wrong side, because there is no  
44 wrong side in a sense, we can always expect that something will emerge from all those start-ups that  
45 create new services or new products; but probably we're beginning to - not ignore, it's too strong to say  
46 that, but - to have a too restricted view on the role of fundamental science in the process and of the  
47 cultural science in general in the society. So, we have to apply a too utilitarian vision. So, I think at the  
48 moment this utilitarian view has become completely dominating for many reasons, that relate to  
49 economic policies in general like ideology and so on, will be a limitation of the process of innovation and  
50 not the contrary. #00:07:14-8#

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

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55 So, there is a dialectic maybe, that's the word that we can use, because fields are structures with  
56 processes of asymmetrical distribution of resources including technology as a resource. But they are also  
57 very dynamic objects. So they are structures and dynamics, that's why my theoretical perspective can be  
58 labelled "genetic structuralism" in a sense following the expression that was invented by a famous  
59 epistemologist and psychologist from Switzerland Jean Piaget. Your question is about the  
60 implementation, but I think the three fields are involved as well in the process of implementation of  
61 technological developments: That is the scientific and technological field itself with two poles which are  
62 pure science, in a sense, and very applied science on the other side. The bureaucratic field as we say, or  
63 the state as a field is also very important in the process. And of course, the market that is the economic  
64 field, which is strongly connected to the state in all the economies actually, which are a mixture of  
65 actors. So more precisely inside those three fields the social division of labor is quite strong now, so we  
66 have a diversity of actors, which are obviously not only scientists in the scientific field, because research-  
67 engineers now have an important role and I think more and more teachers and students play their role  
68 as well in the reproduction of the scientific field itself - here, I mean a school, so we have very important  
69 reflection about the connections to develop between research and training and teaching. And I think this  
70 cannot be forgotten, because teaching is clearly part of the implementation of technological  
71 development as part of the reproduction of the scientific and technological field in general. Now with  
72 this idea that we can have very rapidly massive data, massive information on topics which is changing of  
73 course the scientific practice in my discipline. That is something that we are seeing every day, that it's

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74 now much easier to get data, massive data, but at the same time difficult to interpret. So, we have now  
75 sort of inflation of massive information, a renewal of the tools that can be used to synthesize or to  
76 organize this information with new techniques deep neural networks, machine learning and all those  
77 things that are known emerging a lot in the public sphere, changing the way we proceed with data in  
78 general, we visualize data, we, in a sense, look at the data, we are informed about the world and so on,  
79 including climate change, but also of course demographics and very various fields. And it's clear that  
80 what is changing is probably the balance between the technical uses of data in terms of prediction for  
81 example - we see that with vote. We take the example of vote. And interpretation based on theoretical  
82 insights and the accumulation of knowledge that has been realized in social sciences, in sociology,  
83 demographics, history, and there is now a sort of a changing balance between techniques that are used  
84 to produce not only numbers, but also predictions and the frame in which we can interpret them, which  
85 is sometimes forgotten or put aside. #00:11:28-0#

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

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90 So here I will add to the very general frame that I just draw the idea that the dynamics and the evolution  
91 process in at least periods that dates back from the beginning of the 80s or middle of the 70s is the  
92 period of the economic sector, economic field takes a central place in shifting the entire system and  
93 phagocytating - it's also a metaphor from science - to its own rule of game, rules of game and its own  
94 stakes that is profit accumulation. And that's the reason why I think we're facing at the moment a  
95 process where the autonomy is very restrictive, there are very strong counter-mechanisms against the  
96 autonomy and especially against the autonomy of fundamental research, which I think is put into threat  
97 by these dynamics of completely market-driven process of development of science and technology.  
98 Another aspect is the evolution of inequality. We didn't mention this point, but I'll come back to that, I  
99 think technology is also a vector of inequality, with the digital divide and things like that, which can be  
100 reversed if the public policy of course really aims at reducing the unequal consequences, the unequal  
101 development, that relates to technological evolution. And I think, here my hypothesis is that, at the  
102 moment there is no real public policy to limit these unequal dynamics, which is a dynamic sort of  
103 income, with the work of Piketty and others, of the dynamic of wealth, which relates to the way we share  
104 the products in terms of the value in general economic and social terms, created by the technological  
105 sector at the moment. It's very badly distributed at the end. Some people get very, very rich after some  
106 innovation that I described, I mentioned social networks that are not so strong in terms of technical  
107 invention, properly speaking, they are absolutely great in terms of design, of social technology, of  
108 organization and so on. So here, my hypothesis is that the unequal dynamic is not stopped and will go  
109 on, until it finds a limit. It's all the issue, that's the fourth hypothesis, that it will find a limit and I think  
110 that many aspects of what I have said point to this direction that is the short-term in itself is reducing the  
111 ability to produce real technological innovation at the moment. There can also be some limitation  
112 related to the fact that we underinvest in fundamental research and I think this point should not be  
113 underestimated. If I may speak of my value system, I would insist on big values. I would say equality,  
114 social equality on one side and freedom and democracy on the other. In France we've also brotherhood  
115 in our motto, but I would say that technological evolution can have of course ambivalent effects, that is  
116 positive and negative, even the same innovation can have clearly both. As regards equality, especially  
117 social equality, I already mentioned that there are clearly unequal dimensions of the consequences of  
118 innovation, that is appropriation that are unequal, because people have different levels of educational,  
119 cultural capital and are more or less able to seize the opportunity that relate to new technologies. We  
120 have seen that with the digital divide, which is also inter-generational. I think the natural – there is no

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121 natural, but the mechanical process could lead to an increasing, even a strong increasing in some aspects  
122 of inequality. The ones who have the data, the ones who have the tools to investigate the data – for  
123 example with what happens with big data today – and the ones who are unable to get data. It's obvious  
124 in terms of countries, it's obvious in terms of firms, there are small firms in poor countries, which will be  
125 unable to access to market data that the big firms will have. So, if we think in terms of asymmetries and  
126 above all inequality, an unequal level of resources on the market, it's clear that any change may have  
127 unequal consequences in terms of increase of inequality, so that's the negative side. Basically, like other  
128 aspects that I already mentioned, I will mention a second one, that is on the negative side, which is the  
129 loss of signification, of practices and especially social interactions at the moment, to digitalize, they may  
130 not make sense anymore. This issue I think with changing interactions between men and machines for  
131 example, that's clearly one of the stakes and so immediately understandable in terms of loss of cohesion,  
132 social cohesion, which I think is also related to this value of equality, of social equality, of equal  
133 opportunity. It creates social division, new social division and it creates new social pathologies – here I  
134 use a wording that comes from Emile Durkheim in the 19th century and which is still very relevant today.  
135 You may have countries with a very high level of technology but with a very strong pressure on  
136 education, high rates of suicide, bad social indicators in general. It's possible, I mean, technology doesn't  
137 mean - a high technological level for a country doesn't necessarily mean a lower level of certain specific  
138 pathologies of modernity, psychic pathologies, mental illness and so on, which tends to develop in a  
139 relation to work pressure for example and to many other factors. Here I would say at the moment we're  
140 seeing the bad effects in a quite rapid evolution, especially as regards the work force at various levels,  
141 but even at high levels of responsibility the pressure is so strong, that the number of burnouts and so on,  
142 seems to tend to increase at the moment. Because I think democracy has to do with sharing a value with  
143 sharing ability to interfere with decisions in a collective process. And technology can create divisions and  
144 precisely also on this aspect of including people together in the decision making process. And I think  
145 technologies can be used to develop new processes of decision making, more democratic, more  
146 collective, more inclusive – including the representation of marginal groups and the representation of  
147 minorities and the representation of dominated groups in general. We could use including all this big  
148 data that we have now to move in a better direction on many topics. And it will increase freedom in the  
149 sense that freedom is not something completely metaphysical but freedom is the degree of autonomy in  
150 certain conditions of life. And distancing allows to give more freedom. And technologies may give  
151 more freedom if they are combined with the distancing. Technology can help but it can also be a new  
152 slavery and we see people that are enslaved, that have become slaves of some technological tools –  
153 including professions I think; that's a collective issue not only individual. Of course, we all know  
154 individuals that are facing pathologies relating to technology. It's more collective pathologies which has  
155 to be taken as such and handled as such. #00:20:20-1#

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

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160 My theoretical vision is really centered on this idea of society dividing in fields. That is differentiated a lot  
161 and getting more and more differentiated over time. Which is an important point, because I think that's  
162 part of the knowledge that sociologists and historians have acquired. It's very difficult to generalize from  
163 one field to another, once the fields are very autonomous, and so the way this autonomy is conquered is  
164 in itself a very important mechanism of autonomy production, the autonomy construction of the field,  
165 including professional groups, get more and more autonomous, that is the intent to monopolize aspects  
166 of activities or specialties - that's the obvious case for medical doctors - and in science it's a sort of  
167 "scissiparité" - I don't know if the word exists in English, but in French it is this process of cells to divide

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168 themselves all the time. That is, we have scientific fields that get more and more specialized with very  
169 specific specialists unable to talk to each other once it is two subsectors too far from where they are. So  
170 that's a very strong mechanism we have observed, we know it exists, we know it goes on, working and  
171 it's very important, especially to understand that you cannot stop technological change in a sense. Once  
172 it has begun and it has become something important, central in our society, which is the case. Until there  
173 are strong restrictions against science and against technology, which are impossible to imagine at this  
174 stage - where it goes on. So, there is this process of accumulation as well, so the other mechanism  
175 related to autonomy is accumulation - those fields are places of accumulation. Accumulation of assets  
176 that are different from one field to another, but which are more and more hybrid as well, because fields  
177 interpenetrate. They are both autonomous and at the same time there are - and that's the third  
178 mechanism - forces that put them together with dependency mechanisms. #00:22:54-1#

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

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183 Clearly, there are two things: A rebalancing between fields is in sight and here probably rebalancing at  
184 the moment will necessitate a stronger comeback of the public actor. That's my first idea – a hypothesis,  
185 not more than a hypothesis but I think at the moment and at a global level I think, it's especially  
186 necessitated by the situation as regards climate. It's the direct implication in a sense, of what will happen  
187 for the climate and for the way to deal technologically with climate change, because we have to deal  
188 with it, scientifically und technologically of course, but also socially on many other aspects. But I think,  
189 the second is the transformation of habitus. It's clear that the dispositions of the way we concretely  
190 behave is changing, but probably here, maybe it will be surprising, but I don't think the modern habitus  
191 will change so much. I think innovations in the last years have also created a lot of useless tools or  
192 useless services that finally will be seen as something well, it was at the moment something that we also  
193 that would be the way to behave and finally we didn't. So there is a selection process as regards what we  
194 take from innovations and here probably I think we will be facing some - probably because there will be  
195 cyclical crisis in the economic sector, in the financial sector but we are now in a phase of the cyclical  
196 evolution of the economy, which is quite optimistic, but that could change - we have seen that in 2008 -  
197 oh, before with the internet bubble. Bubbles at the moment, they splash, they crash. There are crashes,  
198 there are also moments where you think, well we have gone in that direction, but it's probably - we have  
199 many applications on our smartphones etc. but at the moment we limit number of applications, we limit  
200 the time we spend - and I think we begin to see things like this with social networks for example, which  
201 are clearly, obviously a technological innovation, but also a social innovation clearly - organizational  
202 innovation - an innovation which put people together technologically, everything was already there, the  
203 internet and so on. It's something very important in terms of innovation but it's a change for the  
204 behavior of people precisely because it has fitted with something that was present, but not explicit and  
205 not clear enough in the demand side. But, probably there will be a retraction of some of these spheres  
206 that have expanded and have taken part of our lives. So here I think it's our role as scientists, public  
207 intellectual if you want, but scientists more generally – we have a long lasting tradition since the  
208 scientific revolution in various countries, of scientists that also try to not only diffuse their own ideas, but  
209 diffuse a particular relation to knowledge that is critical, that is nuanced, that is modest, that is  
210 distanciated again. That notion of distanciation is what I think we lack the most. And here its clear that  
211 we have tools in social sciences to help that distanciation. Distanciation doesn't mean we don't take  
212 innovation. I think there is also this...of course...I did not mention that but there are people who are  
213 clearly resisting any innovation that exists and I think we should not point them as purely conservative  
214 and so on. And even discriminate them in some aspects but on the contrary we should develop are more

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215 distant way to talk about technologies and our uses of technology in general to avoid that kind of  
216 resistance to any change that can lead nowhere. There are good reasons to resist some technologies as  
217 well. I don't want to say that all the resistances against technological changes are bad. I mean sometimes  
218 we know for example industrial agriculture has created a lot of very bad consequences, so as I am not an  
219 environmentalist but very aware of ecological issues I think here we have to be very very careful with all  
220 the negative aspects of supposed productive innovations, which have created a very bad world which we  
221 live in. And in general the industrial revolution has created climate change so we see that the issue is  
222 really, really central and the negative consequences probably what people, the further they are from the  
223 scientific world, see immediately. It's a problem. Because at the same time we know that to combat  
224 negative changes related to technological developments in general and industrial developments etc. we  
225 need more technologies of various kinds. Especially more science and more, I think, critical spirit in  
226 science with what defines a critical spirit in science which is a certain level of distance towards what we  
227 do, refusing a discourse of promises, prophecies of course, which is cooling the system.