Kindai Management Review Vol. 9, 2021 (ISSN: 2186-6961)

Revisiting Nonaka's Organizational Knowledge Creation Theory for during and after the COVID-19 Pandemic

Ayano Nishihara

Rikkyo University, Japan

Abstract

The year 2020 will be remembered as the beginning of a new age: a "new normal," or, to put it more precisely a "new paradigm" triggered by the COVID-19 pandemic. Before the COVID-19 pandemic, businesspeople went to the office daily to work. Then, we almost never appreciated the crowded daily commuting and busy office district. We took many things for granted: face-to-face meetings and actual site visits. However, with the outbreak of COVID-19, we were forced to avoid the 3 Cs: crowded places, close-contact settings, and confined and enclosed spaces. We started to work from home, or from remote places. We became accustomed to meeting virtually on the computer screen. These are just a few aspects of the "new normal" that many of us face. The virus had so much impact on businesses that we were forced to change how we worked and lived and shift to the "new paradigm."

Under these circumstances, we also face multiple critical global issues. The climate crisis is probably the most urgent and critical threat, addressed by the United Nations through 17 goals and 169 targets of the sustainable development goals (SDGs) to be achieved by 2030. Artificial intelligence (AI) is a double-edged sword that may be a savior through the promotion of innovation, while simultaneously a threat if the machines supersede the capabilities of mankind and threaten our existence. Accordingly, many nations and corporations seek innovation to address these issues. However, due to the COVID-19 pandemic, the rate of innovation may slow down, especially because of changes in workstyles. In a survey by Clarivate, nearly half of the organizations surveyed were disrupted by the effects of COVID-19.

Given this recognition of the current situation, one of the critical challenges in the "new normal" is continued innovation; this paper responds to the question of how innovation may be continued. The paper draws on Nonaka's knowledge creation theory since the process of knowledge creation leads to innovation.

Thus, the aim of this paper is to revisit Nonaka's organizational knowledge creation theory to evaluate and identify future research areas with the ultimate purpose of updating the theory to meet the "new normal" during and after the COVID-19 pandemic. The paper is based on data from publicly available sources as well as on responses from an initial survey. To conclude, possible updates to the theory and future research areas are proposed.

Keywords: *Nonaka, knowledge, innovation, creativity, new normal*

1. INTRODUCTION

The year 2020 will be remembered as the beginning of a new age, a "new normal," triggered by the COVID-19 pandemic. Before the pandemic, businesspeople went to the office daily to work. Then, we almost never appreciated the crowded daily commuting and busy office district. We took many things for granted: face-to-face meetings and actual site visits. However, with the global outbreak of COVID-19, almost suddenly, there were urgent requests and orders from governments in many countries that citizens should stay home and work from home, maintain social distance, and wear face masks in public spaces.

In the case of Japan, on April 7, 2020, the Japanese government declared a state of emergency, and we were strongly requested to avoid the 3 Cs (closed spaces, crowded places, and close contact) (Cabinet Secretariat, n.d.). A survey by Pasona shows a rising trend of people working from home (Pasona, 2020): before the declaration of the state of emergency, 39.0 percent of the respondents never worked from home; however, after June, the percentage decreased to 23.8 percent. Of those who worked from home, nearly 50 percent worked from home for more than four days per week during the state of emergency; after June, nearly 30 percent kept the same pace. By working from home, many of us got used to virtual meetings, all taking place on computer screens. This is one of the many aspects of the "new normal" with COVID-19.

Under these circumstances, we also face multiple critical global issues. Environmentally, the consequences of climate change pose many social and economic threats (United Nations, n/d.). The United Nations (UN) addresses these threats through 17 goals and 169 targets of the sustainable development goals (SDGs) to be achieved by 2030. Technically, the development of artificial intelligence (AI) and digital transformation can be a savior through the promotion of innovation; however, it also poses a threat if the machines supersede the capabilities of mankind and threaten our existence (Cellan-Jones, 2014; Columbus, 2019; Kurzweil, 2005). To address these issues, many nations and corporations seek innovation. However, due to the COVID-19 pandemic, the rate of innovation may slow down, especially because of changes in workstyles. A survey by Clarivate suggests that nearly half of the organizations surveyed were disrupted by the effects of COVID-19, as shown in

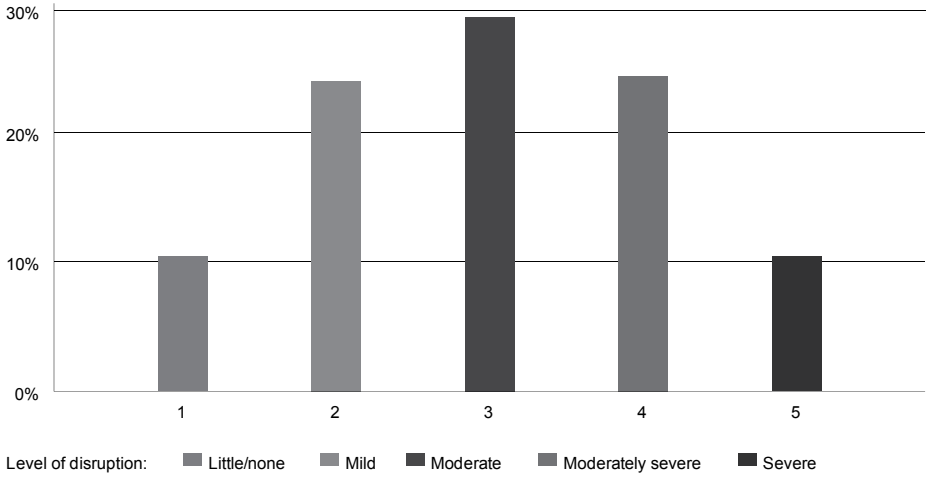

Figure 1: Degree of disruption of organizations' innovation strategy by the effects of COVID-19, on a scale of one (little or no disruption) to five (significant disruption)

Source: Clarivate survey of 247 organizations worldwide.

Figure 1 (Clarivate, 2020).

Given the recognition of the current situation, one of the critical challenges in the "new normal" is continued innovation. A survey by Deloitte Tohmatsu Venture Support Co., Ltd. revealed that more than 50 percent of large companies were expected to reduce their innovation activities by more than 30% due to the impact of COVID-19 (Deloitte Tohmatsu Venture Support, 2020). This paper seeks to address the question of how we can continue innovating in the "new normal" and generate a "new paradigm" (Asonye, 2020). To answer this question, this paper draws on Nonaka's organizational knowledge creation theory (NOKC), since the process of knowledge creation leads to innovation (Nonaka, von Krogh and Voelpel, 2006; Nonaka and Takeuchi, 1995, 2019; von Krogh, Ichijo and Nonaka, 2000). However, because of the "new normal," the theory needs to be revisited. With the 3 Cs and social distancing, there may be some aspects overlooked (regrettably) which may be related to the core of the theory. On the other hand, some insights may be gained (surprisingly) to enrich the theory.

Thus, the aim of this paper is to revisit NOKC to evaluate its applicability during the "new normal," to identify future research areas that may lead to the advancement of the theory and the research field, and to explore practical business implications. The paper is based on the results of an initial survey from publicly available sources.

In the following sections, first, the current status of the literature will be reviewed to establish a background to NOKC from a macro-perspective. An overview of the theory follows, in turn followed by an evaluation of the current theoretical challenges from a micro-perspective. To conclude, future research areas are identified by synthesizing the macro- and micro-perspectives, with a proposal on a possible update on the theory that may support the generation of a "new paradigm."

2. CURRENT STATUS OF THE LITERATURE

To revisit NOKC, it may be useful to recognize the landscape in which the theory appears in the literature. For this purpose, a keyword search was conducted for the number of "hits" on Google Scholar using selected keywords. Key words were selected based on their relevance to NOKC as shown below. The term "artificial intelligence" was also searched, since the key words have recently been closely associated with innovation. The search was conducted on October 28, 2020. All the numbers of hits are approximate.

Pattern 1: knowledge, innovation
Pattern 2: Nonaka, knowledge, innovation
Pattern 3: innovation, creativity, knowledge
Pattern 4: innovation, creativity, tacit knowledge
Pattern 5: artificial intelligence

As of October 28, 2020, there were 3,830,000 hits by the key words in Pattern 1 (knowledge, innovation) and 43,300 hits by those in Pattern 2 (Nonaka, knowledge, innovation). Using the same key words, year-by-year hits are as indicated by the graph in Figure 2. From the graph, from the beginning of the 21st century, the number of studies including these key words gradually increased. This may illustrate the evolution to the knowledge society as predicted by Drucker (1994). An interesting observation is that the trend for Pattern 1 peaked around 2012 and dropped sharply, while that for Pattern 2 plateaued around 2017 and dropped gradually thereafter. This latter trend may indicate that the interest in "Nonaka" is stable and may still be increasing.

As of October 28, 2020, there were 2,140,000 hits by the key words in Pattern 3 (innovation, creativity, knowledge) and 20,600 hits by those in Pattern 4 (innovation, creativity, tacit knowledge). Using the same key words, year-by-year hits are as indicated by the graph in Figure 3. The trend for Pattern 3 peaked in the period 2013–2014, while that for Pattern 4 continued to rise. This latter trend clearly indicates an increasing interest in tacit knowledge.

As of October 28, 2020, there were 2,950,000 hits by the key words in Pattern 5 (artificial intelligence). Using the same key words, year-by-year hits are as indicated by the graph in Figure 4. In this graph, Pattern 1 (knowledge, innovation) is also shown. As shown in Figures 2 and 3, the trend for Pattern 1 peaked around 2012 and dropped sharply,

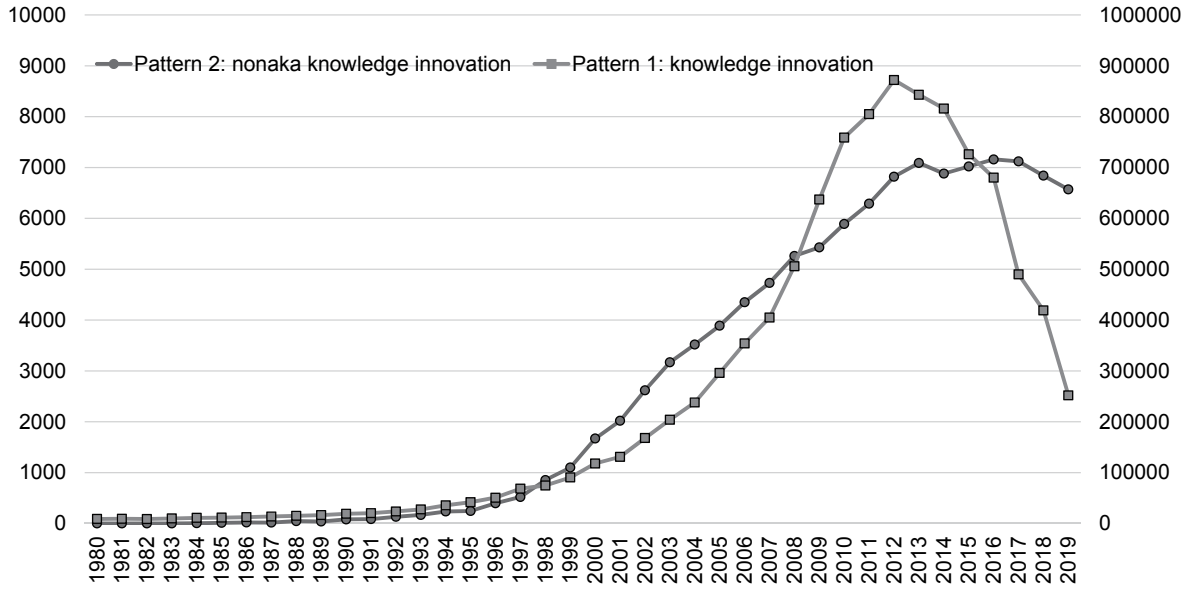

Figure 2: Google Scholar search results for Pattern 1 (knowledge, innovation) and Pattern 2 (Nonaka, knowledge, innovation) from 1980 to 2019

Source: Google Scholar, generated by the author.

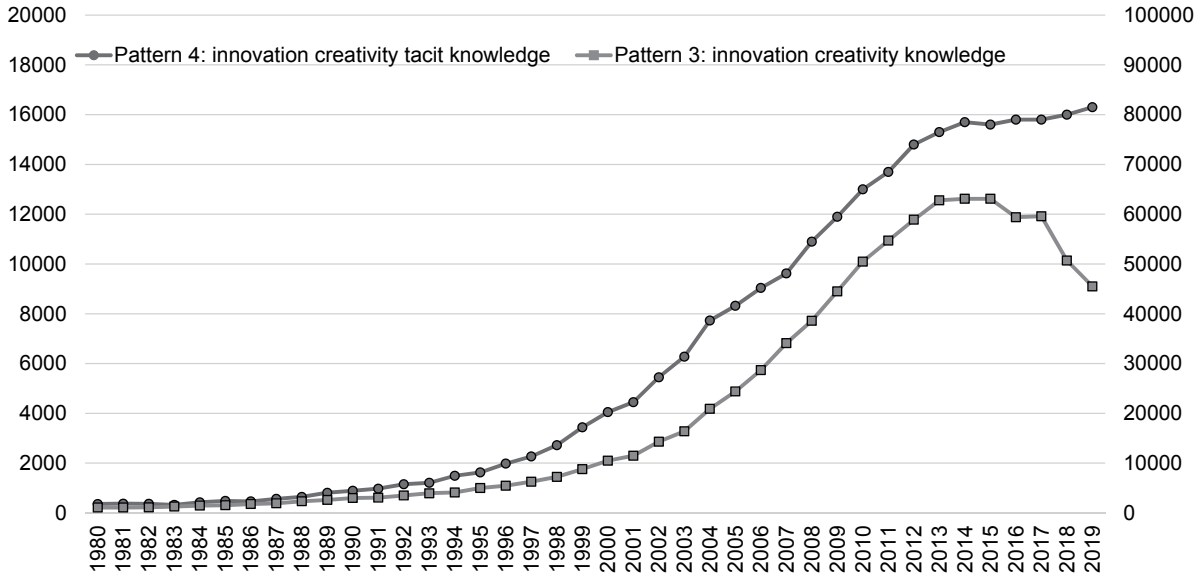

Figure 3: Google Scholar search results for Pattern 3 (innovation, creativity, knowledge) and Pattern 4 (innovation, creativity, tacit knowledge) from 1980 to 2019

Source: Google Scholar, generated by the author.

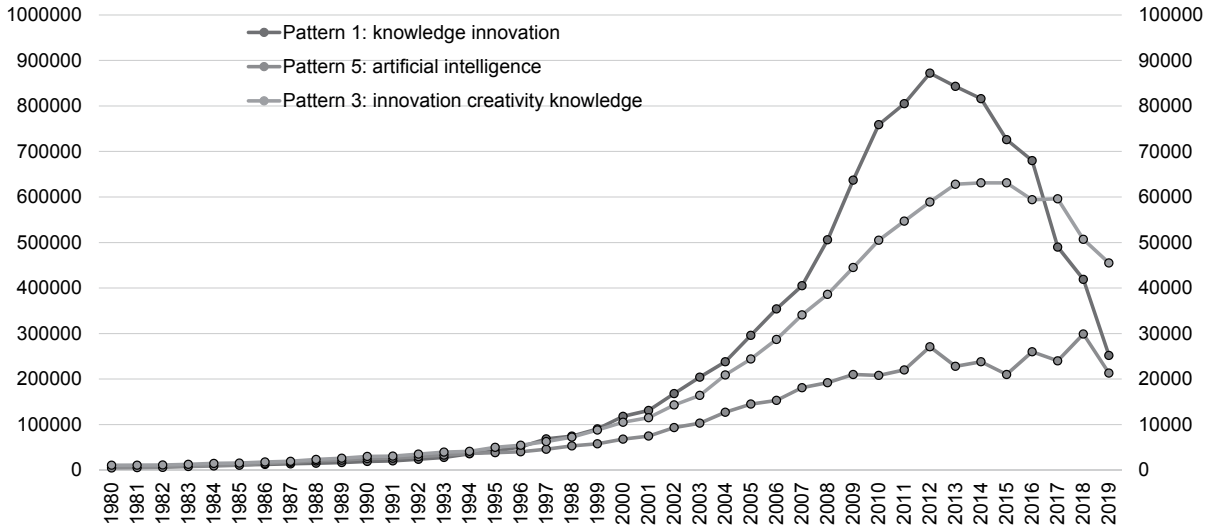

Figure 4: Google Scholar search results for Pattern 1 (knowledge, innovation), Pattern 3 (innovation, creativity, knowledge), and Pattern 5 (artificial intelligence) from 1980 to 2019

Source: Google Scholar, generated by the author.

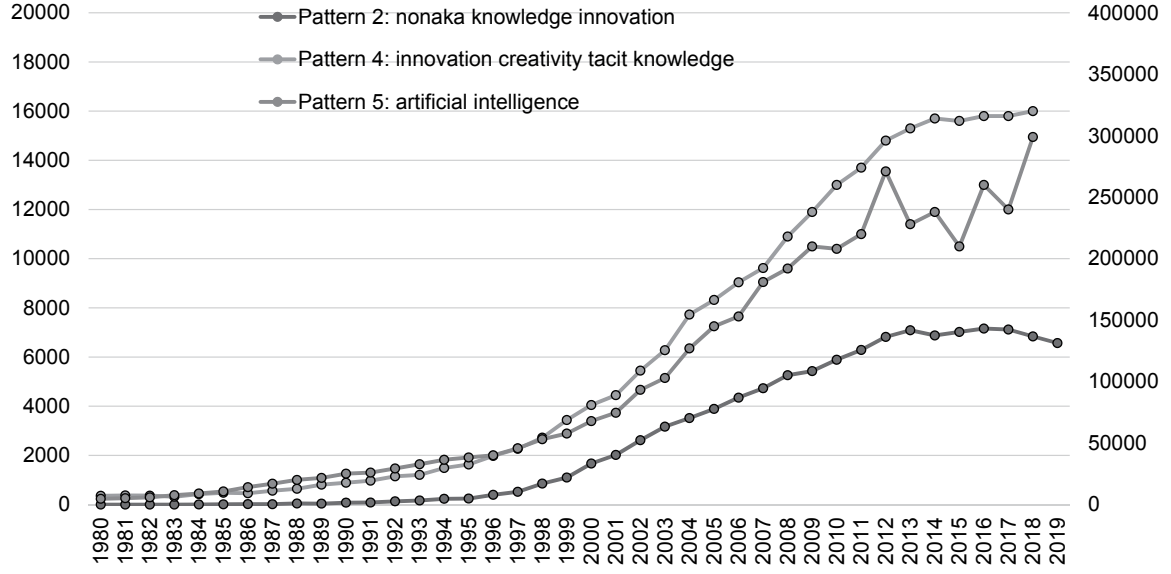

Figure 5: Google Scholar search results for Patterns 2 (Nonaka, knowledge, innovation), Pattern 4 (innovation, creativity, tacit knowledge), and Pattern 5 (artificial intelligence) from 1980 to 2019

Source: Google Scholar, generated by the author.

while that for Pattern 3 peaked during 2013–2014; the trend for Pattern 5 continued to rise, albeit with fluctuations after 2010. From this, we cannot see a clear correlation between the three patterns.

Finally, the trends for Patterns 2 (Nonaka, knowledge, innovation), 4 (innovation, creativity, tacit knowledge), and 5 (artificial intelligence) are depicted in Figure 5. The trends seem to indicate a correlation between the three patterns. Thus, a hypothesis to be proposed is that there is a correlation between the number of articles that discuss AI and "knowledge, innovation, creativity" combined with "Nonaka" and "tacit." Since this is an initial stage of a literature review, for a future study, further text mining will be necessary to clearly identify the positive and negative correlations. Nevertheless, scholars and practitioners increasingly focus on NOKC and tacit knowledge to study the development of AI.

Why are these trends seen after the year 2000? The fast-developing digital technologies, as represented by AI and its impact on human beings, are among the drivers of these trends. Before the COVID-19 outbreak, a major concern in business was how to adapt to these emerging digital technologies and their possible impact on jobs. In short, there was a dichotomy between AI and human beings.

For example, a 2013 report, titled "The future of employment," predicted that 47 percent of American occupations would be replaced by AI in 10 to 20 years' time (Frey and Osborne, 2013). Furthermore, for Japan, Osborne and Frey and Nomura Research Institute conducted a joint survey and predicted that 49 percent of occupations would be replaced by AI (Nomura Research Institute, 2015). However, in both surveys, it was observed that occupations that required human imagination, creativity, and social intelligence, such as leadership and negotiation skills, would be difficult to replace with AI. Thus, a recent understanding of the role of AI is that it augments the skills and capabilities of human beings to extend their creativity (Microsoft, 2020).

A question that arises is how human beings should think, judge, and act, to take advantage of AI as a tool and extend our abilities, rather than allow AI to replace human beings. Essentially, the question is what our mental models and values should be, and both are rooted in our tacit knowledge.

Based on the current status of the literature, we posit, from a macro-perspective, that:

a) Interest in NOKC seems to be increasing, especially in tacit knowledge, and
b) this interest coincides with an increase in studies on AI.
c) The essential question is what our mental models and values should be.

3. OVERVIEW OF NOKC THEORY

NOKC Theory has been evolving over the years since its early stage, focusing mainly on how to accelerate innovation by driving the knowledge creation process (Nonaka, 1990, 1991, 1994). Up until the latest book, "Wise Company," published in 2019 by Takeuchi and Nonaka (Nonaka and Takeuchi, 2019), the theory continued to add terms unique to the theory (see Table 1).

The continual updates to the theory reflect the collaborative work between Nonaka and researchers and practitioners of NOKC Theory to incorporate interdisciplinary knowledge identified through qualitative and quantitative research (Erden, Von Krogh and Nonaka, 2008; Ichijo and Nonaka, 2006; Kase and Cantón, 2013; Nonaka, Kodama, Hirose and Kohlbacher, 2014; Nonaka, Nishihara and Kawada, 2018; Nonaka and Nishiguchi, 2001; Nonaka and Peltokorpi, 2006; Nonaka, Reinmoeller and Senoo, 1998; Nonaka and Teece, 2001; Nonaka and Toyama, 2003; 2005a; 2007; Nonaka, Toyama and Hirata, 2008; Nonaka, Toyama and Konno, 2000; Nonaka and Von Krogh, 2009; Nonaka, von

Table 1: Some of the unique terms in NOKC theory

Term	First appeared
Scrum	Takeuchi and Nonaka (1986)
Tacit knowledge	Nonaka (1988a, 1988b, 1988c)
SECI	Nonaka and Takeuchi (1995)
Ba	Nonaka and Konno (1998)
Phronesis	Nonaka and Toyama (2005b)
Fractal organization	Nonaka, et al. (2014)

Source: Generated by the author.

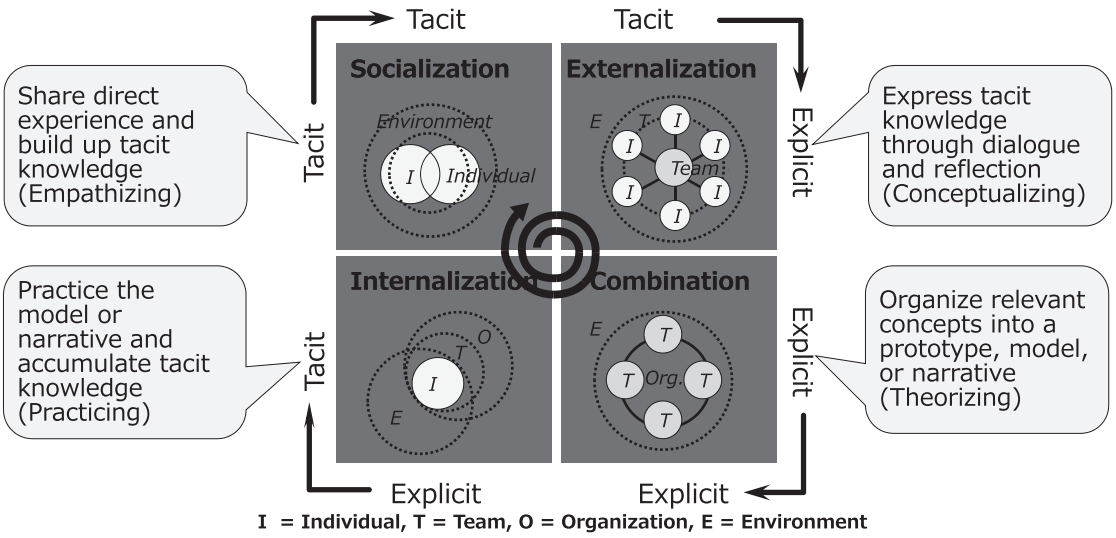

Figure 6: SECI model

Source: Based on Nonaka and Takeuchi (2019) updated by the author.

Krogh and Voelpel, 2006; von Krogh, Ichijo and Nonaka; 2000; von Krogh, Nonaka and Ichijo', 1997; von Krogh, Nonaka and Rechsteiner, 2012). Furthermore, due to Nonaka's interdisciplinary interests in search of the truth, NOKC is found in liberal arts such as philosophy, history, political science, literature, psychology, brain science, etc., making the theory applicable to both the private and the public sectors, communities, etc. (Nonaka et al., 2014; Nonaka and Nishihara, 2018).

Key Elements

In NOKC Theory, knowledge is defined as a dynamic social process of justifying personal beliefs towards true goodness and beauty. In NOKC Theory, knowledge is defined in three types: tacit, explicit, and practical. "*Ba*" is originally a Japanese word that means space or field, which indicates the shared context-in-motion in which these three types of knowledge form a trinity in a *ba*, which becomes the basic unit of dynamic fractal organization (Nonaka, Kodama and Hirose, 2012). Through the conversion of tacit and explicit knowledge as presented in the SECI model, new knowledge will be created, which leads to innovation. SECI model stands for socialization, externalization, combination, and internalization, which are the four knowledge conversion phases. Practical knowledge, or wise leadership, is the driver of the SECI process. The latest version of the SECI model illustration indicates individuals, groups, organizations, and environments in all four phases, but in a different way (see Figure 6). As the model indicates, "environment" can also explain "open-innovation."

The driver of the SECI process is the role of leadership with wisdom, or *phronesis*. *Phronesis* is a term that the ancient Greek philosopher, Aristotle, identified in his book "*Nichomachean Ethics*," along with four other types of knowledge, meaning practical wisdom. *Phronesis* means practical wisdom that is capable of making the best judgement in the particular contexts based on the Common Good and the Virtue (Nonaka, Toyama, and Hirata, 2010).

Six abilities are identified as wise leadership (Nonaka and Takeuchi, 2011; Nonaka, Toyama, and Hirata, 2008): (1) setting a "good" purpose, (2) seeing things as they are and grasping the essence, (3) creating *ba*, (4) narrating the essence, (5) political power to realize the narrative, and (6) fostering practical wisdom in others. It does not require one person to demonstrate all these abilities equally and universally in all contexts and situations; they are to be used in different contexts and situations, and may be exercised by more than one person, as a team.

4. CHALLENGES NOKC THEORY FACES TODAY

As mentioned, with the outbreak of COVID-19, we were forced to avoid the 3 Cs: 1. closed spaces with poor ventilation, 2. crowded places with many people nearby, and 3. close-contact settings, such as close-range conversations. Accordingly, many of us stay at home, work or learn from home using online virtual meeting tools. For example, new-employee training is conducted online, resulting in cases in which new employees (similarly, new students to universities) never go to the company office and never meet their colleagues or superiors. This "new normal" poses some challenges to NOKC Theory.

Challenges to the SECI model and ba

In NOKC Theory, tacit knowledge is highly regarded because it is the basis for all knowledge (Polanyi, 1969). Accordingly, the SECI process emphasizes socialization, which is the tacit-to-tacit conversion phase, in which people empathize with each other and gain new tacit knowledge. For this, it is essential to meet face to face (F2F) in an actual situation (genba) and engage in an intimate relationship. However, this is no longer easily done, due to COVID-19 related restrictions.

F2F meetings have been replaced by online meetings using virtual tools such as Zoom, Meet, Teams, WebEx, etc., all capable of realizing real-time synchronous communication with voice and video. Thus, technically, we can meet F2F and engage in a *ba* through a camera and a screen.

However, based on an initial small survey[1)], respondents found it difficult and/or different to engage with others in virtual meetings compared to real meetings.

Some of the responses were as follows. These responses were almost the same as a general response from students joining in a group workshop, or from businesspeople joining in a business meeting.

> Person A: There is some way to meet someone you know, but meeting someone by chance has disappeared.
>
> Person B: Since we cannot share the atmosphere like we could when we gathered in one place in an actual situation, we have to keep in mind how we can compensate for the effects of sharing an atmosphere when we create a remote place.

Based on these comments, we hypothesize that, in virtual meetings, it is more difficult to engage and establish relationships with people with whom you have never met in a real situation than in real meetings. Regrettably, due to the COVID-19, we miss opportunities and occasions to engage and establish relationship with people with whom we meet for the first time.

However, there seems to be a positive side to virtual meetings. Because we are no longer constrained by time and space, we can virtually meet anyone from anywhere in the world.

> Person C: Being online is an opportunity to make unexpected connections that would never be possible if you were only in a real situation. However, how to strengthen and sustain those connections is the difficult part.
>
> Person D: You will be able to attend seminars and workshops that you could not attend before due to distance, time, and cost barriers. Once you attend, you will become acquainted with others and learn from each other.

Based on these comments, we hypothesize that, in virtual meetings, it is much easier to connect with people physically remote. Indeed, this was also possible even before the COVID-19 pandemic, although online meetings were considered special occasions. Gratuitously, due to the COVID-19, we gain opportunities and occasions to connect with people without the constraints of time and space. However, engaging and establishing on-going relationships is a challenge.

When asked about engaging and establishing relationships with others, nearly all the respondents mentioned having F2F meetings in actual situations (i.e. socialization), and having casual conversations with others online, where possible in real time (i.e., externalization). This suggests that socialization is considered difficult in online meetings, and that it

requires interactions in actual situations. However, there may be compensation in increased occasions for externalization, especially in casual settings, which help people understand one another better in person.

Challenges to wise leadership

In NOKC Theory, phronesis or wise leadership is regarded as the enabler and driver of the SECI spiral; there are six abilities in wise leadership, as already shown above.

From the initial survey, one activity that respondents are less engaged in after COVID-19 is "... visiting the customers and getting to know their true thoughts, which are not expressed in words." Among the six abilities, we observe that opportunities to demonstrate the second ability, seeing things as they are and grasping the essence, have decreased drastically. Meanwhile, the respondents are forced to get used to "grasping the essence" in virtual meetings, utilizing only the two senses, seeing and hearing. Regrettably, the five senses are limited; however, to compensate, they need to utilize their imagination more than before.

An aspect that respondents have seen an improvement in since the COVID-19 outbreak is "always have respect for others and build trusting relationships with people from different walks of life." Another aspect, which was raised by an attendant in a business seminar, was to have more patience; as there would be some time lag in virtual meetings, it would not be possible to fully appreciate others' circumstances.

Based on these points, we posit that imagination, respect, and patience for others may be the abilities that are required more during the COVID-19 pandemic.

These abilities are not explicitly stated among the six abilities; rather, they are regarded as the basis for wise leadership because they are more of personal skills that are required of all people. In NOKC, these skills are indicated as non-cognitive skills which can be learned under the influence of exemplars' mentoring and good habits (Tough, 2012). Therefore, gratuitously, the personal skills that are required during the COVID-19 pandemic will eventually become the basis of wise leadership. Examples of non-cognitive skills include:

- Grit/Perseverance
- Self-control
- Zest
- Social Intelligence
- Gratitude
- Optimism
- Curiosity

Based on the overview of NOKC Theory and its current challenges, we hypothesize, from a micro-perspective, that:

d) Regrettably Generating tacit knowledge in the socialization phase and creating good *ba* face a challenge,
e) gratuitously, there are new ways for us to connect with new people using online tools, and externalization may help in getting to know each other better, and
f) enhancing non-cognitive skills will help us not only establish relationships with other people, but also nurture wise leadership.

5. IMPLICATIONS AND CONCLUSIONS

Through an exploration of the current status of the literature using a keyword search on Google Scholar, an overview of NOKC Theory and its challenges with respect to COVID-19 have been described. Based on the keyword search, the theory seems to be gaining attention. The applicability of the theory during the "new normal" is yet to be confirmed. Based on conclusions from both the macro- and micro-perspectives, we suggest the following future research areas;

g) From a) and d), more research and practice are required to utilize tacit knowledge better, despite restrictions under COVID-19,
h) from b) and c), taking advantage of digital tools, in addition to AI, such as virtual reality or augmented reality, will help us to interact better, even virtually, and
i) from d) and f), more challenges will enhance our non-cognitive skills, and facilitate a search for mental models and values to realize a better world.

In addition, this paper alone offers a few research possibilities. First, the key word search on Google scholar can be deepened by using text mining of the literature and finding co-occurrence networks of the key words. Second, the survey on how actions and feelings changed after COVID-19 can be broadened by extending the reach to broader respondent communities. Third, the hypotheses can be tested, and the results used as a foundation for possible updates to the NOKC Theory that may support the "new normal." It seems that the potential for further research is high, and the possibilities with respect to updating the NOKC theory abundant.

As of January 17, 2021, there is a cumulative total of nearly 93 million cases worldwide, with nearly 0.7 million newly reported cases in the previous 24 hours (WHO, 2021). A variant of COVID-19 is said to be the cause of a rapid increase in the UK, leading to a third lockdown. Japan has faced a rapid increase since around November 2020, and there is a second declaration of a state of emergency in Tokyo, Kanagawa, Saitama, and Chiba prefectures on January 8, 2021. Vaccination has started in the UK, the US, and other countries, and the rate is increasing (Our World (in Data, 2021); however, our attitude and behavior need to change more radically to stop this trend.

As we get used to the situation with COVID-19, during the process of the "new normal" becoming the "now" normal, there will be a shift to a "new paradigm." Where the shift will be heading, and how we will be doing, is a future research topic, ultimately.

NOTE

1) A small-size survey (number of respondents = 13) was conducted to the participants of special interest group on knowledge innovation in Knowledge Management Society Japan, between July 27 to August 11, 2020.

REFERENCES

Asonye, C. (2020). There's nothing new about the "new normal." here's why. World Economic Forum website. Retrieved on October 29 from https://www.weforum.org/agenda/2020/06/theres-nothing-new-about-this-new-normal-heres-why/.

Cabinet Secretariat (n.d.). Special Measures for Pandemic Influenza and New Infectious Diseases Preparedness and Response. COVID-19 Information and Resources. Retrieved on January 5, 2021 from https://corona.go.jp/en/

Cellan-Jones, R. (2014). Stephen Hawking warns artificial intelligence could end mankind. *BBC NEWS*, 2, 10-10.

Clarivate (2020). Chasing change: Innovation and patent activity during COVID-19. Clarivate Website. Retrieved on January 5, 2021 from https://clarivate.com/derwent/campaigns/the-impact-of-covid-19-on-innovation/.

Columbus, L. (2019). The most innovative companies of 2019 according to BCG. *Forbes*. Retrieved on January 5, 2021 from https://www.forbes.com/sites/louiscolumbus/2019/03/24/the-most-innovative-companies-of-2019-according-to-bcg/.

Davenport, E., & Bruce, I. (2002). Innovation, knowledge management and the use of space: Questioning assumptions about non-traditional office work. *Journal of Information Science*, 28(3), 225-230.

Deloitte Tohmatsu Venture Support Co., Ltd. (2020). Innovation strategies for the with-corona era. Deloitte Tohmatsu Venture Support Co., Ltd Website. Retrieved on January 5, 2021 from https://www2.deloitte.com/content/dam/Deloitte/jp/Documents/about-deloitte/covid19/jp-covid19-innovation.pdf.

Drucker, P. F. (1994). *Post-capitalist society*. Routledge.

Erden, Z., Von Krogh, G., & Nonaka, I. (2008). The quality of group tacit knowledge. *The Journal of Strategic Information Systems*, 17(1), 4-18.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254-280.

Hamel, G. (2006). The why, what and how of management innovation. *Harvard Business Review*, 84(2), 72-84, 163.

Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review*, 35(4), 519-530.

Ichijo, K. (2007). Enabling knowledge-based competence of a corporation. In *Knowledge Creation and Management: New Challenges for Managers* K. Ichijo & I. Nonaka (Eds.). Oxford University Press: New York.

Ichijo, K., & Nonaka, I. (2006). *Knowledge Creation and Management: New Challenges for Managers*. Oxford university press.

Kase, K., & Cantón, C. G. (2013). *Towards Organizational Knowledge: The Pioneering Work of Ikujiro Nonaka*. Springer.

Kurzweil, R. (2005). *The Singularity Is Near: When Humans Transcend Biology*. Penguin.

Microsoft (2020). "Leading businesses reveal the power of combining human ingenuity with AI." Microsoft Webpage. Retrieved on October 29, 2020 from https://news.microsoft.com/transform/leading-businesses-reveal-the-power-of-combining-human-ingenuity-with-ai/.

Nomura Research Institute (2015). "49% of Japan's workforce can be replaced by artificial intelligence, robots and other technologies: Estimating the probability of substitution by computer technology for each of the 601 occupations." Nomura Research Institute Website. Retrieved on October 29, 2020 from https://www.nri.com/jp/news/2015/151202_1.aspx.

Nonaka, I., Kodama, M., Hirose, A., & Kohlbacher, F. (2014). Dynamic fractal organizations for promoting knowledge-based transformation—A new paradigm for organizational theory. *European Management Journal*, 32(1), 137-146.

Nonaka, I., & Toyama, R. (2007). Strategic management as distributed practical wisdom (phronesis). *Industrial and Corporate Change*, 16(3), 371-394.

Nonaka, I. (1988a). Creating organizational order out of chaos: Self-renewal in Japanese firms. *California Management Review*, 30(3), 57-73.

Nonaka, I. (1988b). Self-renewal of the Japanese firm and the human resource strategy. *Human Resource Management*, 27(1), 45-62.

Nonaka, I. (1988c). Toward middle-up–down management: Accelerating information creation. *MIT Sloan Management Review*, 29(3), 9.

Nonaka, I. (1990). Redundant, overlapping organization: A Japanese approach to managing the innovation process. *California Management Review*, 32(3), 27-38.

Nonaka, I. (1991). The Knowledge-Creating Company. *Harvard Business Review*, 69(6), 96-104.

Nonaka, I. (1994). A dynamic theory of knowledge creation. *Organization Science*, 5(1), 14-37.

Nonaka, I., Kodama, M., Hirose, A., & Kohlbacher, F. (2014). Dynamic fractal organizations for promoting knowledge-based transformation—A new paradigm for organizational theory. *European Management Journal*, 32(1), 137-146.

Nonaka, I., & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. *California Management Review*, 40(3), 40-54.

Nonaka, I., & Nishihara, A. H. (2018). Introduction to the concepts and frameworks of knowledge-creating theory. In *Knowledge Creation in Community Development*. 1-15. Palgrave Macmillan.

Nonaka, I., Nishihara, A. H., & Kawada, H. (2018). Knowledge-based management theory. In *Knowledge Creation in Public Administrations*. 1-21. Palgrave Macmillan.

Nonaka, I., & Nishiguchi, T. (2001). *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation*. Oxford University Press.

Nonaka, I., & Peltokorpi, V. (2006). Objectivity and subjectivity in knowledge management: A review of 20 top articles. *Knowledge and Process Management*, 13(2), 73-82.

Nonaka, I., Reinmoeller, P., & Senoo, D. (1998). The ART of Knowledge: Systems to capitalize on market knowledge. *European Management Journal*, 16(6), 673-684.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company*. Oxford University Press: Oxford.

Nonaka, I., & Takeuchi, H. (2011). The wise leader. *Harvard business review*, 89(5), 58-67.

Nonaka, I., & Takeuchi, H. (2019). *The Wise Company*. Oxford University Press: Oxford.

Nonaka, I., & Teece, D. J. (Eds.) (2001). *Managing Industrial Knowledge: Creation, Transfer and Utilization*. Sage.

Nonaka, I., & Toyama, R. (2003). The knowledge-creation theory revisited: Knowledge creation as a synthesizing process. *Knowledge Management Research and Practice*, 1(1), 2-10.

Nonaka, I., & Toyama, R. (2005a). The theory of the knowledge-creating firm: Subjectivity, objectivity and synthesis. *Industrial and Corporate Change*, 14(3), 419-436.

Nonaka, I., & Toyama, R. (2005b). Strategy-as-phronesis. *Hitotsubashi Business Review*, 53(3), 88-103.

Nonaka, I., Toyama, R., & Hirata, T. (2008). *Managing Flow: A Process Theory of the Knowledge-Based Firm*. Palgrave MacMillan.

Nonaka, I., Toyama, R., & Konno, N. (2000). a unified model of dynamic knowledge creation. *Long Range Planning*, 33(1). SECI: Ba. and leadership, 5-34.

Nonaka, I., von Krogh, G., & Voelpel, S. (2006). Organizational knowledge creation theory: Evolutionary paths and future advances. *Organization Studies*, 27(8), 1179-1208.

Nonaka, I., & Von Krogh, G. (2009). Perspective—Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. *Organization Science*, 20(3), 635-652.

Our World in Data. (2020). Coronavirus (COVID-19) Vaccinations. Statistics and Research. Retrieved on January 5, 2021 from https://ourworldindata.org/covid-vaccinations

Pasona Group Inc. (2020). Pasona Research Institute announces results of "post-corona work styles survey" based on 1,000 telecommuting workers of all ages. News & Topics. Retrieved on January 5, 2021 from https://www.pasonagroup.co.jp/news/index112.html?itemid=3680&dispmid=798.

Takeuchi, H., & Nonaka, I. (1986). The new product development game. *Harvard Business Review*, 64(1), 137-146.

Teece, D. J. (2000). Strategies for managing knowledge assets: The role of firm structure and industrial context. *Long Range Planning*, 33(1), 35-54.

Teece, D. J. (2013). Nonaka's contribution to the understanding of knowledge creation, codification and capture. *Towards Organizational Knowledge*, 17-23. Palgrave Macmillan: London.

Tough, P. (2012). *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*. Houghton Mifflin Harcourt.

United Nations (n.d.). The Climate Crisis – A Race We Can Win. UN75 2020 and Beyond. Retrieved on January 5, 2021 from https://www.un.org/en/un75/climate-crisis-race-we-can-win.

von Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling Knowledge Creation. How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*. Oxford University Press: New York.

von Krogh, G., Nonaka, I., & Ichijo, K. (1997). Develop knowledge activists! *European Management Journal*, 15(5), 475-483.

von Krogh, G., Nonaka, I., & Rechsteiner, L. (2012). Leadership in organizational knowledge creation: A review and framework. *Journal of Management Studies*, 49(1), 240-277.

WHO (2021). Health emergency dashboard, WHO (COVID-19) website. Retrieved on January 6, 2021 from https://covid19.who.int/.

Dr. Ayano Nishihara (Hirose) is an associate professor of the College of Business at Rikkyo University, Japan. Email: ayano.nishihara@rikkyo.ac.jp