A Look at the Contribution and Future of IT in Customer Service for the Tokyo Waterworks

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Abstract
Public Utility Services Center Co., Ltd. (PUC) has supported customer service for the water supply business in Tokyo (Tokyo Waterworks) by keeping the comprehensive management of customer information through IT and by constructing and providing an information system platform to get business done without problems 24 hours a day, 7 days a week.
Our company aims to provide better services for citizens, with a greater awareness of communication with citizens and workers in water service and more efficient operation of customer service by application of ICT in the future. Specifically, we will provide citizens with services using their preferred mode of communication and realize the business operations to manage human resources effectively by standardizing administrative procedures, increasing their accuracy and speed, and consolidating business operations.
The Tokyo Waterworks needs to provide citizens with services that adapt to changes in their lives as well as operate business efficiently. PUC is effectively using IT to further contribute to greater convenience of citizens and the operational efficiency of the Tokyo Waterworks.

Keywords
comprehensive management; consolidate; convenience of citizens; customer service; information and communication technology (ICT); operational efficiency

Introduction

The water supply business in Tokyo (Tokyo Waterworks) has supported the livelihood and urban activities of citizens of Tokyo from 1898, when water supply began, to the present day, when the city has 13 million people. In recent years, the lifestyle of citizens has become increasingly diverse due to various factors such as changes in living environments, labor conditions, and family structures and the progress and propagation of information technology (IT). The Tokyo Waterworks, as a public utility, needs to provide citizens with services that adapt to changes in their lives as well as operate business efficiently.

Public Utility Services Center Co., Ltd (PUC), formerly a computer center, was established in 1966 to promote the computerization of customer service for the Tokyo Waterworks. After being established, we obtained a license as a system integrator (SI) company, and ever since then, we have supported improved services for citizens and higher operational efficiency through IT as a partner of the Tokyo Waterworks. In 2006, we became a partner company of the Tokyo metropolitan government responsible for the business operations of customer service. By further leveraging our accumulated IT expertise, we are expected to achieve efficient business operations as a business model of the water supply business with commissioning to the private sector.

This paper describes the effectiveness of an IT platform used to support customer service for the Tokyo Waterworks, the future direction of IT utilization, and PUC's current and future roles.

1. Status and Challenges in Customer service for the Tokyo Waterworks

1.1 State of Residents' Lives

The central functions in Japan's capital city, Tokyo, support the concentration of political, economic, academic, and cultural activities and the constant exchange of people, goods, money, and

information. In other words, Tokyo is not only a place where people live, it is also where people work and participate in cultural, leisure, and various other activities. People gather and interact around the clock, 365 days a year in Tokyo. The people there lead diverse lifestyles for such reasons as outlined below.

(1) Geographical environment and concentration of the population in special wards

Tokyo lies on a plain stretching east to west with its eastern area adjoining Tokyo Bay and its mountain areas sharing a boundary with Yamanashi prefecture. The eastern area (accounting for 28% of the area of Tokyo except the islands: see Table 1) is designated as special wards. The central functions in Japan, including the functions of a capital city, are concentrated in the special wards, which contain about 70% of the population of Tokyo. (See Table 2.)

<Table 1 *1>

Division	Area (km^2)	Per mil (‰)
All Tokyo	2.187.65	1.000.00
Special wards	621.98	284.31
Municipalities	783.93	358.34
Countries	375.96	171.86
Islands	405.78	185.49

<Table 2 *2>

Division	Population	Households
All Tokyo	13.080.718	6.344.540
Special wards	8.908.283	4.472.893
Municipalities	4.085.165	1.832.104
Countries	59.558	24.676
Islands	27.712	14.867

*1 Tokyo Metropolitan Government Bureau of General Affairs (2011a)

*2 Tokyo Metropolitan Government Bureau of General Affairs (2011b)

(2) Changes in residents' lives

Residents' lives are changing as described below, according to the Tokyo Metropolitan Government Bureau of General Affairs' *Tokyo Metropolitan Social Indicators* published in 2008 and *Employment Structure of Residents (Basic Study Report on Employment Structure)* (in Japanese) published in 2003 and 2009.

(a) Change in living environments

Tokyo is becoming more livable because of lower prices for land and housing and urban renewal in Tokyo. There seems to be a trend toward fewer people moving out from Tokyo and more people moving into Tokyo ("close to work and home"). (The day-to-night population ratio [daytime population/nighttime population] is decreasing, and the difference between the daytime and nighttime populations is getting smaller. See Table 3.)

<Table 3 *3>

Indicator	Unit	1990	1995	2000	2005
Day-to-night population ratio	%	123.1	124.2	122.0	120.6
Basic data (numerator of formula)	person	14.483.495	14.571.809	14.666.899	14.977.580
Basic data (denominator of formula)	person	11.762.030	11.734.920	12.017.253	12.415.786
Source: Ministry of Internal Affairs and Communications, 1 October, *Census Report* (in Japanese) Description: The day-to-night population ratio is also called the daytime population index. To calculate the daytime population, start with the nighttime population, then add the inflow and subtract the outflow of people during the day. Do not count people whose ages are unknown.					

*3 Tokyo Metropolitan Government Bureau of General Affairs (2008a)

(b) Working hours and work departure times

Workers have long working hours. For example, among the employed individuals who work 250 days or more a year, about 30% of the men and about 16% of the women work 60 hours or more a week. Inevitably, their work departure times tend to be late. (See Table 4.)

<Table 4 [*4]>

Data item	2002		2007	
	Men	Women	Men	Women
Employed individuals working 250 days or more a year	1.781.000	727.000	2.172.000	970.000
Employed individuals working 60 hours or more a week	722.000	152.000	800.000	192.000
Employed individuals working 250 days or more a year and 60 hours or more a week	590.000	119.000	678.000	151.000

*4 Tokyo Metropolitan Government Bureau of General Affairs (2003, 2009)

(c) Population composition

- There is an increasing trend in the ratio of single households to total households. (See Table 5.)
- There is an increasing trend in the ratio of single-elderly households (age: 65 or older). (See Table 5.)

<Table 5 [*5]>

Data item	1985	1990	1995	2000	2005
Single households	1.521.648	1.687.151	1.887.862	2.194.342	2.444.145
Ratio to general households (%)	33.9	35.9	38.1	40.9	42.5
Single-elderly households	134.165	187.441	264.636	388.396	498.443
Ratio of single-elderly households (%)	8.8	11.1	14.0	17.7	20.4

*5 Tokyo Metropolitan Government Bureau of General Affairs (2008b)

- There is an increasing trend in the ratio of double-income households (both spouses working) to married-couple households with husbands working. (See Table 6.)

<Table 6 [*6]>

Data item	1985	1990	1995	2000	2005
Married-couple households with husbands working	2.346.757	2.301.594	2.238.688	2.135.478	2.052.767
Married-couple households with both spouses working	681.100	751.483	754.978	765.920	819.353
Ratio of married-couple households with both spouses working (%)	29.0	32.7	33.7	35.9	39.9

*6 Tokyo Metropolitan Government Bureau of General Affairs (2008c)

(3) Progress and propagation of IT
Table 7 shows the ownership rates of mobile phones and personal computers and the Internet usage rates according to the *March 2010 Survey Results of the Consumption Confidence Survey (Monthly, covering all of Japan)* published by the Cabinet Office, Government of Japan, in 2010.
<Table 7 [*7]>

Data item	Households surveyed	Households with device ownership or Internet users	Ratio (%)
Mobile phone	4.547	4.378	96.3
Personal computer	4.547	3.965	87.2
Use of Internet during past year	4.547	4.214	92.7

*7 Ministry of Internal Affairs and Communications (2010)

1.2 Status and Challenges of Customer service for the Tokyo Waterworks
The above-described state of residents' lives has been a consideration in the customer service for the Tokyo Waterworks, since the Tokyo Waterworks support their livelihood while coping with challenges such as providing equivalent services to every part of Tokyo in the service area of the Tokyo Waterworks, expanding the service menu, and extending service hours.
There is a trend toward "close to work and home," late work departure times, and increasing numbers of single households and double-income households. Concrete examples of our efforts to cope with this trend include not only delivery of services both at work and at home but even delivery of services on the commute home or at the scheduled hour after the commuter reaches home.

Today, the Tokyo Waterworks provide equivalent services throughout the 23 special wards and the 26 municipalities in the Tama area. The Tokyo Waterworks has established service stations throughout of its coverage area. Every service station has attentive reception staff providing services similarly to citizens. The services meet the needs of citizens. Examples of the services include the acceptance of payment of charges by credit card or at a convenience store, and a 24-hour call center established to accept applications and answer inquiries 365 days a year.

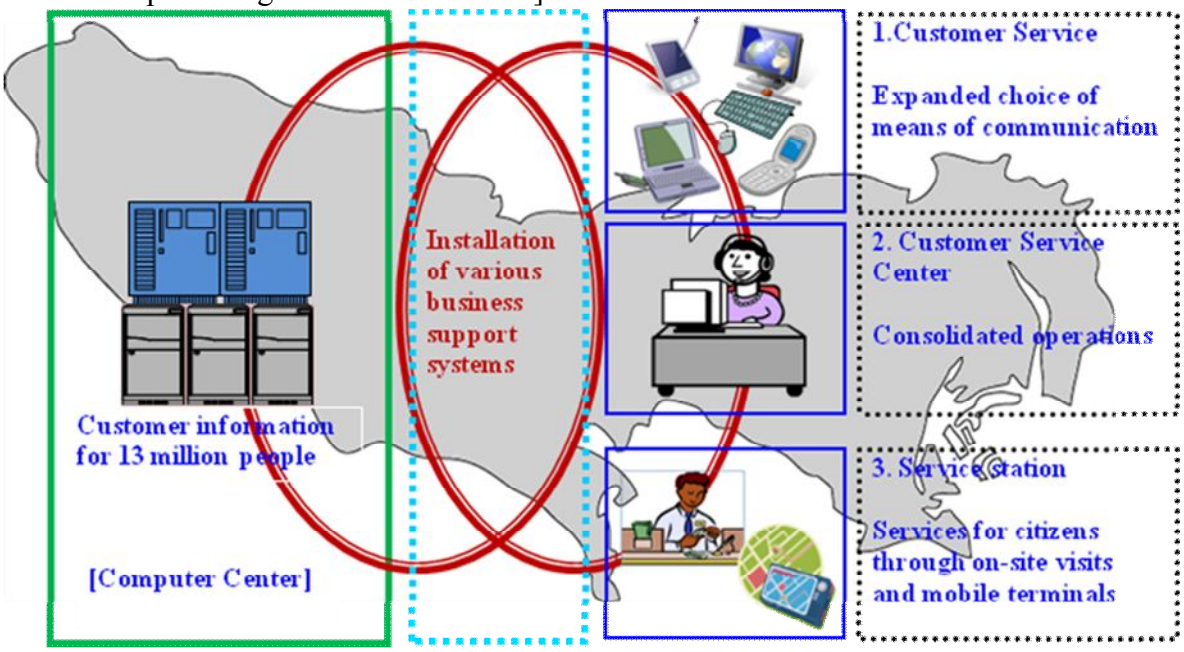
The water supply business is a public enterprise dealing in water, which people need to live, unlike other general commodities. Therefore, the Tokyo Waterworks must impartially and continuously provide services for any people. In addition, the customer service for the Tokyo Waterworks includes tackling the stated challenge of adapting to the increasingly diverse lifestyles of citizens in further pursuit of greater convenience and ever more efficient operations.

2. Effectiveness of IT Utilization
2.1 Constructing the Information System Platform (See Figure 1.)
From our background in the IT field, PUC has provided support to the Tokyo Waterworks to maintain and improve various services for citizens with regard to customer service. The effectiveness of IT utilization and PUC's advocacy of IT lies in the construction of a secure and highly reliable information system platform. The platform realizes comprehensive management of customer information for about as many as 6.8 million registered customers, who have water supply contracts, and provides services continuously 24 hours a day, 365 days a year.

The information system platform constructed and operated by PUC consolidates and manages all customer information in a high-performance computer installed at a computer center fully equipped with security features. In addition, all the service stations in each ward and municipality in the service area of the Tokyo Waterworks are connected via a leased line to form a network. Thus, the information system has higher security and reliability, so 24/7 real-time referencing and updating of

customer information from all areas in the service area of the Tokyo Waterworks becomes feasible. To realize various services appropriate to the conditions described in Section 1.1, we will add service functions based on this information system platform, which is more efficient than providing the same services separately. Moreover, through IT, we can ensure the security, reliability, and efficiency of these services provided over a wide area.

[Figure 1 Conceptual diagram of IT utilization]



2.2 Future Direction of IT Utilization (See Figure 1.)

IT utilization in the future is going to shift toward application of information and communication technology (ICT). We plan to make this a reality with the addition of new functions and upgrades to the information system platform described in Section 2.1. IT utilization is moving in this direction because greater awareness of communication with citizens and workers in water service has become important and necessary in the conditions described below.

(1) The progress and propagation of IT are strongly influencing residents' communication styles in their lives. Nowadays, the mobile phone and personal computer are in widespread use in general households, and most consumers use the Internet, as shown in Table 7. You could say we live in a time of greater choice and consumers can choose the means of communication that suits their own lifestyle. Some means of communication eliminate the need for direct conversation, and some can be used anytime, anywhere.

(2) When PUC was designated as a partner company of the Tokyo metropolitan government to assume the business operations of customer service, our role of complementing the customer service gained more prominence. To satisfy citizens, stable operation with a high level of performance is a necessity for us to respond efficiently. To this end, we need comprehensive management of the various information used in business since information sharing is essential. Not only do the service stations and the call center need to share the information with one another, but also the information must be provided to support workers in water service in all situations where they do their work including visits to customer sites.

2.3 Expansion of Services for Citizens (See Figure 1.)

People want greater choice of means of communication, and the first challenge for us to accomplish

is to expand the choices. We are moving toward realizing various services by using ICT for service upgrades to enhance the convenience of citizens.

Specifically, the procedures targeted for possible service upgrades include the following: procedures for residents to apply for acceptance of a water supply contract, to receive a bill or payment reminder, to pay charges, and to refer to water service usage information showing water consumption quantity or water supply facility information such as water leaks, water supply disruption, turbid water, and water quality. One approach is to build services enabling residents to communicate with the Tokyo Waterworks via mobile terminals and the Internet, providing residents with the services they want.

In the past, to receive customer service from the Tokyo Waterworks, citizens communicated by the following means: talking directly with the reception staff at a service station, or talking directly with an operator at the call center by phone. However, in today's society where consumers have a choice about the means of communication because of IT propagation, we think the gap between the form of service desired by people and the services provided for citizens by the Tokyo Waterworks will grow.

Meanwhile, with the expected rise in the number of single-elderly households, an increasing number of residents will be unable go out on their own, such as because they are physically handicapped. Therefore, we anticipate a great demand in the future for forms of service where a worker in water service from a service station goes directly to the resident's home. Using a mobile terminal, the worker in water service will have the capability to perform customer service on site (discussed in Section 2.4, "Business Reform of Customer service"), helping improve services for citizens.

2.4 Business Reform of Customer service (See Figure 1.)
For efficient response and stable operation with a high level of performance, we think it is essential to build mechanisms to complement and enhance the careers and skills of workers in water service as well as mechanisms enabling consolidated control of business operations. This is because human resources, know-how, and skills can be integrated with these mechanisms and efficiently used. PUC is currently consolidating service station operations for payment reminders and registration of various application forms into call center operations. We propose the following measures to achieve this plan.

(1) Build a mechanism enabling workers in water service to exchange and share information anytime and anywhere through the computerization of information handled in business, the progress of paperwork, administrative procedures, know-how, skills, and so forth. Specifically, we plan to introduce a business support system providing functions such as workflow and navigation functions for administrative procedures.

(2) Build a mechanism for consolidated control of various operations. The target operations include direction and supervision of general business operations, primary acceptance operations for applications and inquiries received from citizens at service counters, registration of the contents of received applications, handover of tasks to each service station, and outbound operations such as payment reminders. We are going to expand the functions of the call center as the customer service center and employ it as the base for consolidated control of business operations. An information link between the customer service center and each service station will be established using the mechanism presented in (1).

(3) Examine the use of computerized information of meter location and map, and mobile terminal operations with comprehensive management of customer information in operations performed by individual service stations during visits to customer sites. For the services required by citizens, we go to customers' homes to perform administrative procedures. Therefore, issues such as reducing workloads, increasing operational accuracy to prevent errors, and preventing information leaks resulting from loss or theft in on-site work must be considered.

3. Conclusion

The current challenges of the customer service for the Tokyo Waterworks are the needs for increasing convenience for citizens and operational efficiency under an assumption of impartial delivery of services. After beginning with a description of these challenges, this paper looked at the current effectiveness and future direction of IT utilization in complementing the customer service for the Tokyo Waterworks. The basis for the IT utilization is all the information, including customer information, supporting the customer service for the Tokyo Waterworks, and the information system platform constructed and operated by PUC for comprehensive management of the aforementioned information. With this platform as the core, which has been shown capable of making diverse services a reality, PUC aims to build a business operation model that effectively uses skills, know-how, and human resources. PUC recognizes that efficiently performed business operations leveraging our accumulated IT expertise will enhance our capabilities, responding to the needs of citizens and complementing the customer service for the Tokyo Waterworks. .

As described above, PUC, as a partner company of the Tokyo metropolitan government, is effectively using IT to further contribute to greater convenience for citizens and the operational efficiency of the Tokyo Waterworks.

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