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Humanizing Management and Innovation

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Abstract

This article is an excerpt from *The Wise Company* book that Ikujiro Nonaka and I published in October 2019 from Oxford University Press. It is a sequel to *The Knowledge-Creating Company* book we published 25 years ago.

As our thinking evolved from information to knowledge to wisdom, we have increasingly pushed for a more humane form of management that uses unique human qualities to innovate for the good of society. They include imagination, empathy, intuition, ideals, morals, sensitivity, and more. The article starts out by addressing our rationale on why we are putting these human qualities at the center of management when the world is becoming more complex and digital.

The article then discusses the future of innovation, which we divided into three stages: Zero to One; One to Nine; and Nine to Ten. In every stage, there will be a fusion of the analog and the digital, where humans and machines will work together and co-evolve. We conclude, however, that humans will lead the co-evolution in the first and third stages, while machines will lead in the second stage.

Keywords: *knowledge creation, knowledge practice, practical wisdom or phronesis, ba, continuous innovation, fusion of analog and digital, management as a way of life*

In October 2019, Ikujiro Nonaka and I published *The Wise Company*,[1)] a sequel to *The Knowledge-Creating Company*.[2)] The publication of our first book gave birth to the field of knowledge management and sparked a movement not just as an academic discipline but also as corporate function.

Given the impact the first book had on both academia and business, why, you may ask, did we wish to write a second book on a similar topic after twenty-five years? On the theoretical front, we wanted to establish the notion of *wisdom* as a focal subject in the field of knowledge management. Metaphorically speaking, we dived into the dynamic and mysterious currents of wisdom under the deep "ocean" of knowledge management. The new book draws heavily on Greek philosopher Aristotle's notion of practical wisdom called *phronesis*, and emphasized the central role it plays in management and organizational life.

On the practical front, we wanted to make knowledge creation a way of life for everyone, thus humanizing it. It is a daunting task that requires discipline and persistence, as well as empathy and love. It also requires the use of *ba*, a concept we appropriated from Japanese philosopher Kitaro Nishida, which means a space or platform that allows a community to share context and create new meaning.[3)] Practicing knowledge creation will not only prompt continuous innovation and improve organizational performance, we believe it will also enrich our lives.

This article is an excerpt of the final chapter I wrote for *The Wise Company*. The title and subtitle have been changed, but the content remains

practically the same. I hope this article will entice the readers of *Kindai Management Review* to read our book published by the Oxford University Press.

HUMANIZING MANAGEMENT

Over the years, the evolution of our thinking, from information to knowledge to wisdom, has pushed us to put human beings at the center of management, as is evident from the use of metaphors and concepts such as "scrum,"[4] "middle-up-down management," "*ba*," and the "inside-out approach" to strategy in our new book. We strongly believe in the value of humanizing management—with its emphasis on bodily experiences, the senses, intuition, beliefs, ideals, hunches, subjectivity, relationships, morals, and values—at a time when the world is becoming more complex and digital.

Why do we put humans at the center of management when the world is becoming more complex, and digital?

We started *The Wise Company* book by acknowledging that the world in which we live is already complex, and will become even more so in future. In fact, complexity—or what scientists call complex systems—is anything but new, according to MIT's Joi Ito and Jeff Howe. According to them,

> ...complex systems predate *Homo sapiens* by more than three billion years. The immune response in animals is a complex system, as is an ant colony, and the climate on planet Earth, and the brain of a mouse, and the intricate biochemistry within any living cell.[5]

The real world, to use the words of David Sax—the author of *The Revenge of Analog: Real Things and Why They Matter*—isn't black and white. It isn't even gray. It is multicolored. Sax goes on to say that the real world is "infinitely textured, and emotionally layered. It smells funky and tastes weird, and revels in human imperfection. The best ideas emerge from that complexity..."[6]

In addition, the real world poses ethical questions that require "unformalizable sensitivity,"[7] according to Gary Saul Morson and Morton Schapiro in *Cents and Sensibility*. Thus, we need to be sensitive to nuances, psychological idiosyncrasies, and cultural contingencies. Morson and Schapiro contend that "ethical questions are often too complex and too important to be safely handed over to any theory, existing or to come." Complexity is already a way of life now, and will be so in future.

Similarly, we acknowledged at the very start of the book that the world is becoming more digital because of the impact of the Internet, Big Data, Cloud computing, Artificial Intelligence (AI), and the Internet of Things (IoT). The future is approaching faster than we expected, with scientists and technologists asking "when" rather than "if" technologies that were once thought to belong to the realm of science fiction—such as autonomous cars, agricultural robots, and tricorders—will become reality.

The word "digital" can be used in many contexts. According to David Sax, "Digital is the language of computers, the binary code of 1's and 0's, which in endless combinations allow computer hardware and software to communicate and calculate."[8] He goes on to say that "digital technology is a transformative force that can deliver vastly more efficient products and services to consumers at a lower cost, and with greater ease, across time and space" and that the "digital economy is disruptive" as it "upends markets and dispels long-held assumptions about business."[9]

Indeed, we read about digital-led automation—such as machine learning, AI, Big Data, data analytics, IoT, and AU (Augmented Reality)—as well as brand names that did not exist a quarter of a century ago (e.g., Singularity, Watson, Siri, Alexa, and others) on the front pages of the business newspapers almost every day.

HUMANS VERSUS MACHINES

The flip side of the question we posed—why do we place human beings at the center of management?—is to ask, will computer hardware and software take over the world as it becomes more uncertain, discontinuous, complex, and digital? Several experts have sounded warnings.[10]

> Stephen Hawking, Bill Gates, and Elon Musk have sounded warnings that AI, especially robotic weapons, might escape our control and take over. Ray Kurzweil has claimed the "singularity" (his term for the moment of takeover) is at hand, surfacing some of our primitive terrors. Given the trend to a surveillance society, our deepening embrace of technology, and the emerging Internet of Things, are we right to be afraid?

Not really, according to recent findings in the field of neuroscience, which support our contention that humans will continue to play a central role in the future. Research about the brain has discovered that humans have an uncanny ability to see the world not only as it is, but also as it could be. We think "what if" and can therefore create our own future. In essence, that's the conclusion of the 2017 book, *The Runaway Species: How Human Creativity Remakes the World*, by Anthony Brandt and David Eagleman.[11] They reached the same conclusion as Peter Drucker, who stated, more than 50 years ago, that we may not be able to predict the future, but we can "make" the future. Drucker's immortal quote has now been backed up by neuroscience.

Brandt and Eagleman—a composer and a neuroscientist—discovered that human brains have an uncanny ability to exploit knowledge gained from past experience, and to explore new possibilities and untried options. The human brain has managed to achieve the exploration/exploitation tradeoff, which has been widely discussed in management literature, enabling human beings to become masters at generating realities by "taking *what is* and transforming it into a panoply of *what-ifs*."[12]

The ability of the human species to create possible futures manifests itself in a number of ways. Humans remodel what they inherit, whether they are "inventing an iPhone, manufacturing cars, or launching modern art. They absorb the world into their nervous systems and manipulate it to create possible futures."[13] In a more mundane situation, we simulate the future each time "we consider alternatives or wonder what might happen if we choose a different path. Whenever we buy a house, pick a college, ponder a potential mate, or invest in the stock market, we accept that most of what we consider may be wrong or may never occur."[14] We run simulations of possible futures internally on a daily basis:

> Should I nod in agreement, or tell the boss that it's a dumb idea? What would surprise my spouse for our anniversary? Will I enjoy Chinese or Italian or Mexican for dinner tonight? If I get the job, should I live in a home in the Valley or an apartment in the city?... by preparing ourselves for the alternatives, we're able to more flexibly respond to the future. This sensitivity marks the major change that allowed us to become cognitively modern humans.[15]

Why are humans different from other species, or, for that matter, from computers? According to Brandt and Eagleman, we keep on hacking at the borders of the worlds we haven't invented—yet. Unlike Siri or Alexa, we don't live in an airtight closed world; our world is open and has "porous borders that leak (the) future. We balance an understanding of our present reality against an imagining of the next. We constantly peer over the fence of today into the vistas of tomorrow."[16] Some experts argue that computers can also make the future—a very different and more mechanistic future, of course. We continue this debate—humans versus machines—in the following section.

HUMANIZING INNOVATION

As we evolve our thinking—from knowledge to wisdom—we see the future of research in innovation consisting of three stages.

The first stage is Innovation: Zero to One, where ideas that never existed before start to emerge, akin to the moment the buds of a plant spring from the ground. Humans will play major roles in driving innovation at this stage.

The second is Innovation: One to Nine, where innovation takes form and flourishes, akin to the moment the shoots, leaves, and flowers of a plant begin to develop and blossom. AI, IoT, AU, Watson, and its unnamed successors—or what we collectively call digital-led automation—will be the key driver of innovation during this stage.

The third stage is Innovation: Nine to Ten, where innovation is refined to meet higher human demands for sensitivity and aesthetics, akin to the moment the flower takes on sophisticated forms, blended colors, and enriched fragrances. Humans will again play a pivotal role in driving innovation at this stage.

In all three stages, however, there will be a fusion of the analog and the digital. By analog, we mean the opposite of digital. It is the yin to digital's yang, the day to its night. It does not require a computer to function and exists in the physical world, as opposed to the virtual one.[17] Analog represents the physical world in which human beings live. As such, we equate human beings with the analog state. Thus, in every stage human beings and machines will work with each other and co-evolve, but human beings will lead the co-evolution in the first and third stages while machines will lead in the second stage, as we will show.

Innovation: Zero to One

Going from Zero to One[18] requires creativity and imagination. According to recent studies, humans have the capacity to come up with new ideas (creativity), as well as the capacity to deal with the uncertainties in their lives and envision different possibilities (imagination). Humans are masters of both creativity and imagination:

> Our constant itch to combat routine makes *creativity* a biological mandate. What we seek in art and technology is surprise, not simply a fulfillment of expectations. As a result, a wild *imagination* has characterized the history of our species....
> Thanks to our appetite for novelty, innovation is requisite. It's not something that only a few people do. The innovative drive lives in every human brain, and the resulting war against the repetitive is what powers the colossal changes that distinguish one generation from the next, one decade from the next, one year from the next. The drive to create the new is part of our biological make-up.[19]
> ...Because of our capacity to reach beyond the facts we've learned, we open our eyes to the world around us but envision other possible worlds. We learn facts and generate fictions. We master what is, and envisage what-ifs.[20]

Being exposed to history helps humans to drive innovation in the Zero to One stage. In Chapter 7, entitled "Communicating the Essence," we discussed how historical imagination helps humans envision "what could be done" in the future. It allows us to look back at historical events from the present, interpret and reconstruct the past, and create possible futures. To reiterate, history explains the "why" by describing the causality between the past and the present and the "how," as in "how has this come to be." Historical imagination is particularly effective during times of crisis because it enables us to have wide and deep insights on what lies behind a phenomenon in a given time and place, and to make judgment calls to create possible futures.

In addition to history, literature helps as well. We pointed out in Chapter 7 how literature helps humans envision other possible worlds and think of alternatives. Stories give us the freedom to feel what it is like to be someone else, provide us with choices about "what could be done," and give us the capacity to deal with complexity and unpredictability:

> There is no way to grasp most of what individuals and groups do by deductive logic. Understanding Robespierre or the French Revolution is not at all like proving the Pythagorean theorem or calculating the orbit of Mars. Human lives do not just unfold in a purely predictable fashion the way Mars orbits the sun. Contingency, idiosyncrasy and choices—all of which allow for alternatives—play an indispensable role (in stories that great novelists write).[21]

In addition to addressing the "what-if" or the "what could be done?" questions, we imagine the future by asking "what should be done?" As we have argued throughout this book, that's what phronesis is all about. In Chapter 2, entitled "the Foundation of Knowledge Practice," we talked about the three types of knowledge the Greek

philosopher and scientist Aristotle identified almost 2,400 years ago. Our shorthand definition of each was as follows:

1. *episteme*: know-why;
2. *techne*: know-how;
3. *phronesis*: know-what-should-be-done.

In terms of theory, knowing "what should be done" serves as the foundation of the new knowledge practice model presented in Figure 3.1 in Chapter 3, entitled "Toward a Model of Knowledge Creation and Practice" (see below).

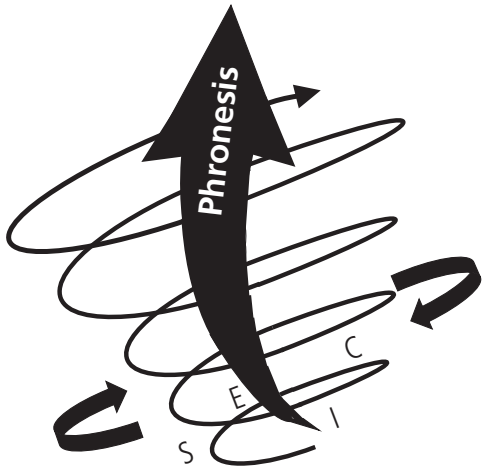

Figure 3.1: The SECI Spiral Model

Phronesis is illustrated as the thick arrow in the middle of the SECI Spiral. Knowing what should be done allows humans to pursue a higher purpose, to create shared contexts and values they can hold onto, and guides them to make moral judgments and raise ethical questions in complex situations. It added a social dimension to our theory—what is good and right for society.

Phronesis factors in the details of specific times and situations. It added a time dimension to our original model, enabling humans to determine what is good at specific times and situations, and to make the best judgment call or to undertake the best action, at that juncture, to serve the common good. For example, Ratan Tata's idea to develop the Nano, an affordable car for the masses, came about at a specific time and under a specific situation—namely, when he saw a family of five riding a motorcycle on a rainy day, getting soaking wet, and zigzagging dangerously through the crowded streets of Mumbai. The drive to create the new is born in such a timely and contextual fashion.

Innovation: One to Nine

Going from One to Nine requires an extension of our intelligence. In order to trigger innovation, the second stage draws heavily on the STEM subjects—science, technology, engineering, and mathematics—which have given rise to new fields of digital technology such as AI, IoT, and AR. In addition, One-to-Nine Innovation makes new use of data such as Big Data, Cloud sourcing, data analytics, and 3-D information.[22)] Simple and familiar applications of these new fields and data sources include AlphaGo for AI, Babolat's tennis racket system for IoT, and PokemonGo for AR.

Artificial Intelligence is used as a label for everything from online assistance (Siri) to autonomous cars, but it was the match between computer software AlphaGo and legendary Go champion Lee Sedol in mid-2016 that propelled AI's prominence. Dubbed as the Humans versus Machines Showdown, AlphaGo ended up winning four out of the five matches. It became the signature event for advocates of singularity—the point at which machines will become more intelligent than humans—to predict that such a day will arrive by 2045. MIT's Ito and Howe are much more cautious, but contend that "it might not be too long before something like AlphaGo will be determining parole, setting bail, flying airplanes, or teaching our children." They continued, "As artificial intelligence progresses, machines may well become an integrated part of our bodies, our homes or vehicles, our markets, our court systems, our creative endeavors, and our politics."[23)]

We realized that machines could soon become an integral part of our lives when we saw a live demonstration of ASIMO, a humanoid robot developed by Honda, in Tokyo in January 2018. More than 30 years in the making, the most recent version of ASIMO—which is short for Advanced Step in Innovative Mobility—stands 4 feet 3 inches tall and weighs 119 pounds. We saw it run at 7 mph, jump a few inches, walk up and down stairs, move its fingers like a human, and speak a few words in

different languages. In addition to these physical abilities, ASIMO has the ability to recognize faces, sound, moving objects, human gestures, and the surrounding environment, enabling it to interact with humans. Thus, it can respond to questions by nodding or providing verbal answers, address different people by their names, and determine whether or not a handshake is needed. "It will be a good companion or a helping hand to have at home in the future, especially for those whose mobility has been impaired," commented Satoshi Shigemi, the engineer responsible for developing ASIMO.[24)]

The Internet of Things has been around for a while, but our first personal encounter with the IoT came through a tennis racket. Babolat's Play Pure Drive product system has a sensor in the racket handle, which allowed us to track and analyze volumes of data that help us improve our game, including ball speed, spin, and impact location.[25)] In effect, a computer was put inside a physical product (a tennis racket), allowing connectivity to be established between the player and the manufacturer. The IoT triggers innovation by converting products into intelligent devices and embedding them into broader systems. Other examples of IoT applications include the following:[26)]

> Smart thermostats control a growing array of home devices, transmitting data about their use back to manufacturers. Intelligent, networked industrial machines autonomously coordinate and optimize work. Cars stream data about their operation, location, and environment to their makers and receive software upgrades that enhance their performance or head off problems before they occur.

Augmented Reality (AR) takes the IoT a step further by closing the gap between the real and digital worlds. AR transforms digital data, displayed on two-dimensional pages or screens, into images or animations overlaid on the real world that are three-dimensional. We saw a simple application of AR in the PokemonGo game on mobile devices, but digital data and images are now being superimposed on the physical world through hands-free wearables such as head-mounted displays and smart eyeglasses.

At its core, AR allows humans to interface with digital data. AR "heads-up" displays in cars, for example, put navigational images, collision warnings, and other information directly over what the driver sees through the windshield.[27)] Other AR innovations that provide that kind of "human interface" solutions, in both consumer and business-to-business settings, will bring the digital world closer to reality.

Propelled by AI, IoT, AR, and other technologies, the digital-led automation world will generate new waves of innovation and new kinds of work in this phase, delivering a vast number of new products and services in the physical world. A mundane example of the new wave: An unmanned café that has opened in Tokyo, where a robot with seven moving parts grinds the coffee beans of your choice after you insert coins into a machine; pours the ground beans into a cone; delivers a quality cup of excellent drip coffee in three to four minutes for less than what you pay at a nearby café; and even talks to you in fluent Japanese while you wait.[28)]

When the fusion of the digital and analog worlds takes place, humans will go through a phase when the world we live in may completely change. The magnitude of the change may be so great that we use the numbers from One to Nine to label the second phase. Humans will work much closer together with machines in a system of co-evolution, but the primary driver of innovation in this phase will be machine technologies.

Innovation: Nine to Ten

The third phase will be about refinements that appeal to human sensitivity and aesthetics. A fitting example of this kind of innovation is "The Toaster" by BALMUDA, a commodity item that was turned into one of the "joys of life" by touching the bodies and hearts of consumers. As we described in Chapter 5, entitled "Grasping the Essence," The Toaster delivers a perfect slice of toast that fits our personal tastes, and does so by making us feel good through the experience: "watering" the machine in an easy-to-hold baby cup, peeking inside a window to see what's going on, hearing a soft tingling sound when the toast is ready, and smelling the aroma of freshly baked bread when we open the door. The Toaster

embraces all five senses.

Innovative ideas that touch the body and the heart do not appear from nowhere. They are "manufactured" from the raw materials of human experience, which is why humans will, once again, be in the driver's seat at this stage of innovation. The developer of "The Toaster" cites two unforgettable experiences—one in his teens in the town of Ronda, Spain, and the second after becoming the president of Balmuda at an office barbecue party in Tokyo—as his starting points.

When we met Kihachiro Kawashima, who became Honda Motor's second president in 1984, he talked of an innovative idea for a self-driving car, the gist of which can be summarized as follows:[29)]

> A car is one of the most expensive things we buy. But it doesn't make sense to be spending so much money and getting frustrated while driving the car in bumper-to-bumper traffic and (becoming) nervous about not reaching the destination on time or getting into an accident. You worry, get tired, and sometimes sweat when driving a car. Does that make sense? It would be a lot better if you could push a button and the car will take you to your destination hands free. That's my dream. That day will come, I assure you, in your lifetime.

The first autonomous car—a computer on wheels operating on a digital infrastructure—will arrive in our lifetime. It will have the potential to reduce driver frustration, accidents, loss of lives, CO_2 emissions, noise levels, parking lots, car insurance payments, and more. The Digital Revolution will produce the first autonomous car through advances in Cloud computing, data analytics, and other technologies, just as the Industrial Revolution produced the Ford Model T, the first mass-produced automobile.

Getting from the Ford Model T to the Toyota Lexus exemplified Nine-to-Ten Innovation in the Industrial Era. The Lexus was launched in 1989 with this goal: "With 50,000 miles on the odometer, ensure that it doesn't look, feel, sound, or perform any differently than one fresh out of the factory."[30)] Similar refinements will be made to the first autonomous car in the Digital Era. It will be characterized by the relentless pursuit of perfection by human beings. As neuroscience has recently shown, the human drive to address the complexity of the real world we live in is unending, and our thirst for the new can never be quenched.

We humans come up with new ideas for refinement using the behavior patterns that are imbedded in us:

- being adaptive and resilient;
- the relentless pursuit of excellence;
- laboring without pause to surprise each other;
- interacting and engaging with others;
- taking a second-person perspective to build empathy;
- developing a holistic view by combining subjective and objective views;
- bending, discarding, and breaking what surrounds us now;
- transcending ourselves ceaselessly and repeatedly.

Human beings have the unique ability to envision the future we want to create. We can see the world not just as is, but also as it could be. With autonomous cars, human beings are wired to ask the following what-if questions:

- What if we could transform former parking spaces and gas stations into parks?
- What if moving to live in a neighborhood further away from the city, but closer to nature, became feasible because we could work while commuting?
- What if the time getting and renewing a driver's license could be spent building bonds with family members and friends?
- What if we convert the money we could save from car insurance to helping other people or causes like Effective Altruism?[31)]

Only human beings have the uncanny ability to reshape and combine what surrounds us in the real world to envision the future. Machines and algorithms will not be able to replicate that unique strength anytime soon.

MANAGEMENT AS A WAY OF LIFE

All this is an illustration of "human-centric management" at work in the field of innovation, with humans playing a central role in the two critical phases of innovation—the Beginning (Zero to One) and the End (Nine to Ten). That kind of management thinking gives rise to a whole new view of an organization—not as a machine for processing data or information, but as a living organism. It is consistent with how the Japanese companies we studied perceive management: as a way of life, not just as a way to maximize profits.

Management, as a way of life, should be concerned about what a company stands for, what kind of a world it wants to live in, how to make that world a reality, where it is going, what kind of a future it wants to create, what kind of legacy it wants to leave behind, and how it can contribute to society. A better tomorrow will come into being when the company understands the mission with which it is entrusted; strives to live in a way that is right and just; and refines itself at all times during its temporal existence.

In addition to having a beginning and an end, a company is similar to a human being when it comes to striving to live the ideal. According to Kyocera's chairman, Kazuo Inamori, human beings strive to live the ideal by doing their best at the ordinary things in life—for example, working hard, thinking good thoughts, doing the right thing, practicing self-reflection and self-discipline, refining their minds, and elevating their character in everyday life. Companies that strive for a similar way of life will be "permitted to survive by society," to rephrase what Fast Retailing's chairman, Tadashi Yanai, said in Chapter 4, entitled "Judging Goodness." Otherwise, society will quickly shut them down.

The upside for companies, unlike humans, is that they can live for more than 100, 300 years, or, for that matter, they can live forever. As we pointed out in Chapter 1, entitled "From Knowledge to Wisdom," the payoff for companies that end up living the ideal is sustainability, resilience, and longevity.

CROSSING THE BRIDGE

We would like to leave readers with three critical messages. First, we hope that many of the next generation of scholars will cross the bridge we've built to make our theory more robust and relevant. In particular, we welcome the inroads of scholars from the STEM disciplines—especially neuroscience and biology—and the recent inroads of scholars from the humanities—especially literature and history—into the field of knowledge management. As we spend more time researching this field, we are constantly learning how little we know.

Second, we hope readers understand why building a bridge between knowledge and wisdom is needed. Wisdom, a higher-order tacit knowledge, upgrades SECI (Socialization, Externalization, Combination, Internalization) in the following ways:

1. SECI was a two-dimensional model, but is now three-dimensional by adding a time dimension. Because of the addition of the time dimension, the SECI Spiral rotates endlessly while reflecting and building on the knowledge created in the past.
2. SECI was an organizational model, but is now a societal model, by the incorporation of the concept of common good.
3. SECI was primarily focused on making one turn, but it now spirals upward as well as tilts left and right in order to adapt to changing contexts and conditions of the high-velocity world.

Finally, we hope that this book helps companies and business leaders cross the bridge between theory and practice. We found that knowledge creation alone is not enough to take managerial actions; the missing link is knowledge practice. We describe six practices in depth in *The Wise Company*.

- Judging goodness (Ch 4)
- Grasping the essence (Ch 5)
- Creating *ba* (Ch 6)
- Communicating the essence (Ch 7)
- Exercising "political" power (Ch 8)
- Fostering practical wisdom in others (Ch 9)

Knowledge creation and knowledge practice will together allow companies and executives everywhere to apply knowledge, put knowledge to good use, and turn knowledge into wise action.

Final words: Never forget that the true wisdom of knowledge manifests itself in action.

NOTES

1) Ikujiro Nonaka and Hirotaka Takeuchi, *The Wise Company* (New York: Oxford University Press, 2019).
2) Ikujiro Nonaka and Hirotaka Takeuchi, *The Knowledge-Creating Company* (New York: Oxford University Press, 1995).
3) For more details of *ba*, see Chapter 6, entitled "Creating *Ba*," of *The Wise Company*.
4) We are called "The grandfathers of Scrum" by Jeff Sutherland, founder of the agile movement and author of *Scrum: The Art of Doing Twice the Work in Half the Time* (New York: Crown Business, 2014).
5) Joi Ito and Jeff Howe, *Whiplash: How to Survive Our Faster Future* (New York: Boston: Grand Central, 2016), 27.
6) David Sax, *The Revenge of Analog: Real Things and Why They Matter* (New York: Public Affairs, 2016), xviii.
7) Gary S. Morson and Morton Schapiro, *Cents and Sensibility* (Princeton, NJ: Princeton University Press, 2017), 10.
8) Sax, *The Revenge of Analog*, xiv.
9) Ibid., 153.
10) J. C. Spender, "Stop Worrying about Whether Machines Are 'Intelligent,'" posted on August 4, 2014b, in *Harvard Business Review*. https://hbr.org/2015/08/stop-worrying-about-whether-machines-are-intelligent.
11) Anthony Brandt and David Eagleman, *The Runaway Species: How Human Creativity Remakes the World* (New York: Catapult, 2017).
12) Ibid., 27, italics added by authors.
13) Ibid., 45.
14) Ibid., 28.
15) Ibid., 27. Italics added by authors.
16) Ibid., 250.
17) As defined by David Sax in *The Revenge of Analog* (p. xiv). He quotes Dan Shapiro, the founder of a start-up called Glowforge, who says, "Analog is always the source, always the truth. Reality is analog."
18) Peter Thiel, an entrepreneur who started PayPal and an investor in Facebook, where he serves as a director, published a book with the same title, but Zero to One in his book is more about technology. Peter Thiel with Blake Masters, *Zero to One: Notes on Startups, or How to Build the Future* (New York: Crown Business, 2014).
19) Brandt and Eagleman, *The Runaway Species*, 31–32.
20) Ibid., 8, italics added by authors.
21) Morson and Schapiro, *Cents and Sensibility*, 9–10, parentheses added by authors.
22) Data is becoming the most important "natural" resource. It promises to be for the twenty-first century what steam power was for the eighteenth century, what electricity was for the nineteenth century, and what hydrocarbons were for the twentieth century, according to Virginia M. Rometty, CEO of IBM (in a speech at a conference in June 2015 that one of the authors attended).
23) Ito and Howe, *Whiplash*, 244.
24) Interview with Satoshi Shigemi, senior chief engineer, Honda Research Institute Japan, on January 8, 2018 at Minami-Aoyama, Tokyo.
25) Michael E. Porter and James E. Heppelmann, "How Smart, Connected Products Are Transforming Competition." *Harvard Business Review*, November 2014, https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition.
26) Michael E. Porter and James E. Heppelmann, "How Smart, Connected Products Are Transforming Companies." *Harvard Business Review*, October 2015, https://hbr.org/2015/10/how-smart-connected-products-are-transforming-companies.
27) For more details, see Michael E. Porter and James E. Heppelmann, "Why Every Organization Needs an Augmented Reality Strategy," *Harvard Business Review*, November–December 2017, 46–57.
28) The unmanned café is called *Henna na Café* (translates to Weird Café) and is owned by HIS,

which also operates *Henna na Hotel*, a hotel with a similar concept. The unmanned café opened in the Shibuya district of Tokyo on January 31, 2018.

29) Interview by the authors on May 6, 1984, in the Honda headquarters in Harajuku, Tokyo,

30) Osono, Shimizu, and Takeuchi, *Extreme Toyota* (Hoboken, New Jersey: John Wiley and Sons, 2008), 51.

31) For more on this topic, see William MacAskill, *Doing Good Better: Effective Altruism and a Radical New Way to Make a Difference* (London: Guardian Books, 2016).

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