From the Editor in Chief

HUMANS AND THEIR TECHNOLOGIES PLAY
THE INFINITE GAME

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The authors of the current *Human Technology* issue approach the relationship between humans and their technologies from quite different angles. Two articles focus on chat technology. In the first, by **Khushnood Naqshbandi** and her associates (Simon Hoermann, David Milne, Dorian Peters, Benjamin Davies, Sophie Potter, & Rafael A. Calvo), the authors focused on codesigning a chat tool for a voluntary-sector organization based on the experiences and needs of the volunteer workers. Meanwhile, in the second, **Marita Skuvje** and her colleagues (Ida Maria Haugstveit, Asbjørn Følstad, & Petter Bae Brandtzaeg) explored the differences between communicating with a chatbot and a chat human, particularly when the chatbot's behavior approaches that of human interaction. **Naveen Kumar and Jyoti Kumar**, in their paper, discussed the next industrial revolution—Industry 4.0—and proposed a framework based on multiple formulae that address the various aspects of both the human and machine components in measuring the efficiency of future smart factories. However, the article by **Subadra Panchanadeswaran** and her coauthors (Ardra Manasi Unnithan, Shubha Chacko, Michael Brazda, Natalie Brooks Wilson, & Santushi Kuruppu) presents a very different perspective of smartness, that of smart phones used by sex workers in India and how this technology has transformed both the work and the workers. Finally, **Patrick Lehane**'s paper on software design explores a theme that is, in some form or another, present in all articles in this issue: the intuitive use of technology.

Technological progress is not simply about inventing applications that automate activities previously conducted by humans. People still play key roles in operating a plethora of technological applications—to tell technologies what to do, where to go, what to produce, who to contact, and so on. No matter how complicated the automated machine, the human always is at some end to use, service, or manage it. However, that human must be trained—or she or he must otherwise feel confident enough in the skills needed—to operate the device. Intuitive use

means that the human interactant feels familiar with an application even if it is new to him or her. This goal of intuitive interaction is emphasized nowadays, particularly during the development of smart consumer applications.

Indeed, many have noticed how the former thick user manuals have shrunk into palm-sized booklets with just a few images and a few lines of mainly inspirational text because the applications are so instinctive to use. Moreover, consumers often do not regard the use of some devices as technology because they have grown so accustomed to them. As Alan Kay, an American computer scientist, has been quoted, technology is "anything that was invented after you were born" (Kay, cited in Larsson, 2011, p. 441). Although Kay's definition was meant to be humorous, it is true that recent innovations are more likely to attract attention than old technology (e.g., chairs, lamps, cars, TVs) because the latter are viewed merely as objects of normal life. In the same vein, Danny Hillis, a computer scientist and an inventor, defined technology as "everything that doesn't work yet" (cited in Kelly, 2007).

Intuitiveness leads to efficiency when the use of technology requires little or no need for training and learning; it also makes an application more lucrative to potential users. That is why the development of technology today is increasingly about automation, making equipment work (together) seamlessly, and whatever technology that cannot be automated is made as easy as possible for the human user (e.g., Endsley, 2017; Moore, Upchurch, & Whittaker, 2018, p. 4). This is evident in Kumar and Kumar's article about future smart factories, the efficiency of which, when measured, takes into account the cognitive load placed upon the human operators. As long as smart factories are not smart enough to take care of themselves, the people they depend on should feel competent and at ease in operating them. Intuitiveness is present also in the two articles about chat technology in this issue. Operating an online chat service between people or people and bots should be smooth and natural. Intuitive interaction is important even—and perhaps most importantly—among the functional illiterate, such as the Indian sex workers who use smart phones to facilitate their everyday work and lives.

Intuitive use often is a step in the evolution of technological innovation between its rudimentary not-at-all-intuitive stage and its final frontier, which could be considered full automation. Achieving full automation will liberate people to devote their energy to something other than the often tiresome, time-consuming, or boring tasks they could gladly do without, no matter how intuitive these tasks are to complete. Just watch the ingenious TedTalk presentation titled *The Magic Washing Machine* by Hans Rosling (2010). In it, Rosling illustrated how washing machines could be considered as "book machines" because they liberated users, particularly women, to educate themselves instead of toiling with some of the time-consuming and menial tasks related to laundry.

One can easily connect Rosling's idea to mathematician Alfred N. Whitehead's statement from more than a century ago. He wrote, "Civilization advances by extending the number of important operations which we can perform without thinking of them" (Whitehead, 1911, p. 61). In the views of Rosling and Whitehead, automation takes humanity further toward personal fulfillment. Or, if that sounds too grandiose, the extra time available at least enables people to enjoy something more entertaining and/or allows more comfortability in daily life. Some would be equally justified in saying automation is making people entertain themselves to death by driving them into the mind-numbing autoplay of games, TV series, and films, as well as making everything too easy.

As readers of *Human Technology* know, we editors of this journal emphasize the human side of technology. However, we often contemplate what the human side constitutes, especially for the future. When intuitive use turns into automated, embedded, instinctive, cybernetic, or even genetic use, we humans might end up using technology as we "use" our internal organs today—mainly unaware of their existence. It is likely that future ubiquitous technology will take care of human needs without the recipients even knowing it, just as applications such as automatic air conditioning today are designed to cater to a person's needs and preferences in a way that makes the user almost oblivious to the technology. Perhaps in the future, the concept of use will mean reading an occasional report created by an artificial intelligence informing any and all users about the many personal technological applications they barely are conscious of using—or perhaps which are *using them*—on the backstage of daily existence. That is, if we were interested in such reports.

Most predictions of artificial intelligence development, such as the one published by the Future of Humanity Institute at the University of Oxford (see, e.g., "Experts predict," 2017), foresee full automation of labor eventually. In that case, the intriguing human–technology question is, what to do in a society where humans do not need to work? Or are such visions really just a dream (or a nightmare) because work will always be an integral social and moral value to the extent that if work became extinct, it would have to be resurrected (see, e.g., European Group of Ethics in Science and New Technologies, 2018; Schwartz, 2015)?

In a way, the extinction of work started already thousands of years ago, ever since the cultural evolution of early humankind started "sucking orderliness from the environment," to use Leslie White's (1959/2016, p. 35) vivid expression, and people began to harness energy with elementary forms of technology to accumulate resources. The resulting surplus of resources enabled specialized professions that were "not really work" because they were not so vital to the physical survival of the society. Rather, they were geared toward inspiring, motivating, and entertaining people. In a way, the priests, jesters, storytellers, and artists of that era (and every era since) could thank technology for their jobs, and their audiences could thank technology for more fulfilling and entertaining lives. Thanks to automation, most of the present-day professions could be said to belong to the same category of not so vital, or perhaps even pointless, as Professor David Graber (2016) claims.

Different views of the social effects of total automation range from moral condemnation to hedonistic utopianism (e.g., Brynjolfsson & McAfee, 2014; Marcuse, 1964/2007). But no matter which view one might hold, it is clear that technology development presents an "infinite game" that is not played to win, but instead just to keep on playing (Kelly, 2007; see also Carse, 1986). Development of technology most likely will never end because new forms of automation liberate humans to think of other new forms. In this respect, studying automation, robotics, artificial intelligence, and the future of technology in general should not aim any lower than asking what is the value of work, if not the meaning of life. When technology replaces most human work, should individuals panic or celebrate, like in the two scenarios depicted in the famous meme in Figure 1? The answer depends on a plethora of complex and frustratingly divisive cultural, social, and political questions revolving around the relationship between an individual and the society.
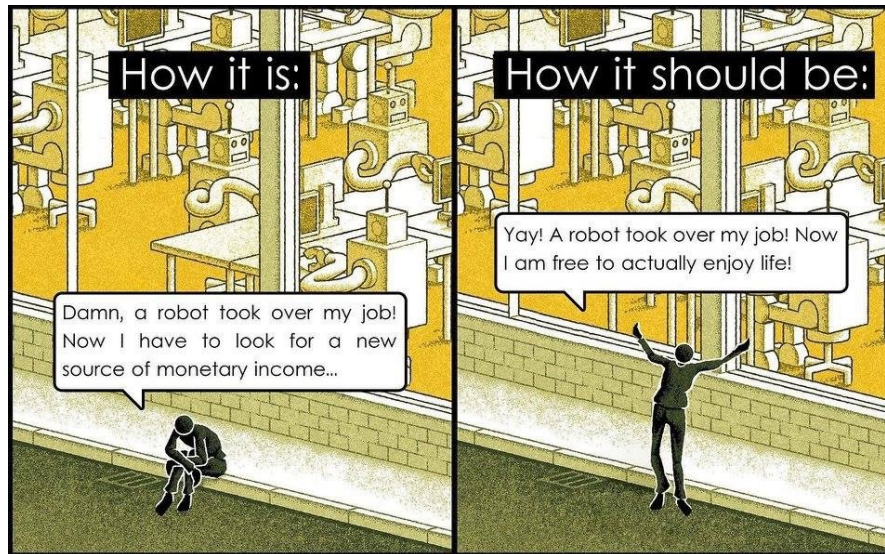
Figure 1. As technology is taking over human jobs, should the reaction be to shout out "The end is near!" or "The beginning is near!" (Picture source: Trox, 2016.)

Fortunately, there are forums like *Human Technology* in which such questions are welcomed to be contemplated. So, if you feel like tackling the issue, feel free to submit an article or even suggest a themed issue, and we can explore the fascinating future of technology more.

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