

Technology and fear: is wonder the key?

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Technology is a social practice that embodies the capacity of societies to transform themselves by creating and manipulating not only physical objects, but also symbols and cultural forms. It is an illusion that scientific and socioeconomic drivers are the sole elements determining the destiny of a technology. Although they are important, what is really crucial is the way in which a human community ‘metabolizes’ a new technology, that is the way in which a new technology becomes part of the mental landscape of people living in that society. In this paper I argue that today, fear of technology mainly emerges from a lack of meaning surrounding the technology revolution. Present technology is developing without a sound cultural framework that could give technology a sense beyond mere utilitarian considerations. Frightening stories then end up being a privileged way to incorporate technology into a meaningful context. However, fear is not the sole emotion that can enable integration of new concepts into mental schemes, two other powerful emotional forces should be considered: wonder and curiosity.

Introduction

Technology is a social practice that embodies the capacity of societies to transform themselves by creating and manipulating not only physical objects, but also symbols and cultural forms. In its essence, technology is power. Any technology gives individuals, as well as societies, the power to free their lives from certain constraints. Technology alleviates the tyranny of human material constitution, its physical limitation, its spacial and temporal constraints, and its limited capacity to perform actions. Yet technology is not only fabricating instruments for a purpose: birds fabricate nests and chimpanzees use sticks for searching for food, but they did not invent any technology. What turns instruments into technological objects is neither their level of complexity nor their function – but rather the meaning associated with them. An instrument becomes a technology when it takes on a symbolic dimension, when it is charged by meanings beyond its immediate purposes and, often, beyond its creators’ awareness. In this paper I argue that the best way to deal with fear of new technologies is to address their symbolic meanings, rather than relying on pure rational arguments. I argue that wonder and curiosity are an effective way to contrast fear and techno-paranoia.

Technology, collective imaginary and politics

All human activities originate in the use of symbols – it was the symbol that transformed our anthropoid ancestors into human beings. Some symbols are shared by the whole species, other symbols are specific to a culture or community, and others belong only to small groups or individuals. The role of symbols in the constitution of the collective can be traced to Emile Durkheim’s work *The Elementary Forms of Religious Life* and to Gustav Jung’s research on the collective unconscious. More recently, the collective symbolic template has been explored in different ways by social scientists [1–3] and psychoanalysts [4–6]. Although they come from different perspectives, these scholars suggest that collective and individual action emerge from collective imaginary, a kind of cultural conditioning that generates the context in which human actions gain sense. Collective imaginary acts as a filter for new information: it is the lens through which people perceive the world. Collective imaginary is mainly made up by stories – narratives that convey sense and therefore help people to understand novelties by including them in a series of meaningful events. Stories are materially powerful; they shape practices, relationships, and commitments, and as such, demand reflective, accountable attention from science policy.

Modern technology also necessitates a change in the relation between science and politics [7]. Because emerging technologies often challenge basic moral assumptions (e.g. the status of the human body, the concept of human dignity, the very definition of living being, and so on) they provoke (directly or indirectly) a crisis, or at least a basic insecurity regarding moral standards that are either sanctioned by law or remain tacit presuppositions. In secularized societies these conflicts no longer find a solution based on religious authority, although religion still has an important role in shaping morality. The space left empty by religious authority was first occupied by politics. However, traditional political processes, which worked well enough to produce democratic control over centralized systems, are unfit to govern decentralized, distributed systems such as those related to emerging technologies (e.g. nanotechnology, biotechnology and information technology). Individualization and decline in political involvement from general society made it increasingly difficult to set technology and science policies by relying on traditional forms of policy decision-making. The answer to this crisis was the birth of the so called ‘expert system’. Experts have been used to support democratic decisions to replace traditional democratic processes, by explaining and advis-

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ing on technology issues. Yet, even experts' neutrality and authority are increasingly contested and it is now clear that even the expert system cannot solve issues raised by the lack of a meaningful framework in which technology innovation can be conceptualized. This has led to two important consequences. First, policy-makers have been under increasing pressure to justify their choices for technology development and pursuit of socioeconomic goals, but they have often been unable to ground their decisions on consensus (or at least they are unable to evaluate whether such a consensus exists). Second, researchers have been under increasing pressure to demonstrate the policy relevance of their findings and to deliver tangible results. However, fewer and fewer researchers and scientists perceive their social utility; on the contrary, more and more they feel that the public consider their research to be 'dangerous'. Ironically, technology revolution, which in principle should empower people, is generating a profound and general sense of powerlessness and of vulnerability. A crisis of the legitimacy of traditional western metanarratives (religion, philosophy, political ideology) has left the 'technological citizen' alone before his choices. Loneliness hardly means autonomy (as some overoptimistic commentators believe) more often it means discomfort and fear. In the collective imaginary technology power has increasingly been perceived as disproportionate, and consequently, risky. Every day, we are confronted with fresh evidence of how far the obsession with technological risks has gone. Techno-paranoia touches many disparate issues, from mobile phones to GM foods, from nanotechnology to the internet, from avian flu to bovine spongiform encephalopathy (BSE), and government and society are continually being re-educated to expect a worst-case scenario. Safety-first has become a virtue for its own sake, to be repeated like a religious mantra, or to be cried as a political slogan, regardless of the practical consequences. It is clear that the problem concerns the symbolic dimension of technology rather than a rational cost-benefit analysis. As the traditional political and religious systems have lost their purchase on society, fear has emerged as the focus for the attempt to create new meanings to guide human behavior. Present technology is developing without a sound cultural framework that could give technology a sense beyond mere utilitarian considerations. Frightening stories then end up being a privileged way to incorporate technology into a meaningful context.

The *Prey* example

An illuminating example of my argument is the way in which people understand and perceive nanotechnology. It has long been a dream of human beings to explore and eventually to manipulate the infinitely small. For centuries mathematics did the job, then engineers started to construct microscopic machines – motors, valves, sensors and computers – at molecular scale. These would be implanted into larger structures in which they carry out their invisible function. Such devices are now a reality and scientists, policy makers, industry and journalists have called nanotechnology the foundation for the 'next industrial revolution'. Yet enthusiasm has been immediately sided by anxiety and over-perception of risks. Undoubt-

edly, legitimate ethical social issues do exist. Yet anxiety has not been generated by a rational risk-analysis, rather by the irrational feeling that sooner or later nanotechnology might turn against us.

In 2004, North Carolina State University researchers conducted the first US nationally representative survey designed to gauge public perceptions about nanotechnology [8]. A random sample of adults in the USA was asked to weigh up potential risks and benefits caused by nanotechnology. The survey also assessed whether a person had read Michael Crichton's best-selling novel *Prey*, in which nanomachines run amok. Researchers anticipated that people who have read *Prey* would be less likely to accept nanotechnology. Their objective was to show that popular literature could negatively influence technology acceptance. However, Crichton's apocalyptic science fiction revealed a counter-intuitive effect. Most *Prey* readers predicted that benefits of nanotechnology would exceed the risks (63%), whereas only a minority (38%) of those who did not read the novel shared the same opinion. Similarly, just 13% of *Prey* readers thought the risks would surpass the benefits, whereas 23% of the non-readers agreed with this.

I think that the lesson to be learned from this example confirms my argument. People don't just need rational arguments. What they need is a narrative, or the possibility for including events in a meaningful series of facts. Today technology is justified only by utilitarian considerations. Yet human beings are hardly 'utilitarian machines', they are rather 'symbolic machines'. They need meanings to give a sense to their life. What is more frightening for any human being is 'non' sense rather than 'bad' sense. Think of a basic human experience, the fear of the dark. We overcome fear of the dark not thanks to light, but thanks to stories, and even frightening stories might help to relieve this fear [9].

Wonder, curiosity and scientific communication

To contrast feelings of vulnerability and alarm about innovation, stories should elicit feelings of pleasure for novelty. A vital instrument to elicit pleasure for novelty is wonder.

Wonder is a normal human reaction towards the complexity and richness of reality. For Aristotle, wonder led people to search for causes and was then essential to the process of philosophical inquiry. At the beginning of Christianity, wonder was thought as the proper response to God and his marvellous creation. Augustine celebrated the human dimension of wonder, by referring to Matthew 8.10, when Jesus marveled before the faith of a Roman centurion. Augustine argued that if our Lord marveled, it means that we should marvel. Marvel and curiosity were important for Natural Philosophers of the Renaissance, such as Ficino, Giovanni della Porta, Francis Bacon and Pomponazzi. They reclaimed the emotion of marvel for Natural Philosophy. Marvel – according to Ficino – allowed the man who understood it to control natural forces. The Baroque category of wonder was still more complex [10]. Baroque was marked by the expansion of the bounds of reality, the emphasis given to dramatization, the prominence of details, but also by the aspiration for simple, harmonious, elegant mathematical theories. This led to

the emergence of a new, sophisticated concept of technology, based on both on love for simplicity (Descartes' 'clear and distinct ideas') and passion for theatrical machineries. Also in the Baroque age, people feared technology (obsession with witches and any kind of sorcery can be partly seen as a popular reaction to Baroque scientific and technological revolution) but this tendency was effectively countered by evoking wonder through complex choreographic apparatus in political ceremonies, trompe l'oeil (trompe l'oeil, literally 'trick the eye', is a painting technique involving extremely realistic imagery, creating the illusion that the depicted objects really exist). in church frescos, extraordinary automata and powerful new weapons.

Wonder is an effective instrument for conveying a new world picture because of its extraordinary suggestive power. However, one could argue that this use of wonder is hardly respectful of democratic procedures [11]. Wonder in the Baroque age was indeed also the mainstay of political practices for controlling urban masses. By inspiring feelings of respect, fear and fascination, wonder can easily become a powerful tool for social control. Celebrated for the ingenuity of their authors, Baroque wonders entertained the elite while seducing, ruling and controlling urban multitudes. Because of this, I suggest that wonder should be used mainly to raise curiosity, which is by definition a 'democratic factor' because it promotes information sharing and encourages dialogue. Together, wonder and curiosity might allow people to overcome paranoid reactions towards new technology [12].

Conclusion

Modernity is confronted with revolutionary and accelerated changes in science and technology that challenge basic implicit and explicit moral assumptions and legal norms. This makes many people feel uneasy with technology; they wonder if it is safe, and they have trouble coping with constant change. Naturally, nothing is perfectly safe, and risks are often hidden and unpredictable. When electric light bulbs were introduced, the New York Times issued warnings that they might cause blindness [13]. This turned out to be wrong, yet today the generation of electric power produces more pollution than any other single industry in the world. Technological risks are vague and erratic and the relation between technology and public opinion is not shaped by a rational cost-benefit assessment. People appreciate technology's benefits (true Luddites are rare) but they would like to have the benefits without

paying any price and running any risk. Unfortunately, this is hardly possible.

All great narratives, which were used in the past to create meanings and to allow people to integrate the new risks of innovation into their world view, are now largely obsolete. Yet we cannot stop technology changing because people are no longer able to make sense of it and therefore cannot justify the risks entailed by technological advances. History teaches that paranoia about technological change rarely stops it. If we are concerned about irrational fear of technology and techno-paranoia, we would do better to form a clearer picture of how scientists and policy makers should communicate with the public.

Above all, scientists and policy makers should refuse any temptation to reject narratives as naïve and misleading. Narratives can give us the key to understanding what is going on in people's minds, and they are a crucial instrument for trying to influence people's vision of future technology. Moreover, narratives can stimulate wonder and curiosity, which is probably the most effective way to create new meaning and to overcome fear and paranoia.

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