Book What Technology Wants

Kevin Kelly
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Recommendation

In this fascinating book, Kevin Kelly, a co-founder and executive editor of *Wired* magazine, draws on a broad range of disciplines to make synthesizing observations about the relationship of technology to life. Unlike many contemporary writers, Kelly uses the term "technology" broadly. He isn't just talking about the newest electronic gadgets; rather, he traces a history that reaches from chipped stone tools to the latest tech toys. Most readers will find some places where Kelly's argument goes too far or slides past an objection, but anyone who dips into his treatise will find it compellingly written and vastly intriguing. *BooksInShort* recommends this thought-provoking work to futurists, planners, innovators, and those interested in human nature and history.

Take-Aways

- Technology includes everything from flint axes and language to computers and culture.
- The "technium" – a "self-reinforcing system of creation" – is the broad range of technologies all life on Earth creates.
- Human impulses and desires spur the technium, which has a life of its own.
- Technology, like life, evolves. Technological evolution gives people more choices.
- Three intersecting forces shape technology: the physical laws of the universe, history and individual choice.
- People should evaluate each new technological option consciously and methodically.
- Technology tends to become more complex, specialized and diversified.
- While a new technology may benefit society, it may also create a new set of problems.
- Individuals should work with technology to help others realize new opportunities.
- In the future, the technium will weave humankind's isolated minds together, move out into space and make the universe self-aware.

Summary

The "Technium"

Technology is so much a part of daily life that people take it largely for granted. Broadly defined, technology has driven humanity for thousands of years. The ancient Greeks used the term *techne* to name the human qualities of "art, skill, craft" and "ingenuity." Language, law and culture are the "soft" technologies that have distinguished and guided societies. "Hard" technologies, ranging from the flint ax to the plow to the internal combustion engine and the computer, have reshaped the planet itself. This growing complex of invention and achievement is the technium, "a self-reinforcing system of creation." As technology becomes more pervasive, intrusive, powerful and, soon, intelligent, people must consciously assess their relationship to technology. The technium has a life of its own, spurred by human impulses and desires.

From Old to New

Technology predates and extends beyond human endeavor: Numerous creatures – including birds, termites and chimpanzees – use sticks or stones as simple tools. Early human ancestors adapted and refined their implements. As capabilities increased, beings with larger brains created more complex tools, and each development fed on the previous one. Starting about 50,000 years ago, impelled by "language and longer lifespans," the human race experienced an explosion of "abundant ideas and innovations." Populations spread quickly around the world. Because language "accelerates learning and creation," its development allowed people to coordinate their activities across time and space and to learn more than an individual could alone. Increased technology meant greater nutrition and longer lives, which changed

society: People escaped the tight cycle of the "short forager lifespan": birth, teenage reproduction and early death. Technology enabled people to live long enough – into their 30's – to become grandparents. Society improved because, for the first time, generations could pass their knowledge to their progeny. Humanity created technology, and technology in turn helped change humanity.

> "If we embrace technology, we need to confront its costs."

As technology develops, it gains more of the attributes of a living system. The technium displays patterns of change similar to those of human biology. Just as single cells became multicellular creatures and simple creatures gained greater complexity, so, too, has technology advanced. The simple communication of primates evolved into human language, and spoken language developed into written words that, eventually, led to global communication networks. The same arcs of succession move through life, culture and technology. Complexity and order continually increase.

> "We don't go on as we are. We address the problems of tomorrow not with today's tools but with the tools of tomorrow. This is what we call progress."

However, technological and biological evolution are not the same. "Biological species" have long lives compared to "technological species," which come and go quickly. Biological evolution is largely incremental; technology often leaps forward. Biological species often disappear by extinction, but old technologies rarely do. You can still find record players, steam-powered cars and oxcarts in "small-time use" even in modern cultures. Technology also changes the nature of human society because it builds upon itself. When a new computer chip comes out, it doesn't just speed up computers, it creates ripples of change throughout the technological world.

> "Tools and bigger brains mark the beginning of a distinctly human line in evolution."

Technology has a multiplying effect that improves human life and makes a relatively radical concept commonplace: progress. Through most of history, people did not expect progress, and when it came, its pace was glacial. Sudden change – due to volcanoes or fire, for example – was always bad. Today, waves of change increase human capacities and choices and improve lives. Around the world, when people get a chance to move from agricultural or hunter-gatherer societies, they do so quickly and voluntarily. Technology has its negative side – waste, pollution and destruction – but its overall effect is positive.

The Nature of Technology

Technology's shape follows a prearranged, chosen path, much like your personality. Your genetics (which you do not control) shape your personality, but so do your history (which you controlled as it happened, but which is now fixed) and your current choices. Likewise, three forces shape technology: The nature of the physical universe, history and free will.

> "Without grandparents, it becomes exceedingly difficult to transmit knowledge – knowledge of using tools – over time. Grandparents are the conduits of culture."

The line of development from ancient Roman roads to the space shuttle offers a striking example of the first two forces. The Romans built roads throughout their empire to a standard width that would accommodate a two-horse chariot. Later, people designed horse-drawn carriages for the same width of road and kept constructing new roads using the same dimensions. Railroads adopted the same road width for their tracks; finally, the carrying capacity of a train from Utah to Florida dictated how large a space shuttle's rockets could be.

> "To see where technology is going, we need to see where it has come from. And that's not easy."

While nature and history appear to impose restrictions to the choices people can make, technological advancements present many more new options. For instance, consider the satellite images of Earth taken at night: The pinpricks of light that illuminate cities are solid evidence of technological progress, except for the area that is North Korea. It appears as a dark space surrounded by light, a "stunning map of technological choice" driven by political decisions.

Making Choices About Technology

The history of invention and innovation reveals a striking pattern. Over and over, the emergence of a new technology – think of airplanes, radio or interactive television – leads proponents to claim that it will bring people together, improve society and make conflict obsolete. While a new technology may benefit society, it may also create a new set of problems. Despite advances, the environment remains at risk, people work at alienating jobs they don't care about and their communities crumble. Every moment an individual spends with a machine displaces a moment interacting with a person. Technology is so omnipresent that it intrudes into every thought. People take this as a given and use technology by default – driving where they used to walk, shopping for what they used to grow and make, and outsourcing "remembering to Google."

> "The technium wants what we design it to want and what we try to direct it to do. But in addition to those drives, the technium has its own wants."

Technology intrudes so pervasively that, at times, it seems that the system "has its own agenda. It is selfish." It reshapes people to meet its needs. Think of how often you do things in response to a machine's time rather than your own. Mechanization and the larger technological system regulate people, thereby – according to some – depriving individuals of freedom. However, people daily engage in an ongoing paradox: They idealize the pretechnological world as one of communal freedom, but, in reality, technology increases individuals' choices.

> "The technium is a global force beyond human control that appears to have no boundaries."

What you do with those choices is up to you and your community. Consider the Amish, an American religious group whose members shun electricity and other modern conveniences. The Amish offer useful lessons about how to deal with technology because they evaluate technological choices relative to higher values. Their assessment of specific technologies and how those would affect their community and the relationships among individuals is much more measured and conscious than most societies'.

"The long-term bias of technology is to increase the diversity of artifacts, methods and technologies of creating choices."

Generally, folks adapt technologies as part of an unreflective social trend due to personal impulse or pragmatism. However, technology can create real disruptions, so people should evaluate each technology deliberately and methodically. First, weigh the new technology's potential and develop scenarios of its possible impact. Once you accept a technology on a trial basis, assess it. Test it. Identify its uses and risks. Weigh those risks, and compare them to the threats inherent in existing technology. If some damage occurs, correct it quickly and redirect the the technology's use. Prohibiting a technology rarely works, so people must learn to make better technology-related decisions.

"So What Does Technology Want?"

When technology operated at the level of a chipped flint hand ax, talking about it wanting anything or going anywhere might have seemed silly. However, as technology evolves, it acquires more of the characteristics of a living being, including free will. Some thinkers extend the concept of free will back to the early seconds of the universe and down to the level of the subatomic particle, until it seems very much like the entire universe is alive and growing. Once you can identify these drives and desires in more basic forms, you'll be able to understand how technology is evolving now. Ultimately, technology "wants what we want":

- **"Complexity"** – In its drive toward complexity, technology is like life itself. Life started as a few molecules that self-replicated into single-celled organisms, which became small, multi-celled creatures, and so on, eventually evolving into humans. The technium's path is similar: everything, from software to cars to toasters, becomes more complicated.
- **"Diversity"** – At the start of the universe, quarks were the only matter. From quarks came subatomic particles, and then the simplest elements of hydrogen and helium. Millions of years passed before different life forms appeared. Similarly, technology moved from shaped stones to machines, computers and information technology.
- **"Specialization"** – Technology follows biological evolution, which "moves from the general to the specific." The "intelligenation" that computers make possible means the continuing automation of everyday functions, like car driving and speech recognition.
- **"Ubiquity"** – Give a species a chance, and it spreads across the globe. Technology expands in the same way. Technologies like agriculture, road building and the use of fire reshaped the surface and even the biosphere of the Earth. And as technology spreads, it changes. The presence of one or two cars on the road creates different challenges, interactions and side effects than a billion cars driving everywhere.
- **"Freedom"** – Basic organisms have only a few choices to make: Move this way or that, eat this or don't. As organisms become more complex, their options expand. The same is true for technology. For instance, Google's search engine sorts information and selects options. As technology develops, it extends the number of choices available to people.
- **"Mutualism"** – Most living creatures rely on other living creatures for survival: Lichens consist of algae and fungi working together. Technology moves in the same direction, making human collaboration possible.
- **"Beauty"** – People have always sought and found beauty in nature. Now they can find it in technology. A sophisticated tool combines the principles of its design with the historical specifics of its development to become strikingly and uniquely beautiful.
- **"Sentience"** – Insects, animals and plants show clear signs of intelligence. Technology shows similar signs, as thought spreads into technological objects. Artificial intelligence is creating "microminds" that handle speech recognition, analysis and "fuzzy logic."
- **"Structure"** – The expanse of information is growing. Clouds of disconnected data don't have much impact, but if you arrange them into structures, they become more powerful and meaningful. Local information joins larger "pools of knowledge," theory connects diverse observations, and people organize and codify knowledge.
- **"Evolvability"** – The technium functions like an ecosystem, changing over time to meet challenges and increasing "the speed of human biological evolution." Technology changes people and lets them make larger, more sweeping changes to their surroundings.

The Future of Technology

When you think about where technology is going, you might wonder what the future will be like and what you should do about it. To frame these questions, consider what sort of "game" life is. "Finite games" (like sports or card games) have clear winners and losers, specific rules and distinct boundaries. Finite games can be a lot of fun and generate a lot of drama, but, by definition, they are limited in time and implication. The other kind of game is the "infinite game." Infinite games don't have winners and losers and aren't restricted in the same way. These games keep going; the play possibilities keep increasing. An infinite game's goal is to keep playing it.

"How can technology make a person better? Only...by providing each person with chances."

All the defining elements of our world – everything from evolution to technology, including the mind itself – are infinite games. To create the future, make choices that will amplify the game and provide more opportunities for everyone. When you do, you'll be part of a self-creating experiment in which the technium weaves humankind's isolated minds together, moves out into space and makes the universe self-aware.

About the Author

Kevin Kelly, co-founder and executive editor of *Wired* magazine, also wrote *Out of Control* and *New Rules for the New Economy*. He runs the Cool Tools website where readers review gadgets.