

Overcoming "Tragedies of the Commons" with a Self-Regulating, Participatory Market Society

Dirk Helbing

Our society is fundamentally changing. These days, almost nothing works without a computer chip. Processing power doubles every 18 months and will exceed the capabilities of human brains in about ten years from now. Some time ago, IBM's Big Blue computer already beat the best chess player. Meanwhile, computers perform about 70 percent of all financial transactions, and IBM's Watson advises customers better than human telephone hotlines. Will computers and robots soon replace skilled labor? In many European countries, unemployment is reaching historical heights. The forthcoming economic and social impact of future information and communication technologies (ICT) will be huge - probably more significant than that caused by the steam engine, or by nano- or biotechnology.

The storage capacity for data is growing even faster than computational capacity. Within just a year we will soon generate more data than in the entire history of humankind. The "Internet of Things" will network trillions of sensors. Unimaginable amounts of data will be collected. Big Data is already being praised as the "oil of the 21st century". What opportunities and risks does this create for our society, economy, and environment?

From "*homo economicus*" to "*homo socialis*", the networked decision-maker

Let's start by analyzing the situation today. Probably, the most widespread economic paradigm is that of "*homo economicus*", who merely tries to maximize personal benefits. It is often believed that such behavior balances and coordinates the interests of individuals, as if controlled by an "invisible hand" and automatically maximizes social welfare.

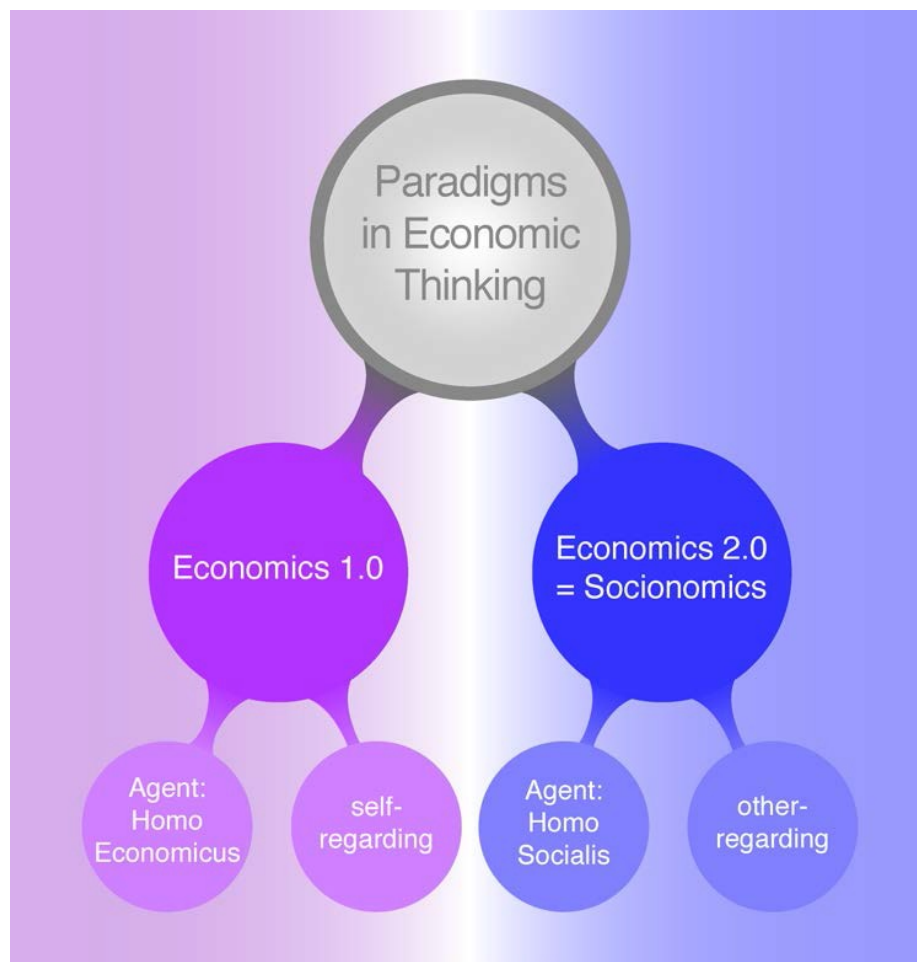
If one believes in this neoclassical credo, then, economic problems arise mainly from the fact that there are too many regulations, or that some people do not adhere to the principle of self-regarding optimization. But why are there so many regulations, and why do many people have fairness preferences?

It was long believed that the merciless forces of evolution and natural selection could not have created man other than as a selfish being. However, recent scientific insights teach us something else. It has been demonstrated that the very same evolutionary forces that create "*homo economicus*" may also produce a different kind of people under very realistic circumstances: "*homo socialis*". "*Homo socialis*" tries to reach favorable outcomes as well, but considers the impact on others when taking decisions. As a consequence, "*homo socialis*" does not decide in an independent, but rather in an interdependent, "networked" fashion. This has surprising consequences: while "*homo economicus*" often runs into "tragedies of the commons", for example, the exploitation and pollution of the environment, overfishing and/or global warming, "*homo socialis*" can overcome such problems and reach a higher success by conditional cooperativeness.

Reputation systems to master social dilemmas

The above tragedies of the commons result from social dilemmas. These are situations, in which it would be good for everyone, if everybody behaved cooperatively, but where there is also a temptation to take advantage of the cooperativeness of others. Under such conditions, cooperation is likely to erode. To avoid this, it is common to establish regulations and enforce compliance with them by means of monitoring and punishment strategies. However, over time, the costs of such strategies have created enormous public debts, and in some cases *de facto* state bankruptcy.

But there are also alternatives. The root problem is that we have created an institutional framework for "*homo economicus*", for which cooperation in social dilemma situations cannot thrive. But it would also be possible to create institutions for "*homo socialis*"; i.e. institutions which provide a suitable framework to support self-regulation. With such institutions for "*homo socialis*", the principle of Adam Smith's "invisible hand", i.e. the favorable self-organization of a complex (market) system to the benefit of everyone would work much better than with institutions for "*homo economicus*".



The difference between "*homo economicus*" and "*homo socialis*" is that the latter takes into account the interests of others when making decisions, which implies interdependent decisions or "*networked minds*." The different nature of "*homo socialis*" leads to a complex dynamics and another macroscopic outcome than expected for "*homo economicus*." In the case of public goods problems, for example, interactions of agents with strictly self-regarding preferences will lead to "*tragedies of*

the commons,” while the self-regulation of “*homo socialis*” can overcome this undesirable state and foster cooperation, leading to higher individual and social benefits. Due to the different system dynamics and different systemic outcomes, both types of agents cannot be described by the same body of theory. They require separate sets of literature and different institutions.

How to envisage a self-regulating market system? The transfer of the principle of Swiss-style bottom-up democracy to the business world would probably be a good way to imagine this.

What would be suitable institutions for “*homo socialis*”? It is known that social dilemmas can be overcome by various social mechanisms, such as genetic favoritism, direct reciprocity (“you help me, I help you”), or punishment of uncooperative behavior. Genetic favoritism tends to create ethnic conflicts between tribes, while direct reciprocity may promote corruption. The punishment of non-cooperative behavior corresponds to our current approach, but this seems to have reached the limits of feasibility and affordability. Note, however, that there is a further approach, which transfers the success principle of social communities to the context of the “global village”, namely reputation.

“Prosumers” and “qualified money”

Reputation systems in the internet spread very quickly. Nowadays, customers evaluate products and sellers, news, comments, politicians, institutions and companies. Reputation creates the opportunity to sell good quality for a higher price. Scientific studies of *ebay* and other electronic platforms show that customers prefer sellers who have good reputations, and that these sellers can charge more. When quality competition complements price competition, this can also create incentives to improve social and environmental production conditions, i.e. sustainability. Based on reputation principles, it would even be possible to establish a new kind of money, “qualified money” or “social money”, which could overcome some of the problems of the current financial system.

The Information Age will transform markets fundamentally. In the following, I will outline just some aspects of the now emerging “democratic, participatory market societies.” Flexible self-organization will play a much bigger role than today. The emergence of “prosumers” illustrates this. These are consumers who participate in the production of the products they buy. Instead of just selecting existing products from a catalogue or choosing the special features of a personalized car, consumers will be able to create new components of products, new designs, or even entirely new products. For example, they could use a 3D printer to produce their own cell phone cover and distribute it to others. Or they could come up with their own fashion and upload it to a company webpage to produce it for them, their family, friends, and colleagues, or indeed customers all over the world. People could also distribute their own books, their own music and their own movies. Or they could put a team together to construct more sophisticated products.

An “innovation ecosystem” of flexible “projects”

While the 20th century was an era of democratization of consumption, the 21st century can become an era of democratization of production. Next to today's companies, flexible, participatory forms of production will emerge, which I term "projects". Creative minds will come together to realize joint project ideas. After completing a project, everyone will be looking for another project or two, and so on. Social media platforms such as Amazon Mechanical Turk will make it possible to bring ideas and skilled workers together. As a consequence, this will lead to a more direct participation of people in production processes. There will also be a much greater diversity of products, tailored to individual needs. Thus, while computers will increasingly replace our current types of routine and executive work, we will have an opportunity to replace these jobs by more creative activities. Production by large corporations will then be complemented by an innovation ecosystem made up of thousands of projects. The huge range of smartphone apps, which platforms such as *app stores* have enabled, gives just a first idea of the unlimited possibilities for new projects. Open Data and the Web2.0, Web3.0, etc. will further accelerate this development.

However, Europe has not found its place in this new innovation universe, yet. Suitable institutions must first be established: the aforementioned reputation system is just one of them. Furthermore, open platforms are needed to enable participation and cooperation. In order to encourage an open exchange of information and the emergence of an innovation ecosystem, new incentive systems are required, which reward creative contributions. For this, the relevance of innovations must be made measurable, and inventors must be compensated for the use their ideas, e.g. with micropayments. Last but not least, we need a new science, which helps us to understand and create the participatory market society. While current economics ("economics 1.0") is tailored to "*homo economicus*", the emerging "economics 2.0" must be tailored to "*homo socialis*", the networked decision-maker. These and further institutions should be part of a far-reaching strategy to create an "innovation accelerator".

An age of creativity and participation is ahead of us. We just have to use the opportunities that modern information and communication technologies offer. Reputation systems and social media can promote awareness of the risks and benefits of our available decision alternatives. In particular, they can help us to address challenges such as global warming and other problems in a more cooperative and sustainable way.

References

Dirk Helbing, *Economics 2.0: The natural step towards a self-regulating, participatory market society.*, *Evolutionary and Institutional Economics Review* 10(1), 3-41 (2013), see http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2267697; A new kind of economy is born – Social decision-makers beat the “homo economicus”, see <http://arxiv.org/abs/1309.7453>; for related videos search youtube.com for “economics 2.0” and the TEDx talk at <http://www.youtube.com/watch?v=nsrRo9x0j80>; also see "Countering climate change with climate olympics" at <http://www.youtube.com/watch?v=TaRghSuzBYM>.