Supporting the Commitment of Local Governments to Digital Transformation (DX)

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Abstract

In recent years, the rapid evolution of broadband network technology, together with the widespread dissemination of ever more sophisticated smartphones and other electronic devices, has reached a point where traditional governmental administrative procedures that involve the signing and stamping of original paper documents seem out of step with contemporary practice. Eliminating paper and digitizing all administrative data make it possible to realize the huge performance gains that AI-enabled big data and other cutting-edge technology offer. Applications for digital data are expanding at a phenomenal pace, creating new value and providing a range of exciting new tools for management and administration.

In this context, we are committed to providing local citizen-facing public agencies with the support and the technologies they need to execute a successful digital transformation (DX). In this paper, we discuss the ways in which we are helping to standardize operations and implement and validate practical applications.

Keywords

standardization, commonization, My Number card, online, AI, RPA

1. Introduction

It would not be inaccurate to say that Japan is now undergoing an unprecedented transformation that no other country has yet to experience. Key drivers of this transition include a rapidly aging population that has resulted in a steadily decreasing population. These in turn have led to a host of challenges, piling up one after another in rapid succession — from disappearing revenue sources and labor shortages to skyrocketing social welfare spending and obsolete infrastructure replacement. With the country already reeling, fiscal 2020 brought what was perhaps the biggest challenge yet — the outbreak of the novel coronavirus disease (COVID-19). The response to this pandemic massively impacted day to day life, business operations, and much more. Under these conditions, business as usual is no longer an option; instead, we have no choice but to transition to new lifestyles. Against this background, Japan enacted a bill to launch the Digital Agency on September 1, 2021. This agency lists six priority action items based on the above-mentioned issues and is committed to forging policies that will make

transactions with the public easier and more convenient while streamlining and enhancing the administrative performance of local governments.

In the sections that follow, we discuss this great transformation — that is, the digital transformation (DX) of local governments that the soon to be established Digital Agency will foster and support. We begin by examining the commitment by local governments to engage in this transformation, how their systems have evolved so far, and where they stand now, highlighting actual cases where NEC has contributed.

2. Evolution of Local Government Systems

Decades of technological advances have gradually refashioned the way public agencies conduct their business. Over time, administrative work has made several significant transitions. Computerization eliminated the need to do everything by hand, informatization simplified the collection and organization of data, and standardization assured compatibility between different departments. In this section, we outline the evolution of local government systems from

the early post-war period until today.

2.1 From manual work to general-purpose computers

The Local Autonomy Law was promulgated in April 1947, right in the middle of Japan's post-war recovery. It was at this time that local government structures were reorganized into today's prefectural system and new municipal administrative operations began. Naturally, clerical work was performed manually and would continue to be done so for most of the next three decades.

Beginning in the late 1970s and continuing on into the 1980s, mainframes (legacy systems), suited to large-volume clerical processing with stable operation, were gradually introduced to local governments. System building at this stage stayed in the realm of specific optimization where mainframes were created for individual local governments.

2.2 Introduction of open system packages

Various vendors started developing and offering packages for local governments in the 1990s, changing the style of municipal administrative systems from specifically designed systems to package systems.

In the 2000s, as technological progress accelerated with the integration of the Internet into business and public operations, compact, high-performance systems became both more powerful and more affordable. Reliance on mainframes supplied and maintained by specific vendors was no longer necessary. Instead, the trend was towards introduction of standardized packages across agencies (total optimization). Yet, even as local governments shifted from big, closed systems to compact, open systems, they continued to rely on individual customization to match the administrative procedures already in place even when a package system was introduced. This meant there was still a lot of room for improvement — for example, by decreasing the amount invested in IT systems.

2.3 Cloud computing and the debut of the My Number system

Towards the end of the 2000s, a trend towards sharing systems and storing data in the cloud was becoming increasingly apparent — especially in smaller local governments. This trend became known as "local government cloud" in common parlance and was actively promoted at the time.

The dispersal of public systems into the clouds was closely followed in the second decade of the 21st century by the introduction of social security and tax identification system called Individual Number. More commonly known as My Number, this system involved the assignment of an individual number issued to each citizen and resident of Japan. Aimed at improving people's convenience, this system finally took full advantage of information and communications technology.

3. The Great DX Transition at the Local Government Level

As discussed above, local government systems have transitioned from mainframes to open system packages and clouds (in smaller local governments). As a result, standardization and commonization are now underway, leading to an expectation on the part of the public that local municipal clerical work to be conducted more efficiently, while investment in IT systems is reduced. Nonetheless, the actual state of digitization at many levels of Japan's government structure remains inadequate and outdated. For example, there is concern that the My Number system has not been sufficiently used by citizens to apply for temporary cash handouts for COVID-19 relief. This concern with respect to the effective utilization of digitization applies to various other contact points with residents, as well. We expect that the new Digital Agency will direct significant resources to promoting and supporting more effective utilization of digitization.

In this section, we look at what local governments are doing now with respect to standardization and commonization, moving administrative procedures online, and promotion of the utilization of AI and RPA in the administrative sector.

3.1 Standardization and commonization

The Study Group on Strategies for Local Government in 2040 was launched in 2017. This study group released a paper focusing on the issues local governments would face in 2040 and what measures would be needed to address them. The paper argues that in an age of decreasing population and absolute labor shortages, a paradigm shift in local government operations is required. To achieve this paradigm shift, the paper recommends standardization and commonization of local government administrative procedures.

Subsequently, in 2018, the Study Group on Standardization of Operational Processes and Systems and Utilization of AI and Robotics in Local Governments (Smart Local Government Study Group) was launched. This was followed by the establishment of the Advisory

Committee on Local Government Systems in 2019. These marked the beginning of the creation of standardization specifications for 17 of local government operations.

In April 2021, the standardization specifications for resident records were released. Release of standard specifications for group 1 (nursing care, welfare for the disabled, school attendance, and local taxes [fixed property tax, individual inhabitant tax, corporate tax, and light vehicle tax]) is planned for the summer of 2021 and for group 2 (child allowance, voter list, national pension, advanced elderly medical service, livelihood protection, health management and child rearing allowances, and child and child care support) in the summer of 2022.

While the costs of IT systems have remained high due to individual customization in local governments, efforts are ongoing to bring down these costs by pushing standardization. It is now possible to make government administrative operations more sophisticated and more efficient and to improve resident services by allocating staff man-hours conventionally involved with system introduction to local government clerical work that is truly necessary.

NEC not only aims at complete compliance with the standard specifications of resident records but also with any standard specifications scheduled for future release. We will also support the achievement of the goals pursued by national and local governments and other administrative bodies by offering systems that feature full compatibility with a government-authorized standardized digital infrastructure provisionally named "Gov-Cloud" and by helping those governmental bodies that offer cloud-based services.

3.2 Moving administrative procedures online

In addition to standardization and commonization, another priority action item for the Digital Agency will be online applications by members of the public for temporary cash handouts for COVID-19 relief which have been highlighted as being a serious problem.

The plan is that applicants will be able to apply online at the My Number portal (Mynaportal) using their My Number cards. The targeted procedures for the time being total 31 procedures that include child care (15 procedures), nursing care (11 procedures), disaster relief (disaster certificate), and car ownership (4 procedures). It is hoped that these online applications will be established in all local governments by the end of fiscal 2022.

In addition, improvements in the Mynaportal's user experience (UX) and user interface (UI) and achievement of network communications for mission critical systems will make it possible for members of the public to make applications from home.

NEC will devote maximum effort to helping transit government procedures online. Details on how this will be achieved are discussed in the preliminary cases introduced in section 4 below.

3.3 Promoting the use of AI and RPA by local governments

The Smart Local Government Study Group recommends that any clerical work that can be done by AI and robotics should be done by AI and robotics. This will facilitate the transition to smart local governments that make full use of disruptive technology (such as AI and robotics). As of February 2020, only 277 local governments had introduced this technology. However, it is expected that future progress in standardization and commonization will enable more and more local governments to introduce this technology at an accelerated pace. NEC has been involved in several actual cases that utilize not only RPA, but also AI. Details about these cases are discussed in the following section.

4. Digital Use Cases

4.1 Smart administrative service counter solution

Basic resident registers handled by local governments should be created based on factual information about residents under the supervision of mayors of cities, towns, and villages. Basic resident registers improve the convenience of daily life of residents by authenticating residential conditions and providing foundational material for various government clerical works. With a view to addressing the public's rising consciousness about personal information and improving the reliability of basic resident registers, identity verification procedures for notifications have been standardized nationwide now and are handled in a rigorous manner.

These changes have led to increasing demand for improved online application procedures facilitated by an immediate transition to DX. Prevention of identity theft and confirmation of identity authenticity are prerequisites for achieving this transition. With respect to electronic notifications, procedures using the Japanese Public Key Infrastructure (JPKI) are required by the Basic Resident Registration Act. On the other hand, procedures for moving in and out are usually required to be face-to-face. Procedures normally
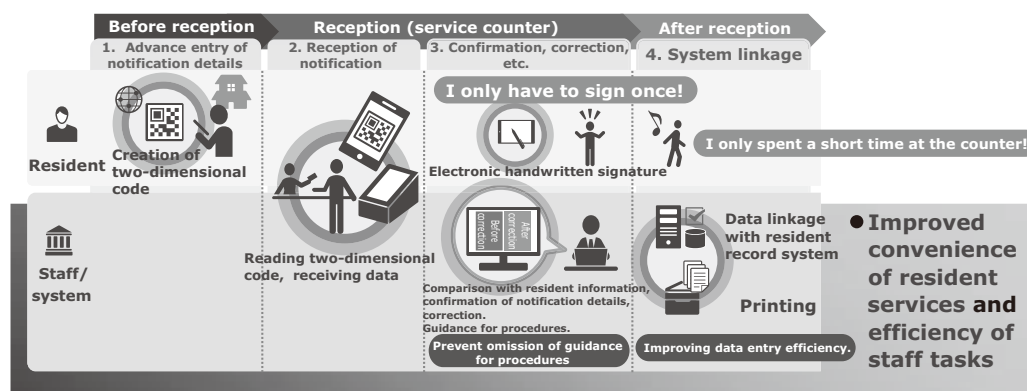
Fig. 1 NEC's Smart Administrative Service Counter Solution supports the digitization of service counters.

conducted in person have presented various problems during the ongoing coronavirus crisis and are now undergoing urgent review. The idea is to push policies that will make it possible for most procedures to be handled via the Mynaportal.

In this context, NEC is developing the smart administrative service counter solution that is expected to improve local government service counter procedures. One of its greatest features is a reception function that uses a pen tablet for change-of-address application procedures that require face-to-face interaction. This function will make it possible for local government staff to correct information declared by residents. It will also make it possible to search special Chinese characters (characters not included in the JIS character set) used in people's names based on characters (strokes) drawn on the tablet. Technology that saves the stroke information and authenticates the individual's identity is also incorporated.

Another challenge is the font used on the residence certificate. Those fonts feature special characters different from those used by ordinary PCs, so accurate confirmation of those characters is necessary. Previously, local government staff had to check handwritten characters visually and enter them using dedicated software. We are trying to build a system that allows residents to choose and decide on character candidates themselves. This will make possible self-service notifications and enable residents to conclude procedures on their own (**Fig. 1**).

4.2 Mynaportal messaging function

The smart administrative service counter solution introduced in section 4.1 above are intended primarily to reduce staff workload when local residents are filling out

paperwork at a local government office. However, the national government is currently working to popularize the My Number card and eliminate in-person procedures altogether by making it possible for people to do everything online without having to go to a government office.

Once this has been achieved and conventional flows of paper-based applications which require residents to come to the government office are successfully transferred online, it is expected that operations normally handled on a face-to-face basis will be massively impacted. To achieve this, the Japanese government is vigorously promoting the Mynaportal. The Mynaportal incorporates a messaging function that lets people know when there is information that they need to pay attention to. This function is likely to be actively utilized in the future.

Although the Mynaportal messaging function is already available, it is not widely used because the My Number card itself has not yet been popularized. Furthermore, any system that electronically sends messages from a local government to local residents must be configured so that it can generate messages compatible with the various different interfaces used by the people who will receive those messages. Considering the fact that few people currently use the Mynaportal, it is natural that local governments conscious of cost effectiveness are reluctant to introduce this function.

To solve this problem, NEC has developed a dedicated tool that can externally specify the address numbers of local residents to send messages to. Development of this tool was possible by fully utilizing our original technology that extracts text information from PDF file formats after generating XML file formats that can achieve system linkage from electronic documents (**Fig. 2**). This made it possible to build a system that can link with
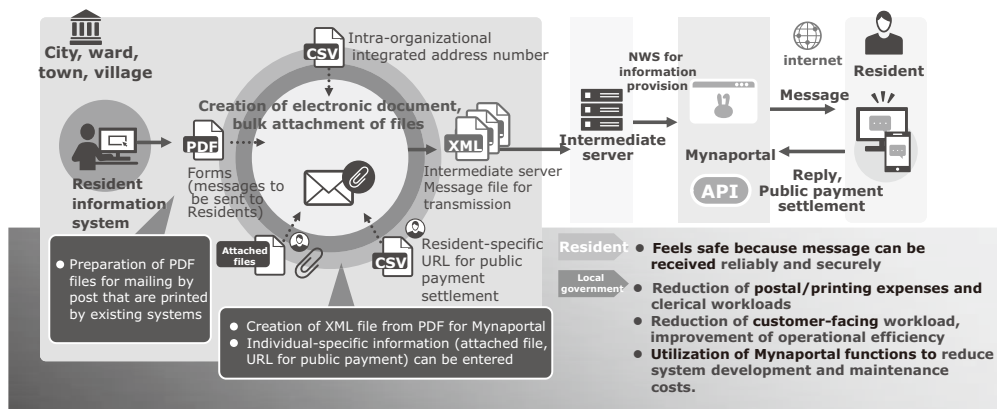
Fig. 2 Validation of digitization of messages to residents using the Mynaportal.
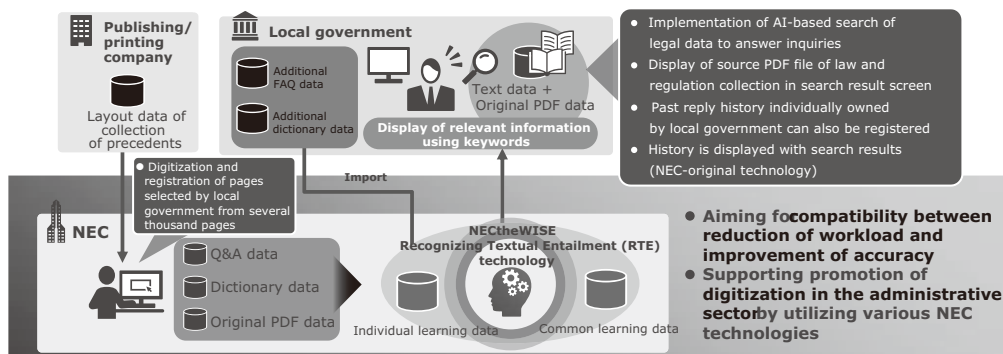

Fig. 3 Validation of AI system that searches collections of law/regulation and case studies.

messages from the Mynaportal without requiring major modifications to current mission critical systems.

This can be used not only for transmission of system-generated documents but also for messaging of documents created using different apps (e.g., Word). Conventional paper-based messages incurred significant printing and posting costs. However, this is not the case with digital messages, which offer tremendous cost savings and save on labor by avoiding the problem of messages being returned due to absence of receivers.

4.3 AI-related precedents

Government administrative work is executed based on laws and regulations. However, these laws range widely and there are cases where judgment is difficult depending on how a law is interpreted. When judgment is difficult only using judicial precedents and legal interpretations, memos are sometimes issued as supplementary material. This requires local government staff to make a judgment based on the latest laws and various memos. Local government staff has to read

such wide-ranging material to make confirmation and appropriate judgment. So reduction of such workload on staff has been demanded for some time.

To address this issue, NEC developed and validated an AI-related precedent assistant that enables local governments to search entries in law collections by utilizing NEC's auto response function, which incorporates the Recognizing Textual Entailment (RTE) technology (**Fig. 3**). This assistant function is different from a keyword search function, making it possible to search text lines whose meaning is closely related even if text lines include completely different keywords. It does this by displaying lines of text in sequential order beginning with those judged closest to the original text lines after AI reads contexts and analyzes connotations. Instead of a one-question-and-one-answer style, this system uses a one-question-and multiple-answers style, dramatically increasing speed and efficiency, finding the desired answer much more quickly than a chatbot system.

Additionally, content is not something created by staff. We believe that the key to solutions that support local

government operations is the ability to quickly retrieve the correct answer. This can be achieved by entering the latest legal literature data provided by publishers that publish books about local government operations. Because these publishers immediately respond to any law revisions, keeping that information up to date is much easier.

5. Conclusion

We believe that the establishment of the Digital Agency and the impact of the COVID-19 pandemic will accelerate digitization in the local government market. At NEC, we are committed to contributing to the improvement of performance of local government operations and resident service convenience.

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