

Utilization of Open Data via Public-Private Cooperation in Tourism Sector

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Fujitsu is using open data from the tourism sector to enable diverse stakeholders to create information linking models through public-private, regional, and international cooperation, which are generally referred to as tourism cloud models. The intention is to develop a new information-oriented society through data linking of tourism information owned by regional public entities as open data. This requires increasing the amount of information of existing information services, reducing data collection and maintenance costs, and accelerating the distribution of regional information by sharing data between various information services. To this end, Fujitsu is developing technology to automatically collect data from websites and to standardize data formats. This development is part of a linkage platform for smooth mutual utilization of tourism information in the public and private sectors. Such shared use will lead to the development of a co-created society through regional data linking. This paper describes the advanced technology that characterizes these models, operation models created through regional cooperation, and measures for utilizing regional open data from the tourism sector. The main points are based on actual examples of public-private sector cooperation implemented in Aomori Prefecture in Japan.

1. Introduction

There has been much activity in recent years on the conversion of data managed by regional public entities to open data for release to the private sector. Data catalog sites for releasing such open data are being set up by regional public entities and more than 280 such sites have so far been launched. Regional participation activities by the general public using open data (civic technology or *civic tech*) have also been growing. As part of this trend, 346 cities throughout the world came to participate in International Open Data Day 2017, a worldwide simultaneous event promoting the awareness and use of open data. Japan was represented by 65 cities reflecting an upsurge of activities surrounding open data in Japan compared with other countries. Against this background, the Basic Act on the Advancement of Utilizing Public and Private Sector Data was enacted in Japan in December 2016. This act obligates regional public entities to formulate a basic plan for advancing the use of public-private data and to release public data (obligation of municipal

governments to make an effort), and in addition, to formulate measures for promoting even greater use of data among its citizens and enterprises.

This paper introduces a case study in the use of open data through public-private cooperation in the tourism sector. It describes, in particular, a tourism cloud model created by Fujitsu in cooperation with local governments and private enterprises in Aomori Prefecture, Japan (hereafter, Aomori tourism cloud model).

2. Case study: Creation of Aomori tourism cloud model

2.1 Background

The Aomori tourism cloud model originates in the 2009 100-year anniversary of the birth of renowned Japanese writer Osamu Dazai in the Kanagi district of Goshogawara City, Aomori Prefecture. This area where he grew up along with the family house in which he was born (Shayokan or Osamu Dazai Memorial Museum)

and other related sites have become sightseeing destinations for Osamu Dazai fans in Japan and around the world. In particular, 2009 with this 100-year anniversary and 2010 with the opening of the Shin-Aomori Station for the Tohoku Shinkansen (bullet train) provided a once in a century opportunity to develop this tourism cloud. While thinking about what measures to take to make good use of this opportunity along with local non-profit organizations (NPOs) in Kanagi, local residents, etc., the following regional issues came to light.

1) Intermodal passenger transport

Public transportation facilities from Shin-Aomori Station (opened in 2010) to Goshogawara city are limited, with the result that travelers often use their own cars or rental cars. There are also travelers who enjoy making the rounds of nameless places to follow in the footsteps of Osamu Dazai, so support is needed for preparing freestyle sightseeing routes by car with diverse needs.

2) Hidden charms of the region

Local residents made comments such as “Our land has much charm and attractive features that we would like others to know about” and “We would like people to enjoy a trip to Okutsugaru (a popular sightseeing destination) arriving at an early time by Shinkansen.”

In response to these issues, Fujitsu, with support from the Ministry of Internal Affairs and Communications

(MIC) (FY2008 Project for Creation of Regional ICT Usage Models), applied its advanced technologies to the development of the My Route Guide service enabling travelers themselves to plan their own travel routes on tourism websites with ease (Figure 1).

In addition, the tourism information used here was not limited to famous places. To promote the discovery of the area’s hidden charms, we also used detailed tourism information unique to local NPOs and governments as open data.

2.2 My Route Guide

My Route Guide (Figure 1) is a convenient web service that automatically calculates driving time and distance to create an optimal travel route by having the traveler simply select the sightseeing spots that he/she would like to visit from tourism websites of the local government. While simulating one’s own driving route, the traveler can easily plan an excursion that not only includes famous places but also enables the discovery of little-known sightseeing spots located along and near the route.

The information on sightseeing spots registered in My Route Guide includes tourism information (about 3,000 items) over a wide area in Aomori Prefecture stored as open data as well as information on eating and drinking establishments and other services provided for reuse by the private sector. Implementing the

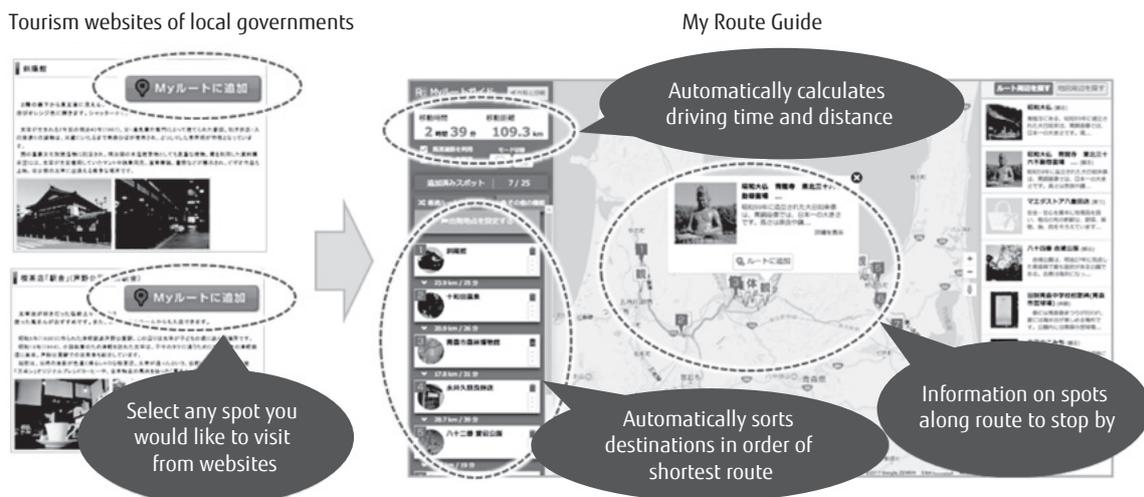


Figure 1 My Route Guide for planning your own travel route by car.

My Route Guide service on the tourism websites managed by local governments makes it possible to provide information on travel routes and side trips in all areas of the prefecture. This enables the dissemination of tourism information covering a wide area in a way that no single local government could easily do.

Fujitsu set up My Route Guide as a wide-area linkage platform of sightseeing and tourism information that enables joint use of such information from tourism websites managed by local governments within a prefecture (Figure 2).

2.3 Use of open data by the private sector

Tourism information provided by regional public entities can be used by private enterprises within the prefecture as open data. For example, at TOYOTA Rent-A-Lease AOMORI CO., LTD., a regional rent-a-car company, a tourism information service available for smartphones has been created and rolled out as a rent-a-car counter service at 19 of its offices in the prefecture (Figure 3). When in a particular area, there is a need for information not only on famous sites and attractions but also for detailed information unique to that area. Collecting that information, however, can be costly and maintaining and updating data is not a

trivial task. Providing such information to the private sector as open data can mitigate that workload and lower the costs of introducing and maintaining such an information system.

In addition, about 400 retail establishments within the prefecture that are regular clients of TOYOTA Rent-A-Lease AOMORI such as for leasing have become co-sponsors of digital coupons, which have been consolidated into a website for smartphone use and provided as a mobile coupon service usable in all areas of the prefecture. A large selection of coupons that can be used over a wide area is a particularly enjoyable service for rent-a-car users that are visiting for leisure purposes. Furthermore, for TOYOTA Rent-A-Lease AOMORI, digital coupons are a service enhancement for rent-a-car users, but by also directing those users to the company's clients within the prefecture, they also contribute to regional activities that aim to promote enjoyable trips in Aomori.

2.4 Business continuity through private sector financing

Fujitsu manages the tourism cloud model including My Route Guide as an independent business. In the case of Aomori Prefecture, local governments can

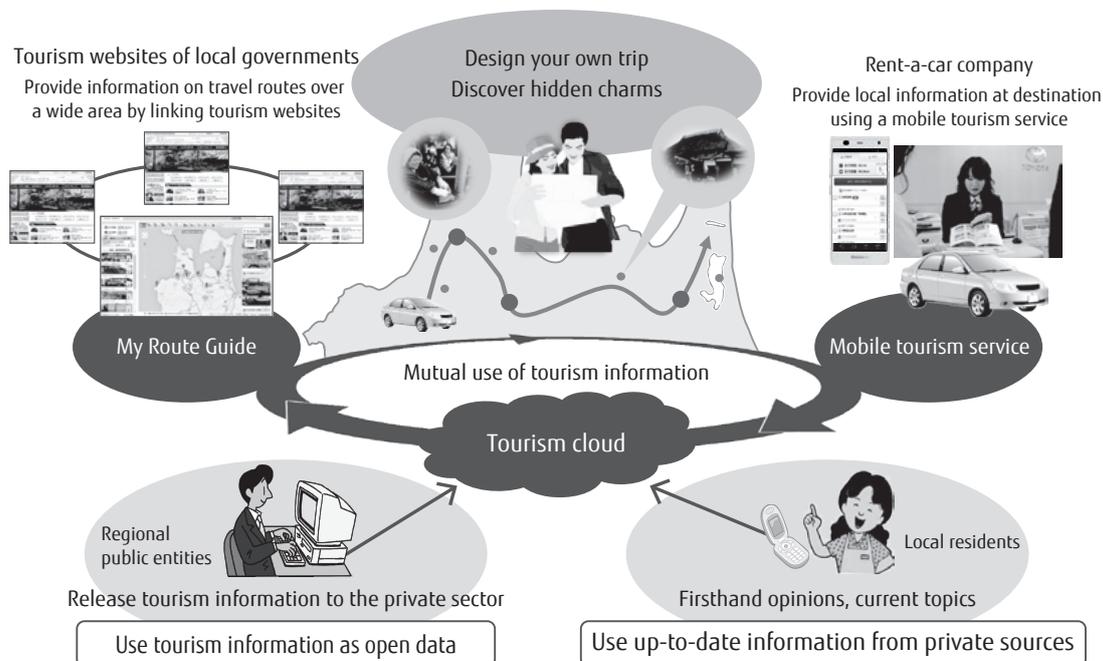


Figure 2
Tourism cloud model that links areas by open data.

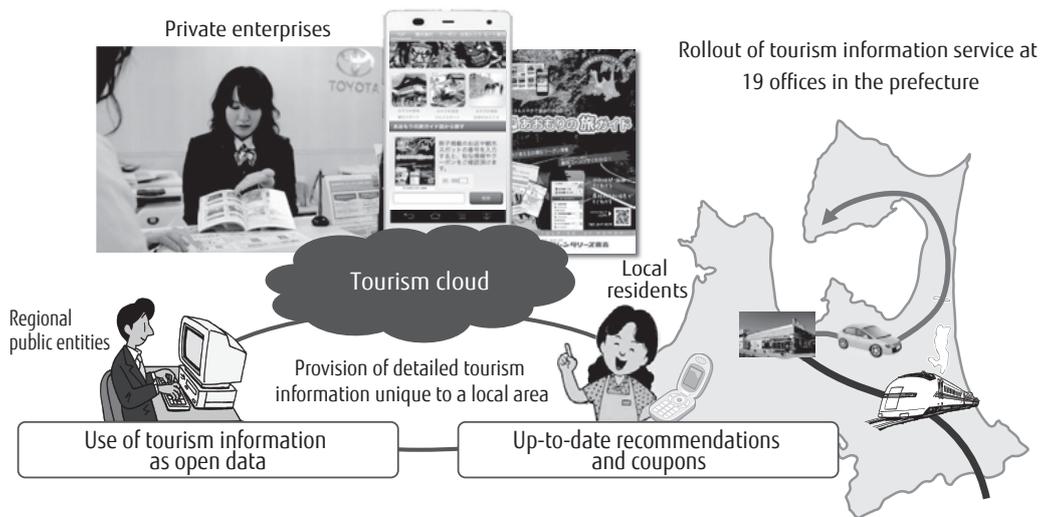


Figure 3
Provision of tourism information service at rent-a-car counters.

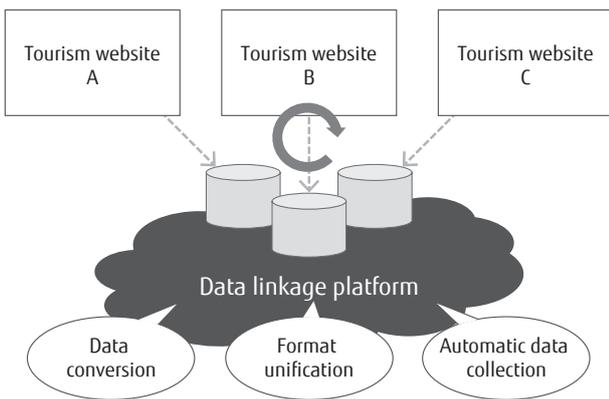


Figure 4
Automatic data collection technology targeting tourism websites.

use My Route Guide at no charge. At the same time, by enabling tourism information provided by these local governments to be used by private businesses such as the rent-a-car company described above, a business model for this Aomori tourism cloud model is taking form. Managing the release of public data and its use by the private sector in a mutually beneficial manner is a special feature of this tourism cloud model.

At present, My Route Guide is being used in 14 prefectures around Japan. Its advanced technology, successful deployments, and role in a management model for the public good driven by the private sector has been highly evaluated as a superior model for

wide-area coordination of open data and public-private cooperation in the tourism sector. The Aomori tourism cloud model, in particular, received the 2014 Local Computerization Award, Special Award of MIC.

3. Issues in reuse of tourism information

Regional tourism information is said to have great potential for widespread use by the private sector and local governments. For example, it could be used for disseminating wide-area tourism information through inter-regional cooperation, creating tourism information services in the private sector and lowering their cost, and improving traveler satisfaction by enabling the discovery of hidden charms and points of interest.

However, the burden of data registration in public entities is a problem that needs to be solved. Even if the registration of such data has been completed as an initial business step by outsourcing or other means, a failure to keep that data updated will create a problem affecting not only the tourism sector but also the shared use of that data.

In response to this issue, Fujitsu has developed technology for automatically collecting tourism content on existing tourism websites as shown in **Figure 4**. This technology solves the above problem by mechanically reusing information on existing tourism websites, thereby eliminating the need for local governments to register data anew. Furthermore, in addition to static

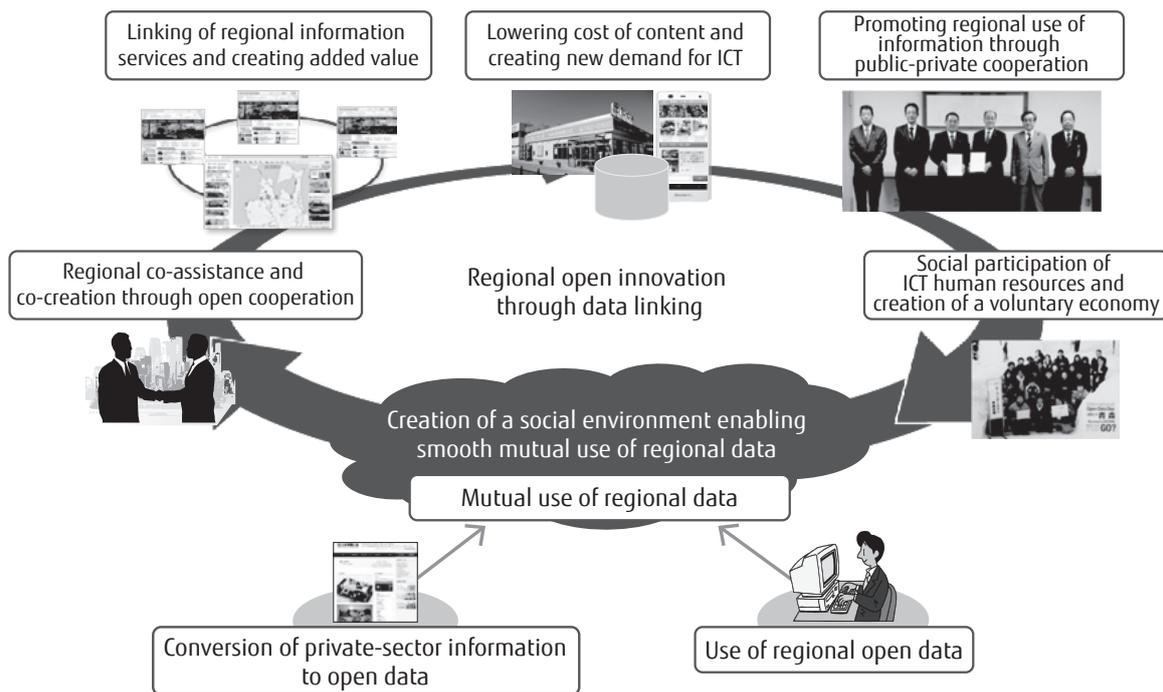


Figure 5
Concept of public-private cooperative use of data.

tourism data, this technology enables the continuous reuse of dynamic tourism data on events and the like.

The promotion of wide-area tourism may also include cases of tourism-information sharing by local governments or the provision of tourism information to upper-level wide-area tourism organizations. In such cases as well, we can expect this automatic collection technology to ease the burden of data registration by data providers and to enable the use of up-to-date data at all times.

4. Public-private cooperative use of open data

Using its know-how in the development of open-data public-private cooperation models in the tourism sector, Fujitsu seeks to promote a new information society through data linking among a variety of regional sectors (Figure 5).

To this end, Fujitsu teamed up with Aomori Prefecture and public entities, private enterprises, universities, and other entities within the prefecture to establish the "Aomori Public-Private Data Use Promotion Consortium" in October 2015. Fujitsu is now participating in open-data use promotion activities through such

public-private cooperation. The following introduces the activities of this consortium.

4.1 Open data awards

Open data awards recognize enterprises, organizations, and individuals within Aomori prefecture for outstanding social achievements in the use of open data. An award system has been established and divided into three categories: data openness, data use, and public awareness. In particular, the data-openness category was established not only to recognize the releasing of data by public entities but also to stimulate the releasing of data by private enterprises. Releasing of data by enterprises can be viewed as corporate social responsibility (CSR), that is, as a regional contribution, so the aim of recognizing and visualizing such achievements is to create a virtuous cycle that can help enhance corporate value.

The Misawa City Chamber of Commerce and Industry, which introduced Fujitsu's tourism cloud model, has released member-related information such as local eating and drinking establishments as open data on its own site. This initiative received the FY2015 Contribution to Data Openness Award as a pioneering

promotion of data openness in Aomori prefecture. In addition, TOYOTA Rent-a-Lease AOMORI mentioned above has received the Data Use Award in recognition for its achievements in promoting tourism through the use of smartphones and tourism open data.

Fujitsu proactively makes proposals on open data usage and data openness for customers who introduce the tourism cloud model. Moreover, it also supports customers in using that open data in a way that contributes to society and not simply as a means of enhancing data.

4.2 Data-use advisor system

Regional ICT-related business operators including Fujitsu connect open data with economic activities. From among these operators, the Aomori Public-Private Data Use Promotion Consortium certifies learned individuals having a certain amount of knowledge on open data as data-use advisors and delegates some of the activities for promoting the use of open data to them. A data-use advisor counsels a customer on data openness and business using open data and is involved in creating shared value that is "good for the seller, the buyer, and society" ("sampo yoshi" philosophy in Japan) in relation to the customer's regular business. The following introduces some of these activities in Aomori Prefecture.

Aomori University provides an open-data curriculum for its students in the Faculty of Software and Information Science and contributes to regional activities using open data. Aomori Software Academy Inc. provides education on open data for enterprises and local governments and facilitates ideathons on the use of open data. In addition, IT COWORK INC. provides open data and ICT education for local high school students and other levels as regional contribution activities. It has also developed a smartphone application that provides information on trash collection days using data from local governments as open data. This application is provided free of charge to Hachinohe City, Hirosaki City, and other cities in Aomori Prefecture, thereby contributing to improved public services on behalf of local governments. Furthermore, Joint of Aomori Computer service works with its customers to open up the information on their websites for secondary use through an open data license (Creative Commons license) and advises them on the use of open data.

Such voluntary initiatives by private enterprises constitute a special feature of activities in Aomori prefecture toward the use of open data.

4.3 Operation of public-private data catalog site

Fujitsu is working with the Aomori Public-Private Data Use Promotion Consortium in the trial provision of "Aomori Data Catalog Site" as a regional data catalog site for joint use by the public and private sectors. This site has the following features:

- 1) Provides a web interface that can easily register data from both public and private sectors
- 2) Provides automatic conversion of uploaded Excel data to data formats that are easy to reuse such as CSV, JSON, TSV, XML, and RDF
- 3) Combines different types of data and standardizes formats through linked open data (LOD) (commonly known as 5-star open data) ^{note)}

The automatic collection technology described earlier is used to automatically collect Excel-formatted data (2-star open data) from the open-data catalog sites of other local governments and perform secondary conversion to RDF.

Different data formats among local governments can present a problem in open-data regional linking activities for wide-area tourism, wide-area disaster-prevention measures, etc. In these cases, the standardization of data formats among local governments can be easily achieved by conversion to RDF.

Furthermore, the operation of a data catalog site can consider not just the registration of raw data but also the registration of URLs pointing to information on reusable pages on websites. Compared with converting the information to raw data and registering that data beforehand on the local-government side, a scheme that converts target data to raw data at the time of the user's request eliminates unneeded processing and minimizes the burden of releasing data by local governments.

These activities were evaluated by MIC, which

note) In the secondary use of open data proposed by Tim Berners-Lee, an index indicating the ease of computer processing for a data format. 1 star: PDF, 2 stars: Excel, 3 stars: CSV/XML, 4 stars: URI/RDF, 5 stars: LOD.

awarded the Aomori Public-Private Data Use Promotion Consortium with the FY2017 Info-Communications Promotion Month Tohoku Bureau of Telecommunications Director-General Prize on the occasion of the "Radio Day and Info-Communications Promotion Month" memorial ceremony on June 1, 2017.

5. Conclusion

Focusing on the use of open data in the tourism sector, we introduced the Aomori tourism cloud model as a case study and initiatives toward expanded use of open data.

A variety of real issues arise in the use of public-private data such as the burden of data provision, continuity of operations due to the need for data updating, existing data formats and format differences, and traffic control in the composite use of different types of data. At Fujitsu, we are working on solutions to these problems as a social experiment within the tourism sector. In addition, we aim to connect these efforts to the creation of a new information society in which open data can be mutually and smoothly used among diverse stakeholders in a region as shared assets of society.

The linking of open data is the lifeblood of open innovation in a region promoting co-assistance and co-creation. The use of external data expands the possibilities of a customer's business while also serving as a gateway to regional innovation. For example, it can lead to public-private cooperative business through public-private data linking and the creation of a collaboration model based on data linking across industries and regions. Furthermore, the releasing of data by an enterprise can enhance communication with the local community as an element of CSR, which, in turn, can uncover new stakeholders and stimulate various types of feedback from the community. The social participation of ICT human resources using *civic tech* can drive the emergence of a new region. Their activities have the potential of becoming a driving force in the creation of new economic value in a region by fostering a transition from the traditional market economy to a voluntary and sharing economy.

Today, with regional issues becoming increasingly complex and regional finances in a severe situation, the division of roles between the public and private sectors as social leaders needs to be reassessed. In response

to this need, Fujitsu seeks to provide high value-added solutions using open data and other forms of external data and to promote a social shift by supporting a co-creation process that connects customers and the community and creates a new sense of solidarity.

In closing, we would like to extend our deep appreciation to companies, local governments, universities, and NPOs in Aomori prefecture for their generous cooperation and support in our activities surrounding the Aomori tourism cloud model and use of open data.



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Mr. Maita is currently engaged in R&D and operation of tourism clouds and development of regional information models using tourism and regional data.