What if all technologies were inherently social?

How technology has shaped society and how future technologies might affect it in the years to come are subjects for frequent debate. It can be tempting in this context to think of technologies as neutral 'things' that can be used for good or bad depending on the user's intentions and skills. But what if technologies were social objects that reflected and reinforced human activities or even political values? In fact, while mechanisms, effects and implications remain open to debate, experts on the relationship between technology and society broadly agree that technologies are indeed social in this way. By scripting, restricting and enabling different human behaviours, technologies can influence our lives in much the same way that policy programmes do. A number of key ideas have emerged from this field over the last five decades, with various implications for European policy-making.

The first thing to consider is a philosophical question: what is it about a technology that makes it a technology, and not something else? Take a simple fishing rod. It combines a stick, string and a hook to create something that is more than its constituent parts, a tool that is *for* fishing. This '*for*ness' is an important part of the definition of a technology. Without being *for* fishing, it would not really *be* a fishing rod at all, it would be little more than a collection of physical materials. The way a technology is used is an important part of what a technology is. It is certainly as important as the physical materials that constitute it. This applies to artificial organs and blockchains just as much as it does to fishing rods.

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So how does a technology's social side come to be defined, and why does this matter for society? There are several classic case studies from the literature that explain different ways in which technologies and society can shape each other, and how this can influence our values and behaviours in profound ways. Bijker's fascinating study on bicycles, plastics and light bulbs highlights how technologies are interpreted differently by a range of social groups. These perspectives or framings develop and compete until there is a broad consensus or closure around what the technology is, as well as the problems that it solves. The approach also allows room for new controversies to emerge and reopen the process, leading to a renegotiation of the technology and its associated problems and solutions. It is through this social process that technologies acquire their *for*ness. For example, biofuels could have been defined as a technological solution to the problem of energy security, rural development or climate change (or combinations thereof). In the end, the climate change framing came to dominate, and subsequent debates about indirect land-use change, for example, were largely expressed in terms of carbon emissions. Closure does not mean that everyone shares the exact same framing. Technologies can be described as 'boundary objects', which are adaptable enough to be understood by specific groups in very different, even conflicting ways, while still maintaining enough of a broad, common identify to enable meaningful dialogue and stable development.

Technologies have 'scripts' that can affect our lives by prompting the user to behave in a certain way. Latour gives the example of cars that detect someone is not wearing a seatbelt and 'beep' the driver into submitting to the rules, or even refuse to start unless everyone is buckled up. Here, technology takes on the role of an enforcer of morals or laws, shaping the choices of the driver and encouraging an outcome that conforms to the rules. The role of technology in shaping our choices is not just about respecting the law, it's also about our

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March 2018 - PE 614.552

habits. Mundane technologies often prompt us to behave in certain ways with a surprisingly profound influence on our lives. For example, Shove has shown how routine practices of comfort, cleanliness and convenience – that enrol everyday technologies such as washing machines and freezers – have a substantial impact on how we define 'normal behaviour' as well as on our resource consumption.

These ideas also apply on a grander scale, with our entire technological infrastructures having strong macro-social effects. Winner, for example, has argued that the low overpasses in Long Island were deliberately designed to ensure that 'poor people and blacks, who normally used public transit, were kept off the roads because the twelve-foot tall buses could not get through the overpasses'. Negative effects may not always be as crass or deliberate as Winner suggests but, if technologies are to help us advance to a particular vision of the future, close attention must be paid to their associated values and behaviours. Feenberg proposes that machines and systems that are combined for one purpose can continue to have this effect in a different context. In his study of factories and online education, he observes how technologies that were designed with the aim of deskilling and disempowering workers in order to reduce costs can continue to have this effect if they are adopted uncritically in other contexts, even if they have more egalitarian aims.

This whistle-stop tour of the most important ideas about the relationship between technology and society over the past five decades is not exhaustive and, in condensing large volumes of literature into a few lines, it inevitably simplifies quite nuanced concepts. It should also be mentioned that these ideas are not always fully compatible with each other, and the authors and schools of thought are often engaged in debate. Some diverge on basic theory, particularly on how much emphasis should be given to social versus material reality in explaining the development of technology in society. Others differ on methodology, such as whether and how social reality can be distinguished from material reality. Still more debate the practical consequences of their scholarship, whether and how it should be mobilised to advocate for specific political or community goals. Despite this, there remains broad agreement that technologies are not the neutral material outputs of objective scientific processes, but are permeated by social values that affect our lives in important ways.

Implications for policy-making

What do these understandings of technology in society mean for European policy making? The, now dated, idea that technologies are objective and neutral objects implied a passive posture for the regulator, whereby scientists delivered new technologies, the market responded, and policy-makers observed the consequences and tried to mitigate any harmful effects. The knowledge now that technologies embody values, and that these values matter, gives policy-makers a renewed incentive to be more proactive. At the very least, consideration needs to be given to the kind of values technologies should embody, and to the steps that can be taken to achieve this in practice. Indeed constructive technology assessment in the 1980s and the more recent responsible research and innovation and participatory design movements have each built upon these concepts to encourage the proactive and deliberate social shaping of technologies and their values from the earliest stages of development.

Some of these concepts can also be detected in mainstream current debates. One topical example is the idea that the current model of financing journalism through online advertising and distributing it on social media is associated with negative influences on our society, including fake news, polarisation and election interference. The options available to respond to this challenge are regularly evaluated against values such as freedom of speech, media pluralism and editorial responsibility. The EU is also attempting to align technologies with European values by establishing codes of conduct for the internet and robotics. These examples build on an understanding of the mutually shaping relationship between technology and society, and attempt to harness it to deliver better outcomes for the general public.

This 'What if ...?' publication is a product of the Scientific Foresight Unit (STOA) of EPRS. More information on the unit's activities can be found at http://www.europarl.europa.eu/stoa/ and http://epthinktank.eu/author/stoablogger/