

---

# The 2020 Report on Introducing Childcare AI Chatbots to Public Service

---

Childcare Open Data Conference

April, 2020



# Table of Contents

---

<b>1</b>	<b>Conference</b>	<b>3</b>
1-1	Purpose of the Conference	3
1-1-1	Background	3
1-1-2	Objectives	4
1-2	Conference Participants and Time Frame	4
1-3	Main Agenda	5
<b>2</b>	<b>AI-Driven Parenting Chatbots</b>	<b>6</b>
2-1	What are AI chatbots?	6
2-2	Compatibility Between Parenting and AI Chatbots	6
2-3	Overview of Initiative	6
2-4	Use Cases	7
2-4-1	Shibuya City	7
2-4-2	Kumamoto Prefecture	8
2-5	Challenges	10
2-6	Column	12
2-6-1	Shibuya City	12
2-6-2	Kumamoto Prefecture	12
<b>3</b>	<b>Considerations</b>	<b>13</b>
3-1	Categories needing improved responses	13
3-2	Required Data	14
3-3	Determining Categories	15
3-4	Operational Issues and Solutions for Local Governments	18
3-5	Other	19
3-5-1	AI Chatbot Trends	19
<b>4</b>	<b>Future Outlook</b>	<b>20</b>
4-1	Future Outlook	20
4-1-1	Potential Popularization of AI Chatbots	20
4-1-2	Anticipated Benefits of Standardization	20
4-1-3	Application in Other Fields	21
4-1-4	Other	21
4-2	Recommendations for Society	22
<b>5</b>	<b>Appendix</b>	<b>23</b>

---

## Introduction

---

This report focuses on increasing the use of AI chatbots among other ICT tools to help parents identify common parenting problems and give concrete advice on how these could be resolved. This second edition adds the latest data and other recent agenda to the existing record of discussions held by the Childcare Open Data Conference ("Conference") since 2019.

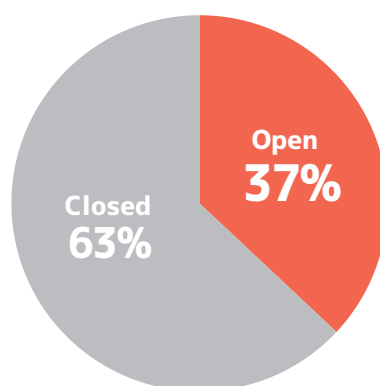
Additionally, this report is dated February 2020 unless stated otherwise.

## 1-1 Purpose of the Conference

### 1-1-1 Background (Domestic development of AI-driven parenting chatbots and significance of opening up data)

The 2016 Basic Act on the Advancement of Public and Private Sector Data Utilization obligates both the Japanese national government and local governments to advance open data initiatives. As such, local governments are now required to formulate their own "prefectural plan for the advancement of public and private sector data utilization," in which they outline the measures they will take to advance open data. However, according to the "List of Open Data Initiatives by Local Governments" released by the Cabinet Secretariat's Information and Communications Technologies (IT) Comprehensive Strategy Office ("Cabinet Secretariat's IT Comprehensive Strategy Office") on December 16, 2019, only around 37% of local governments (668 out of a total of 1,788 governments) had already opened up their data.<sup>1</sup> Thus, while the progress of local governments' open data initiatives is improving, the current rate still falls short of the Japanese government's goal of all local governments having opened up their data by FY 2020.

Figure 1: Local governments that have already opened up data



When asked about the delay in their open data initiatives, some local governments cited their uncertainty over the benefits that could be gained from opening up data, as well as the time and effort involved in their organization and publication. They went on to give some possible scenarios, including opening up data only to find that no one is utilizing it or giving feedback.<sup>2</sup>

However, at the same time, expectations have been mounting among local governments toward AI chatbot technology and its potential. This led to several local governments launching their own proof of concepts in 2016 to trial the technology, with one of these—Shibuya City—going on to officially integrate AI chatbots into their services from 2017.<sup>3</sup> As a result of these proof of concepts, the local governments involved praised the technology's benefits with comments such as, "residents can make inquiries even outside of our business hours," and "residents can use chat instead of telephone to easily find out more information on procedures." This has given rise to expectations that AI chatbot technology could not only stream-

1. Cabinet Secretariat's IT Comprehensive Strategy Office, "List of Open Data Initiatives by Local Governments (Dec. 16, 2019)." <<https://cio.go.jp/policy-opendata>> (Japanese)

2. Based on interviews with local governments.

3. "Kawasaki City and Kakegawa City Team Up with Mitsubishi Research Institute for Proof of Concept." <<https://www.mri.co.jp/news/press/20160906.html>> (Japanese)

line and improve government services, but also boost resident satisfaction.<sup>4</sup>

When implementing AI chatbots, local governments will need to create an FAQ dataset that covers what a resident might ask the chatbot and prepare a list of possible responses. Having this dataset in place will enable the chatbot to provide users with the most relevant answer to their inquiry. Approaches to dataset creation will differ by AI development company and local government—at the time of writing, no one standard approach has been settled on.

### 1-1-2 Objectives

The Conference's objective is two-fold: to further adoption of AI chatbots among local governments, and to promote the opening up of associated FAQ data. These goals would be achieved by creating the required datasets in consultation with AI chatbot development and operating companies.

Participating companies in the Conference envisioned that individual costs to build and provide AI chatbots would be reduced if local governments organized and released FAQ datasets under a unified format. Hence, achieving lower implementation costs for local governments is likely to lead to more progress on open data.

While the types of inquiries residents have might vary greatly, the Conference settled on parenting as its main theme based on the idea that parents likely have a high demand for such a service considering their difficulty in making in-person inquiries.<sup>5</sup>

## 1-2 Conference Participants and Time Frame

The Conference's participants were composed of local governments that had already implemented AI chatbots, AI chatbot companies, experts on open data, observers, and LINE Corporation serving as the secretariat. Other AI chatbot providers were consulted in addition to the companies listed below.

Category	Participating Organizations
Local governments	Shibuya City Kumamoto Prefecture
Corporations	LINE Corporation ALBERT Inc. ASUKOE Partners Inc.
Experts	Noboru Koshizuka (Professor at the University of Tokyo's Graduate School of Interdisciplinary Information Studies) Masahiko Shoji (Professor at Musashi University's Faculty of Sociology)
Observers	Cabinet Secretariat's IT Comprehensive Strategy Office Cabinet Secretariat's Headquarters for Japan's Economic Revitalization Local Governments ICT Promotion Office, Regional Communications Development Division, Information and Communications Bureau, Ministry of Internal Affairs and Communications
Secretariat	LINE Corporation

After the interim report was released in June 2019, the Conference started its investigations anew in October 2019 and concluded them in February 2020.

4. Hyogo Prefecture, Amagasaki City, Tamba City, Graduate School of Informatics at Kyoto University, the Center for Robust Intelligence and Social Technology at the National Institute of Informatics, LINE Corporation, "2018 Progress Report on Studies into Utilizing the LINE App to Resolve Social Issues." <[https://www.nii.ac.jp/news/upload/nii\\_newsrelease\\_20190606.pdf](https://www.nii.ac.jp/news/upload/nii_newsrelease_20190606.pdf)> (Japanese)

5. Based on a survey conducted by Shibuya City to identify children's/parenting needs and create a business plan for providing support. In response to the question, "What kind of parenting support (including education) would you like to have offered to you (from either close family/friends or from your local government)?" 584 respondents selected "Short-term daycare, childcare for children during illness and convalescence, etc.," 220 said "Ability to consult/talk with someone," 111 said "More/improved facilities, such as playgrounds and support centers," 84 selected "Support for parents (e.g. parenting classes)," 68 said "Receive/make it easier to find information," and 20 selected "Financial support." From among these responses, it was thought that "Ability to consult/talk with someone," "Support for parents (e.g. parenting classes)," and "Receive/make it easier to find information" were communication issues that could potentially be addressed with AI chatbots.

Shibuya City Office, "Survey to Identify Children/Parenting Needs for a New Support Plan." Mar. 2014. p. 15 <[https://www.city.shibuya.tokyo.jp/kusei/shisaku/ku\\_keikaku/kosodatashienjigyo\\_plan.html](https://www.city.shibuya.tokyo.jp/kusei/shisaku/ku_keikaku/kosodatashienjigyo_plan.html)> (Japanese)

## 1-3 Main Agenda

The Conference aims to create a standard FAQ dataset format for local governments to use when implementing AI-driven parenting chatbots. While the FAQ format itself was included in the interim report, this latest investigation focused on establishing specific FAQ items. The following methods were used to collect information and determine the items.

Issue	Method of Investigation
Compiling of specific sample FAQs	<ul style="list-style-type: none"><li>●Conducted interviews with chatbot providers</li><li>●Conducted interviews with local governments</li><li>●Organized local governments' FAQ data</li></ul>
Operational structure within local governments	<ul style="list-style-type: none"><li>●Conducted interviews with local governments</li></ul>
Issues pertaining to format standardization	<ul style="list-style-type: none"><li>●Conducted interviews with local governments</li><li>●Conducted interviews with chatbot providers</li></ul>

## 2 AI-Driven Parenting Chatbots

### 2-1 What are AI chatbots?

The word "chatbot" is a portmanteau of the words "chat" and "bot (short for robot)." Originally, chatbots could only perform along the set patterns determined by its administrator. However, the development of artificial technology (AI) and natural processing language technologies in recent years has led to the creation of AI-powered chatbots that can now answer short questions from users.

What then, is the difference between an AI chatbot and a website FAQ page or search engine (hereafter, collectively called "search engines")? When a user enters their query into a search engine, they find themselves scouring through search results to find the result that is closest to what they are looking for. In contrast, AI chatbots can "converse" with a user to judge and then provide what it thinks will be the most relevant answer, thereby reducing the burden on the user to find answers themselves. For example, if a user makes a vague inquiry that could have several possible answers, the AI chatbot can—much like a human could—ask further questions to narrow down the possible answers. As many AI chatbots use character icons and are programmed to "speak" in sentences, users could also feel more at ease making inquiries, seeking consultations, or writing out their thoughts. AI chatbots hence serve as an effective channel between users and the system behind the scenes, which is in contrast to the one-directional nature of search engines.

### 2-2 Compatibility Between Parenting and AI Chatbots

There are certain to be many households who have experienced feelings of anxiety and isolation as a growing number of families settle down in cities away from extended family, and find themselves with fewer ties to their immediate community.<sup>6</sup> These families are likely to experience unexpected difficulties, such as having no one in close reach that they could regularly contact for help, or having to grapple with their child's sudden—albeit non-serious—illness or injury on their own. The [automated and 24/7] nature of AI chatbots make them readily available to handle any questions parents might have in these situations, illustrating how well suited the technology could be as a tool to support them. Hereafter, the report will use "AI-driven parenting chatbot(s)" to refer to AI chatbots that can respond to questions on parenting topics.

### 2-3 Overview of Initiative

AI-driven parenting chatbots are provided by local governments via messenger services like LINE or their own proprietary app. These services differ from traditional FAQ webpages by utilizing AI technology to simulate conversations with users. Users can type in their questions as they usually would when chatting with another person, and the AI technology will provide the most relevant response. In contrast, page layouts can hinder users from finding the information they want when searching their local government's FAQ page. AI chatbots however, are available 24 hours a day, 365 days a year, and can promptly provide information while it is "conversing" with the user.

### 2-4 Use Cases

At the time of writing, the following local governments are currently providing AI-driven parenting chatbots.

---

6. Cabinet Office, "Background of Review and Main Points of New System." 2015 Declining Birthrate White Paper, <[https://www8.cao.go.jp/shoushi/shoushika/whitepaper/measures/english/w-2015/pdf/part1\\_2-1.pdf](https://www8.cao.go.jp/shoushi/shoushika/whitepaper/measures/english/w-2015/pdf/part1_2-1.pdf)>



Local Government	Name of AI Chatbot	Service Launch
Shibuya City, Tokyo	–	Aug. 2017
Kumamoto Prefecture	Kikinasse AI – Kumamoto no Kosodate	Aug. 2018
Shimada City, Shizuoka Prefecture	Shima-iku LINE	Oct. 2018
Yaizu City, Shizuoka Prefecture	Yaichan no Kosodate AI Support	Jan. 2019
Kasugai City, Aichi Prefecture.	Oshiete! Tōfū-kun!	Jan. 2019

Below, more information is given on the pioneering use cases of Shibuya City and Kumamoto Prefecture.

## 2-4-1 Shibuya City

### (1) Summary

In August 2017, Shibuya City launched a new AI chatbot-based support service for the city's parents that was available to take questions at any time, 24 hours a day, 365 days a year. The initiative drew national attention as the city became the first local government in the country to introduce an AI chatbot into its services. At the time of writing, nearly two and a half years have passed since the service was first launched. The city plans to develop the service further based on residents' needs and other pertinent factors.

### (2) Features

When a user types in their query, Shibuya City's AI-driven parenting chatbot can identify the words, find the closest match within the city's pre-made FAQ, and then provide the most relevant answer. The chatbot's answers will never deviate from the responses the city has prepared beforehand for common questions on parenting.

For its interface, the chatbot uses the LINE app, while utilizing ALBERT Inc's advanced AI-powered chatbot Sugures under the hood. To prepare the AI chatbot's responses, the city only has to upload its FAQ responses to Sugures. Users can then access the chatbot through [Shibuya City's official account on] the LINE app and find the information they need. After providing an answer, the chatbot will also send this message to determine the accuracy rate of its responses: "Did this answer your question? Your feedback can help improve responses. -- Yes/No."

From May 2019, Shibuya City also integrated an AI chatbot into its dedicated parenting support website, Neuvola. This offered residents further convenience with two channels—the LINE app and the Neuvola website—to now choose from for asking questions.

Going a step further beyond the existing FAQ and chat functions of the LINE app, Shibuya City added a search function in November 2018 capable of finding nearby facilities based on a user's location. Then, from September 2019, the city added a booking service for parenting-related appointments and courses, such as pregnancy consultations and classes for new parents.

Figure 2. Screenshot of services offered by Shibuya City's AI-driven parenting chatbot



### (3) Who is the service aimed at?

The service is targeted at families with children of preschool age or younger and expecting parents. To raise awareness of the service, Shibuya City advertises on its official website and distributes postcards (with a QR code for easy access) along with copies of its maternal and child health handbook. (Appendix, Figure 1)

According to the 2015 Basic Complete Tabulation on Population and Households, there were 10,418 children aged six years and under living in the city. At the time of writing, 14,249 users had friended the city's official account.<sup>7</sup>

### (4) Time Frame

The initiative was launched in August 2017, and is ongoing at the time of writing.

### (5) Members

In principle, members of the Planning & Coordination Department operate the initiative. They are in charge of registering the department's FAQ datasets, as well as creating and registering new ones as needed based on the types of questions received from residents. The department will confirm with the relevant team if there are certain matters they cannot verify themselves.

### (6) Results

Since 2017, Shibuya City has continued to create more FAQ responses, resulting in a total of 1,299 responses uploaded to the Sugures chatbot as of February 2020. At the same time, the great variation in user inquiries has resulted in the chatbot recording a 75% accuracy rate (based on data aggregated between January 14–February 3, 2019).

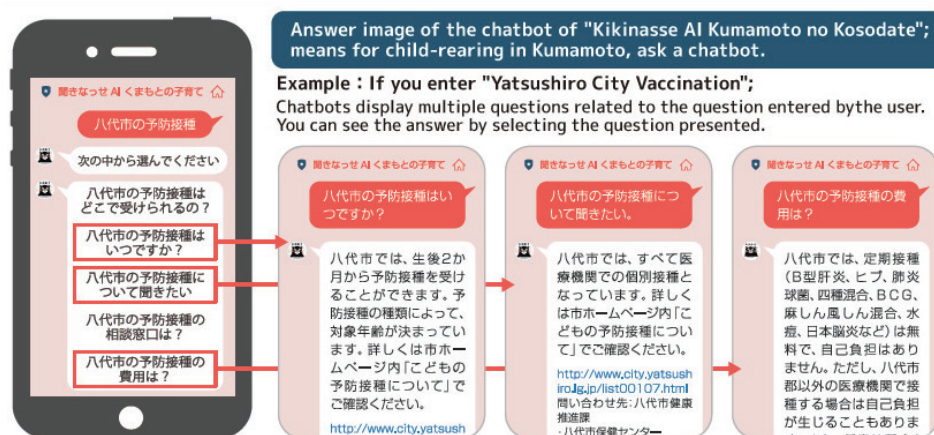
The 24 hour, 365 days a year availability of the booking feature for parenting courses (added in September 2019) has also demonstrated effectiveness. In contrast to the fixed schedule of the telephone booking service (8:30 am until 5 pm weekdays), the availability of the LINE-based booking feature at all times of the day has seen many residents utilizing it during the evening hours and the New Year. When working parents or those previously working (but now on parental leave or due to other circumstances) were asked what time they usually arrived home, 93.3% said from around 5 pm to 8 am the next morning—a large percentage that falls outside the operating hours of the telephone booking service. From this result, it could be concluded that parents are mostly making bookings after work, during New Year holidays, or other times when they can more easily find a spare moment.<sup>8</sup> This result also verifies the convenience offered by the AI chatbot in allowing users to book whenever they wish.

## 2-4-2 Kumamoto Prefecture

### (1) Summary

In the one-year period from August 2018, Kumamoto Prefecture carried out a proof of concept for an AI chatbot-based support service for parents. From August 2019, the service was launched as an official prefectural service. It draw attention nation-wide as the first case in Japan of a prefectural government utilizing AI chatbots to provide parenting support.

Figure 3. Screenshot of Kumamoto Prefecture's AI-driven parenting chatbot.



7. As of February 20, 2020.

8. Shibuya City Office, "Times Parents Arrive Home." Survey to Identify Children and Parenting Needs for a New Support Plan. p.17 <[https://www.city.shibuya.tokyo.jp/assets/detail/files/kusei\\_plans\\_pdf\\_kosodate\\_houkokusho.pdf](https://www.city.shibuya.tokyo.jp/assets/detail/files/kusei_plans_pdf_kosodate_houkokusho.pdf)> (Japanese)

Similar to Shibuya City's chatbot, Kumamoto Prefecture's AI chatbot is able to match up a user's inquiry with the closest one in the pre-made FAQ, and will never deviate from this dataset. Also, like Shibuya City, the prefecture's chatbot uses the LINE app as its interface and ALBERT Inc's advanced AI-powered chatbot Sugures behind the scenes.

## (2) Features

One distinct characteristic of Kumamoto Prefecture's initiative was the action it took before even creating an FAQ dataset. To create it, the prefecture first prepared a list of 80 common paperwork questions pertaining to non-school aged children, before then collecting responses from all 45 of its municipalities. These questions address topics such as parenting support systems, preschools and kindergartens, pregnancy and childbirth, parenting in general, and health checkups and recommended vaccinations. In addition to this, the prefecture also compiled information and arranged it into FAQ responses on all matters shared across the municipalities (e.g. systems, frameworks), as well as parenting concerns and parent-friendly stores (i.e. stores that provide changing tables, or offer special deals to families with young children). As of February 31, 2020, the prefecture has compiled 3,873 responses.

According to the results of a user survey conducted during the proof of concept, many parents wanted information on facilities and spots that were family-friendly and events that they could bring their children to. In response, the prefecture added a search function in August 2019 that leveraged LINE's location feature to help families find parent-friendly stores.

Figure 4. Screenshot of the search function in Kumamoto Prefecture's AI-driven parenting chatbot.



## (3) Who is the service aimed at?

The service is aimed at anyone who is looking for information on parenting in Kumamoto Prefecture.

Further, the prefecture has a system that recognizes companies whose representatives publicly declare support for their employees' work-life balance—including getting married and raising children—referring to these businesses as "Yokaboss (good boss)" companies. During the FY 2018 proof of concept, only employees of Yokaboss companies, prefectural employees, and employees of municipal parenting support departments were able to participate. To spread awareness of the initiative, employees from the prefecture's Parenting Support Division handed out fliers when holding information seminars and visiting municipalities. Registration was then opened to everyone after the official launch of the service. Following this, employees announced the service on the prefecture's website and distributed notification cards (Appendix, Images 2 and 3).

## (4) Time Frame

The proof of concept ran for a one-year period starting from August 2018. Then, in September 2019, the service was opened to the wider public and is still available at the time of writing.

## (5) Members

The initiative is managed by employees of the prefecture's Parenting Support Division, who are charged with updating FAQ datasets uploaded to the AI chatbot. These datasets encompass common FAQs across the 45 municipalities, as well as parenting concerns and questions. Additionally, the prefecture also collates any FAQ data that municipalities have updated on their own and uploads these to Sugures's admin panel.

## (6) Results

At the time of this report's compilation in FY 2019, many users were observed accessing the AI chatbot service not just during the late evening hours (9 pm – 11 pm), but also during the prefectural office's opening hours (9 am – 5 pm). Users were likely utilizing the chatbot even when city offices were open because they now had the option of obtaining information without having to leave their homes. As for the evening hours, it could be concluded that like Shibuya City's booking service, many users were able to find more time to use the service after work.

Additionally, the AI chatbot also checks its response accuracy by asking the user the question, "Did this answer your question? Please help improve the AI's responses by selecting 'Yes' or 'No.'" In answer to this, 72.1% of users replied with "Yes," which suggests that around 70% were satisfied with the responses the chatbot provided.

The search feature added in August 2019—stemming from the high demand revealed by the proof of concept's user survey—experienced low usage rates due to under-advertising. However, user response was positive after prefectural employees gave demonstrations on how to use the feature. At the time of writing in FY 2019, the most popular search term was "diaper changing room," followed by "discounts." The top search term reflects one of the most common concerns faced by families with infant children: where to find a space to change diapers while out and about. Many parents who cannot find a changing table often find themselves with no choice but to change their child's diapers in their car or go searching for a place with few people around. Because of this, there has been a growing number of parents who have said they "would like a search function for diaper changing rooms." Although the search function currently only covers facilities within Kumamoto Prefecture, the government is considering expanding the scope to cover parent-friendly facilities in neighboring cities (such as in the Kyushu region and Yamaguchi and Okinawa Prefectures). Doing so could potentially offer greater convenience to families living near Kumamoto's borders with other prefectures.

## 2-5 Challenges

Based on interviews with local governments and businesses offering AI-driven parenting chatbots, the creation of FAQ datasets was identified as the most laborious task. Each government currently follows its own format when creating FAQ data to post on their websites or to answer telephone inquiries. Moreover, certain matters span across several departments in some governments, leading to each team creating their own FAQ. This has resulted in wholly different question categories and example responses between not just governments, but also within their own administrations.

As such, the question will be where to begin in tackling this issue if these FAQ datasets are to be used efficiently for AI-driven parenting chatbots (refer to the image below and section "5. Members" in previous pages under Shibuya City and Kumamoto Prefecture's respective initiatives). To add to this, some local governments said that they outsourced the creation of FAQ datasets.

Shibuya City	Planning & Coordination Department creates and uploads FAQ dataset ↓ Adds more information as needed
Kumamoto Prefecture	Prefectural government creates list of questions for FAQ dataset ↓ Creates FAQ dataset based on responses collected from municipalities and uploads ↓ Adds more information as needed
Other local governments	Outsources creation of FAQ datasets

When outsourcing, local governments may find costs rising from the increased amount of communication required between themselves and the contractor. In some cases, development could come to a standstill if the contractor cannot get in touch with the project's supervisor at the local government.

Taking these circumstances into account, it will be imperative that local governments looking to adopt an AI-driven parenting chatbot are provided with an FAQ dataset format that has all the most in-demand information already organized. Governments could then reduce development costs by adding in their own responses to this format and providing this da-

taset to the AI chatbot company of their choice.<sup>9</sup> Further, opening up FAQ datasets based on this format would also enable residents to develop and offer their own chatbots for public use.

---

9. Sabae City in Fukui Prefecture is one example of open data leading to the development of new services. Other exceptional cases have been published under the Government CIOs' Portal Japan's "Open Data 100" list.

## 2-6 Column

### 2-6-1 Shibuya City

Shibuya City residents are currently able to send in their opinions to the city office by letter. But unless they have a specific purpose or complaint, or are strongly motivated by something, how many of them will actually go as far as writing and sending that letter?

I feel that by fusing this AI-powered auto-reply service with a familiar platform like LINE has made it easier for residents to share their thoughts with the city.

One particular time in which I keenly felt this was during October 2019, when Typhoon Hagibis made landfall in Japan.

Scores of anxious residents asked the AI chatbot questions throughout day and night about the typhoon's approach and expected landfall, when the evacuation advisory would be lifted, and other concerns.

Although the emergency situation meant that the chatbot was not able to properly answer as many questions as we might have liked, we were still able to hear residents' concerns firsthand and continue responding to them [in the ways that we could]: providing answers in real-time to concerns and inquiries, adding to the FAQ as needed, and broadcasting push notifications. In the end, we received many LINE messages of thanks and appreciation.

It proved to be an invaluable experience that made me feel more connected with the city's people.

An AI-powered chat service running on the LINE platform is not just a simple auto-reply tool. LINE's widespread familiarity in Japan as a communication tool is what makes it possible to really connect with residents. And in that I think lies its potential to serve as a brand new way for governments to communicate with their citizens.

### 2-6-2 Kumamoto Prefecture

Kumamoto Prefecture's main focus was on creating a system that would be there right alongside parents from birth until their child's first day at elementary school. To make this happen, we needed a tool that could be used at anytime, anywhere, and by anyone.

Although some mothers have recently found themselves raising their children without an immediate support network, or being the only one pulling their weight in child-raising and housework, parenting is not something one person can do on their own. When there is no one nearby that they can reach out to, it is vital for these parents to have someone they can talk to no matter what time of day or occasion. Many males in particular may find it hard to open up about their worries with someone else. However, we thought that the Kikinasse AI Kumamoto Kosodate chatbot could offer anxiety-free parenting support 24 hours a day, 365 days a year.

Moreover, many residents travel around within the prefecture as part of their day-to-day life, with the most prominent example being those who travel to the government ordinance city of Kumamoto City for work. Cases like this have necessitated the need for a service that can be used no matter where the resident is physically located within the prefecture. As making this into a reality required the cooperation of all the municipalities, prefectural government employees visited these local governments directly and held information seminars to explain the initiative and ask for their support. Though the initial response expressed clear hesitation at the time and effort involved, all the local governments understood that it would produce a tool that could directly connect them with their residents. At present, not only did municipalities create a shared FAQ for various procedures, but the customizable nature of Kikinasse AI Kumamoto no Kosodate also led them to actively tailor the chatbot to their own needs.

Additionally, there are currently around 2,000 parent-friendly stores in Kumamoto Prefecture that welcome children and offer special discounts and deals. To help parents find nearby stores, the chatbot offers a search feature that uses location information from LINE. The service is also linked with the Japan Pediatric Society, enabling the chatbot to respond to inquiries on illnesses and accidents. Lastly, we are working on an FAQ to address general parenting questions so that the chatbot can be beneficial for anyone and everyone.

Anytime, anywhere, for everyone—Kikinasse AI is here for Kumamoto's parents.

## 3 Considerations

### 3-1 Categories needing improved responses

#### (1) Categories needing improved responses

When operating an AI chatbot, it is essential to expand FAQs for the most in-demand categories among parents. To identify these categories, an analysis was carried out on a total of 6,383 words typed into Shibuya City's AI-driven parenting chatbot between January to December 2018.

Results ranked words related to "Casual conversation" as the most frequently typed in. The most common phrase was "advice on child-raising" (418 times), followed by "applying for nursery school" (412 times), "seasonal shots for children" (357 times), "garbage disposal rules and related paperwork" (279 times), and lastly "information on all nursery schools and preschools" (276 times).

Other frequently input terms were related to hospitals, the Shibuya City office, and residence certificates.

#### (2) Categories in lesser demand

In contrast, words relating to introductory information on the city (such as its history) and its policies and projects (e.g. plans, meetings) were typed in only around 10 times within the same period.

#### (3) Summary

In Shibuya City's case, its AI-driven parenting chatbot most frequently received inquiries about "pregnancy and birth," "childcare," and "health checkups and seasonal shots." Parents who have just welcomed a new child are likely to use the AI chatbot to find out where they can receive parenting advice, contact information for hospitals, which facilities provide parenting support, and types of seasonal shots and when to get them. Parents are also likely to use the AI chatbot to gather information on day cares or preschools and the associated application forms.

Additionally, it can be surmised from the frequent number of inquiries about other lifestyle matters (such as garbage disposal rules and local events), that the AI chatbot is also being used by parents for other parts of their daily life.

Thus, it can be summed up from the words input into Shibuya City's AI-driven parenting chatbot that the following categories need to be prioritized: pregnancy and birth, childcare, health checkups and seasonal shots, health and medicine, sightseeing and events, and facilities. While ongoing studies on the in-demand categories are needed to account for the potential differences between neighborhoods, the above-mentioned categories would likely be an efficient starting point for creating FAQs.

#### (4) Other (required number of FAQs)

Shibuya City's AI-driven chatbot has a total of 1,148 FAQs as of June 2019 (although the number of actual registered responses is 1,107, the total has been counted as 1,148 due to some responses appearing in numerous categories). After analyzing words input into the AI chatbot between January to December 2018 (excluding those which could not be categorized and casual conversation-related topics) and ordering categories by highest frequency, it was found that 788 FAQs would be required to cover 75% of the in-demand categories. While residents' needs will play a part, this 788 figure can be treated as a concrete yardstick for deciding how many FAQs would be required to cover these aforementioned top categories. (Refer to Appendix Table 1 and Image 4)

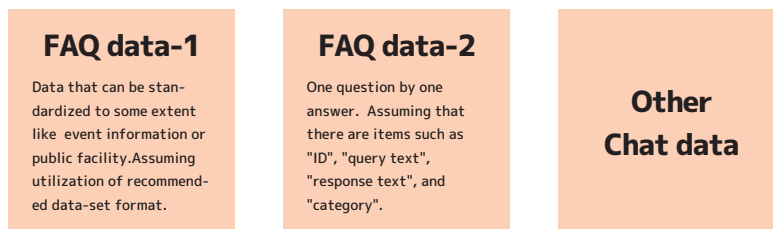
An all-purpose AI chatbot FAQ has also been created based on Shibuya City's own, with an extract included in the Appendix.

## 3-2 Required Data

### (1) Types of required data sets

Although it is a given that using an AI-driven parenting chatbot requires "FAQ data" that is based on a one-answer-per-question format and focuses on the recommended categories in 3-1, "casual conversation data" is also vitally important in anthropomorphizing the chatbot and making it enjoyable for users to talk with.

Figure 5: Types of required data sets



### (2) FAQ Data

For the purposes of smooth data management, FAQ data could broadly be divided into two types: (1) data that can be readily standardized, such as event and public facilities information, and (2) all other information (e.g. how to apply for preschools and financial aid).

However, it must be kept in mind that category (1) will require registering a large amount of data, with certain items (such as events) also needing regular updates. This type of data—in other words, simple to standardize but needing regular updating—should be managed separately from category (1) and under a different data format, which would then be expected to facilitate more agile and smooth operations.

In summary, it would be effective to have the basic format be one-answer-per-question (using the same data items as Shibuya City's AI chatbot: ID, inquiry, response, and category), and then manage events, public facilities and other data classified under the above-described group (1) under a separate format. In this regard, the Cabinet Secretariat's IT Comprehensive Strategy Office offers "Examples of Recommended Dataset Formats – 6. List of Events" and "Examples of Recommended Dataset Formats – 12. List of Public Facilities" on its data catalog website <data.go.jp>, which are already serving as the foundation for advancing open data within Japan. As such, using these formats as a baseline is recommended when opening up data on events and public facilities.<sup>10</sup>

Table 1: Example #2 of FAQ data

ID	問い合わせ文	応答文	カテゴリ1	カテゴリ2
001	母子手帳を受け取りたいのですが、手続きを教えてください。	窓口で妊娠届をご記入いただき、母子手帳をお渡しします。 住民票の世帯が別の方が代理で窓口に来られる場合は、委任状が必要になります。  ♪詳しくはこちら <a href="https://www.city.xxx.lg.jp/boshi_techo">https://www.city.xxx.lg.jp/boshi_techo</a>	妊娠・出産	母子手帳
002	母子手帳の受け取り場所はどこですか？	母子手帳は、xxx市役所3階住民課窓口、市民サービスセンター、△△保健相談所で受け取れます。  ♪詳しくはこちら <a href="https://www.city.xxx.lg.jp/boshi_techo">https://www.city.xxx.lg.jp/boshi_techo</a>	妊娠・出産	母子手帳
003	母子手帳はすぐに発行してもらえますか？	母子手帳は、妊娠届の内容を確認させていただき、その場でお渡しします。  ♪詳しくはこちら <a href="https://www.city.xxx.lg.jp/boshi_techo">https://www.city.xxx.lg.jp/boshi_techo</a>	妊娠・出産	母子手帳

10. Actind Inc., operator of the "Ikou yo" trip information site for families with children, is one company that is currently utilizing the government's recommended formats to create their own datasets and propose them to local governments.



### (3) Casual Conversation Data

The analysis of words typed into Shibuya City's AI-driven parenting chatbot between January to December 2018 found that around 10 percent of the most common words were related to "casual conversation." From this, it can be surmised that there is significant demand for this category. Many questions were about the AI chatbot itself, including "are you an AI?" and "what can you do?"

### (4) Other (potential expansion of a casual conversation feature)

During the Conference, it was pointed out that casually conversing with the AI-driven parenting chatbot was not only a means to an end, but also served to help parents (particularly expecting mothers) feel less isolated. Isolation is also one of the underlying factors behind the growing social issue of infant abuse, as families move away from their extended family and find themselves with fewer ties to their new community.

Though chatting with an AI chatbot cannot completely replace conversation with a real human, it is thought that its faceless and third-party nature, social media-like familiarity, and its 24-hour availability could make it easier for parents to broach topics they would otherwise find hard to with another human (for example, fears that they will or may already be abusing their child).

In this vein, there are expectations that AI chatbots will be able to support parents in two ways in the future: not only will they act as an outlet for the stresses of child-rearing and help stave off feelings of isolation, but they will also be able to determine when to offer channels to more official consultation support. For example, a user may type in "I haven't been getting enough rest because my child hasn't been sleeping. It's been really hard," and the chatbot will send a message along the lines of "Public health nurses are available for consultation at the ABC Center from 9 am to 5 pm weekdays. Short-term childcare is also available. Please contact \*\*\* City's \*\*\* department for more information."

## 3-3 Determining Categories

While the purpose of FAQ categories are ultimately to help local governments manage their own FAQs, creating an FAQ with more standardized and succinct categories will enable a greater number of municipalities to mutually utilize FAQs from other cities and companies. Based on this line of thinking, categories are currently being determined based on the existing categories used by Shibuya City's AI-powered parenting chatbot (Table 2).

Further, Conference participants pointed out that in-demand categories not covered by existing FAQ search terms could actually be picked up by an AI chatbot. For example, questions such as "What events are on this weekend?" and "What seasonal shots does my child need right now?" can span across multiple departments in an administration and consequently, can be difficult to address on a website. An AI chatbot however, has the potential to resolve these types of inquiries.

For this latest investigation, categories were established after analyzing user needs (based on data measuring the response accuracy of Shibuya City's chatbot). As more data is accumulated and analyzed, it will be possible (and necessary) to consider more suitable categories that are both easy to understand for local government employees, as well as bring value to the AI chatbot and align with users' needs.

Table 2: Determining FAQ categories

第1カテゴリ	第2カテゴリ	推奨データセットの活用が考えられるもの
ごみ・リサイクル	ごみの分類と手続き	
	リサイクルの分類と手続き	
学校・教育	教育相談	
	就学援助・奨学資金	
	小学校・中学校の手續・制度	
学校・教育	小中学校の転校について	
	通学区域	
	放課後クラブ	
	その他の相談窓口	
環境衛生	環境衛生	
観光・イベント	地域の豆知識	
	観光名所	○
	観光イベント情報	○

観光・イベント	親子教室	○
	幼児食講習会	○
	施設の開放	○
	出産前学級	○
	出産後の集い・支援	○
	多胎育児の集い・支援	○
	園庭開放	○
	防災・防犯イベント	○
区の紹介	自治体の概要	
	自治体の組織	
	自治体の歴史	
健康・医療	感染予防	
	健康づくり	
	健康一般	
	健診・相談	
	病院	
健診・予防接種	子どもの健診情報	
	子どもの健診手続き	
	子どもの健診一覧	
	子どもの相談	
	子どもの予防接種	
	大人の健診情報	
	大人の健診手続き	
	大人の健診一覧	
健診・予防接種	大人の予防接種	
広報	広報誌等発行物	
	ホームページ	
高齢者・介護と福祉サービス	高齢者・介護と福祉サービス	
採用・職員情報	採用・職員情報	
子どもの手当・助成	ひとり親家庭支援	
	医療費助成手続き	
	医療費助成紹介	
	医療費助成相談	
	児童手当相談	
	児童手当紹介	
	児童手当手続き	

子どもの手当・助成	その他助成	
子育て・子ども家庭支援	子ども・子育てに関する相談	
	子育て支援情報	
	役所情報	
	子育て・子ども家庭支援・その他	
施策・計画・取り組み	基本指針	
	各種計画	
	議会	
	選挙情報	
	選挙	○
施設	スポーツ・文化・生涯学習	○
	スポーツ施設	○
	医療・健診施設	○
	公園	○
	イベント施設	○
	子ども・子育て支援施設	○
	産後ケアセンター	○
	子育て支援センター	○
	保養施設	○
	駐輪場・公共駐車場	○
	庁舎	○
	土木・清掃・リサイクル	○
	女性相談	○
	施設	商工・労働・相談
納税施設		○
飲食店		○
公立小学校・中学校		○
私立小学校・中学校		○
公立幼稚園・保育園等		○
私立幼稚園・保育園等		○
病院一覧		○
住民票・戸籍・印鑑証明	印鑑登録	
	戸籍	
	住民票	
	住民票・戸籍・印鑑証明 手続き窓口	

公式アカウント について	公式アカウントについて		
商工・労働・ 相談	商工・労働・相談		
障がい者	障がい支援		
	障がいに関する手当		
	障がいに関する手続き		
生涯学習・ スポーツ	スポーツ		
税金	軽自動車税		
	税情報		
	税の手続き		
	税の問い合わせ		
妊娠・出産	妊娠・出産健診		
	母子健康手帳		
	妊娠・出産に関する手当・助成		
	出生届		
	妊娠届		
	育児の相談		
	乳房ケア		
	赤ちゃん訪問		
	妊娠・出産相談		
	出産届出・手続き		
	子育て関連の統計情報		
	子どもの預かり	子ども・子育て支援新制度	
		ファミリー・サポート/ヘルパー	
リフレッシュ時預かり保育			
一時・休日・短期緊急保育制度			
延長保育			
保育事業			
保育ショートステイ			
病児・病後児保育制度			
新設保育園			
保育メール			
保育園の入園申込			
保育利用料の軽減			
保育料			
幼稚園・保育園等の全般情報			
幼稚園・保育園等の補助金			

子どもの預かり	幼稚園・保育園等の手続き について	
	幼稚園・保育園等の制度	
保険・年金	国民健康保険	
	介護保険	
	国民年金	
	その他年金	
暮らしに関する 相談	暮らしに関する相談	
暮らしに役立つ 情報	気象情報	
	区内の郵便番号	
	自転車・自動車・バス	
	パスポート	
	水道	
	地図	
	ペット	
暮らしに役立つ情報・その他		
防災・防犯	防災・防犯情報	

## 3-4 Operational Issues and Solutions for Local Governments

### (1) Points of caution during chatbot operation

Investigations on this topic were conducted based on the assumption that AI chatbots are mainly operated by local governments (as these entities have a point of contact with residents). Additionally, it was mentioned during the Conference that government-run chatbots would be expected to provide more accurate and high quality information than company-run ones, as well as need to operate in real time to cover as many parenting needs as possible (for example, to answer questions such as "What family events are on this Sunday?").

### (2) Methods for Ensuring Accuracy

#### (i) Clarify which department is in charge

Considering the numerous departments that are in charge of various parts of FAQ data, this leads to the question of how to ensure accuracy, quality, and real-time responses. To achieve this, local governments will need to clearly designate the responsibility of operating the AI-driven parenting chatbot to a specific department (or person). It would then mainly fall to this department to edit and update the FAQ data, rather than leaving it to multiple departments as was the previous practice.

#### (ii) Establish operational process beforehand

To ensure smooth operations, it is vital to establish operational rules in advance and ensure employees are clear on how to edit FAQ data and how often it should be updated.

#### (iii) Frequency of updates

While FAQ data on procedures required by laws and ordinances are unlikely to need frequent updates, data on events will require daily or weekly updates in order to provide the latest information. In this way, local governments will need to keep in mind that some categories will require more frequent updates than others.

However, as previously mentioned, insufficient administrative resources will certainly affect how frequently FAQ data on events can be updated. To counter this, local governments are advised to consider utilizing the information accumulated by company databases.<sup>11</sup>

Additionally, when considering that an AI-driven parenting chatbot is being operated by a government body, there should be consideration paid to creating guidelines that help appropriate content. When government bodies are utilizing the databases of private-sector companies to deliver information through the chatbot, any overtly political, religious or commercial content should be excluded.

### (3) Operations at Shibuya City

In Shibuya City's case, the Management & Planning Department—rather than the parenting support department—handled all additions and edits to the chatbot's FAQ data. More specifically, the department acts with a certain level of sovereignty: handling any minor updates to FAQ information on the city's website on its own rather than making multiple edit requests to individual departments. This type of approach is thought to be an effective way of managing operations. Of course, there will be some occasions when information must be shared with the relevant teams, or when major amendments that are not publicized must be escalated to the right department.

### (4) Other (AI chatbots for different needs and situations)

After analyzing data input into Shibuya City's AI-driven parenting chatbot between January and December 2018, it was discovered that users were not inquiring as often as expected about several "anticipated needs." These included "sick child/convalescence care programs," which was typed in only 20 times, and "tuition support/scholarships," which was input 16 times.

---

11. In Takayuki Matsuo's Legal Analysis on the Usage of AI and Robotics in the Administration: Information Network Law Review #17 (p. 108, March 2019), he writes, "In cases where the information provided by a [company-developed] chatbot is offered as-is to residents . . . this would be akin to having outsourced a part of administrative tasks to the private sector." From the perspective of a "supervisory administration" that calls upon the assistance of the private sector to systemically manage social self-reliance, he went on to say, "[Administrations will need to] place an obligation on the private sector beforehand to guarantee their AI/robots will produce results, and then consider the capabilities of each before selecting one. [Administrations will also] need to consider what abilities they are looking for in an AI/robot and selection criteria. This should be based on the specific tasks [that would be covered by the AI/robot], and to what degree errors by the AI/robot can be permitted against the results that are being expected. Examples of errors include the AI/robot being unable to find the right information, or identifying incorrect information as correct. [Administrations will need to] consider whether the AI/robot's capabilities are within an acceptable range of error."

Though this could be put down to a simple discrepancy between residents' actual needs and the needs the city determined beforehand through its own analysis, there could be several other reasons why users were not searching for these topics. This could include difficult terminology or low awareness of existing programs, meaning users could not be reasonably expected to type in the "right" keywords to obtain relevant hits even though the FAQ data for these topics are already available.

One possible solution for this is to create and upload dictionary data related to parenting. Also, it will be vital to consider what form an AI-driven parenting chatbot should take if it is expected to narrow down different needs and situations through conversation (for example, identifying the user's needs and circumstances when they type phrases such as "We're having financial trouble after having our child," or "What should I do next after giving birth?").

In the short-term, users could be given clear examples of questions the AI chatbot can answer before inputting their inquiry. This would help them to better understand the chatbot's answer range and obtain better search results. Furthermore, clearly setting out what the chatbot can and cannot answer could be an effective way of managing users' expectations.

## 3-5 Other

### 3-5-1 AI Chatbot Trends

Currently, the most common type of AI chatbot uses a pre-made FAQ dataset—matching the user's input to the closest response in the dataset before providing an answer. However, in future, more advanced user identification, authentication and contextual AI technologies could potentially start producing AI chatbots capable of providing more personalized responses.

There are several ways to achieve this personalization: users' "attributes" (information) could be leveraged, or words and phrases they typed in past conversations with the chatbot could be interpreted.

If deciding to utilize user attributes, a user could be asked to register their gender, their parenting status (e.g. wanting to start a family, currently pregnant, or just gave birth), how many children they have, their children's ages, and any other relevant information before using the AI chatbot. Even if a user's inquiry is vague, combining their user attributes with the input words can produce a response that is relevant to their parenting status. For example, a user may ask the question, "How do I brush my child's teeth?" Knowing a user's attributes will make it possible to give different answers for different situations. A user with an infant can be advised to start with a gauze pad and gradually have their child move onto a toothbrush, while a user with a school-age child can be advised to take care with six-year molars when brushing.

However, this method will require linking these user attributes with the AI chatbot's FAQ dataset. Before this can be done, a cluster analysis (or other appropriate methods) would need to be conducted on input words to determine the optimal user attributes to include.

As for the second method of interpreting past input words, this would likely entail picking out characteristics from past conversations and employing analogical reasoning to deduce what the user is looking for—no matter how vague the search terms. For example, a user may type in "help desk." The chatbot can then for example, provide information on parenting-related help desks if the user goes on to ask about child-raising matters, or guide them to the pension consultation desk if that is what their question was about.

As it would also be possible to identify individual users this way, local governments could then respond both reactively and proactively to inquiries. For example, a local government could send information on dental checkups for three-year-olds in advance and possibly prevent health issues before they happen.

As Japanese society continues to shift towards a smartphone-based one, growing demand is expected for traditional in-person paperwork and consultations (such as change of address) to also make the move over to smartphone. In this scenario, AI chatbots could serve as a smartphone-based concierge to users and help make government procedures more convenient for residents.

## 4 Future Outlook

### 4-1 Future Outlook

#### 4-1-1 Potential Popularization of AI Chatbots

As mentioned in a report from a Ministry of Internal Affairs and Communications' study group, "Standardizing Work Processes and Systems in Local Government and Utilizing AI/Robotics – Creating Smart Local Governments to Achieve Society 5.0 (May 2019)," Japan's dwindling working-age population will result in two phenomena progressing in tandem: (i) an increasingly limited labor supply and (ii) the accelerated development of Society 5.0 (i.e. a "super-smart society") technologies. Within these circumstances, it will be crucial for local governments to continue providing services in a sustainable way to maintain their residents' welfare.

If AI chatbots were employed, not only could local governments reduce the amount of human resources usually needed to handle residents' inquiries, but the chatbot's ability to take inquiries at all hours could also boost residents' satisfaction with government services.

For a younger generation in particular that is both familiar with chat-based communications and usually unable to visit city offices during the day due to work or other reasons, providing access to government services via AI chatbot is likely to be especially valuable.

While some local governments are gradually adopting AI chatbots, more are expected to recognize the mutual benefit of improved convenience for both municipalities and residents and get on board.

#### 4-1-2 Anticipated Benefits of Standardization

Traditional ways of managing information will need to change in order to utilize new technologies in providing government services and information on related programs. One solution would be to redefine the structure of government program information as a "service." The aspects of service design come along with the process of digital transformation. While discussions are underway about whether local governments need to be incorporating these aspects into their operations, it is evident that in addition to ways of using digital technologies, the structuralization and management of information must change to include the end user's perspective—in this case, residents. It might also be judicious to keep in mind that government services have unique characteristics. Government services are used by citizens and have been created in accordance with Japanese laws. Since these laws are valid nation-wide, local governments would not be required to create information on their own for government programs in the first place. While centralized information management has been difficult in an "analog" society, it is possible to do so for shared information domains in a digital society. Additionally, local governments would be able to approach information management in a new way—tailoring this information to fit their local circumstances when disseminating to residents.

To give an example, one government service offered nationally is the child care benefits program. As the program's name and details are the same across all regions of the country, there is a significant benefit to opening up related datasets. On the other hand, there are many services commonly offered by local governments (such as financial assistance when using babysitters) for which the law does not prescribe specific service names or details. Hence, even if there were a standardized dataset for the aforementioned babysitter aid for instance, there would be little use in local governments and companies utilizing it as the conditions of the service, the name, and even whether it is offered at all will differ between municipalities. Additionally, many difficulties remain for services in which the details cannot be inferred from the service name. While preparing datasets that have been standardized to an extent will eliminate the time and effort that would be required to make them from scratch, the further popularization of AI chatbots will also depend on matching up the right data with the different services offered by individual local governments. While there are municipalities that are of course creating their

own FAQ datasets after finding that existing standard ones do not contain what they need, there may also be ones that end up creating their own datasets due to uncertainty about which standard datasets to use or which data to reference. This could be the case even in spite of the fact that many government services are based on the same national laws and would be the same in essence even across different municipalities. As such, it is essential to devise ways to help local governments utilize datasets with more ease and subsequently, ensure datasets are more widely used and standardized.

For AI chatbot utilization and government services in particular, information structuralization is relatively easy to achieve due to the similar types of services that are offered by across local governments (e.g. financial aid services, use of public facilities). Structuralizing information within an appropriate range is expected to enable the standardizing of FAQ data and make it easier to use new digital communication technologies, along with enhancing interactions between residents and their local government.

As stated above, centrally managing information on government services will entail establishing common data items, boilerplate summaries, and common FAQ scenarios for AI chatbots. The aim would then be to have as many participants as possible provide and use the actual content of the information (i.e. the data itself). It will be important to distinguish both who the original provider of the content is, as well as the reward process for them. The LINE Sticker business model is a straightforward example of this. For content that will be used by government agencies, it is essential to create and release content that many organizations can use publicly, while also incentivizing organizations to continue using the content—in other words, the establishment of an ecosystem for information on government services.

Further, developing a governance model for this ecosystem is recommended. This would include making operational rules explicit, and determining who and at what cost the content can be produced, operated, and used. The global organization Creative Commons is one example of such an ecosystem, having a system in place that enables sharing of copyrighted works. Hence, the hope is that such frameworks will serve as a reference in developing an environment for reliable and sustainable operation of open data for AI chatbots in Japan.

#### 4-1-3 Application in Other Fields

Although this investigation focused on several local governments who already have a track record in using AI chatbots for parenting support, Conference participants pointed out that AI chatbots could also be used for other fields where there was a high demand for responding to inquiries. For example, from October 2017, Shibuya City uploaded an FAQ dataset for its waste disposal/oversized garbage system—another area that receives many inquiries—to its AI-driven parenting chatbot. This is one part of the city's ongoing efforts to expand the domains covered by the AI chatbot and enhance its everyday utility.

Other fields that an AI chatbot could cover include general procedures/notifications, tourism, nursing/welfare, health/medicine, environment, and death/inheritance. Future investigations will aim to analyze the use of AI chatbots in other domains and further explore their possible applications.

#### 4-1-4 Other

Although discussions during this investigation focused on local governments and the services they offer to their residents, the large number of procedures at the national government level could also be a subject of investigation. In other words, it could be possible to build upon the use of AI chatbots for local government procedures and introduce them into national organizations as well.

Additionally, text-based AI chatbots are the most common type at present but voice recognition-based ones could see more growth as smart speakers become more popular. Target users may also broaden beyond demographics familiar with using smartphones as the chatbots make their way into fields such as nursing and welfare. Against this background, future investigations should certainly cover the use of FAQ data in voice-activated AI chatbots.

FAQ data for these types of AI chatbots are of course, also expected to be used for parenting support. At present, the large majority of users are accustomed to searching their questions and concerns on search engines. As such, many chatbot logs have recorded users simply typing in single keywords much like on a search engine. Section 2-1 outlined the differences between AI chatbots and search engines and how AI chatbots are designed in a way that users can "talk" with them, making users feel more at ease asking questions and broaching issues they might feel uncomfortable talking about with another person. Supposing that users subconsciously think of "typing in a question" and "searching with a search engine" as the same, and accordingly type single words into the chatbot, implementing voice activation could make inquiries easier in these situations.

## 4-2 Recommendations for Society

As stated in section 4-1, local governments are expected to receive some level of benefit from implementing AI chatbots. At the same time however, numerous issues have been highlighted: the high initial costs involved, lack of human resources capable of operating an AI chatbot, and the time and effort required to create an FAQ dataset to name a few.

This report put forward several measures that could assist in lowering the initial barriers to using AI chatbots, including creating a standard dataset and establishing associated provision rules, recommending what FAQ categories to create based on the typical needs of residents, and deciding on specific FAQ items. Future investigations will leverage the know-how gained from creating recommended datasets while seeking the support of the Cabinet Secretariat's IT Comprehensive Strategy Office.

Additionally, it should be mentioned that the above-mentioned measures will not completely solve the cost and human resource issues faced by local governments. However, it is anticipated that the Ministry of Internal Affairs and Communications—who oversees the administrative management of local governments—and the Cabinet Secretariat's IT Comprehensive Strategy Office—who promotes open data—will proactively provide support to local governments who are leading the way in AI chatbot initiatives.

If the public and private sectors cooperated to further the usage of AI chatbots, the number of use cases could increase and different practices and data on results can accumulate. Analyzing these could then potentially generate AI chatbots that bring benefits to both local governments and their residents.





Appendix – Image 3. Kumamoto Prefecture's notification card



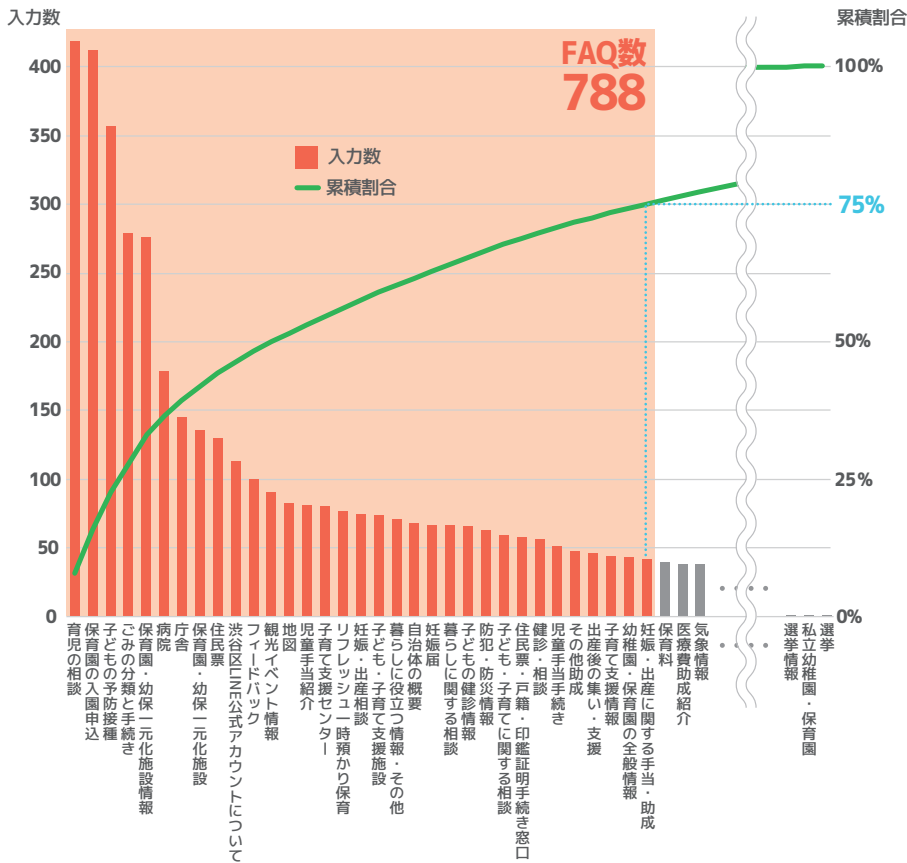
Appendix – Table 1. Data input into Shibuya City's AI-driven parenting chatbot (January to December 2018)

カテゴリ	入力数	割合
分類不能	575	9.0%
雑談	526	8.2%
育児の相談	418	6.5%
保育園の入園申込	412	6.5%
子どもの予防接種	357	5.6%
ごみの分類と手続き	279	4.4%
保育園・幼保一元化施設情報	276	4.3%
病院	179	2.8%
庁舎	145	2.3%
保育園・幼保一元化施設	136	2.1%
住民票	130	2.0%
渋谷区LINE公式アカウントについて	113	1.8%
フィードバック	100	1.6%
観光イベント情報	91	1.4%
地図	83	1.3%
児童手当紹介	82	1.3%
子育て支援センター	81	1.3%
リフレッシュー時預かり保育	77	1.2%
妊娠・出産相談	75	1.2%
子ども・子育て支援施設	74	1.2%
暮らしに役立つ情報・その他	71	1.1%
自治体の概要	69	1.1%
妊娠届	67	1.0%
暮らしに関する相談	67	1.0%
子どもの健診情報	66	1.0%
防犯・防災情報	63	1.0%
子ども・子育てに関する相談	59	0.9%
住民票・戸籍・印鑑証明 手続き窓口	58	0.9%
健診・相談	56	0.9%
児童手当手続き	52	0.8%
その他助成	48	0.8%
出産後の集い・支援	46	0.7%
子育て支援情報	44	0.7%
幼稚園・保育園の全般情報	43	0.7%
妊娠・出産に関する手当・助成	42	0.7%
保育料	40	0.6%
医療費助成紹介	39	0.6%
気象情報	39	0.6%
戸籍	39	0.6%
区立公園	38	0.6%
税情報	35	0.5%
幼児の健診情報	35	0.5%
飲食店	34	0.5%
ひとり親家庭支援	33	0.5%
小学校・中学校情報	33	0.5%
出生届	32	0.5%
保育利用料の軽減	31	0.5%
出産届出・手続き	30	0.5%
スポーツ	30	0.5%
観光名所	30	0.5%
一時・休日・短期緊急保育制度	29	0.5%
高齢者・介護と福祉サービス	28	0.4%
スポーツ施設	28	0.4%
自治体の組織	28	0.4%
健康一般	27	0.4%
ファミリー・サポート/ヘルパー	26	0.4%
幼稚園・保育園の手続きについて	25	0.4%
スポーツ・文化・生涯学習	24	0.4%
国民健康保険	23	0.4%
子育て・子ども家庭支援・その他	23	0.4%

病児・病後児保育制度	20	0.3%
その他の相談窓口	19	0.3%
税の問い合わせ	19	0.3%
幼児食講習会	16	0.3%
小学校・中学校の手続・制度	16	0.3%
就学援助・奨学資金	16	0.3%
大人の検診情報	15	0.2%
放課後クラブ	15	0.2%
保育事業	14	0.2%
税の手続き	14	0.2%
商工・労働・相談	14	0.2%
延長保育	13	0.2%
出産前学級	13	0.2%
幼稚園・保育園の補助金	12	0.2%
イベント施設	12	0.2%
保育メール	11	0.2%
リサイクルの分類と手続き	11	0.2%
医療費助成相談	11	0.2%
地域の豆知識	11	0.2%
自転車	10	0.2%
通学区域	10	0.2%
健康づくり	10	0.2%
印鑑登録	9	0.1%
自転車・自動車・バス	9	0.1%
乳房ケア	9	0.1%
議会	9	0.1%
子ども・子育て支援新制度	8	0.1%
各種計画	8	0.1%
障害者支援	7	0.1%
幼児検診一覧	7	0.1%
医療・健診施設	7	0.1%
妊娠・出産健診	7	0.1%
子育て支援施設	7	0.1%
その他年金	7	0.1%
親子教室	7	0.1%
ペット	7	0.1%
基本指針	6	0.1%
区内の郵便番号	6	0.1%
幼児の検診手続き	6	0.1%
大人の予防接種	6	0.1%
児童手当相談	6	0.1%
産後ケアセンター	6	0.1%
病院一覧	6	0.1%
教育相談	6	0.1%
女性相談	5	0.1%

パスポート	5	0.1%
広報誌等発行物	5	0.1%
感染予防	5	0.1%
公立幼稚園・保育園	4	0.1%
区民保養施設	4	0.1%
HP	4	0.1%
園庭開放	4	0.1%
医療費助成手続き	4	0.1%
環境衛生	4	0.1%
駐輪場・公共駐車場	4	0.1%
自治体の統計情報	4	0.1%
採用・職員情報	3	0.0%
水道	3	0.0%
赤ちゃん訪問	3	0.0%
多胎育児の集い・支援	3	0.0%
土木・清掃・リサイクル	3	0.0%
大人の検診一覧	2	0.0%
幼稚園・保育園の制度	2	0.0%
自治体の歴史	2	0.0%
幼児の相談	2	0.0%
新設保育園	2	0.0%
保育ショートステイ	2	0.0%
障害者に関する手続き	1	0.0%
国民年金	1	0.0%
障害者に関する手当	1	0.0%
小中学校の転校について	1	0.0%
選挙情報	1	0.0%
私立幼稚園・保育園	1	0.0%
選挙	1	0.0%

## Appendix – Image 4. Number of input words and coverage rate



## Appendix – Proposed all-purpose FAQ

Based on Shibuya City's FAQ, this proposed FAQ was created for all local governments to use. Under "Sample inquiries" and "Sample responses," municipalities can write in information that is specific to their circumstances. The "Sources" section can be used to note supervising departments and other sources to help alleviate the burden of maintaining the FAQ. The "UM Category Tags" and "UM Services" sections provide the Universal Menu, a system created by the International Universal Menu Association for public services provided by the national government and municipalities.

In addition, part of the proposed FAQ has been included in this report. The entirety of the proposed FAQ can be found on the Secretariat's homepage, or on the websites of some Conference participants.

The use of this FAQ data work (including reproduction, public transmission, translation, deformation, and other adaptations) is governed by the Creative Commons License Attribution 4.0 International. This refers to the terms and conditions of the copyright license set forth in Section 4.0 International.

<https://creativecommons.org/licenses/by/4.0/legalcode>

Please clearly indicate one of the following on the website or in the chatbot's instructional materials or otherwise on the website you are using.

A: CC-BY 4.0 Child Care Open Data Council (letter designation)

B: <https://licensebuttons.net/l/by/3.0/88x31.png> By Child Care Open Data Council (image representation)

ID	サンプルID	サンプル問い合わせ文	サンプル応答文	カテゴリ1	カテゴリ2	出典	参考UMカテゴリタグ	参考UMサービスメニュー (標準的な行政サービス名称)
001	00001	母子手帳を受け取りたいのですが、手続きを教えてください。	窓口で妊娠届をご記入いただき、母子手帳をお渡しします。 住民票の世帯が別の方が代理で窓口に来られる場合は、委任状が必要になります。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	妊娠		妊娠・ 出産	妊娠の届出・ 母子健康手帳の交付
002	00002	母子手帳の受け取り場所はどこですか？	母子手帳は、〇〇市役所本庁舎△△階××課窓口、◎◎出張所、………(その他の受け取り場所を適宜記載)………で受け取れます。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	妊娠		妊娠・ 出産	妊娠の届出・ 母子健康手帳の交付
003	00003	母子手帳はすぐに発行してもらえますか？	母子手帳は、妊娠届の内容を確認させていただき、その場でお渡しします。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	妊娠		妊娠・ 出産	妊娠の届出・ 母子健康手帳の交付
004	00004	妊婦健診受診票はいつの分から使えますか？	妊婦健診の受診票は、受診票を受け取った日より後で、病院が妊婦健診と規定した日に利用できます。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	健診		妊娠・ 出産	妊婦健康診査
005	00005	妊婦健診受診票は〇〇市外で使えますか？	妊婦健診の受診票は、●●県内の契約医療機関でお使いいただけます。 受診希望の病院にお問い合わせください。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	健診		妊娠・ 出産	妊婦健康診査
006	00006	妊婦健診受診票受取前に病院にかかった分は、還付されますか？	妊婦健診受診票をお渡ししてからの助成になります。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	健診		妊娠・ 出産	妊婦健康診査
007	00007	妊婦健診が14回以上かかりましたが、追加で助成してもらえますか？	妊婦健診費用の助成は14回までに限られます。それ以降は自費での対応をお願いします。 ▼詳しくはこちら (自治体HP内関連ページのURL)	妊娠・ 出産	健診		妊娠・ 出産	妊婦健康診査

008	00008	●●県内で引越したら、妊婦健診の受診票は？	<p>受診票の妊婦歯科健診は、〇〇市内のみでのご利用になります。</p> <p>それ以外の受診票は、●●県内共通になりますので、そのままお使いいただけます。</p> <p>各自治体独自のサービスが受けられる場合がありますので、引越し先の自治体にお問い合わせください。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	妊娠・出産	健診		妊娠・出産	妊婦健康診査
009	00009	●●県内で引越したら、子どもの受診票は？	<p>1歳6か月健診の受診券は、〇〇市内のみでのご利用になります。</p> <p>それ以外の受診票は、●●県内共通になりますので、そのままお使いいただけます。</p> <p>各自治体独自のサービスが受けられる場合がありますので、引越し先の自治体にお問い合わせください。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	健診・予防接種	子どもの健診・相談		子育て	<p>乳幼児健康診査（6か月未満）</p> <p>乳幼児健康診査（6か月から12か月）</p> <p>1歳6か月児健康診査</p> <p>3歳児健康診査</p> <p>乳幼児の歯の健康診査</p> <p>▲▲市独自の乳幼児健診</p>
010	00010	●●県外へ引越したら、妊婦健診の受診票は？	<p>受診票はご利用いただけなくなります。引越し先の自治体にお問い合わせください。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	妊娠・出産	健診		妊娠・出産	妊婦健康診査
011	00011	●●県外へ引越したら、子どもの受診票は？	<p>受診票はご利用いただけなくなります。引越し先の自治体にお問い合わせください。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	健診・予防接種	子どもの健診・相談		子育て	<p>乳幼児健康診査（6か月未満）</p> <p>乳幼児健康診査（6か月から12か月）</p> <p>1歳6か月児健康診査</p> <p>3歳児健康診査</p> <p>乳幼児の歯の健康診査</p> <p>▲▲市独自の乳幼児健診</p>
012	00012	妊婦健診受診票の余りを換金してもらえますか？	<p>妊婦健診に対する助成制度であり、金券ではありません。</p> <p>そのため換金等はできません。</p>	妊娠・出産	健診		妊娠・出産	妊婦健康診査

013	00013	里帰り出産の際、受診票は使えますか？	<p>●●県以外では受診票の利用はできません。</p> <p>ご出産後「里帰り等の妊婦健診費用の助成」として、受診1回あたりの限度額範囲で、母子手帳、領収書、未使用受診票の枚数に応じて、助成金を支給します。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	妊娠・出産	健診		妊娠・出産	妊婦健康診査 里帰り出産時の妊婦健康診査の費用助成
014	00014	子どもが生まれたら、どんな手続きが必要ですか。	<p>出産後に必要な手続きは出生届・出生通知票の提出、児童手当、子ども医療費助成の申請等があります。</p> <p>▼詳しくはこちら (自治体HP内関連ページのURL)</p>	妊娠・出産	出生届		妊娠・出産	出生届 出生連絡票 乳幼児医療費(子ども医療費)の助成 児童手当
015	00015	(乳房ケアに対する助成)の使い方を教えてください。	<p>(乳房ケアに対する助成を行っている場合は、申し込み方法等を記載してください。)</p> <p>例「こんにちは赤ちゃん訪問の際にお渡ししたケア券に記載の宛先(助産師会)にお申し込みください。乳房ケア券がまだお手元に届いていない場合は、母子保健・産前産後ケアセンターへお問い合わせください。</p> <p>◆お問い合わせ (自治体の担当課等の名称) (電話番号) / (開庁時間)</p>	妊娠・出産	相談・学級		妊娠・出産	産後ケア事業
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
969	00652	(保育担当課)の場所を教えてください。	<p>(保育担当課)は〇〇市役所本庁舎の×階にあります。</p> <p>▼庁舎案内図 (自治体HP内関連ページのURL)</p>	施設	庁舎		null	null
970	00653	保育のしおりがほしいです。	<p>(該当するものがあれば記載してください。)</p> <p>例「保育のしおりとは各保育園で作成し、入園時等に配布している園のルール等を記載したものです。通っている保育園で入手できますので、各保育園にお問い合わせください。」</p>	保育	保育園・幼保一元化施設		null	null
971	00654	避難所はどこですか？	<p>〇〇市の避難所施設は市立小中学校など〇か所が指定されています。詳しくはこちらをご覧ください。</p> <p>▼避難所施設一覧 (自治体HP内関連ページのURL)</p>	防災・防犯			防災・災害	避難所一覧(指定避難所、地域避難場所、広域避難場所、福祉避難所)

972	00655	一時集合場所はどこですか？	<p>※※一時集合所を採用している自治体（都区、大阪市）のみ※※</p> <p>〇〇区の一時（いっとき）集合場所は区立学校の校庭や区立公園などがあてられています。</p> <p>ここで災害の状況を見極めます。また、避難場所へ避難するために集合します。</p> <p>避難場所に近ときは、直接避難場所へ集合します。詳しくはこちらをご覧ください。</p> <p>▼一時（いっとき）集合場所一覧 （自治体HP内関連ページのURL）</p>	防災・防犯			null	null
973	00656	避難場所はどこですか？	<p>〇〇市の避難場所は〇〇公園など〇か所があてられています。詳しくはこちらをご覧ください。</p> <p>▼避難場所一覧 （自治体HP内関連ページのURL）</p>	防災・防犯		防災・災害	避難所一覧（指定避難所、地域避難場所、広域避難場所、福祉避難所）	
974	00657	防災地図が見たい。	〇〇市の防災地図についてはこちらをご覧ください。 （自治体HP内関連ページのURL）	防災・防犯		防災・災害	防災マップ・ハザードマップ	
975	00658	帰宅困難者の避難施設はどこですか？	帰宅困難者のための支援（受入）施設についてはこちらをご覧ください。 （自治体HP内関連ページのURL）	防災・防犯		防災・災害	帰宅困難者対策	
976	00659	住民税の納税証明書を取りたい。	住民税の納税証明書は、（申請場所（自治体の担当課、支所・出張所等））で発行しています。申請方法等、詳しくはこちらをご覧ください。 （自治体HP内関連ページのURL）	税金	住民税	税	市税の証明・閲覧	
977	00660	軽自動車税の納税証明書を取りたい。	軽自動車税の納税証明書は、（申請場所（自治体の担当課、支所・出張所等））で発行しています。申請方法等、詳しくはこちらをご覧ください。 （自治体HP内関連ページのURL）	税金	軽自動車税	税	軽自動車税	
979	00661	禁煙・分園の公園はどこですか？	<p>〇〇市では園内の受動喫煙防止対策として分煙環境を整備するため、市立公園〇か所を、禁煙公園または分煙公園に指定しています。</p> <p>▼禁煙公園・分園公園一覧 （自治体HP内関連ページのURL）</p>	施設	区立公園	null	null	
981	00662	住民税の計算方法を教えてください。	住民税の算出方法についてはこちらをご覧ください。 （自治体HP内関連ページのURL）	税金	住民税	null	null	



---

## Acknowledgements

---

There are so many people who contributed to the compilation of this report and I wish I had enough space to thank them all. Thank you to each and every one of you. I would like to especially thank Professor Noboru Koshizuka from Tokyo University and Professor Masahiko Shoji from Musashi University for their constant guidance, Mr. Hideyuki Takarada from Shibuya City and Mr. Hikaru Sawada from Kumamoto Prefecture for lending their time to pen columns, and Ms. Kazumi Hamada from Albert Inc. and Ms. Miki Naruse from LINE Corporation for their help in writing this report. Again, I would like to express my deepest gratitude.

Keisuke Kaneyasu, LINE Corporation (Secretariat), Childcare Open Data Conference

Published April 2020

---

## The 2020 Report on Introducing Childcare AI Chatbots to Public Service

---

The date of publication    April,2020

Publisher                      Childcare Open Data Conference

Secretariat                      LINE corporation Public Policy  
   JR Shinjuku Miraina Tower 23rd FL., 4-1-6 Shinjuku,  
   Shinjuku-ku, Tokyo, 160-0022, Japan

---