

Healthcare and the Fourth Industrial Revolution: Realizing the ‘greatest happiness of the greatest diversity’

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New technologies hold great promise for improving the quality and efficiency of care and patient well-being. The COVID-19 pandemic has spurred new developments, including the expansion of telemedicine and the use of contact-tracing applications. The pandemic has also forced healthcare organizations to rethink how they manage and support their patients and customers by looking beyond the traditional model in which patients need to visit a hospital to report their symptoms and have tests performed, and then receive medical care based on the results. As gaps in the healthcare delivery system become more pronounced, a patient-centric, digital-first strategy is no longer a “nice to have” but a necessity.

One solution to this challenge is to make healthcare more individualized and inclusive through the use of data and technology. Until now, the only viable way to provide healthcare services was to do so uniformly; individualization was simply too inefficient. However, the emergence of artificial intelligence and big data has made it possible to pursue individualization and inclusion efficiently. This means that health systems are able to offer tailor-made medical support appropriate for each person based on age, region, lifestyle and other factors.

This will require a fundamental conceptual shift away from 18th-century philosopher Jeremy Bentham’s idea of “the greatest happiness of the greatest number” to a new kind of utilitarianism that might be called “the greatest happiness of the greatest diversity”. Such an approach would help provide the necessary services to each individual patient without leaving anyone behind.

The purpose of this briefing paper is to examine the idea of “the greatest happiness of the greatest diversity”, illustrated through three examples in the field of healthcare.



Changes in healthcare through the Fourth Industrial Revolution



The subject of healthcare is the human body, which is an extremely analog thing. By emphasizing the role of humans and the importance of the analog sphere while also making use of technology, it will be possible to provide high quality services that are individual and inclusive rather than uniform and average.

Koichi Narasaki,
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Realizing “the greatest happiness of the greatest diversity” in healthcare will require fusing the “digital” and “analog” worlds – a major challenge that also holds great potential. In each of the cases discussed in this paper – Takeda Pharmaceutical (Case 1), Salesforce (Case 2) and Sampo Holdings (Case 3) – success was achieved not simply by applying the latest data and technology. In each case, efforts were made to improve existing analog services by securing real-world points of contact between doctors and patients, among medical professionals, and between caregivers and the elderly. Digital technology played a supplementary role, helping to meet needs, solve social issues and create value in ways that could not be achieved by analog means alone.

Case 1, an initiative to seamlessly connect patient monitoring with wearable devices and online medical care, exemplifies the future of healthcare using technology and data. Case 2 illustrates how the integration of solutions and data on the Salesforce platform helped to ensure continued provision of efficient care through telehealth while prioritizing patient and employee safety. Case 3 shows how technology can not only support the provision of high-quality in-person services, but also contribute to solving the serious social issue of a shortage of care workers.

Care for One: Pilot project for next-generation healthcare system for Parkinson’s disease

Summary

In 2020, Takeda Pharmaceutical and Kanagawa Prefecture in Japan began a pilot study for a next-generation healthcare system. Care for One is a platform that seamlessly connects wearable-device monitoring, telemedicine, online medication guidance and drug delivery. The goal is to use Care for One to reduce the burden of hospital visits and support symptom monitoring on patients with Parkinson’s disease, and to improve their quality of medical care.

Takeda developed a new app called Monipad in collaboration with Apple Watch for symptom-monitoring, which makes it possible to detect symptoms that used to be hard to notice. Doctors can view patient data remotely, and Parkinson’s patients can receive medication guidance via telemedicine and take delivery of prescribed drugs at home. Takeda

believes it is their responsibility as a pharmaceutical company to help establish sustainable healthcare systems. This clinical research was achieved through a partnership among multiple companies, including Integrity Healthcare, Salesforce, NTT docomo, Medipal and Deloitte. More diseases and businesses will be eligible in the future, as different industries cooperate to promote patient-centric care.

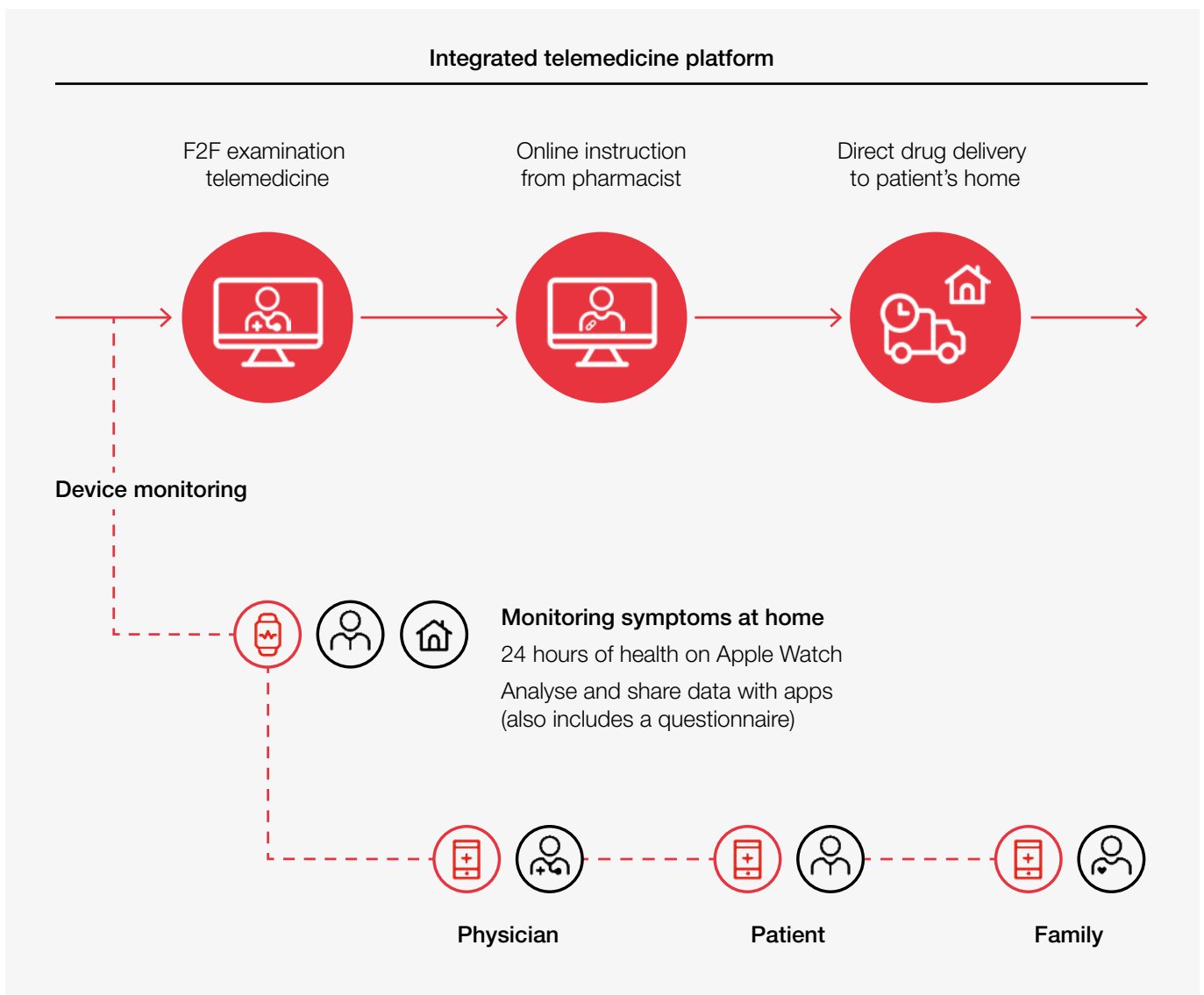
Issues to be solved

- Reduce the burden of hospital visits for patients, their families and caregivers
- Monitoring, recording and visualization of symptoms, and sharing data between patients and medical professionals

Utilization of Fourth Industrial Revolution technology

- Monitoring, recording, visualization and sharing of symptoms using wearable devices
- Online platform for home consultation and drug delivery

FIGURE 1 Care for One: Integrated telemedicine platform



MIMIT Health: Following a patient's health journey

Summary

MIMIT Health is an independent multi-specialty physician group providing minimally invasive surgeries in Illinois, USA. Their previous in-house solution was fragmented and inefficient, making it difficult to obtain holistic reports from medical records, or patient data. This meant that doctors, care coordinators and other teams at MIMIT could not communicate or collaborate with each other, which led to poor patient care.

The situation started to change when MIMIT adopted Salesforce's healthcare platform to unify disjointed systems. By centralizing data to create a single view of all health records and care plans, an employee can now click on a specific patient and understand how MIMIT acquired that new patient, show the physician that performed the procedure and who handled billing. The company has also uploaded all of its electronic medical records data into an analytics tool, tracking the patient from the minute of first interaction all the way to post-surgery.

As a result of these transformations, and seamlessly connecting the Salesforce platform with artificial intelligence and other healthcare solutions by other vendors, MIMIT Health's teams have gained a new level of visibility into their patients' health journey that has enabled them to provide more tailored care for each patient. It has also increased the overall efficiency of patient engagement processes, which, coupled with decreased system maintenance costs and enhanced culture of collaboration between stakeholders, has led to 40% revenue growth per year since the adoption of the new digital platform.

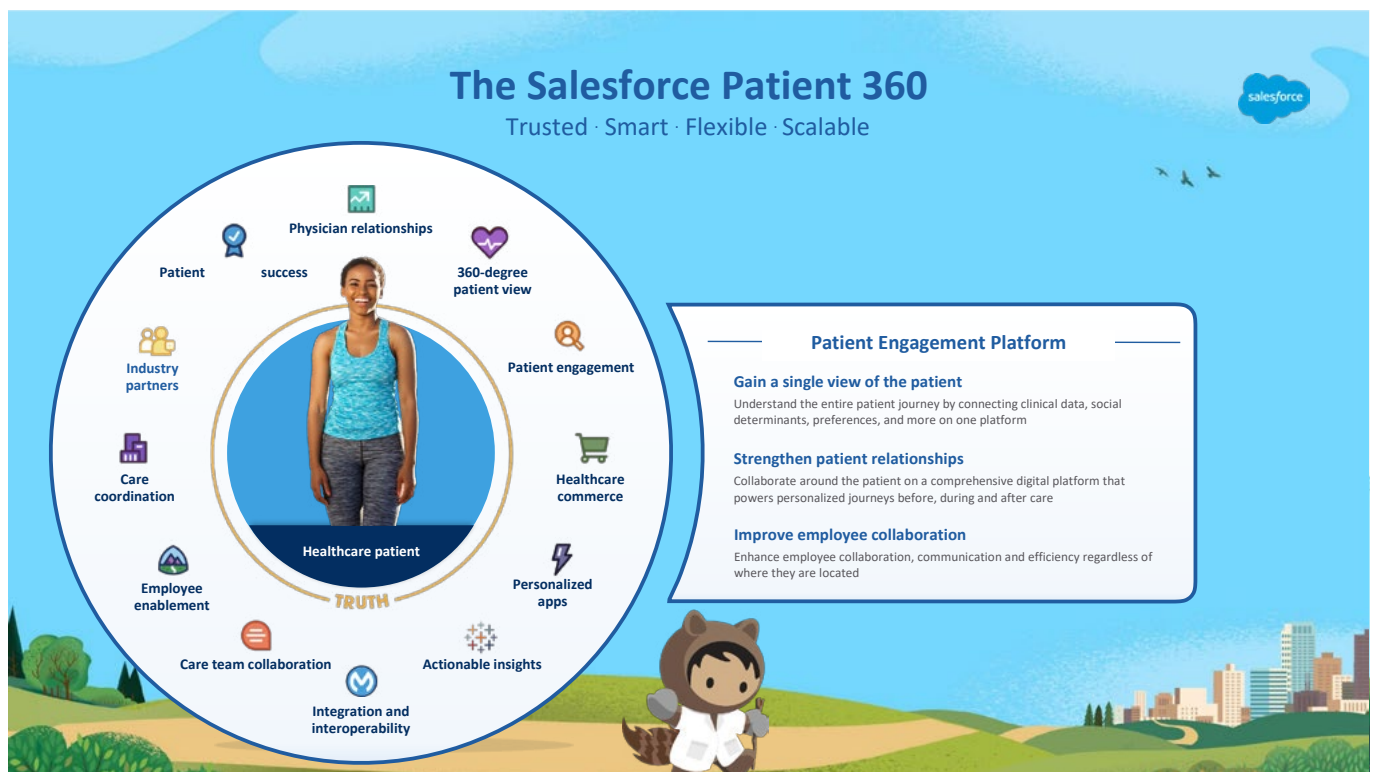
Issues to be solved

- Fragmented and siloed patient information

Utilization of Fourth Industrial Revolution technology

- Centralization of patient data on a single digital platform
- Operational efficiency and continuous improvement of patient engagement through the integration of artificial intelligence and analytics tools

FIGURE 2 The Salesforce Patient 360



Custom-made care through the use of data from nursing care sites

Summary

Sampo Holdings, in partnership with Palantir, aims to solve social issues by using real data generated from the nursing care business. For example, the company's nursing homes integrate and utilize data from internet of things sensor-equipped beds, which includes information on sleep, pulse rates, meals, activities, physical abilities, nutrients and care services provided. This promotes the realization of custom-made care services that are sustainable in the social structure of a "super-aged" society – where more than 25% of a country's total population is aged 65 years and older.

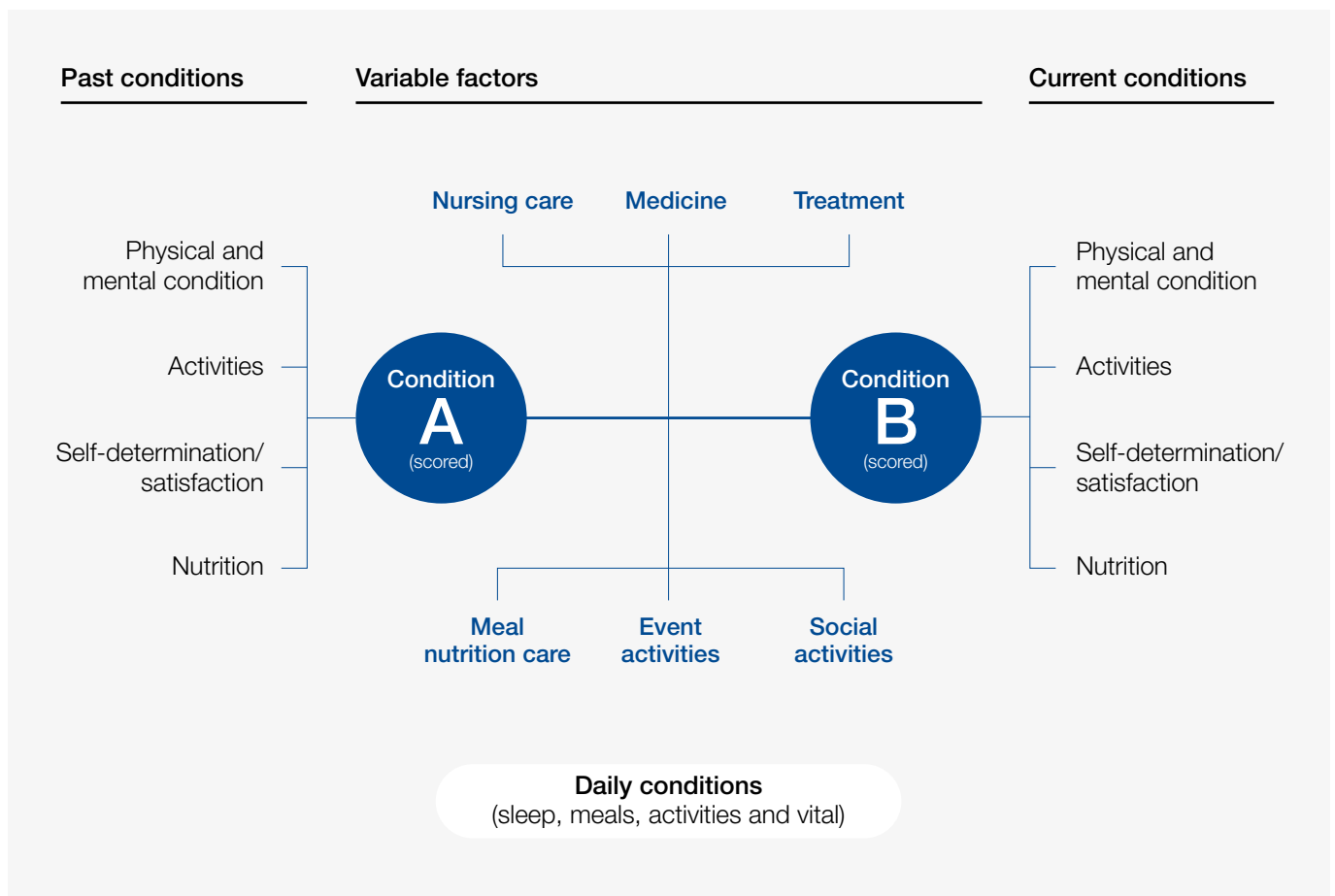
Issues to be solved

- Shortage of care workers in a super-aged society
- Difficulties in the provision of high-quality and custom-made care services due to personnel shortages and economic rationality
- Addressing the level of service depending on the experience of care workers

Utilization of Fourth Industrial Revolution technology

- Combine distributed data to centralize information needed by caregivers and care planners
- Data on the mental and physical condition of the elderly and factors affecting their condition
- Provision of personalized nursing care services based on the digitalized physical and mental conditions

FIGURE 3 Visualization of conditions and realization of custom-made care through the use of real data from nursing care sites



A multistakeholder approach to meet individual needs



It is important to focus on the needs of the patient — not on what can be done digitally, but on what the patient actually wants.

Masato Iwasaki, Director, Japan General Affairs, Takeda Pharmaceutical, Japan

In Case 1, the use of a wearable device and a special application made it possible to detect symptoms that were previously difficult to see or communicate. The system also made it possible to receive treatment for Parkinson's disease from the comfort of one's own home, from consultation to receipt of medication. Collaboration among different industries is expected to further expand the range of diseases and businesses as providers aim to promote patient-centred medicine.

Initiatives such as Case 2, which integrates digital technology, will allow for total medical data review and the provision of personalized patient care.

In Case 3, staff members with relatively little experience are now able to detect changes in the physical condition of nursing care residents that they would not have been able to notice before, and are able to provide optimal care tailored to their individual needs. The system allows providers to reduce the number of regular night-time rounds, resulting in fewer disturbances to residents' sleep and smaller burdens on staff amid a persistent caregiver shortage.

New technologies that address a range of needs are emerging all the time, as are solutions that connect these technologies across different fields. Since the “push” of new technology and the “pull” of user demand mutually influence innovation, both perspectives are indispensable. To realize the “greatest happiness for the greatest diversity” of people, it is crucial to promote multistakeholder collaboration among companies, governments and others seeking to solve the same problems. The companies in the above case studies are seeking to solve problems by utilizing their own strengths and those of partner companies.

Towards a sustainable system



The time has come for us to redesign our systems based on the themes of diversity, inclusiveness and sustainability, with the aim of moving away from a mass-consumption society to a society that realizes not only economic rationality, but also the richness of diversity.

Hiroaki Miyata, Professor and Chair, Department of Health Policy Management, Faculty of Medicine, Keio University, Japan

The use of data and technology in healthcare has opened up the possibility of providing value that is more personalized and more effective. It has been said that the health sector is an area where digitalization has been slow to take hold, but the realization of individualization and inclusion has begun to transcend the boundaries of companies and sectors worldwide. The cases are not only stories about what individual companies can accomplish – they are models for rethinking traditional networks and individualizing what kind of support is best for each patient depending on his or her situation through multistakeholder collaboration.

The data generated from this model also holds new possibilities, and options for supporting patients before they need treatment or care are certain to expand further. The evolution of healthcare is moving to the next stage with the use of data and the advancement of technology — from an era of uniform medical care that focused on efficiency and broad improvements in quality of life, to an era where maximizing happiness and well-being means finding the most diverse and tailor-made ways of delivering it.

This paper was based on a session at the World Economic Forum Global Technology Governance Summit, organized by the Centre for the Fourth Industrial Revolution Japan's [Healthcare Data Policy Project](#) community in April 2021.

In April 2021, the World Economic Forum Centre for the Fourth Industrial Revolution Japan's Healthcare Data Policy Project held a session with Takeda Pharmaceutical, Salesforce.com and Sampo Holdings on the theme “Greatest happiness of the greatest diversity in healthcare”.

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