# Exploration of Fulfillment Beyond the Digital Society

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Modern society is in the midst of a paradigm shift. After three major transformations -- the agricultural revolution, the industrial revolution, and the information revolution -- the world is about to generate a new society that will bring about the next fulfillment.

What is fulfillment? GDP (Gross Domestic Product), an indicator developed in the 20th century, has visualized fulfillment by measuring the volume of production activities and evaluating a country's economic strength, level of development, and level of welfare for its people. On the other hand, it has been pointed out that GDP fails to measure true fulfillment, or wellbeing. Therefore, NRI attempted to express the next fulfillment by introducing "$i$," which represents imaginary numbers, in addition to GDP, which is a real number[1].

Behind this lies the trend of sustainability and the progress of digitalization. This means seeking to realize a sustainable society in harmony with the environment, instead of growth achieved by the pursuit of material fulfillment through the consumption of limited resources, and the transformation of the values of consumers and business activities into the pursuit of mental fulfillment. Here, the structural change in the existing manufacturing, services, and consumption has been supported by advances in digital technologies including internet and big data[2].

Along with efficiency, which has been regarded as important since the industrial revolution, information revolution added the value of optimization. Digital platforms have realized overwhelming efficiency in transactions, rapidly accelerated production activities, and increased consumer convenience and satisfaction through optimization. The concept of footprints, which visualize nature and human activities, is encouraging the optimization of resource allocation and going to achieve regenerative global development through supply chain management.

We hope to capture the next era and contribute to further fulfillment. We seek to understand the world beyond digital society through repeated discussions with the experts in academic world and the industrial world, from the perspective of liberal arts surpassing the concepts of natural sciences and humanities.

An emerging major trend, though it is still a hypothesis, is the worldview of "Regenerative," or more comprehensively "Generative," and a plural form of "Realities" resulting from it. "Regenerative" is change into an era of regeneration that goes beyond keeping society sustainable and redefines and creates a fulfilling life. "Realities" in the plural form is change, beyond the means by which digital technologies make society better, into an era in which the digital itself naturally exists and is perceived

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[1] "$i$" indicates spiritual fulfillment instead of material fulfillment. For example, consumer surplus can be measures as part of it.
Nomura Research Institute, "GDP + i: A Proposal of a New Economic Indicator for the Digital Age" (https://www.nri.com/jp/knowledge/report/lst/2023/souhatsu/0407, accessed July 2023)
[2] The expansion of D2C services and the growing demand for CX in recent years are changing value chains for businesses and market structure.

as reality. William McDonough, an American architect, said "Being less bad is not being good.[3]" The issue next to "Sustainable" should be "Regenerative." It is not limited to the regeneration of the natural environment, but includes the regeneration of abilities and values of human beings themselves, and the regeneration of local communities built on the relationships among human beings and with social infrastructure.

The technological innovation that realizes the transformation of those values is digital technologies that can generate Realities in the plural form. They extend finite production activities in reality into the unlimited virtual. This means that the functions of people, goods and services exist as components in the space that integrates cyber and real, and new services and businesses are created by combining those functions. This is also the worldview mentioned as digital nature[4]. Based on it, we believe that we can transform fulfillment limited to the material aspects into a form that seeks fulfillment in the mental aspects, or "$i$," by rewriting the premise of finiteness of the real world with digital technologies. Zhuangzi once preached in "The Butterfly Dream"[5] that essentially same things may look different. Markus Gabriel, a proponent of new realism, argues that there are innumerable "fields of sense."[6] If the digital looks unreal, it is just pretense, and reality and virtual both becomes real. Such technological innovation will create the next era.

What is "fulfillment" in the era beyond digital society? The industrial society has increased producer surplus (real numbers), while the digital society has increased consumer surplus expressed by "$i$" (imaginary numbers). This means that fulfillment in the era beyond digital society will be complex numbers "$a + bi$," which is a combination of real and imaginary numbers.

Fulfillment seems to be the hope in life, the empathy of delight, and the creation of new culture. It may be brought about through altruism in society, or it may be generated in the moment of new transition created by an encounter with something. If we can capture and measure it, we should be able to steer the growth of the era beyond digital society in the appropriate direction.

While the direction still cannot be clarified, it is at least an area that cannot be reached by DX that enhances efficiency and optimization of production and consumption activities through existing digital technologies. One hypothesis is that it will be realized by elements such as regeneration, generation, and creation which is enabled by AI, XR, and other technologies, and those elements will create "Realities" in the plural form.

The germinating signs of such transformation are now emerging. Wageningen University & Research in the Netherlands is studying an agricultural method called pixel cropping[7]. This is a method of farming that places diverse varieties at a high density on the same field, and it is said to be effective in increasing yield, improving reuse efficiency, combating pests and pathogens, and controlling weeds. A common form of agriculture is single-variety large-scale cultivation through the pursuit of efficiency. However, it has caused challenges to sustainability from the perspective of fertilizers, pesticides, and irrigation. The regenerative/generative ability is enhanced by intentionally and artificially creating a wide variety of near-nature circumstances.

By breaking down the barrier of finiteness through new technologies, the attempt to greatly liberate

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[3] William McDonough, "Being Less Bad is Not Being Good" (https://ecorner.stanford.edu/videos/being-less-bad-is-not-being-good/, accessed July 2023)

[4] Yoichi Ochiai, *The Century of Magic* (PLANETS, 2015)

[5] Zhuangzi, "Now I do not know whether I was then a man dreaming I was a butterfly, or whether I am now a butterfly, dreaming I am a man."

[6] Markus Gabriel, Why the World Does Not Exist (Polity, 2015)

[7] Lenora Ditzler and Clemens Driessen "Automating Agroecology: How to Design a Farming Robot Without a Monocultural Mindset? "(*Journal of Agricultural and Environmental Ethics* (2022), Volume: 35, Issue: 1)

the generative or imaginative/creative ability of humans, businesses and society will also make progress. In the world of physical augmentation presented as cybernetic avatars[8], there are studies in brain science on brain-machine interfaces (BMI), which connects the brain and machines. British anthropologist Robin Dunbar has argued that there is a limit to the number of people whom humans can maintain stable social relationships (Note: 100 to 250 people, which is called the Dunbar's number)[9], but the augmentation of consciousness through BMI aims to break down that barrier. In the field of VR (virtual reality), there are studies to enhance empathy and imaginative/creative ability of humans by experiencing different genders, races, and circumstances (e.g., a homeless person).

In this era beyond DX, how we understand "relationships" will likely be an important issue.
> How will the relationship between human beings and nature, that is, the way of coexistence with the environment and infrastructure, change?
> How will the relationship between human beings and machine, that is, the way of acceptance to physical and mental augmentation, change?
> How will the relationship between human beings and society, that is, the way of community formation, change?
> How will the relationship between human beings and businesses, that is, how employment, industries and businesses should be, change?

Making each relationship better leads to fulfillment, that is, hope, empathy and creation. We will approach understanding new fulfillment by understanding the objects of social capital broadly, not limited to the relationship among human beings. Not fighting over scarce resources, but compete for the creation of fulfillment. We believe that market mechanisms in the future should be brought about by "competition" for fulfillment rather than "conflict."

Businesses should be required to build relationships that create such fulfillment. Today, the so-called attention economy is dominating business. It is a model that generates economic value by attracting people's "attention" (pay attention) in an information society. Its system is an advertising business that snatches perception, built on the scramble for people's finite disposable time. Is fulfillment created here?

After the attention economy, respect economy should come. A system in which the economy works by gaining respect of people (pay respect) becomes a model for creating fulfillment by using relationships as capital. The engineering community of GitHub creates and releases good programming codes to create even better ones. In Civic Tech, citizens work together to collect and communicate data to solve local problems. In the respect economy, the act of paying respect to oneself also increases. There will be progress in consumption behavior to compliment oneself and investment to enhance self-approval and self-efficacy.

Here, something new that cannot be measured by financial fulfillment is generated and evaluated. This attracts capital and leads to the creation of culture. Relationships are created and integrated among human, natural, mechanical, social, and business stakeholders.

Lifecycle management is attracting attention as a foundation for ensuring "Respect." At the root of relationships lies trustfulness, and traceability is a technology to achieve it. The demand for footprints has spread from natural assets to industrial assets. BIM (building information modeling) in the field of architecture links the relationship between materials and buildings. It clarifies where materials come

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[8] The Cabinet Office, "Moonshot Research and Development Program"
(https://www8.cao.go.jp/cstp/moonshot/sub1.html, accessed July 2023)
[9] Robin I. M. Dunbar, *How Many Friends Does One Person Need?* (Faber & Faber, 2010)

from, who is involved in it, and where they are returned after being dismantled. Economic activities can be encouraged to be regenerative by realizing lifecycle assessment that links consumption and regeneration on a macro scale and reliable networks among stakeholders[10]. There is a movement where businesses committed to regenerating human connections, societies, ecosystems and economic systems through economic activities are called regenerative companies[11] to avoid regarding only economic value as capital. In such a movement, digital technologies to create "Realities in the plural form" will be important.

If we can regard social relations as capital, we can think of change in the aspects of capitalism and businesses, which are the preconditions for business management. In addition to capitalists who accumulate money, the concept of capitalists who accumulate respect will also emerge. Relationships between businesses and stakeholders based on respect should also be built. Can we indicate relationships of new contracts and capitals based on respect by "$a + bi$"?

This is one hypothesis that penetrates into the future. What kind of society will come beyond digital society? How can we make it fulfilling? We would love to discuss with anyone who has awareness to these topics.

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[10] It connects with the idea of industrial symbiosis, which is the essence of the circular economy.
[11] *WIRED*, VOL.49 (Condé Nast Japan, 2023)