

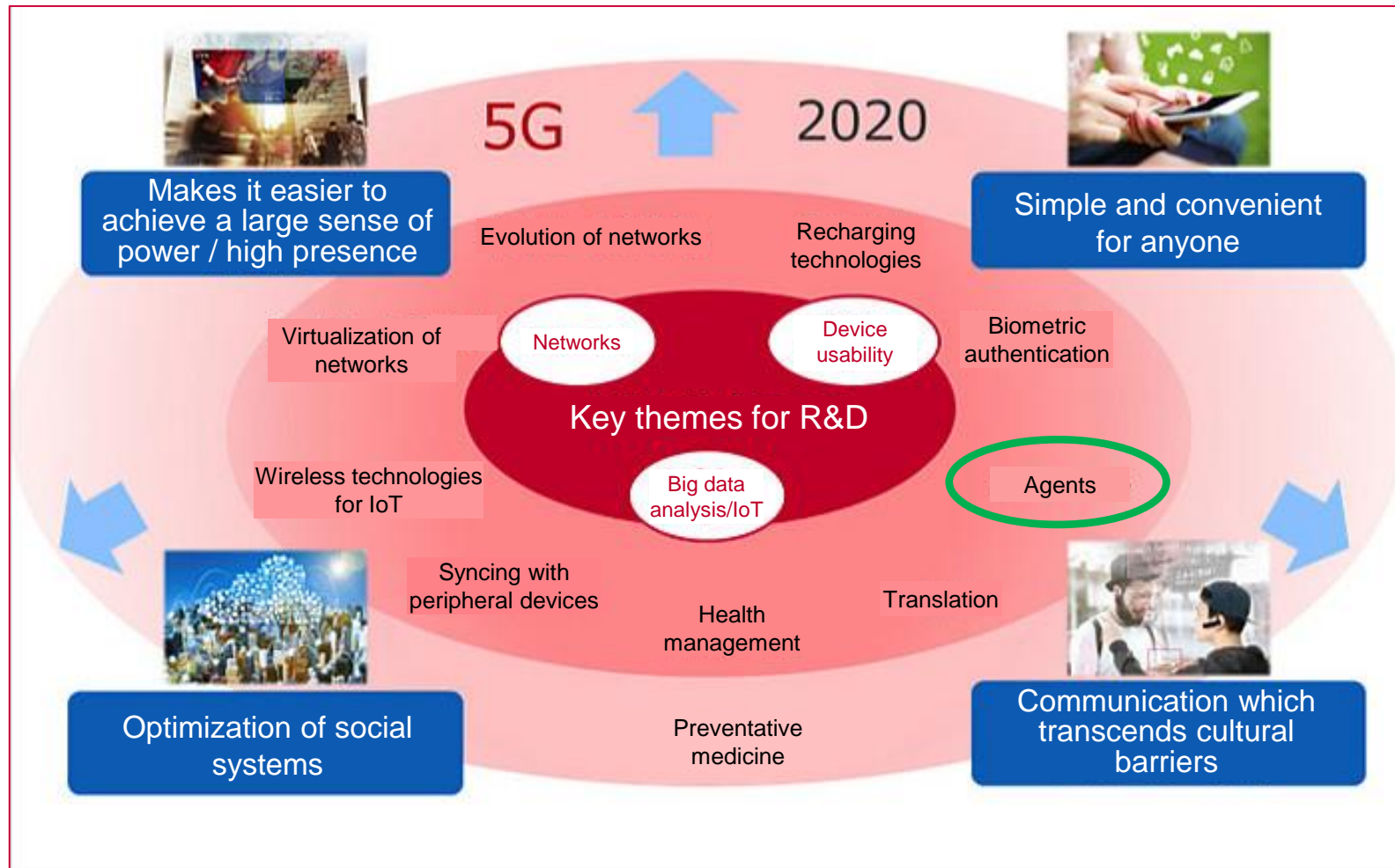
Utilization of Chatbots as a Means of Providing Correct Guidance on how to Sort Waste

Service Innovation Department
NTT DOCOMO, INC.

Corporate Profile

- Company name
 - NTT DOCOMO, INC.
- Origin of company name
 - **Do** Communications Over The **Mo**bile Network
- Content of business
 - Telecommunications business
 - Mobile phone services
 - Optical broadband services
 - International services, etc.
 - Smart life business
 - Content / commerce services
 - Finance / settlement services
 - Corporate solutions (IoT, etc.), etc.

DOCOMO's Vision for the World in 2020



Technologies relating to Agents (Chatbots*)

Since March 1, 2012, DOCOMO's services and functions in smartphones provide voice agents that can be used for a wide range of purposes



■ Major kinds of technologies

- Interpretation of intent
 - This technology is used to understand the utterances of users (interpretation of intent) and decide on tasks for executing the next action.
 - It extracts the necessary conditions and parameters for executing tasks based on the utterances of users.
- Scenario dialog
 - This technology responds in dialog format in accordance with a scenario defined in advance.
 - It also makes it possible to separate scenarios according to the user's answer and achieve complex dialogs.

* Chatbot = A coined word comprising of "chat" + "robot," taken to indicate a system which replies automatically to chats.

Issue of Waste Disposal

The volume of waste generated in Japan is gradually decreasing, but is still currently at around 40 million tons. Daily waste (household waste) accounts for a particularly large proportion of this, so there is a need to reduce the amount of daily waste we generate or promote reuse / recycling where possible.

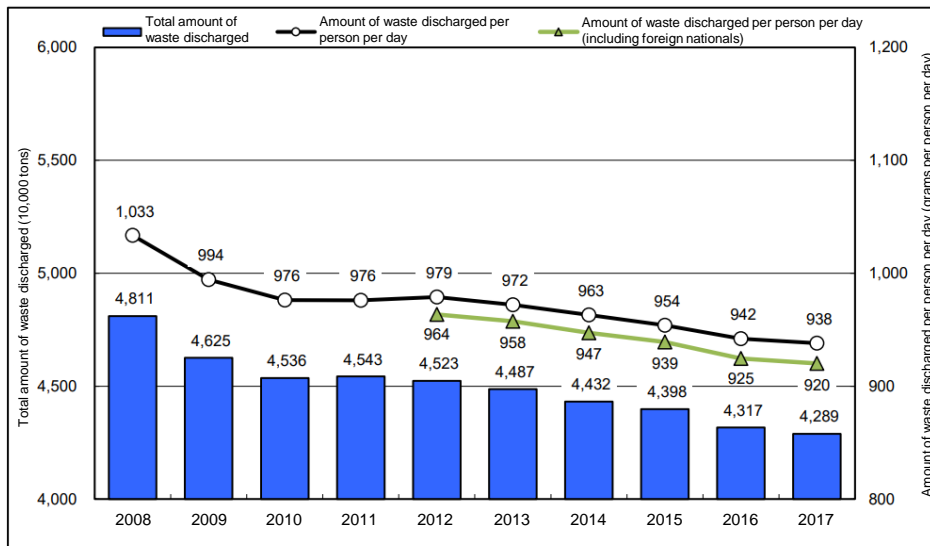


Figure 1: Transition in the total amount of waste discharged

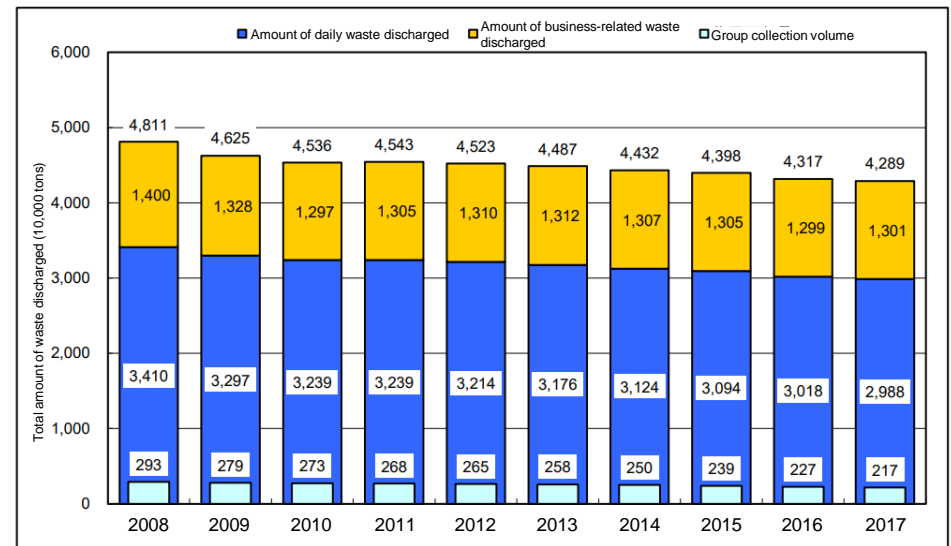


Figure 2: Transition in the amount of daily and business-related waste discharged *5)

*5) Figures for daily waste: Household waste. In the case of figures obtained through estimates, the total collected through municipal collections and contractors.

Figures for business-related waste: Waste from workplaces. In the case of figures obtained through estimates, the total collected through licensed contractors and waste brought in directly.

[Source] Ministry of the Environment: "Current Situation concerning the Generation of General Waste and its Treatment (2017 Fiscal Year)"
http://www.env.go.jp/recycle/waste_tech/ippan/h29/data/env_press.pdf

Issue of Waste Treatment and Chatbots

In recent years, a variety of different products have been appearing on the market. For many of these products, it is not always easy to know at first glance how to correctly dispose of them, even when searching for more information on municipality websites, etc. This is why we developed a chatbot that tells people how to correctly dispose of products simply by telling it what they want to throw away.

How to sort and dispose of waste and resources

Search by item name

<Dictionary of Waste Sorting>
Allows you to find out how to sort and dispose of waste and resources using the name of the item.

Mio and Io's Dictionary of Waste Sorting
Mictionary

Chair

Search results

Search results including the word "chair": **87 results**

List of search results

Item	Type of waste	
IC recorder	Burnables	Metal parts classified as small metal items
Ice crusher	Burnables	Metal parts classified as small metal items
Ice cream server	Small metal items	Plastic ice cream servers classified as burnables
Ice cream lid (paper)	Burnables	
Ice cream lid (plastic)	Plastic containers and wrapping	
Ice cream container / wrapping (paper)	Burnables	Outer box that has not had direct contact with ice cream classified as paper
Ice cream container / wrapping (plastic)	Plastic containers and wrapping	
Ice cream maker (metal)	Oversized waste	Ice cream makers under 30 cm classified as small metal items
Ice cream maker (plastic)	Burnables	
Ice skate blade	Small metal items	Ice skate blades 30 cm and above classified as oversized waste
Popsicle stick	Burnables	
Ice pick	Small metal items	Wrap pointed sections in newspaper, etc.
Ice pail (glass)	Non-burnables	
Ice pail (metal)	Small metal items	
Ice pail (plastic)	Burnables	



Advice from Io on How to Sort Waste

powered by Repl-AI

Please tell me the name of the item you would like to dispose of and I will tell you how to sort it correctly for disposal. If you would like information on how much it will cost to dispose of oversized waste, please tell me something like "fee for bicycle."

Chair

If the item you wish to dispose of is a seat, chair or reception chair, you should dispose of it as oversized waste. If it is under 50 cm, dispose of it as burnable waste (not including chairs made of metal).

You can find out more details on how to dispose of oversized waste [here](#).

Please input your message.

Effects of Chatbots

Statistics for the use of a chatbot which provides guidance on how to sort waste in the City of Yokohama in FY 2017

- **Number of times used**
 - Approx. 2.16 million times
- **Average success rate for answers given**
 - Around 74%
 - Even when the chatbot cannot provide an answer, it asks the user about the item's material and size and tells how to correctly dispose of it
- **Use outside of call center operating hours (21:00 – 7:59)**
 - Approx. 30% (around 650,000 cases)
- **Cost effectiveness**
 - A few hundredths of the cost compared with call center costs
 - A reduction in burden on employees calculated as being equivalent to around 100 million JPY per year
 - * CPC (Cost Per Call) calculated as 210 JPY
- **Other**
 - While at some other municipalities, a single employee has had to respond to 9.5 inquiries a day, in some cases this has been reduced to 6.4 times a day



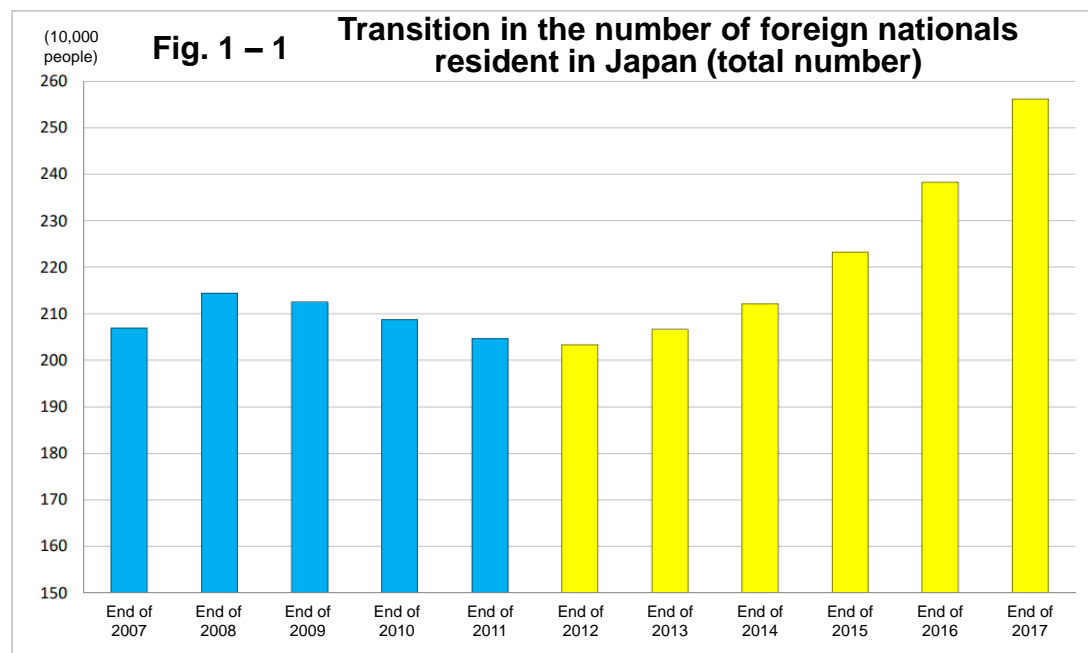
Yokohama 3R Dream Mascot "Io"

[Citation]:
"Yokohama 3R Dream (Slim) Plan, Resources and Waste Recycling Bureau, City of Yokohama"
Affiliated organization: Resources and Waste Recycling Bureau, City of Yokohama

Future Prospects

As the below chart shows, the number of foreign nationals living in Japan is on the rise.

In the future, we will consider developing multilingual chatbot services to provide non-Japanese speakers with advice on how to sort their waste.



[Source] Ministry of Justice: “Concerning the Number of Foreign National Resident in Japan as of the End of Fiscal Year 2017 (Definitive Figures)
[End of Fiscal Year 2017] Officially Published Figures”
<http://www.moj.go.jp/content/001256897.pdf>