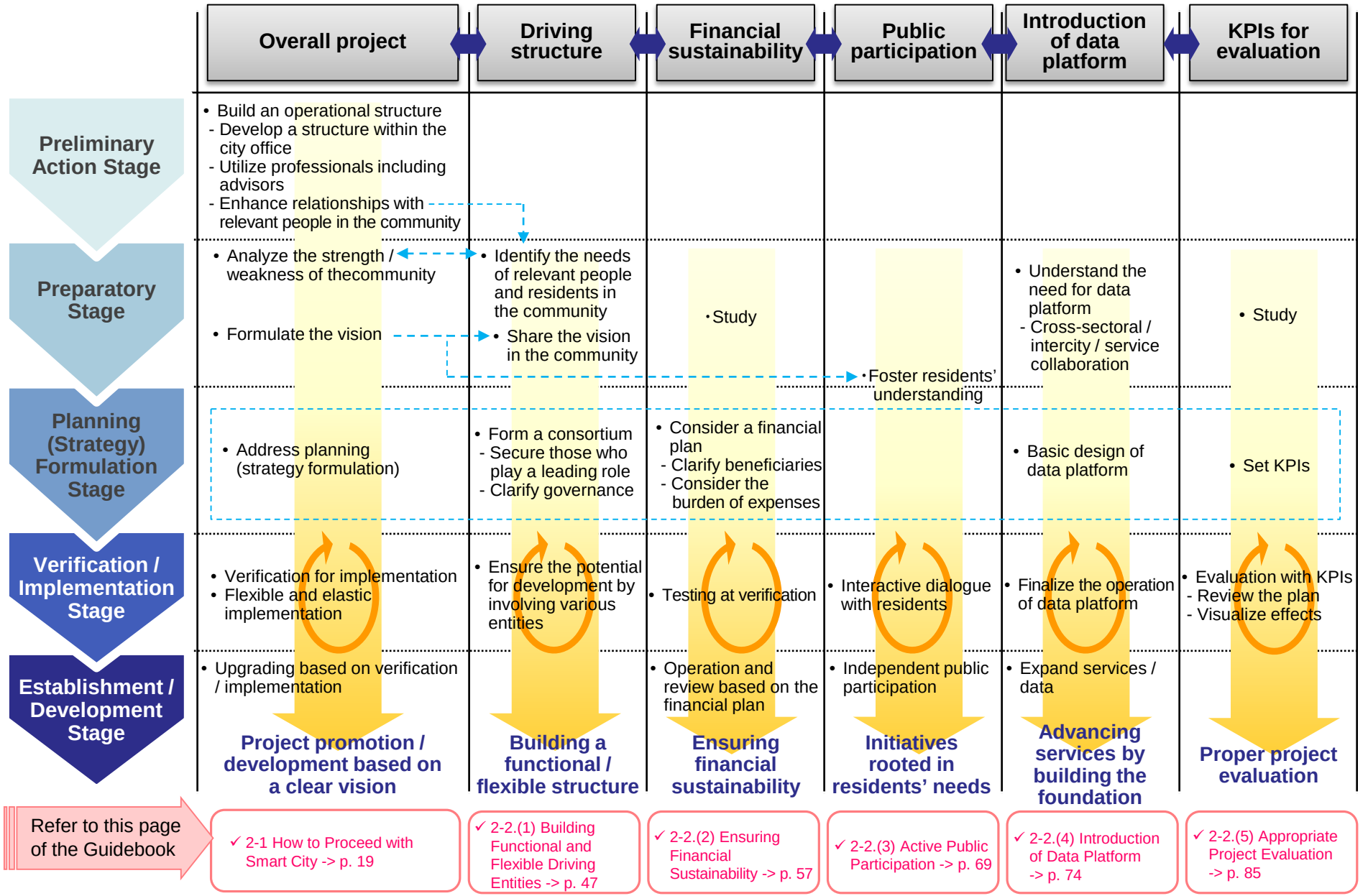
Chapter 2
Toward the Realization of Smart City

Toward the Realization of Smart City: Overall Picture



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* This overall picture was created by sorting out and averaging collected examples, and how to proceed with an initiative varies depending on the actual situation of the community.

2-1 How to Proceed with Smart City

2-1 Types of Smart Cities

○ Smart city can take a variety of forms depending of factors, such as the target area, objective, contents of the project, entities that play a central role and size of the city. This Guidebook covers the two types below, which are considered to be typical. * The two types below were summarized as average images on the basis of collected examples, and the actual situation varies from community to community.

	Government-initiated type	Area management type
Target area	○ An area with the scale of a city or urban area	○ Target specific district scale areas
Objective / description	○ Initiatives that increase the efficiency of administration systems or provide various administrative services mostly to improve well-being	○ Initiatives that provide services aimed at supporting the lives of community residents and the business operations of companies based in the district mostly to enhance the value of the district
Driving entity	○Consortium led by local government etc.	○ Consortium led by community development organization and a local government etc.
Major role of local government	○ Supervise / lead the formation of a consortium, establishment of rules and planning (strategy) formulation as well as facilitate progress ○ Provide various administrative services etc.	○ Take the initiative in forming a consortium and planning (strategy) formulation in collaboration with a community development organization ○ Clarify the status of the district in administration plans and policies, and support the activities of community development organization
Major entities involved	Service **Local government / Corporation operating Smart City*1 / Private sector** ○ Examples of services provided: administrative procedures, disaster prevention, crime prevention, medical care / welfare, health, mobility, education, industry, infrastructure management ○ Service users：residents of / visitors to the entire city area Data platform **Local government / Corporation operating smart city** Data **Local government / Corporation operating smart city / Private sector**	Service **Community development organization*2 / Local government / Private sector** ○ Examples of services provided: dissemination of town information, town block management (i.e. infrastructure management, cleaning, security, logistics, energy) ○ Service users： residents and companies of / visitors to a specific district Data platform **Local government (Community development organization)** Data **Community development organization / Local government / Private sector**

*1. Corporation operating smart city: A corporation (e.g. joint stock company, corporate juridical person) that is specifically set up under the driving entities to operate smart city
*2. Community development organization: An organization consisting of relevant people in a specific district, including an area management corporation and a Town Management Organization (TMO), and engaging in activities to revitalize, and improve the quality of, the district.

2-1 How to Proceed with Smart City

Described below are the chronological explanations of matters to do and points to note toward the realization of smart city.

- Because this Guidebook is primarily intended for local governments, explanations are focused on the government-initiated type, in which a local government plays a greater role.

Preliminary Action Stage

Stage during which smart city is initiated and started

- Clarify an awareness of issues / a sense of purpose
- Strengthen the structure of a local government etc.

Preparatory Stage

Stage during which the policy of an initiative is decided and shared with residents and the organization is built

- Build a core structure that leads the project
- Share the core structure and vision with residents

Planning (Strategy) Formulation Stage

Stage during which concrete initiatives are made and strong driving structure is built

- Form a project driving entity (consortium)
- Consider / draw up a concrete plan for realizing the project

Verification / Implementation Stage

The social acceptability of services is verified and implemented in society step by step

Establishment / Development Stage

Implemented services are properly monitored, improved and smart city is established in the community

2-1 How to Proceed with Smart City: Example (Utsunomiya City)

Process at Utsunomiya City

- Utsunomiya City promotes smart city as a means to realize a network-type compact city.
- With a focus on LRT, the city is implementing the initiative in the areas of mobility (e.g. AI-based operations), hospitality (e.g. biometric authentication) and energy (e.g. a regional power producer and supplier)

Preliminary Action Stage

Clarify a sense of purpose

- A joint research with Waseda University in the field of transportation / energy led to a smart city initiative that combines the field with services of other departments (mobility, tourism), then a common sense of purpose was clarified.
- **A common sense of the sophistication / acceleration of a network-type compact city with ICT** was developed.

Preparatory Stage

Set up a council

- A council was set up by eight organizations consisting mainly of companies participating in the research with the city and Waseda University. A structure was built in which university professors **serve as advisers** on the contents of the initiative and the operation of the council.

Develop a vision

- Council members considered the vision. It was developed in line with the city's administrative plans.

Strengthen the city structure

- **A project team was launched** in the city office (cross-sectoral collaboration was established)

Planning (Strategy) Formulation Stage

Strengthen the council structure

- Toward the full-scale implementation of the initiative, **applications for additional council members were invited from the public, and 16 organizations with motivation for independent verification were selected.** Area-specific working groups were set up for project promotion.

Planning

- **A smart city action plan was developed.**

Strengthen the city structure

- **A department dedicated for the promotion of smart city (Smart City Promotion Office) was set up** in the city office.

Verification / Implementation Stage

Verification test Business model

- Business models studied in the action plan were **materialized through verification**.

Share information with residents

- In conducting verification tests, information was shared / opinions were exchanged with organizations including a community association and a shopping district association.

Data platform

- The introduction of data platform was considered to explore the possibility of linking data between activities of different areas.

Establishment / Development Stage

* To be implemented step by step from 2021

(1) Preliminary Action Stage ① - Government-initiated type

■ Develop a driving structure within the city office by involving all the relevant departments with support from professionals, such as advisers / architects, and make preparations for serious consideration by building up the momentum through dialogues with relevant people in the community, including the municipal assembly, local business leaders and regional residents' groups.

➢ **Build an operational structure involving all sections**

・Utilize professionals such as advisers and architects

- It is important to utilize professionals with expertise who support a local government by, for example, providing various information, coordinating with private companies and providing advice on services introduced.
- From this viewpoint, it is necessary as a first step to invite specialists in areas, such as digitalization, industrial promotion, community development and private information, as advisers or specialist staff in the city office.

* The areas and number of specialists are not fixed; they should flexibly be considered according to the necessity at each stage.

・Develop a structure within the city office

- It is also necessary to develop a functional and flexible structure within the city office by, for example, setting up as an organization directly supervised by the head of a cross-sectional project team, which consists of departments, such as information / planning, industrial promotion and policy implementation (e.g. welfare, community development, environment).

✓ In order to focus the attention of local government staff and relevant people in the community on smart city promotion, it may be effective for the head of a local government to express the intention by, for example, declaring the promotion of smart city.

✓ Developing an organizational structure is only a first step. The important point is to steadily continue to improve the organizational structure until it works while strengthening it and creating mechanisms.

・Enhance staff members' knowledge

- Another important point is to enhance staff members' knowledge step by step by constantly holding training courses and hiring IT personnel so that a certain level of knowledge about smart city can be gained at all the relevant departments.

➢ **Have dialogues with community stakeholders, including the municipal assembly, local business leaders, regional residents' groups and local universities, and build up the momentum**

・It is also important to build up the momentum for a united effort in the community with support from advisers by, for example, holding study meetings with relevant people in the community and providing courses for them.

✓ Having wide-ranging project areas and relevant people, smart city initiatives tend to lose focus. Therefore, it is effective to share the original intent of an initiative among local government staff as well as with relevant people in the community.

(1) Preliminary Action Stage ② - Government-initiated type

Points to note

① Build a close collaboration between advisers etc. and a local government (Do not leave the entirety of the operations to advisers)

- Some local governments leave all the operations, from clarifying challenges to determining contents, to advisers etc.
- Reflecting, as a local government familiar with the community, on what priority policies have been adopted and why as well as what strengths / weakness the community has, sharing these matters with advisers etc. and closely collaborating with them will lead to the most effective use of the capabilities of advisers etc.
- In view of this, it is also effective to clarify the roles and authority of advisers etc. in a document.

② Build a structure involving all sections (Eliminate the harmful effects of sectionalism)

- Some smart city initiatives are fragmentary because only responsible departments, such as information and planning departments, work hard without full cooperation from departments that implement policies.
- It is true that departments that implement policies do not have sufficient knowledge / experience in the digital area and that digitalization will change the mechanisms and operations of administration themselves, but the steps below will help you gain their understanding and cooperation step by step.
  ① Set up a flexible and practical organization in the city office, which may take a form of the project team directly supervised by the head of a local government, instead of a routine meeting like a liaison conference within the city office, and in doing this, incorporate departments that implement priority policies in the team.
  ② With support from advisers, hold discussions on how the individual policies and operations of departments that implement policies can be improved through the utilization of digital technologies and data, accumulate small successful experiences and gain their understanding gradually.
  ③ Raise the level of understanding by taking measures, including enhancing the training of staff at departments that implement policies and by assigning staff knowledgeable about data analysis.
- Note that the responsible department without sufficient authority cannot facilitate the initiative. It may be worth considering clarifying in advance the roles and authority of the responsible department as well as the expected roles of departments that implement policies.

(1) Examples of Initiatives at Preliminary Action Stage

○Build an operational structure involving all sections
-- Develop a structure within the city office, enhance staff members' knowledge

Establishment of a department that promotes ICT (Sapporo City)

- **The department responsible for ICT strategy promotion was newly established** in the community development policy bureau.
- **Sapporo City ICT Utilization Strategy was formulated as an initiative for a cross-sectoral approach**, which includes the utilization of data from public and private sectors.

* The city announced that starting from FY2021, 'Digital promotion bureau head' would be established and the department responsible for ICT strategy promotion be transferred to the smart city promotion department.

Source: Sapporo City website:
https://www.city.sapporo.jp/kikaku/ictplan/

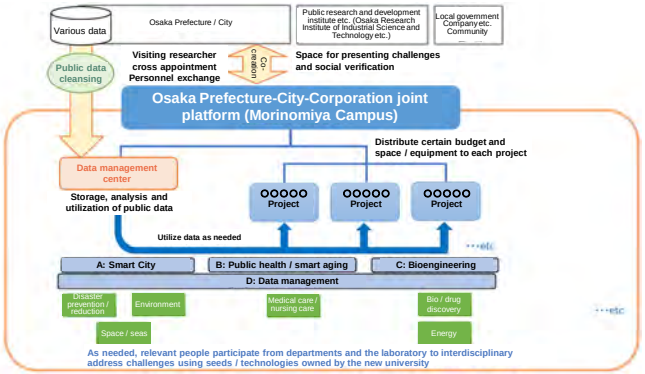
Improvement of staff members' IT skills, collaboration with a university in the community (Aizuwakamatsu City)

- **As cross-sectoral organizations in the city office, the informatization management and promotion committee (the deputy mayor serves as CIO)** and its subordinate, the informatization policy study team (consisting of four teams [three at the time of establishment], including the digital government promotion study team), were established.
- To enhance staff members' ICT skills, those who had worked at the information policy department were assigned to relevant departments, and **a informatization personnel registration system (passing the examination of data-processing technician is required for the registration) was created**.
- Moreover, **in collaboration with the University of Aizu, which specializes in ICT**, local analytics personnel are developed, and graduates of the University are continued to be employed as staff.

Source: http://www.lictia.jp/

Joint platform with a public university (Osaka Prefecture / City)

- Osaka Prefecture / City will open the Osaka Metropolitan University (tentative name) by merging Osaka Prefecture University with Osaka City University in 2022.
- The new university will **establish a joint platform with the government**, and **contribute to solving challenges faced by cities in Osaka by leveraging the public university's advantages**, such as public data analysis and the industry-academia-government network.



(Source) Osaka Prefectural Government Basic concept of the new university (July 2020)
(http://www.pref.osaka.lg.jp/fukatsu/koritsudai_osaka/shindaigaku_kihon.html)

(1) Examples of Initiatives at Preliminary Action Stage

○Build an operational structure involving all sections
-- Utilize professionals such as advisers and architects

Invitation of external specialists (Kaga City)

- Kaga City of Ishikawa Prefecture and the Japan Research Institute, Limited, concluded a 'Partnership agreement on Smarty City promotion in Kaga City.'
- Under the public-private-partnership, regional challenges were identified, a policy system was clarified and support was provided for policy making with specialists.

Source: https://www.jri.co.jp/page.jsp?id=34963

Conclusion of a comprehensive partnership agreement (Kobe City)

- Kobe City of Hyogo Prefecture and Microsoft Japan Co., Ltd. signed on 4 June, 2020 a comprehensive partnership agreement on four subjects, including 'Working style reforms' and 'Promotion of data linkage infrastructure toward the realization of smart city', triggered by COVID-19 countermeasures.
- Microsoft provided advice on smart city and conducted a research on data linkage infrastructure and a trial project of smart city services.

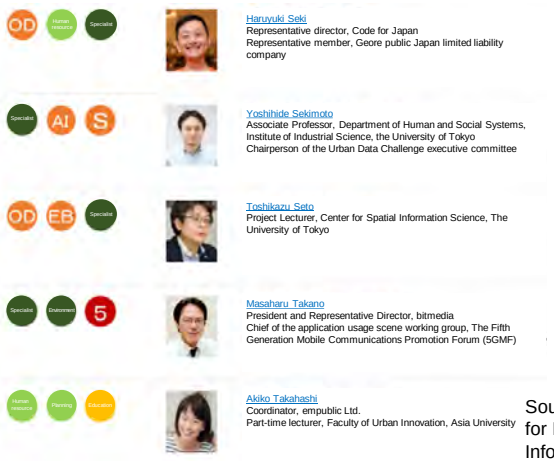
KOBE UNESCO City of Design

Microsoft

Source: https://www.city.kobe.lg.jp/a05822/292356629182.html

System to support the dispatch of specialists

- The Ministry of Internal Affairs and Communications commissions specialists in ICT and data utilization to serve as 'regional informatization advisers' and dispatch them at the request of local governments and other organizations.
- A specialist can be dispatched for up to three days per application with the applicant bearing no cost of the specialist's travel expenses and honorarium.



- Provide support in 26 areas, including open data, network infrastructure and human resource development
- In FY2020, a total of 207 specialists were commissioned

Source: Website of the he Association for Promotion of Public Local Information and Communication (https://www.applic.or.jp/page-1862/)

Involvement of an architect in Super City initiatives

- In inviting applications from the public for districts designated as 'Super City', which started in December 2020, the involvement of an 'architect' who plans the overall Super City initiative, including the setting of regional challenges, development of project plans and utilization of advanced technologies, was required.

(1) Examples of Initiatives at Preliminary Action Stage

○ Strengthen a local government's operational structure and build an driving structure involving all sections -- Initiative for Digital Transformation at Bandai Town, Fukushima Prefecture

Creation of CDO

- Bandai Town of Fukushima Prefecture established in November 2019 the post of 'CDO (Chief Digital Officer)' for the first time as a local government in order to promote town administration, improve operational processes at the town office and formulate data-based policies by utilizing digital technologies.

Guideline for the creation of Bandai Town Chief Digital Officer (enforced on 1 June, 2020)

* Excerpt

(Establishment)

Article 1. The Mayor shall establish the post of the Bandai Town Chief Digital Officer (hereinafter referred to as 'CEO') who heads up the digitalization of administration, and assign a person who have professional knowledge, skills or experience to the post, in order to contribute to improving resident welfare by utilizing digital technologies.

(Duties)

Article 2. The CDO shall perform the duties listed below at the Mayer's request.

(1) Matters concerning the digitalization of administration.

(2) Matters concerning policies and planning of informatization measures.

(3) Other matters specified by the Mayer.

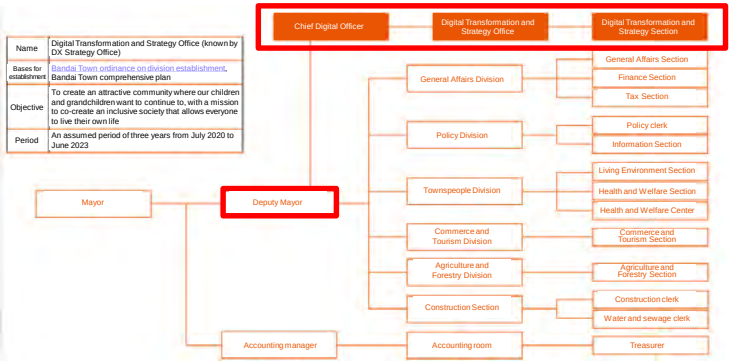
(Appointment)

Article 3. CDO shall be appointed by the Mayor from among those who have professional knowledge, skills or experience.

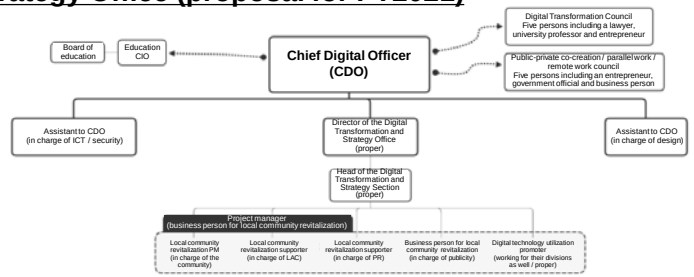
Establishment of the 'Digital Transformation and Strategy Office'

- To promote DX, the 'Digital Transformation and Strategy Office' was established as a cross-sectoral organization directly supervised by the deputy mayor on the basis of the Bandai Town comprehensive plan and the Bandai Town ordinance on division establishment.
- A temporary organization established for an assumed period of three years.

○ Organizational positions of CDO and the Digital Transformation and Strategy Office



○ Organizational structure of the Digital Transformation and Strategy Office (proposal for FY2021)



Source: Website of Bandai Town (https://www.town.bandai.fukushima.jp/site/dx/)

(2) Preparatory Stage ① -- Government-initiated type

■ Share in the community the vision for an ideal smart city by clarifying the community's goals to be achieved, challenges and advantageous natural environment / culture / industry, while understanding the needs of relevant people and residents in the community.
■ In addition, share the benefits of introducing a data platform among relevant people.

➢ **Clarify the challenges, resources and strong / weak points of the community**

・It is helpful to review the present situation and challenges of the community before beginning to consider details, by, for example, clarifying goals to be achieved, challenges, important policies, and community's local resources and advantageous natural environment / culture / industry, on the basis of the local government comprehensive plan etc.

➢ **Identify the needs of relevant people in the community and residents**

・It is important to identify the needs, or what the community wants through smart city by continuing to have dialogues with relevant people in the community and trying to carefully understand residents' needs.

➢ **Understand the need for data platform**

・The solution using a silo-type (see p. 31) ICT (information and communications technology) system, which is built for each theme of various community challenges, has achieved many successful results.

However, since individual silo-type systems are independent and not linked to each other, a significant number of databases and apps have been buried. This issue has become increasingly evident.

・To avoid making the same mistake, it is an effective option to build a data platform as a common system foundation.

・Although building a data platform alone will not realize smart city or solve challenges, an OS is needed in the groundwork ('Make haste slowly'), and its benefits should be shared among relevant people.

(2) Preparatory Stage ① -- Government-initiated type

➢ **Share the vision in the community**

- In constructing the framework of a smart city project, it is crucial to discuss, on the basis of the aforementioned clarification and understanding, what should be aimed at, which policy areas should be strengthened and which advantages should be enhanced through the utilization of smart technologies and various data, among the structure in the city office, specialists including advisers, relevant people in the community (e.g. business community, universities), experts from various fields and private companies that can become key partners, and to form a common understanding of goals to be achieved (vision).
- The contents of the discussions can be compiled as a vision, and if the timing coincides with the revision of a comprehensive plan etc., can be clearly stated in the comprehensive plan while having in-depth discussions on the combinations of policies / measures utilizing smart technologies and other policies / measures.
  - ✓ It is another effective approach to gradually gain the community's understanding and momentum through practical activities that strengthen the current priority measures of the comprehensive plan etc. one by one by utilizing smart technologies and various data before trying to consider and share a vision.
- In this stage that is aimed at discussing goals to be achieved, it is effective to make efforts to share them with relevant people and residents in the community as broadly as possible, including the process of discussions.

Points to note

① Awareness of the importance of Preliminary Action / Preparatory stages (Avoid formulating a rough-and-ready, superficial vision plan)

- ➢ Rushing to a smart city, some local governments make a smart city plan by leaving almost all operations to consultants etc. without sufficient development of personnel in the city office or dialogues within the community.
- ➢ A smart city can be realized only when the government, business community and residents each understand and efficiently use smart technologies; it is essential to build a strong foundation without turning Preliminary Action / Preparatory stages into a mere formality.

(2) Preparatory Stage ② -- Government-initiated type

Points to note

② Participation by diverse entities in consideration (from supplier-centered to resident-centered)

- In some cases, only the relevant people on 'the supplier side', mostly consisting of the government, private IT / communications companies and specialists from the digital field, are involved in discussions to formulate a visions etc.
- Since smart city is originally aimed at evolving residents' lives and various city activities to make them more comfortable, affluent and safer, involving specialists and relevant people from a variety of fields and levels is effective in this stage, in which the future direction is discussed.

  (For example, health / medical care / welfare, universal design, biodiversity, environment, diversity, ethics, law and sociology.)

- It is also an effective process to spur open discussions by residents as much as possible, by, for example, collaborating with residents' groups engaging in Living Lab and community activities, or soliciting a wide range of proposals from residents using an interactive tool.
- In addition, it may be helpful to build relationships with not only the local business community but also private companies that will support a future ecosystem, through collaboration with startups operating in the community.

③ Unit of data platform construction

- Presently, a data platform is often constructed by each individual municipality, but independently building a data platform appears to be burdensome for a single municipality.
- Shared use by multiple municipalities centered around an ordinance-designated city / core city, as well as a move by a prefecture to take the lead in constructing data platform for shared use by its municipalities have begun to emerge.

(2) Examples of Initiatives at Preparatory Stage

○ Formulation of a vision and sharing in the community

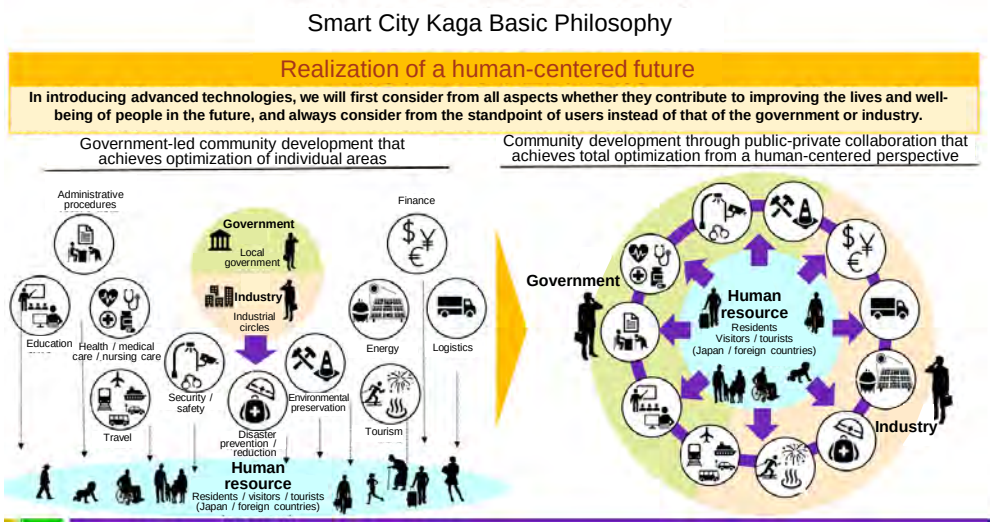
Inclusion in a comprehensive plan through town meetings with residents (Aizuwakamatsu City)

- In its highest-level plan 'Aizuwakamatsu City Seventh Comprehensive Plan' (planning period: FY2017 to FY2026), the city positioned 'Smart City Aizuwakamatsu' as one of the major perspectives to promote the creation of a sustainable, resilient and strong community in which residents can live a secure and comfortable life, in one of the three concepts of the plan, 'To a Town that Continues to Connect'.
- In preparing the Comprehensive Plan, the city conducted a questionnaire survey of residents and held town meetings to share the policies of the city with residents, and reflected the opinions of residents in the Plan.

https://www.city.aizuwakamatsu.fukushima.jp/docs/2016110400058/

'Kaga City Smart City Declaration' (Kaga City)

- The city announced on 30 March, 2020 the basic concept of 'Realization of a human-centered future society' and the operation principle, 'Kaga City Smart City Declaration'.
- At the same time, the city developed 'Smart City Kaga Initiative' and 'Kaga City Public and Private Sector Data Utilization Promotion Plan' that specify steps to realization and basic policies of various data utilization.



https://www.city.kaga.ishikawa.jp/shisei_gikai/smartcity/5252.html

(2) Preparatory Stage---Need for data platform

○ What is data platform?

- Data platform: A general term for IT systems that facilitate the introduction of various services to be realized through smart city, by integrating functions that communities intending to realize smart city commonly use to realize smart city.
- **The functionality requirements, stated in the 'Smart City Reference Architecture',** can broadly be divided into **the three characters: ① interoperability (be linked), ② data distribution (flow) and ③expandability (sustainable).**

Three characteristics of data platform

① Interoperability (be linked)

A mechanism that allows a system to 'be linked' to the city's / intercity services (e.g. app), to data platform in other cities and to systems used in other fields

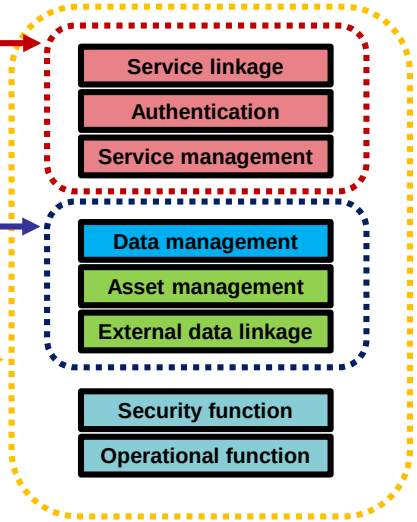
② Data distribution (flow)

A mechanism for mediating and linking various data in and out of the community

③ Expandability (sustainable)

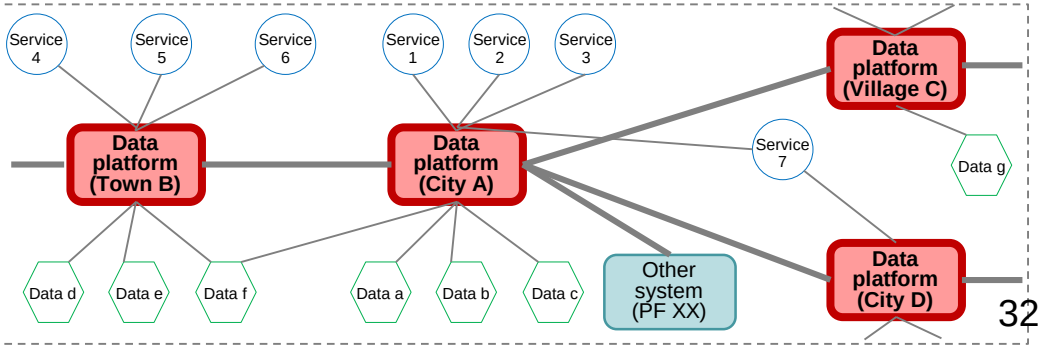
A mechanism for making expansion of data platform easy, through the operation of the minimum functional unit or by other means, in order to enable data platform to expand step by step as smart city develops

Data platform functional groups (Reference Architecture)



Origin / image of data platform

- Originating from the fact that the birth of OS enabled computers of different types to use the same software, a data linkage platform etc. is figuratively called '**data platform**'.
- However, unlike computers, cities themselves function without (City) OS, and therefore, it is more accurate to consider it '**the node of a network that links data and services of different cities**'.

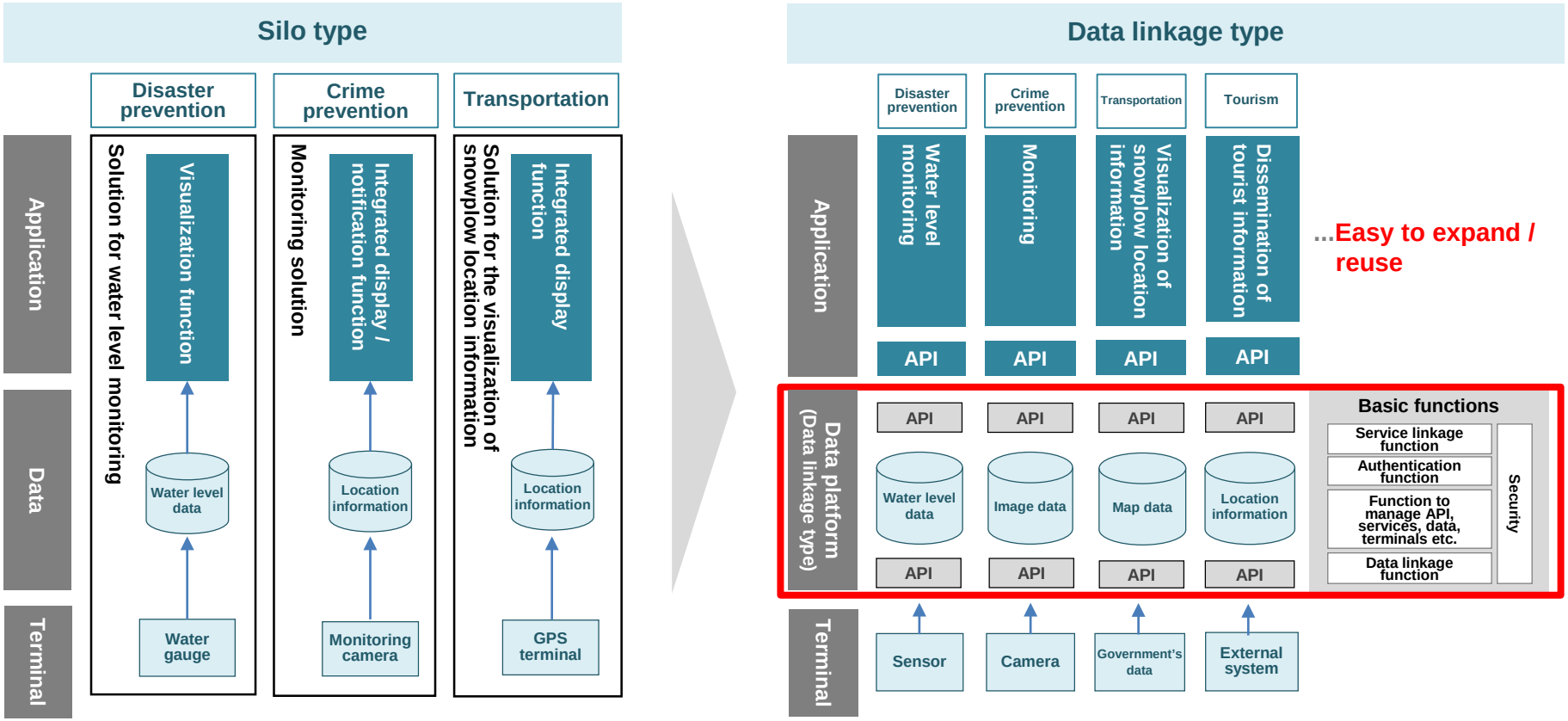


(2) Preparatory Stage---Need for data platform

○ Need for data platform (data linkage platform etc.) ①: Breaking away from silo-type systems

- Silo (bulk storage) type: If Smart City Initiatives are individually implemented without constructing a data linkage platform, **each solution will vertically stands in parallel with each other like silos**, **preventing the linkage / distribution of data and services**. In addition, they entail **high development cost** **because** constructed systems and services **cannot be reused**.

- Data linkage type: The construction of the data linkage platform of data platform will enable data sent from terminals, such as a sensor, to be efficiently collected / managed and linked with each other between cities / sectors.



* API (Application Programming Interface): A mechanism (interface) for enabling external applications etc. to use the function of a data linkage platform.

(2) Preparatory Stage---Need for data platform

○ Need for data platform (data linkage platform etc.) ② Linkage between cities / sectors / services

- There are **different applications in different cities**
- Constructed systems and services cannot be reused, **keeping each city's development cost at high levels**

- **Only one-to-one linkages are possible between data and services,** preventing the maximization of data value
- Analysis technology with AI etc. cannot be used to the full

- **Services are not integrated / linked between sectors even** within the same city, **making it difficult to improve the convenience of residents**
  (e.g. each app / service requires login)

Construction of data platform

Linkage between cities

- Even if one's city of residence and city of employment are different, **wide-area services can be provided**
  -> Allows wide-area alert at the time of disaster
  -> Expands the market size
- Horizontal deployment will enable new systems to **be developed faster and at lower cost**

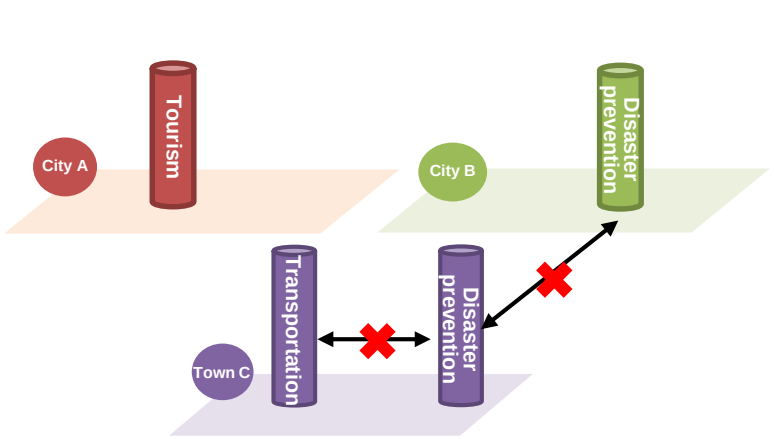
Linkage between sectors

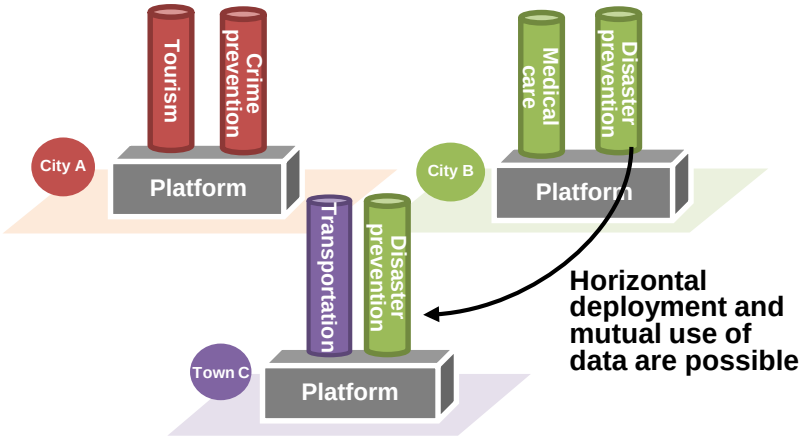
- Utilizing data across sectors and organizations will become possible, **leading to the provision of advanced services**

-> Disaster prevention measures can be advanced using a combination of hazard maps, road traffic records, satellite images, meteorological data etc.

Service linkage

- Linking individual services for residents with data **will achieve one-stop services**
- It will become possible for anyone to develop services at low cost (the democratization of innovation)





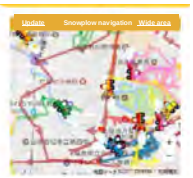
Reference: Introduction example of data platform

Providing services utilizing data platform (Aizuwakamatsu City, Fukushima Prefecture)

* Selected as a data utilization-type smart city promotion project by the Ministry of Internal Affairs and Communications in 2017.

- In December 2015, the city-run portal site / data platform 'Aizuwakamatsu Plus' started its operation
- Largely, five services are linked to data platform 'Aizuwakamatsu Plus' -> Verification is ongoing in other fields including payment
- Data is mostly from the city's open data utilization platform 'Data For Citizen'

・**'Aizuwakamatsu Plus'** is a website that **preferentially displays recommended information** based on **individual attributes** (e.g. the user's age, gender, family structure and interests)
・**Users can use** multiple **one-stop services** by registering **one ID and password.**

	Snowplow navigation	Digitalization of a maternity passbook	Aizukko + (plus) (distribution of school information)	Inquiring AI	Application preparation support service
Service / App	・In winder, location information of about 270 snowplows in the city is disclosed 	・The data owned by the city, from data of infant medical examinations and vaccinations to the height / weight growth curve and the dates for vaccinations, are linked and displayed	・'School news', 'Class news', emergency information etc. can be viewed 	・AI answers inquiries about ways to dispose of garbage, the appropriate section of the city etc. utilizing LINE 24 hours a day, 365 days a year 	・For some of application documents to be submitted to the city, entering specified items using a smartphone etc. will prepare multiple documents at one time

Data platform: City-run portal site 'Aizuwakamatsu Plus'

Data

Open data* (There are 322 data sets available (as of 1 March, 2021))
・Statistical data owned by the city
・Administrative data (disposing of garbage) etc.

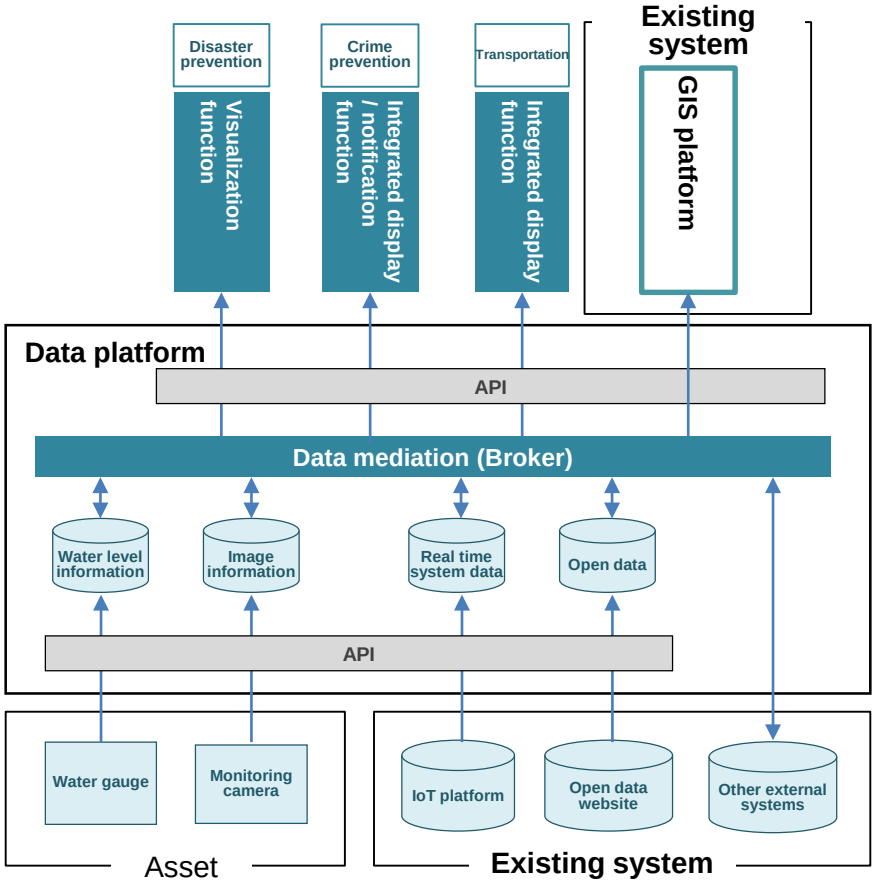
Sensor data
・Snowplow location data

Personal data
・Mother and child health information

* 'The city's open data utilization platform: Data For Citizen' was constructed as a project to promote community development utilizing ICT, which was included in the FY2012 supplementary budget.

○ Reference: Relationship between data platform and local governments' existing systems

- The aim of smart city, 'Solve various challenges facing cities and regions by utilizing new technologies such as ICT', is still achieved through the use of data stored in platforms, including open data websites and GIS (geographic information system) platforms.
- These existing systems were developed according to objectives and technology levels at the time of construction and have been individually present; data platform is expected to serve as a guide to effectively use the data of these systems, creating a variety of apps / services.



Relationship between each existing system and data platform	
GIS platform	Existing systems will be able to benefit from data platform if they are modified to collect and display newly installed sensor data from data platform.
・Open data website ・IoT platform (real time system data)	Existing systems that local governments have individually developed as silo-type systems, including open data websites and IoT platforms processing real time system data, will become accessible from various services if systems are modified so that each system can register data in data platform.
Other external systems	For examples, systems that the central and local governments have individually installed as silo-type systems and use to provide information, such as water levels of rivers, meteorological data and traffic information, will become accessible from various services if systems are modified so that they can distribute data via data platform.

(3) Planning (Strategy formulation) Stage -- Government-initiated type

■ The driving entity, consisting of public, private and academic entities that share the vision and independently join the project, takes the initiative in developing a concrete plan (strategy) for the implementation of the project and introduction of data platform (including the need for the introduction).

➢ **Form a project driving entity (consortium)**

・A project driving entity (consortium) may be formed by relevant people in the community, including a local government, advisers, local universities and residents' groups, as well as private companies etc. listed below, which share the vision and independently join a smart city project.

…Private companies that provide technologies, systems and services (IT vendors, communications, transportation, finance...)
…Urban developers that develop a good-quality town utilizing technologies and services
…Academics and other professionals that provide expert knowledge in priority areas etc.

・For private companies, this step may take a form of public invitation from the standpoint of requiring participating companies to share the vision and independently join the project.

➢ **Consider / draw up a concrete plan (strategy) for realizing the project**

・The driving entity draws up a plan (strategy) that specifies concrete steps to realize the vision etc.

・The contents of a plan (strategy) may include project goals, challenges to be solved and new value to be created, concrete activities, the direction of data collection / management / utilization, systems to be built, a financial plan, process planning and the division of roles among entities.

・In addition, the points below will need to be considered in drawing up a plan (strategy).
① Ensuring the flexibility of a plan (agile plan)
② Properly identifying the needs of residents
③ Clarifying governance rules in the project driving entity

➢ **Develop the basic design of data platform**

・Consider whether data platform should be introduced or not on the basis of the regional challenges and details of activities that were clarified

(3) Examples of Initiatives at Planning (Strategy formulation) Stage

○ Form a project driving entity (consortium)

Collection of organizations that support the vision (Niigata City)

・To give a concrete from to the 'Niigata City urban design' developed by Niigata Prefecture / Niigata City, the driving entity, consisting of public, private and academic entities, was formed by collecting members that support the smart city initiative utilizing ICT technology etc. and are motivated to implement the project to promote the 'Niigata City urban design'.

Niigata City Smart City Council

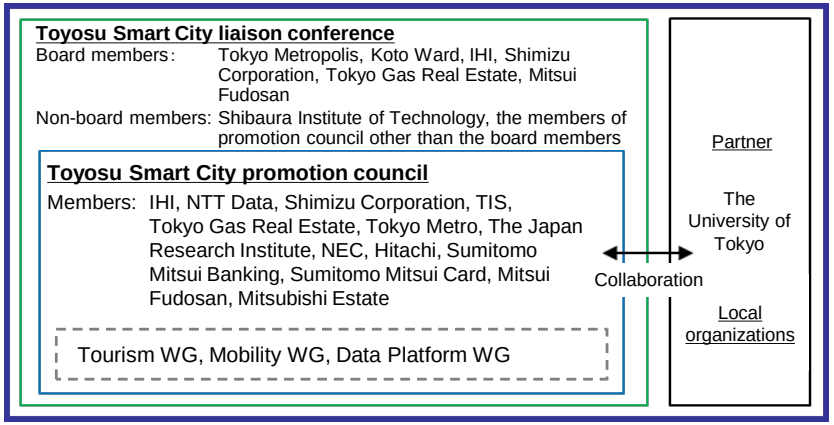
Provision of technology	Private companies / organizations (26 organizations)
Local government	Niigata City
Those responsible for smart city in the community	Niigata Furumachi town development corporation * Urban renewal corporation Niigata Station / Bandai: considering responsible organizations
Experts	Niigata University, Graduate Institute for Entrepreneurial Studies

Enhance the practicability and sustainability of the initiative in collaboration with the community

■ Source: Realizing a creative city using smart planning as an engine (Niigata City Smart City Council)

Concentration of Toyosu-related companies and technology provider companies (Toyosu)

・Companies related to Toyosu (major landowners and companies) and technology provider companies formed the driving entity in collaboration with Tokyo Metropolis and Koto Ward.



■ Source: Toyosu Smart City implementation plan (Koto Ward)

Additional invitation of applications from those that want to participate, to embark on initiatives in new areas (Ustunomiya City)

・The 'U Smart promotion council' was started by eight organizations, but **participating organizations were additionally collected to strengthen the 'Smart Mobility' initiative**; 16 organizations meeting the application conditions below were additionally selected.

■ **Application conditions (the roles that the Council expects organizations ,etc. to play)**

An organization etc. that supports the objectives of the Council and independently carries out concrete activities, including the development, verification and research of new technologies and systems that help solve challenges, by making the most of the strength of each organization etc.

Enrollment in the U Smart promotion council

Invitation of applications for enrollment in the 'U Smart promotion council' (we closed applications on 11 October 2019.)

We invite applications from companies / organizations (hereinafter called Organizations etc.) that want to take part in the promotion of the council's initiative, which includes addressing, or providing necessary support for, the development / verification / research of new technologies and systems in the city that contribute to realizing smart city in the city (the 'Making the life and town vibrant with ICT' project in the 6th Utsunomiya City Comprehensive Plan).
This fiscal year, we invite applications from Organizations etc. for 'Mobility', an area that needs to be strengthened to achieve the goals of the council.

■ Source: Utsunomiya City's website

(3) Examples of Initiatives at Planning (Strategy formulation) Stage

○ Consider / draw up a concrete plan (strategy) for realizing the project

Major matters that should be included in a plan (strategy)

・Examples of descriptions in smart city model projects by the Ministry of Land, Infrastructure, Transport and Tourism

Goals of the district	Defining the future image of the city, setting goals that are aligned with the city's challenges in light of the improved lives of residents
Challenges of the district	Challenges facing the district, advanced technologies and data to be used to address those challenges
Setting of KPIs	Setting target values, which are aligned with the district's goals and challenges and indicate the effects on cost reduction and the improvement of the district's value / profits, as well as setting the fiscal year in which the set target values are expected to be achieved
Contents of the initiative	Overall picture of the initiative, details and characteristics of the initiative
Road map for implementation	Time frame for research, planning, verification and implementation, with the target fiscal year in which each of them is achieved
Division of roles among members	Consensus formation and division of roles among the stakeholders as well as the driving structure
Policy to make the initiative sustainable	Proper public-private cost sharing as well as a financial plan and payout time based on estimations, with initial investment to maintenance / operation in consideration
Data utilization policy	Policy for the development and utilization of the data and platform that are expected to be used in the initiative
Policy for horizontal deployment	Describing a model for horizontal deployment after clearly showing a common initiative for nationwide deployment

Kashiwa-No-Ha Smart City Action Plan

- In March 2020, an action plan aimed at building a 'Station-centered Smart Compact City' utilizing data and new technologies, such as AI and IoT, was prepared and announced.
- Under the concept of 'TRY the Future -- the ever-evolving town', the plan states the promotion of town development by listing four themes and on the basis of three strategies.

Otemachi-Marunouchi-Yurakucho district Smart City Vision / Action Plan

- In March 2020, an action plan to 'update and redesign existing cities' through 'a public-private partnership (PPP) and area management' was developed and announced.
- The plan states how the district's value can be enhanced through smartification and how the data utilization-type area management can be achieved toward the district's goals / vision.

(4) Verification / Implementation to Establishment / Development Stage ① -- Government-initiated type

■ Pursue social implementation in line with the plan (strategy), while enhancing the degree of maturity and social acceptance of the plan for introducing systems and providing services mainly through verification tests.

■ In addition, aim to realize a smart city that is firmly rooted in the community by improving services etc., introducing new services etc. and linking the initiative to data platform while properly monitoring the effects of implemented services etc.

➢ Conduct verification tests for implementation

・Conducting verification tests by clarifying subjects to be studied / verified, such as concrete needs, social acceptance and the adequacy of a financial plan, to avoid only carrying out experiments for experiments, will enable you to take steadier steps to social implementation.

➢ Flexible and elastic social implementation

・In pursuing social implementation, it is expected as a matter of course that not everything goes according to plan (strategy).

・It is effective to take a flexible and elastic approach by, for example, giving priority to a project in a particular area, such as the introduction of mobility services, according to the status of progress or preparation of projects of each area, or by introducing services gradually from a particular district.

・If successful experiences can be shared with residents and a smart society can be realized even if gradually through such an approach, it may be possible, as a result, to realize a plan (strategy) earlier.

➢ Finalize the operation of data platform

・Services / apps will never gather only by making data platform and waiting for them. An active stance is needed to understand desired data, search for such data and perform matching.

➢ ‘Constant upgrading’

- Not the social implementation of services etc. but firmly establishing smart city in the community would be considered the goal.
- Technological innovation is rapidly advancing. It is effective to try to constantly ‘upgrade’ smart city by improving services and introducing new services while properly monitoring the effects of implemented services etc.

➢ Need for long-term initiatives

- In order to reach a state in which smart technologies are efficiently used at various levels, including the government, private sector and residents, and smart city is rooted in the community, it is necessary to not only improve IT literacy of each level but also consider that the reforms of conventional systems and processes of the government, society and economy do not produce immediate results but do require long-term, continued measures.
- Therefore, with the future addition of functions in mind, data platform needs to be constructed using a building block approach, which provides easiness of expansion, from the beginning. In addition, precisely because it will be operated for a long term, attention needs to be paid to avoid vendor lock-in.
- It is also necessary to change the real urban space (physical space) to a form appropriate to a smart society in stages, such as a town that responds to autonomous driving mobility and a town that variably responds according to the lives and actual behaviors of residents.
- In this sense, smart city may be considered to be initiatives that are matured from a long-term perspective.

○ Verification for social implementation

Casual sensing and daily complete medical checkup (Arao City)

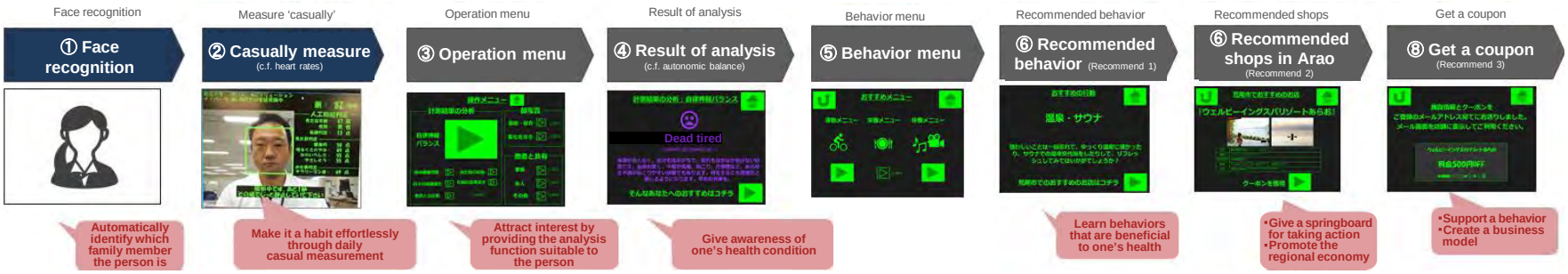
- Arao City faces the challenges of low rates of residents undergoing a special health checkup and high treatment costs of lifestyle-related diseases for those not undergoing a health checkup. The city aims to extend healthy life expectancy by enhancing health awareness and making it a habit to engage in activities beneficial to improve mental and physical health through smart healthcare services, such as a daily health control recommendation service.
- Toward social implementation, the city **verified social acceptance** in FY2020 **by considering it the PoC (proof of concept) phase**. The city **verified the business model** in FY2021 **by considering it the PoB (proof of business) phase.** The city now aims to improve services etc. through verification tests and achieve social implementation in FY2023.

2020 (PoC phase)
- Investigated reactions of users (e.g. residents)
  -> Whether they want to use, how much they are willing to pay to use
- Checked challenges related to installation / provision
  -> Necessary resources, cost of introduction / operation and management

2021 (PoB phase)
- Determined services to be implemented
- Verified sustainability by providing a service using a prototype
  -> Verified viability as business, including cashflow

* From the beginning, the initiative has been challenge-oriented rather than technology-oriented; the city has been taking a stance of adopting opinions of Arao City residents from the planning stage

(Image of the daily health control & recommendation service) * One of multiple hypotheses



○ Verification for social implementation

The gradual service area expansion of the delivery of purchased goods by drone (Ina City)

- Ina City is facing a situation in which those living in mountainous areas without a private car, including elderly people, have difficulty in moving around / going shopping.
  (The nearest supermarket is 11 km away and it takes 40 minutes each way by bus, which runs only twice a day)
- In FY2020, the city implemented drone delivery services for shopping. Those who place an order by 11:00am for goods from about 300 items on the cable TV screen using the remote control, with which elderly people are familiar, can have them delivered by a drone etc. by evening.
  * The drone is remote-controlled by Shinshuinasora at its base facility. It automatically flies on set routes.

January 2017 (Fact-finding survey on shopping)

- Inconveniences of shopping and an increasing number of people with limited access to shopping facilities, including those requiring nursing care and elderly people living alone, were recognized as regional challenges.

-> Areas with high demand were selected

From FY2018 (Development / technological verification)

- Technological development of drones that fly over rivers, and collaboration procedures / specifications etc. were finalized.
- One month before launching the service, a free trial campaign was conducted to provide a period in which people 'were encouraged to try' without paying registration / usage fees.

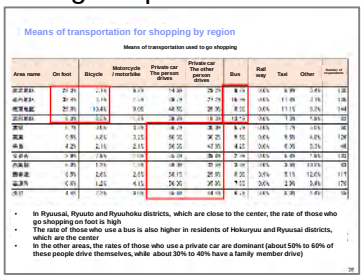
August 2020 (Project launch)

- The project started in four villages in Hase District.
- 33 of about 600 households (of which about 150 are those with only elderly people)

October 2020 Area expansion

- The area was expanded to nine villages **(Personnel such as volunteers were secured)**
- 47 of about 900 households (of which about 300 are those with only elderly people)

(Identification of residents' needs through a questionnaire survey)



■ Source: 'Ina City Survey on shopping of foods' (January 2017)

(5) Points to Note regarding the Area Management Type

-- The division of roles and relationships between the local government and the supporters of community development, including the community development organization, vary among target districts according to whether the district is located in a newly developed area or a built-up area, or whether it is in a large city or local city. However, mainly in light of the points below,

① initiatives in the district are directly linked with administrative themes, such as solving administrative challenges facing the local government and realizing the vision to be achieved, and

② the introduction of services etc. in the district is a test case that leads to a citywide smart city initiative,

it is considered necessary to independently join smart city initiatives in the target district as the local government in collaboration with a community development organization.

➢ **Give a clear status to the district that pursues smart city initiatives**

- It is possible that taking preferential measures for the target district, which will not apply to the other districts, may be needed, including the flexible and elastic operation of systems / rules as well as personnel, financial or other support.
- Therefore, it is considered effective to give a clear status to the target district in the administration policy by, for example, taking the opportunity of revising the comprehensive plan to specify that smart city initiatives are pursued in the target district as a test case of the citywide initiatives.

➢ **Share an awareness of issues / a sense of purpose between the community development organization and the local government**

- As a precondition for the local government to promote smart city in collaboration with the community development organization etc., it will be necessary to share an awareness of issues / a sense of purpose between both parties while harmonizing smart city with the existing initiatives of the organization etc.

➢ **Build a promotional / support structure involving all sections**

- It is also effective to undertake initiatives in various fields as test cases in the target district.
- Therefore, it will be effective to build a promotional / support structure involving all sections, including departments that implement policies, at the local government and to improve staff members' knowledge even when the community development organization plays a leading role in the district.
- Building such a structure is also beneficial in speeding up decision making at the government to respond to the speed of 'private sectors'.

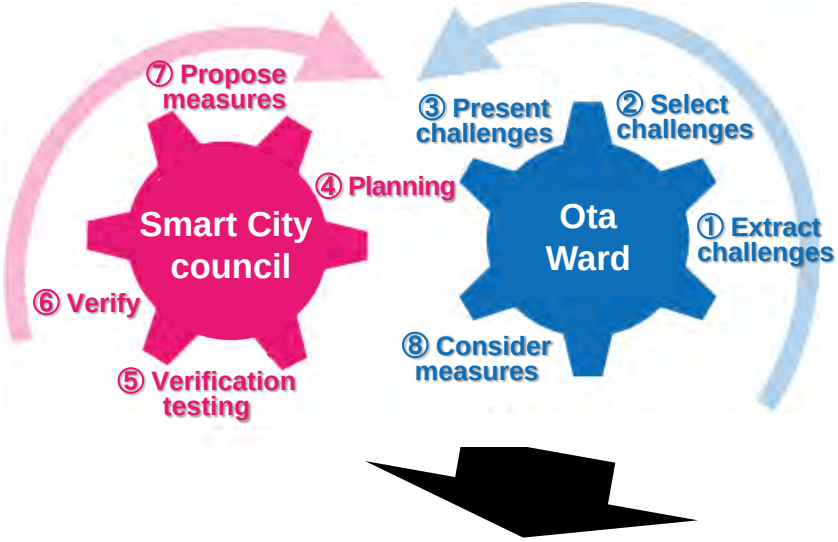
➢ **Provide support to the community development organization**

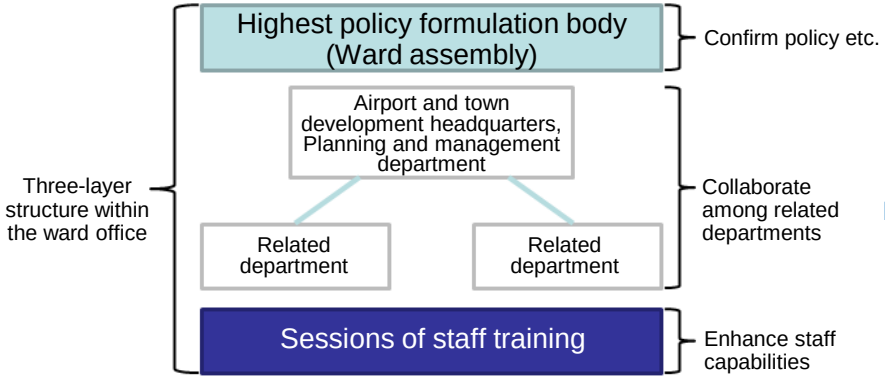
- Some community development organizations may be weak in terms of both financial and human resources. If they need to be developed as organizations that support smart city in the district, it is necessary to assist them in securing independent source of funds and improving the structure.
- It is also a good idea for the local government to join a public-private-academia community development organization from the standpoint of strongly driving smart city.

(5) Points to Note regarding the Area Management Type (Example)

○ Haneda Innovation City in Haneda zone 1 promotion council (Ota Ward)

At the Haneda Airport site zone 1, the Haneda Smart City promotion council, consisting of Ota Ward, which is the landowner, Haneda Mirai Kaihatsu Co., Ltd., which owns and manages Haneda Innovation City (HIcity), Kajima Corporation, which is the largest shareholder in Haneda Mirai Kaihatsu, and other organizations, was set up; the council promotes initiatives that contribute to solving challenges facing Ota Ward by forming test beds suitable for the verification of leading-edge technologies / services that address various 'industry' challenges.





Position of the district

- In July 2015, the ward developed 'Haneda Airport site 1st zone development policy' stating the development policy of the Haneda Airport site.
- It states that the district is aimed at building a 'creation and dissemination base for new industry, in which people, companies and information at home and abroad gather and interact with each other, under the concept of "Building a 'creation and dissemination base for new industry' that connects the city with the world".

Sharing an awareness of issues / a sense of purpose

- The ward extracted challenges mainly from the Comprehensive Strategy for Overcoming Population Decline and Vitalizing Local Economy and provided them. The promotion council reviewed the policies and contents of the smart city initiatives.
- The ward, Haneda Mirai Kaihatsu Co., Ltd., Kajima Corporation and the Japan Research Institute served as the secretariat and promoted the sharing of an awareness of issues / a sense of purpose between public and private sectors, including the consideration of the overall plan.

Building a promotional / support structure involving all sections

- The highest policy formulation body for administrative management confirmed the 'Realization of sustainable city Ota' through smart city projects, and developed a PDCA system, which includes the extraction of further challenges.
- Training sessions were planned so that each staff member can gain deeper understanding and knowledge of the effectiveness of smart city and view the initiatives as their own issue.

Providing support to the community development organization etc.

- Lively discussions were invited through 'Analysis of outcomes' and 'Proposal for improvement', and both the public and private sectors came up with ideas beneficial to the community development.
- Being a green field type project in a site adjacent to an airport, which is unprecedented in and outside Japan, the initiative is being promoted in close collaboration.