RUGGEDISED
Designing smart, resilient cities for all

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Written By	Daniel Cassolà (ISINNOVA)	November 2022
Checked by	Mario Gualdi (ISINNOVA)	November 2022
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Project partners:

01 - GEMEENTE ROTTERDAM (ROT)- NL
02 - UMEA KOMMUN (UME) - SE
03 - GLASGOW CITY COUNCIL (GCC) - UK
04 - RISE RESEARCH INSTITUTES OF SWEDEN AB (RRI)- SE
05 - ISTITUTO DI STUDI PER L'INTEGRAZIONE DEI SISTEMI SC (ISINNOVA) - IT
06 - AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH (AIT) - AT
07 - NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO (TNO) - NL
08 - ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI) - DE
09 - ERASMUS UNIVERSITEIT ROTTERDAM (EUR) - NL
10 - UMEA UNIVERSITET (UU) - SE
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13 - STATUTARNI MESTO BRNO (Brno) - CZ
14 - COMUNE DI PARMA (Parma) - IT
15 - URZAD MIEJSKI W GDANSKU (Gdańsk) –- PL
16 - Ballast Nedam Bouw & Ontwikkeling Holding B.V. (BN) - NL
17 - ROTTERDAMSE ELEKTRISCHE TRAM NV (RET) - NL
18 - ENECO ZAKELIJK BV (ENE) - NL
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33 - GDANSKA INFRASTRUCTURA WODOCIAGOWO-KANALIZACYJNA SP ZOO (GIWK) - PL
34 - RISE ACREO AB (RA) - SE

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Executive summary

With the structure of a report, this document describes and summarizes the findings of the activities that have been held as a result of the international collaboration programme between the RUGGEDISED project and Japan. In essence, this report is intended to show in detail the presentations[1], discussions, contributions and conclusions of the joint exercises aimed at the mutual flow of experiences and knowledge.

The structure of the document is as follows:

- Chapter 2 introduces the collaboration and summarizes the online kick-off meeting;
- Chapters 3 and 4 summarize the two knowledge sharing workshops;
- Chapter 5 summarizes the virtual study visit hosted by Rotterdam;
- Finally, Chapter 6 outlines the main conclusions drawn from the meetings and the lessons learned.

[1] See annexes.

Contents

Figures

1. Introduction

"**International Cooperation with Japan**" is an activity proposed by ISINNOVA pursuant the interest shown by the Mission of Japan to the EU in the Smart Cities and Communities initiative of the European Union. It was positively reviewed in the summer of 2020 by the Steering Committee of RUGGEDISED and subsequently by the European Commission. It was incorporated in Contract Amendment No. 3 of RUGGEDISED. It seeks to foster facilitated knowledge share between the respective international smart city programs employing budget made available by unused resources in the project and resources made available by the Japanese Government.

The activity aims to structure, facilitate, and foster a mutual flow of knowledge between the **6 RUGGEDISED cities** – the Lighthouse Cities of **Glasgow**, **Rotterdam** and **Umeå**; and the Fellow Cities of **Brno**, **Parma** and **Gdańsk** – and **key smart city players in Japan**, which are the **Government's Cabinet Office**, responsible for the overall coordination of Japan's smart city program, and the selected cities of **Hamamatsu**, **Kamakura** and **Tamana City**. The expectation is for both sides to establish an environment in which inspiration, growth and long-term synergies can be unlocked.

The following are the two milestones that preceded the organization of the interactive meetings:

- *Identification of the topics of most interest* (February-March 2021): The first phase entailed surveying the knowledge share areas of most interest from both sides. This was led by ISINNOVA, which together with representatives of the Japanese Government administered a **survey** with Japan's relevant parties and the cities of RUGGEDISED in view of framing the collaboration in terms of work **processes**, **tools** and **topics**.
- *Analysis of survey results* (March-April 2021): ISINNOVA, supported by representatives of the Japanese Government, assessed the results of survey and accordingly shaped up an EU-Japan knowledge share program, identifying collaboration **contents**, **processes**, **logistics** and **timeline**.

The results of the survey showed that these were most sought-after **smart city aspects** to be addressed over the course of the cooperation in a series of 3 workshops and 2 study visits:

a. Establishing **partnerships** with other cities and smart city players.
b. Learning about overall **smart city approaches** for potential **replication**.
c. Learning about **governance approaches**.
d. Learning about the **role of public and private sector** and **PPP approaches**.
e. Learning about the **role of citizens /civil society/ end users**.
f. Learning about **working business models**.
g. Exploring the **technological features** of smart solutions.
h. Learning about local **policy and market trends** relevant for the smart city realm.
i. Learning about working **funding schemes** for smart city projects.

While Covid-19 substantially slowed down the take-off of the initiative, the 12-month extension of RUGGEDISED made it possible for this activity to unfold in such a manner that a great part of its potential could be leveraged. Unfortunately, the planned bilateral missions – the Japanese delegation visit to Europe and the RUGGEDISED cities visit to Japan – had to be cancelled due to travel restrictions. In turn, a virtual study visit was hosted by the City of Rotterdam.

Albert Engels, Coordinator for the RUGGEDISED Project

"According to my perspective this meaningful alignment between European and Japanese cities clearly showed that it deserves extra attention and promotion!"

2. Online kick-off meeting

The cooperation formally kicked-off by an **introductory online meeting** that took place on 11 October 2021 (09:00 AM CET / 04:00 PM JST). The meeting was open to all EU and Japan participating cities. During the official launch meeting, the project action plan and potential milestones were discussed; the cooperation seeks to build a **collaborative exchange of best practices, expertise and information** between the six RUGGEDISED cities - Lighthouses: Glasgow, Rotterdam and Umeå, and Fellow Cities: Brno, Parma and Gdańsk - and key smart city players and cities in Japan: Hamamatsu, Kamakura and Tamana City.

The EU-Japan knowledge share program was presented and fine-tuned during the conference. All the cities introduced themselves with the support of a presentation (See ANNEX I).

2.1 Expected results

The main goals the participants wanted to reach through the cooperation were identified as the following:

- Facilitate a process of **knowledge share** between international city programs.
- Structure, assist, and foster a **mutual flow of knowledge** between the 6 Ruggedised cities and key tiers of smart city players in Japan.
- Establish an **environment** in which **inspiration, growth and long-term synergies** can be triggered and sustained.
- **Empower the cities** through knowledge share and training.

2.2 Agenda

Time (CET)	Topic	Presenter
09:00 - 09:10	**Welcome, presentation of agenda and goals of cooperation**	Mario Gualdi and Daniel Cassolà, *ISINNOVA*
09:10 - 09:15	**Welcome from RUGGEDISED**	Albert Engels, *RUGGEDISED Project Coordinator*
09:15 - 09:20	**Welcome from the Mission of Japan to the European Union** **Welcome from the Cabinet Office of Japan**	KAWABATA Issei, *First Secretary, Mission of Japan to the EU* 川端　一生　　一等書記官 MATSUNO Kenji, *Deputy Director, CAO* 松野　憲治　　企画調整官
09:20 - 09:30	**Smart city Rotterdam**	Albert Engels, *RUGGEDISED Project Coordinator*
09:30 - 09:40	**Smart city Glasgow**	Gavin Slater, *Head of Sustainability, Glasgow City Council*
09:40 - 09:50	**Smart city Umeå**	Carina Aschan, *Strategic developer - RUGGEDISED Project Manager*
09:50 - 10:00	**Smart city Brno**	Yuliya Ostrenko, *EU H2020 Project RUGGEDISED Locality Manager*
10:00 - 10:10	**Smart city Gdańsk**	Joanna Tobolewicz, *RUGGEDISED Project Coordinator*
10:10 - 10:20	**Smart city Parma**	Cristina Pellegrini, *RUGGEDISED Project Manager*
10:20 - 10:30	**Smart city Hamamatsu**	TAKIMOTO Yoichi, *Specialist Supervisor*　瀧本　陽一　専門監
10:30 - 10:40	**Smart city Kamakura**	AMAGI Hidefumi, *Director* 天城　秀文担当課長 KATSU Yuki, *Assistant Director*

		勝　勇樹　課長補佐 WAKAMATSU Shigeru, *Assistant Manager* 若松　繁　担当主査 KOBAYASHI Chinami, *Senior Staff* 小林　千奈美　主事 SATO Takuma, *Senior Staff* 佐藤　琢磨　主事
10:40 - 10:50	**Smart city Tamana**	YASUDA Nobuhiro, *Engineering Senior Officer* 安田　信洋技術主任
10:50 - 11:00	**Next steps and closing words**	Mario Gualdi, *ISINNOVA*

2.3 Conclusions

On this first day of cooperation cities got to meet each other and shared thoughts in terms of expectations and strategic topics of conversation. The next steps involve organizing **interactive online workshops** in which local policy makers, practitioners, and experts will discuss viable solutions, technical and process issues, and future opportunities in **relevant smart city domains** such as governance approaches, civil society and citizens engagement, public-private funding schemes, working business models, and tips for replication.

Further to the online meeting ISINNOVA and Japan's Government Cabinet Office wrapped up the proceedings and used them to work out the concrete cooperation events, and namely:

a. Online workshops/webinars to facilitate the acquisition of new knowledge and to receive inspiration from smart solutions developed elsewhere.
b. Onsite/virtual missions, which are deemed most valuable.
c. Other online bilateral/multilateral meetings if requested.

Figure 1: Kick-off meeting snapshot

3. Online Workshop #1 – Knowledge sharing

The first workshop was held online on 2 December 2021 (08:30 AM CET / 16:30 PM JST) and lasted two and a half hours. The meeting was the first step in the **knowledge sharing process** among all European and Japanese actors. The agreed topics were "**Stimulating citizens participation**" and "**Solutions for smart mobility**". The sessions started with several presentations by the cities (see ANNEX II), in which different approaches and solutions were showed. Then lively debates ensued with the support of a Mural board (see Figures 2 and 3).

3.1 Agenda

Time (CET)	*Time (JST)*	Duration	Topic	Presenter (Moderator)	Comments
08:30	*16:30*	5'	**Introduction to the knowledge sharing workshop**	ISINNOVA CAO	*Objectives and format: Mario Gualdi and Kenji Matsuno*
			Discussion of 2 Smart City topics with experts		
08:35	*16:35*	65'	<Session 1> **Stimulating citizens participation** Approaches and concrete examples, focusing on issues and solutions, cooperation opportunities **ロッテルダム市、鎌倉市、浜松市からそれぞれ市民参加の具体的取組や障壁、今後の試み等**	Rotterdam (ISINNOVA) Kamakura Hamamatsu (CAO)	*Max 8 minutes intro from each city on the topic to be discussed:* *1. Rotterdam (Esmeralde Marsman)* *2. Kamakura* *3. Hamamatsu* *Lively Q&As: Active engagement, with cities asking each other specific questions on issues, solutions, future opportunities, particularly if they entail cooperation (R&I, industrial, institutional)* *Mural board shared on the screen where each participant can add information directly on the topic panel during the discussion (2 minutes introduction to Mural if needed)*
09:40	*17:40*	10'	**Coffee break**		 *Preferably hot*
09:50	*17:50*	60'	<Session 2> **Solutions for smart mobility, local public transportation (on-demand) management especially under rapid declining population, maintenance of infrastructure** Concrete examples, issues encountered and foreseeable, mid-term outlook, cooperation opportunities	Umeå (ISINNOVA) Tamana City (CAO)	*Max 10 minutes intro from the city on the topic to be discussed:* *1. Umeå (Carina Aschan)* *2. Tamana City* *Lively Q&As: Active engagement, with cities asking each other specific questions on issues, solutions, future opportunities, particularly if they entail cooperation (R&I, industrial, institutional)* *Mural board shared on the screen where each participant can add information directly on the topic panel during the discussion*

			ウメオ市、玉名市からモビリティ、特に人口減少下での地域公共交通をテーマに、課題や取組事例、直面する課題について。		
10:50	*18:50*	10’	**Conclusions and impressions**	CAO ISINNOVA	*Wrap up: Kenji Matsuno and Mario Gualdi*

3.2 Summary of the sessions

Stimulating citizens participation

The city of Rotterdam opened the round of presentations sharing some examples focused on the **active participation of citizens**. The city of Kamakura showed a couple of examples of their Smart City Initiatives regarding the topic of **public dialogue**. Hamamatsu presented their process towards a functioning **regional data linkage platform** which invites citizen participation.

Question 1

What were the biggest crises and successes? 市民参加の取り組みを進めるにあたって最も困難と感じたことは？また、何が最もうまくいったと感じたか？

Crises

- Finding citizens with different backgrounds
- Try to connect citizens by questionnaires does not work in Rotterdam knowing we have more than 175 nationalities
- ロッテルダムでは 175 の国籍の住民がいて質問票で市民にコンタクトすることは困難
- 無関心層の巻き込み
  How to get everyone interested in these projects.
- 鎌倉市）困難だった部分は、知識やバックボーンの違うそれぞれの参加者の土台をある程度揃えないと、その後の議論の質や深さに大きな差が出ることが分かった。市が考えていること、議論してもらいたいことを事前に的確にインプットし、そこから議論を展開する必要がある。
  (Kamakura City) Unless the foundation of each participant with different knowledge and background is aligned to some extent, there will be a big difference in the quality and depth of the subsequent discussion. It is necessary to input precisely what the city is thinking and what it wants to be discussed in advance, and to develop the discussion from there.
- どうやって異なるバックグラウンドの参加者の間の議論をファシリテートするか
  How to facilitate discussion among people from different background
  - ←Kamakura city まず、お互いが持っているバックグラウンドや価値観を簡単に自己紹介をしてもらい、そこから具体的な議論に入っていきました。
  - Rotterdam: We go to the street and to where people live to have real contact. Volunteers have same cultural backgrounds than interviewees.
- スマートシティに抵抗がある人もいる中でなぜ進めるのかを理解してもらうことが難しい
- 玉名市→ロッテルダム 6 つのセンサーはは具体的にどのような役割がるのでしょうか。また、センサーのデータはどのように利活用されているのでしょうか。
  What are the roles of the sensors? How to use the data from 6 different types of sensors?
  - Rotterdam: We only use the data for specific purposes because they measure different things (bicycle traffic, level of water, illumination…)

- 高齢者や学生、子育て世代の巻き込み
  Involving the elderly, youth, and those raising children is an issue.

- How does city of Rotterdam use the data from sensor?

- スマートシティを進める目的やビジョンの共有が課題だった
  It is hard to develop a shared vision and goal to work for smart cities.

- 鎌倉市→松野さん
  ロッテルダムさんの、プライバシークイーンとテクノロジーファンのグループセッションの話をもう少し詳しく聞いていただけると嬉しいです。
  Kamakura City -> Mr. Matsuno
  It would be nice to hear a little more about Rotterdam's group session with Privacy Queens and Technology Fans.

- ヨーロッパでは、市民参加のプログラムやツールが確立されていますか？（浜松市）
  Could you outline some of the established programs and tools used for increasing citizen participation in Europe (Hamamatsu City)
    - Brno: Some examples are a platform (“on you” in English) to propose projects or ideas or to raise concerns. All citizens can vote the selected projects. 20 projects are financed after their feasibility is checked by a team of municipal experts. Another tool is an “emotional map” drawn after on-site interviews with citizens.

- ヨーロッパでは、若い世代の参加を促すために工夫されていることはありますか？（大学や高校との連携等）
  What is being done in Europe to encourage the participation of the younger generation in this kind of programs? (Cooperation with universities and secondary schools, etc.)

Successes

- 鎌倉市）うまくいった点としては、初めてのチャレンジとしてオンラインで手話通訳を入れたオペレーションができた。
  (Kamakura City) This was the first time we successfully conducted an online event using hand language.

- In Brno we use feeling/emotional maps to collect opinions about the neighbourhood (https://www.pocitovemapy.cz/brno-2016/#11/49.1974/16.60410)

- iBOT and iQUEEN

- Participation from diverse group how EU cities ensure participation from wide range of groups?
  EU 側はどうやって多様なグループからの参加を確保しているか？

- （ブルノ市）自分たちの住む地域でどのようなプロジェクトや活動ができるかを市民に決めてもらうことは、非常に有効です。
  To let citizens decide what projects and actions can be done in their neighborhoods is quite engaging - we have very successful city participatory budget project (Brno city)

- I liked the Kamakura way of citizen participation in designing a scene set
  このように、スケッチを演じてみることは、より多くの人を巻き込むための素晴らしいアイデアです。

- When increasing the rate of civic participation, what should we be cautious about?
  市民参加をアプローチする上で、どのようなことに注意しているのか？
  鎌倉市）まず、市の考え、思い、描いている仮説、そして議論してもらいたいポイントや議論の位置づけ（今日の議論が全体のどこに結びつくのか）をしっかりと市民に伝えるようにしている。なんとなくや、あいまいな議論を投げかけると、参加者の満足度につながらず、継続的な共創のパートナーになってもらえないと思う。

Question 2

What were the main results? 市民参加の取り組みを進めたことにより得られたものは何か？

- 鎌倉市）スマートシティという新たな切り口で市民との関係性ができ、さらに、今度のスマートシティの取組を市と一緒に創り上げていく仲間づくりができた
  (Kamakura City) Through establishing a relationship with citizens through the new approach of smart cities, we were also able to make friends who will work together with the city to create the next generation of smart city initiatives.

- 浜松市：まちへの愛着が高まる。地域の課題等について自分事化される。
  Hamamatsu City: Successfully increased emotional attachment to the city. Increased self-regulation of local issues.

- In Rotterdam it was important to start with the insights before doing the experiments
  ロッテルダムでは、実験をする前に、インサイトが重要でした。

- 日本では Decidim は一番よく使われているツール https://decidim.org/
  Decidim (Most famous tool in Japan) https://decidim.org/

- Also here in Parma we are starting to work with Decidim

Question 3

What had the most important effects locally?市民参加を進めることで、地域にどのような影響があったか？

- 鎌倉市）町内会長のように、地域への影響力のあるステークホルダーの参加につながったので、今後、徐々にそうした参加者からの口コミでの横展開が期待できる
  (Kamakura City) Since the project led to the participation of influential members of the community, such as the heads of local neighbourhood associations, we can expect the project to gradually expand horizontally through word of mouth from such participants in the future.

- Transparency is not enough, participation of citizens is necessary
  透明性だけでは不十分、市民の参加が必要。

- Awareness of colleagues who work in the smart city that sensors can be a reason to have contact with citizens

- 共助型交通の導入に向け、地域住民と協議を重ねる中で、住民の地域への関心が高まるとともに、住民間の繋がりが深まった。

Question 4

Which key people were most important for the success? 誰（どのような主体）が、市民参加の取り組みを進めるにあたって重要な役割を果たしたか？

- 鎌倉市）未来を担う学生が参加することにより、場がなごやかになり、ゲストとホストという関係から、みんなで創り上げるという機運が高まり、参加者がより主体的に議論に参加できた
(Kamakura City) The participation of students, who are the leaders of the future, made the event more relaxed, increased the momentum of discussion between guests and hosts, and allowed participants to participate in discussions more proactively.

- It was good to hear from the citizens in the streets and public park (more backgrounds, and therefore good input for understanding real needs)

Question 5

Can you already spot concrete ground for EU-JP cooperation, at programme or bilateral level? EU 側都市とさらに協力を深める可能性について

- The importance to learn from Japan how to be prepared for the aging society is very interesting for EU!

- It's interesting to learn more from the questions of Kamakura about how to design a smart city on civic engagement

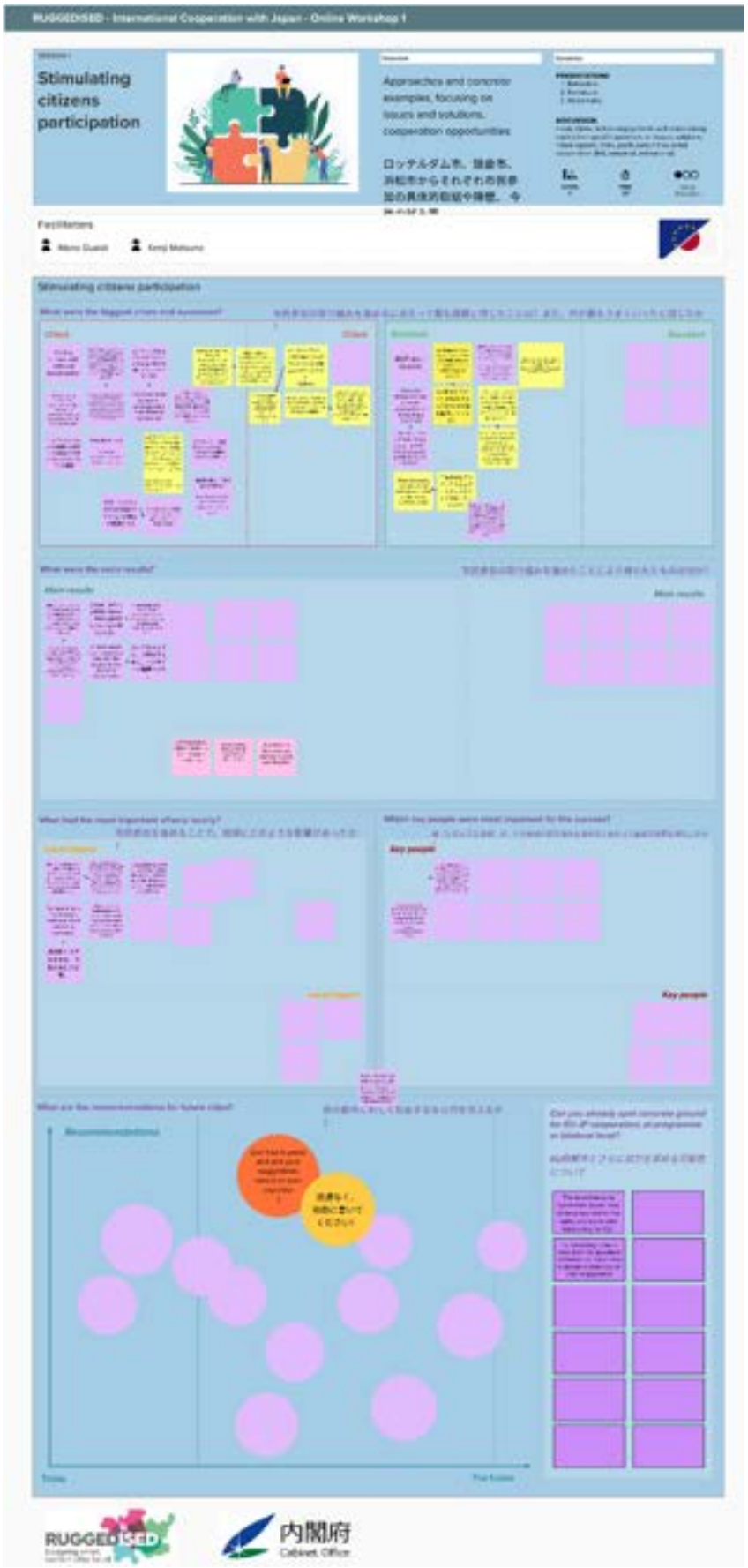


Figure 2: Original Mural board from session 1. Online Workshop #1

Solutions for smart mobility, local public transportation (on-demand) management especially under rapid declining population, maintenance of infrastructure

The second session was opened by Umeå with a presentation of an example of **stakeholders' cooperation for Smart Mobility**. Tamana City showed how ICT is used to **optimize transportation services** through the digitization of operational data.

Question 1

What were the biggest crises and successes? 市民参加の取り組みを進めるにあたって最も困難と感じたことは？また、何が最もうまくいったと感じたか？

Crises

- What about existing residents living in the outskirts?
- How to maintain public transportation services with a declining population?
- How does 5km rule affect land prices in Umeå? How was the discussion? Were there any objections from the people?
    - Umeå: It is not a rule, it is a strategy for planning schools, workplaces, etc. Density is a much-discussed topic. Prices are higher in the center. The municipality is only giving building permits for mixed housing to avoid gentrification.
    - CAO: Due to population decline, there is also a national debate about density and city planning.
- 玉名市）タクシー事業者や運転手との調整が困難であった。
  (Tamana City) It was difficult to coordinate with exiting taxi businesses and drivers.
- Is the U-bike accessible to the elderly and other people with disabilities?
- How to make a consensus on an urban plan to increase density in city center?
- How to interest people not used biking to use a bike?
    - Umeå: It is fun and people want to test it. It is not the traditional bike.
    - Brno: The city is working on infrastructures to facilitate biking. Many countries in Northern and Central Europe are very advanced in this. Bureaucracy might slow down desired changes.
- How does Tamana City solves the digital divide?

Successes

- Increase in operational efficiency using new systems
- Free use of public transport for elderly people in Rotterdam
- SENIOR BUS service (Brno city)
- More focus on infrastructure for bikes than cars increase the use of bikes!
- In Tamana City on-demand transportation services cover the city areas with sufficient demand. In the surrounding or in scarcely populated areas other solutions are implemented (share taxis)
    - Umeå: The use of car is almost unavoidable in rural areas. The city has taxi services for senior and young citizens in distant rural areas.

Question 2

What were the main results? 市民参加の取り組みを進めたことにより得られたものは何か？

- 鎌倉市→玉名市さんへ質問です！！！
  スマートシティという観点から、このデマンド交通が、例えば防災やヘルスケアなど、他の分野との連携や新たな価値を生むような兆しはありますか？
  (Kamakura City to Tamana City) From the perspective of a smart city, are there any signs that this on-demand transportation will create new value or link up with other fields, such as disaster prevention or healthcare, for example?
  - 玉名市回答）他の分野連携や新たな価値を生むような兆しかわかりませんが、３D 都市モデルと連携できないか検討中です。
    (Response from Tamana City) We are currently considering to explore this issue with the use of 3D city models. At the moment it is hard to connect it to a wider context in different fields, and potential sources of value.
    - 玉名市さん
      ありがとうございます！！鎌倉市　勝
      Thank you from Kamakura City!

- 報告書の作成や統計資料の作成が早くなったため、分析等がしやすくなった。
  Efficient preparation of reports and statistical materials enabled easier analysis.

- What is the number of users of the service in Tamana City?

- Has Tamana City seen a decline of car ownership/use because of this service?

- The Japanese government encourages Japanese cities to use public hybrid and hydrogen vehicles. Same thing for charging stations. This is done via official procurements, changes in the legislation and incentives.

Question 3

What had the most important effects locally?市民参加を進めることで、地域にどのような影響があったか？

- (玉名市) これまで経験によって、運行ルートを木間禎太が、システムの導入によって、効率的な運行が可能となり、乗車時間の短縮や 1 時間以内に送迎できる人数の向上
  (Tamana City) Since the introduction of this new system, certain operators have now able to operate more efficiently, shortening the boarding time and increasing the number of people who can be picked up and dropped off within an hour.

Question 4

Which key people were most important for the success? 誰（どのような主体）が、市民参加の取り組みを進めるにあたって重要な役割を果たしたか？

- 玉名市用のシステムをカスタマイズし、オペレータや運転手向けの研修会を開催し、フォローアップしてくれる事業者
  Businesses that can customize the system for Tamana City and follow up with training sessions for operators and drivers are important.

Question 5

Can you already spot concrete ground for EU-JP cooperation, at programme or bilateral level? EU 側都市とさらに協力を深める可能性について

- Digital divide is a huge issue in Europe
- The impact of the fast aging society in Japan is very learningfull for EU

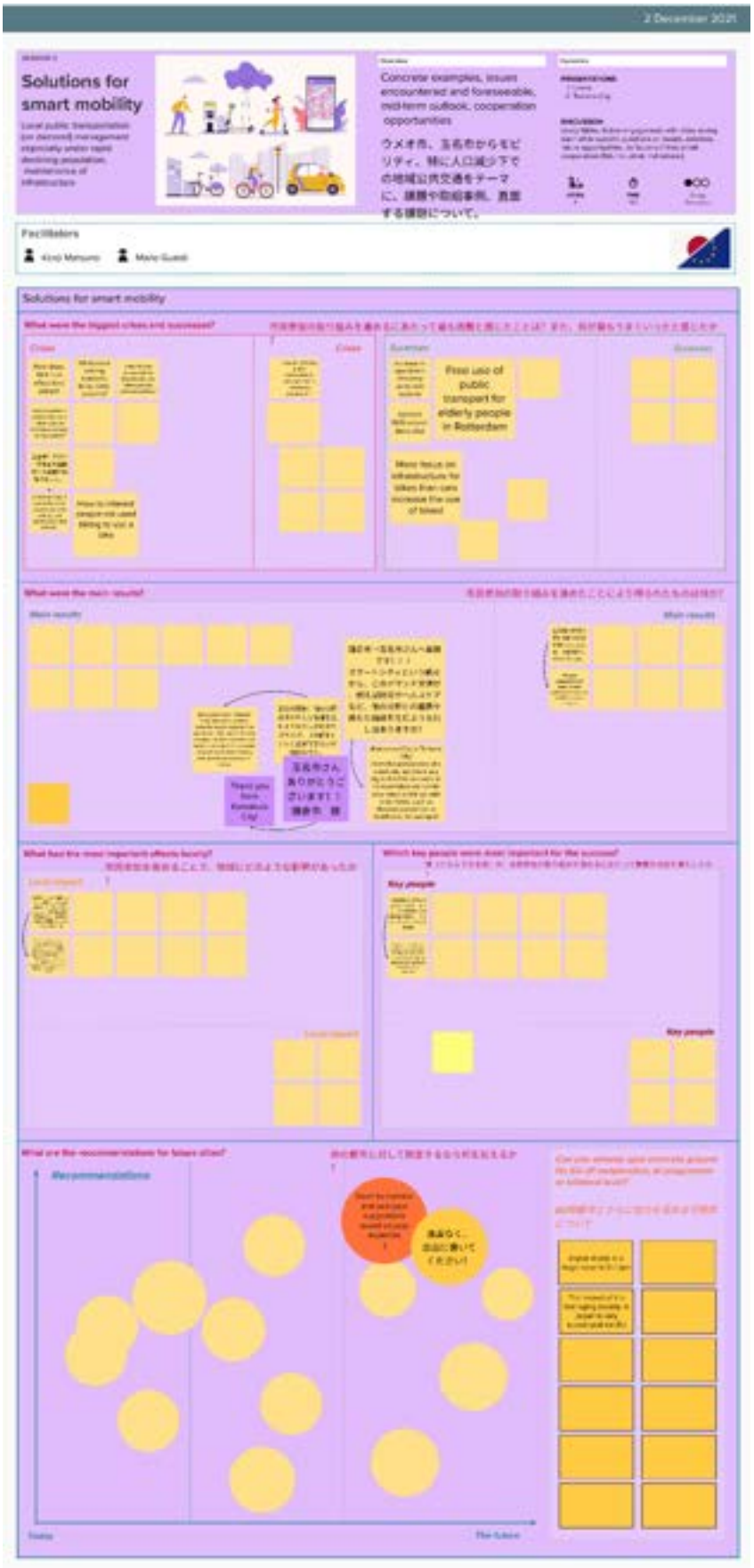


Figure 3: Original Mural board from session 2. Online Workshop #1

3.3 Conclusions

The discussion was very lively and the use of Mural board allowed for a lot of **interactions**. The discussed topics of interest can serve as the **basis for several avenues of debate**. It could be possible to create a map of themes and interests. The second workshop will rely on some of the arguments presented in this meeting. The collected material is also a good starting point for **further bilateral or multilateral cooperation**.

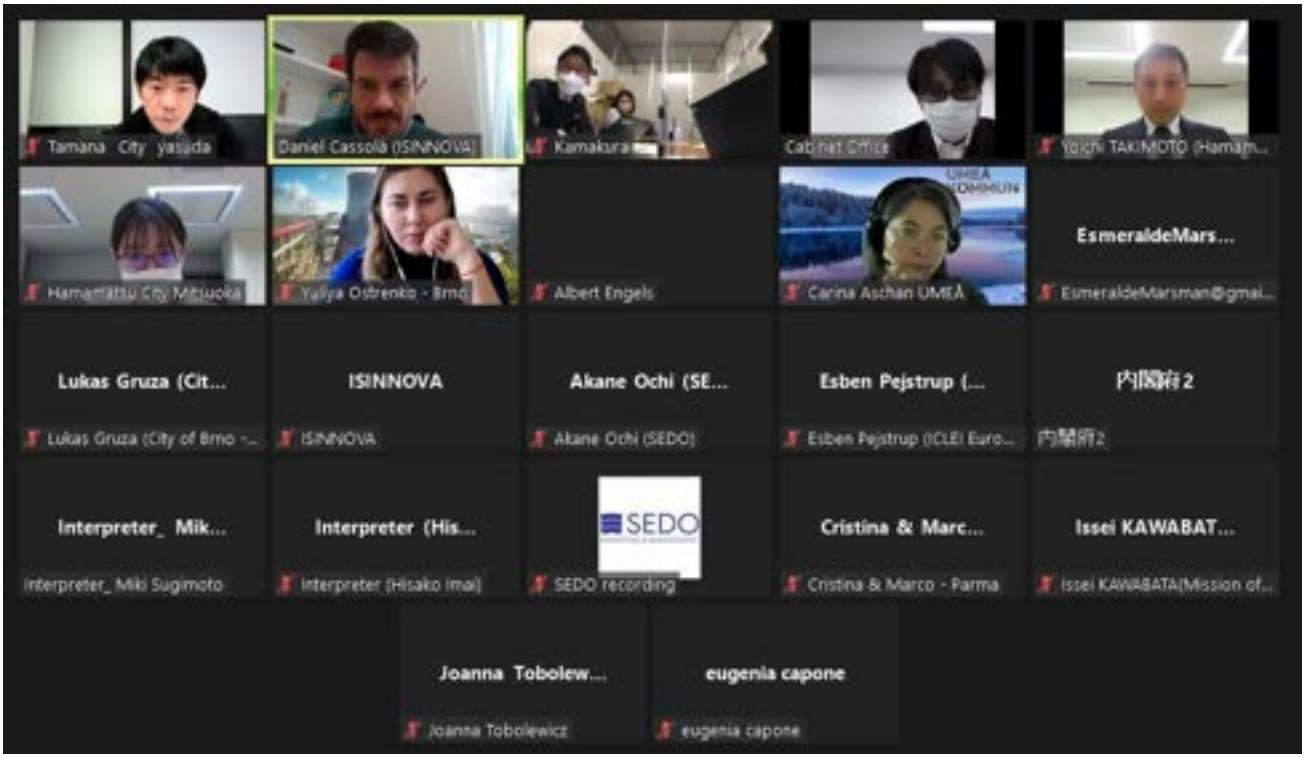


Figure 4: Online Workshop#1 snapshot

4. Online Workshop #2 – Knowledge sharing

The second workshop was held also online on 11 March 2022 (08:30 AM CET / 16:30 PM JST) and lasted two and a half hours. The meeting was the continuation of the knowledge sharing process between RUGGEDISED and Japan and served followed the same structure of **offering and receiving inspiration** from smart solutions developed elsewhere. This time the agreed topics were "**Urban data platform and Digital Twin**" and "**Business model and financing**". Each session started with two presentations (see ANNEX III), in which different approaches and solutions were showed, followed by discussions supported by a Mural board (see Figures 5 and 6).

4.1 Agenda

Time (CET)	*Time (JST)*	Duration	Topic	Presenter (Moderator)	Comments
08:30	*16:30*	5'	**Introduction**	ISINNOVA CAO	*Objectives and format:* *Mario Gualdi and Kenji Matsuno*
			Discussion of 2 Smart City topics with experts **スマートシティに関する以下の２つのテーマについて、関係者で意見交換を行う**		*Lively Q&As: Active engagement, with cities asking each other specific questions on issues, solutions, future opportunities, particularly if they entail cooperation (R&I, industrial, institutional)* *Mural board shared on the screen where participants can add information directly on the topic panel during the discussion* *質疑応答：参加都市間で具体的な課題、解決策等について質疑。* *Mural board（オンラインのホワイトボード）を活用して、参加者が直接情報を追加することが可能（日本語で投稿いただければ事務局で翻訳します。）*
08:35	*16:35*	60'	<Session 1> **Urban data platform and Digital Twin** Approaches and concrete examples, focusing on issues and solutions, cooperation opportunities **都市データプラットフォームとデジタルツイン：具体例、課題と解決策に焦点を当てるとともに協力の可能性を探る**	Rotterdam (ISINNOVA) MLIT (CAO)	*Max 10 minutes intro from each city on the topic to be discussed:* 4. *Rotterdam: Open Urban Platform and 3D Digital Twin (TBC)* *都市データ基盤と 3D デジタルツイン（P）* 5. *MLIT: Urban data platform and its use cases (TBC)* *都市データプラットフォームとユースケース（P）*
09:35	*17:35*	10'	**Coffee break**		

09:45	*17:45*	65'	<Session 2> **Business model and financing** Concrete examples, issues encountered and foreseeable, mid-term outlook, cooperation opportunities **スマートシティのビジネスモデルと資金調達：具体例、課題と解決策に焦点を当てるとともに協力の可能性を探る**	Umeå (ISINNOVA) Tamana City (CAO)	*Max 10 minutes intro from the city on the topic to be discussed:* 3. *Umeå: Business model for local energy market (TBC)* *地域のエネルギー市場におけるビジネスモデル（P）* 4. *Tamana City: Local power supply company project (TBC)* *地域新電力（P）*
10:50	*18:50*	10'	**Conclusions and impressions**	CAO ISINNOVA	*Wrap up: Kenji Matsuno and Mario Gualdi*

4.2 Summary of the sessions

Urban data platform and Digital Twin

Rotterdam opened the round of presentations showing its **Digital City approach**, particularly the Open Urban Platform and 3D Digital Twin. The Ministry of Land, Infrastructure, Transport and Tourism of Japan presented several use cases of **Urban Data Platform** and thorough examples of **3D City Modelling** in Japan and its future.

Question 1

What were the biggest crises and successes? 「デジタルツイン」市民の取り組みを進めるにあたって最も困難と感じたことは？また、何が最もうまくいったと感じたか？

Crises 危機

- Slow moving initiatives
  イニシアティブの実現に時間がかかりすぎる。
- DT is a new topic for policy makers, so lots of time spend on learning
  DT は政策担当者にとって新しいツールであるため、学習には時間がかかる。
- データの更新頻度をどのように行っていくか　玉名市
- Some data are not machine readable
- 自治体で知識や技術がある職員がまだ少ない
- まだユースケースが少なく導入の費用対効果の面で課題がある
- Lots a 2D datasets, 3D datasets are more expensive to more (and needs to be more accurate)
  2D データセットが多く、3D データセットはより予算がかかる（もっと正確である必要もある）。
- 市役所の中で、部局横断的な連携、活用体制が必要（都市計画部局だけでは、民間のユースケース創出等の取組が難しい）

Cross-departmental collaboration and utilization systems are needed within the City Hall. (It is difficult for the city planning department alone to create use cases for the private sector, etc.)

- How to involve private companies to 3D modelling?
  3D モデリングに民間企業を参加させる方法とは？
  - Rotterdam: It is an early market, in order to accelerate it:
    - 1 stimulate private sector involvement
    - 2 keep the platform open for innovation

- Lack of municipal skills on new digital tools. How to manage this?
  - MLIT: Build a training community and environment to promote something that is new.

- GIS department understands 3D, but city processes need to follow

- All types of data come together in the OUP/DT, but data is in silos (not interoperable, not FAIR)

- Trust needed among data stakeholders

- How to get data from private parties (i.e. building owners)?
  - Rotterdam: Data needed, for instance firefighters need to go into buildings for assessment. No clear legislation at the moment.

- データの公開による、マイナスの側面はありませんか？例：不動産価格への影響等
  鎌倉市
  Potential negative impact of open data? (eg. real estate price)
  - Rottedam: Inevitable associated risk, but it is necessary
    リスクはあるが、必要なことです。

Successes 成功

- Go through the various stages: from Proof of Concept, over Prototype to MVP

- OUP bring citizens together on a similar topic
  OUP は、同じようなテーマで市民を集めています

- Learn from other cities and regions around the world

- 3D is more intuitive, less abstract than 2D
  3D は 2D よりも直感的で、よりリアルな表現ができる

- Incremental insight into benefits of usage of 3D
  3D 活用のメリットをより深く理解することができました。

- 2D データを 3D 化することによって、情報を伝えることが容易になった。玉名市
  3D model contributed to better communication with citizens

- Representative use cases help in communication

- 玉名市さんへ　具体的に何のデータを３D 化しましたか？
  鎌倉市
  Dear Tamana City, what specific data did you convert to 3D?
  From, Kamakura City

- 鎌倉市さんご質問ありがとうございます。災害の発生予測されている地域を LOD1 で、都市機能誘導区域を LOD2 で作成してもらい、りってきで議論できるように、災害情報を重ね合わせしてもらいました・玉名市
  Thank you for your question, Kamakura City. I asked them to create the areas where disasters are predicted to occur in LOD1 and the urban function induction zone in LOD2, and overlay the disaster information so that we can discuss it. Tamana City.

- Can we talk about common-shared standards?
  共通化された規格について、もう少し詳しく聞かせてください。
  - Rotterdam: Committed to open standards to make our platform fair and accessible. Dutch legislation and commitment to a fair and open access https://www.forumstandaardisatie.nl/
    オランダのフェア＆オープンアクセスに関する法律 https://www.forumstandaardisatie.nl/
  - Most cities use similar technology (PPI), alignment works
  - Good pickup of open standards - still need to get better on Geo and BIM interaction
    オープンスタンダードのピックアップが良い。しかし、Geo と BIM の相互作用については、まだ改善する必要がある。

Question 2
What were the main results? 「デジタルツイン」の取り組みを進めたことにより得られたものは何か？

- To all: Have you got examples of indicators? If so, are there incremental improvements after putting in place the 3D tool?
  新たな課題の発見【災害対策等】玉名市

- 皆さんへ：指標の事例をお持ちですか？その場合、3D ツールを導入した後に段階的に改善されていますか？
  Discovery of new issues [disaster countermeasures, etc.] Tamana City.

Question 3
Which key people were most important for the success? 誰（どのような主体）が、「デジタルツイン」の取り組みを進めるにあたって重要な役割を果たしたか？

- To Mr Akahoshi: What is the importance of the National government regarding the success of the implementation?
  行政、データ作成に携わるコンサルタント

- 赤星氏へ：実装の成功に関して、国政の重要性を教えてください。
  Consultants involved in administration and data preparation

Question 4
What are the recommendations for future cities? 他の都市に対して助言するなら何を伝えるか？

- 鎌倉市はまだ３D モデルに取り組んでいませんが、cityGML と AR を活用した津波のシミュレーションを市民とのワークショップで使うと、市民の避難ルートや避難場所の把握、理解促進につながると思いました！
  鎌倉市
  Kamakura City has not yet worked on 3D models, but we thought that using a tsunami simulation utilizing cityGML and AR in a workshop with citizens would help them understand and better understand evacuation routes and evacuation sites!
  City of Kamakura

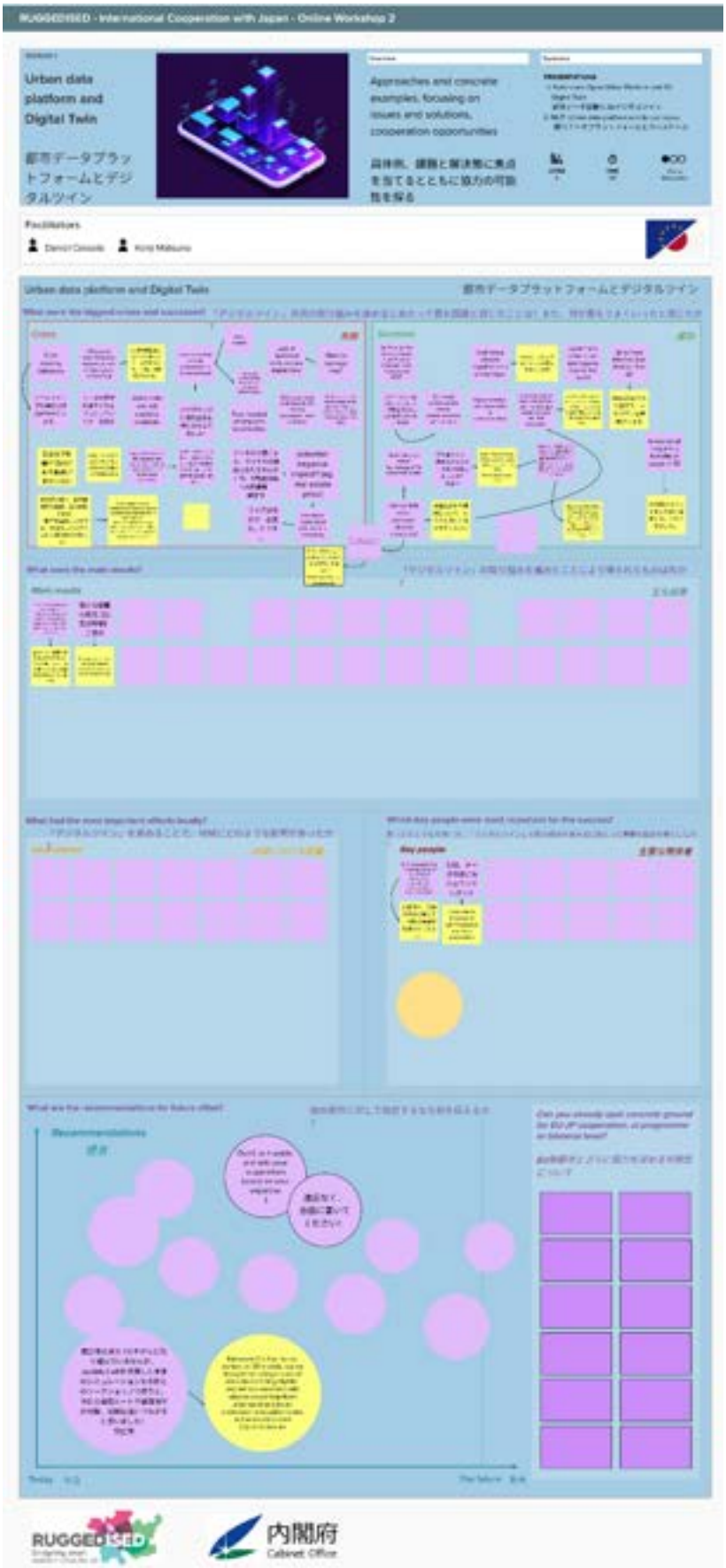


Figure 5: Original Mural board from session 1. Online Workshop #2

Business model and financing

The city of Umeå introduced its approach to **Business Model Innovation** with a couple of smart city examples regarding connection to **renewable energy and geothermal energy storage and exchange**. Tamana City presented an example of the **business model used in a local power supply** company project.

Question 1

What were the biggest crises and successes? 「デジタルツイン」市民の取り組みを進めるにあたって最も困難と感じたことは？また、何が最もうまくいったと感じたか？

Crises 危機

- Different stakeholder has different scope- scopecreep
  ステークホルダーによって、関与できる範囲は異なります。
- Valuation of margin energy
- Valuation of climate impact
  環境影響の評価方法
- 具体的な目標を設定し、現地のステークホルダーとコミュニケーションを図る
  Set a concrete target/ objective and communicate with local stakeholders
- 地元のステークホルダーからの投資を促すにはどうしたらいいですか？
  How to encourage investment from local stakeholders
  - Glasgow: Very active in the past months to bridge the gap between the private and the public sector. Climate neutral policies have speeded up collaborations. The public sector faces the challenge to attract private capital. Green New Deal is a framework that can also facilitate co-creation and investments. We might have a more detailed plan for a “just energy transition” in a year.
- 庁内の合意形成
  Consultation within city government
- 共助の領域のサービス展開での、資金の持続可能性
- 現地のステークホルダーが価格上昇を受け入れるか？
  Will local stakeholders accept higher price?
- How to invite stakeholders to a table for discussion?
- 民間企業の巻き込み方
  How to involve the private sector?
- ビジネスとして成立するにあたり、一定の規模が必要
  （自治体の行政区域を越えた連携が必要となることもある）
- 日本のスマートシティ事業の多くのスタートは、国の補助金活用で、補助金が終わると事業も終わってしまう
  Many smart city projects in Japan start with government subsidies, and when the subsidies end, the projects end as well.
  - Glasgow: National funds focus now on hydrogen. A big issue is how to continue the growth of projects when funding stops. We are collaborating with Japanese partners and there are a lot of international synergies that might allow international financing opportunities. National subsidies are temporary.

    - CAO: International cooperation is also very important regarding financing opportunities.

- 地域におけるビジネスモデル形成において、誰がイニシアティブをとるか
  Who will take the initiative in forming business models in a given region?

- 素早く他地域へ横展開していく仕組みや連携
  Community/ process for quick replication

Successes 成功

- A common view on demands of energy, and their climate impact
  エネルギー需要とその環境負荷に関する共通認識

- An improved understanding of how to optimise cooling system, energy storage, power use and more
  冷却システム、エネルギー貯蔵、電力使用などを最適化する方法についての理解向上

- What is the level of use/acceptance of the simulation engine?
    - Umeå: We have tested the engine in a testbed, but it is applicable generically to any kind of event. It is no confined to a particular environment.

- Is Umeå's business model also for private households or just large scale energy companies?
    - Umeå: It is aimed at Business to Business, but it might be expanded in the future for retail consumers.

- Is Tamana City looking into some kind of cooperative business model with different stakeholders?
    - Tamana City: It could be an idea to invite local people, local business to invest and get a share of the local energy company.

Question 2
What were the main results? 「デジタルツイン」の取り組みを進めたことにより得られたものは何か？

- Design of local market engine of energy
  地域エネルギー生産市場の設計に成功

- Price components including valuation of CO2-emissions
  CO2 排出量の評価を含む価格構成要素

- Time matched buy-sell of energy
  エネルギー売買の協調

- Examples of consolidated structures of collaboration/ partnership?
  コラボレーションやパートナーシップの統合的な構造の例？

Question 3
What had the most important effects locally? 「デジタルツイン」を進めることで、地域にどのような影響があったか？

- A cooperation around better use of local assets
  地域資産の有効活用に向けた協力

Question 4

Which key people were most important for the success? 誰（どのような主体）が、「デジタルツイン」の取り組みを進めるにあたって重要な役割を果たしたか？

- Project partner group プロジェクト パートナー グループ
- Developers デベロッパ
- Policy makers of Umeå 政策担当者

Question 5

What are the recommendations for future cities? 他の都市に対して助言するなら何を伝えるか？

- 1. Find a suitable testbed, w dedicated stakeholders
  1. 適切なテストベッドを探し、専門のステークホルダーを持つ
- 2. Identify common values, and their composition
  2. 共通する価値観とその構成比を確認する
- 3. Try different value propositions, form value components of a new Business model
  3. 新しいビジネスモデルを構築するために、さまざまな価値提案を試し、価値の構成要素を評価する。
- 4. Set up key parameters of the value components
  4. 価値の構成要素の主要なパラメータを決定する。
- 5. Form valuing principles of margin energy
  5. マージンエネルギーの価値評価原則を形成する
- 6. Set up buy-sell orders to try out the market place
  6. 市場を試すための売買注文を設定する
- 7. Publish beta version on testbed market, test periods, feedback loops etc.
  7. ベータ版を公開し、市場テスト、テスト期間の評価、フィードバックループの評価等を行う。
- 8. Scale up along with business segments and products. ie Power, heating, cooling
  8. 事業分野や製品に沿ったスケールアップを図る。例えば、電力、暖房、冷房など。
    - Glasgow: We work at local and regional levels to guarantee the right scale. We work with solutions that can be replicated in other contexts. International alliances allows to benefit from economy of scale and learn best practices. Heat networks are being legislated to support private investments.
    - CAO: Various levels of cooperation is crucial (local, regional, national, international). The national government can stimulate the process by setting up national targets (predictability for companies).

Figure 6: Original Mural board from session 2. Online Workshop #2

4.3 Conclusions

The discussion was very stimulating with **active participation** from both sides and many new issues arose. The cities offered to provide **additional information** on their solutions, examples and case studies. All agree that there is plenty of **possibilities for cooperation** in the near future. It seems clear that it is very important to have a wide area of participation with stakeholders to make projects sustainable. In that sense, **scaling up** can be achieved by collaborating with **stakeholders from outside the local environment** and by **national and regional governments setting concrete objectives**.

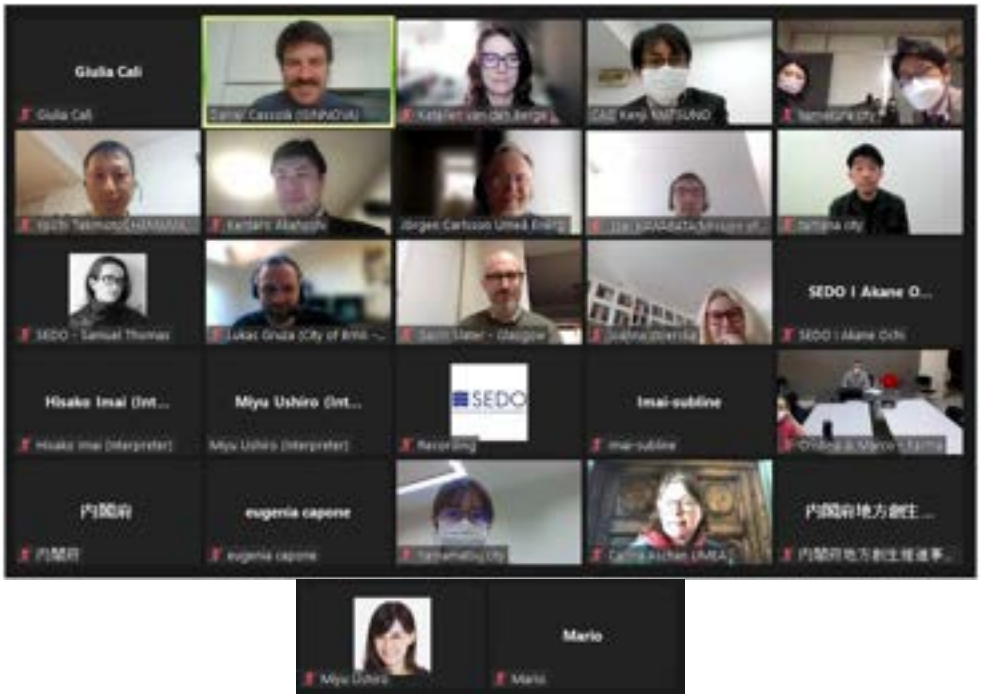


Figure 7: Online Workshop#2 snapshot

5. Virtual Study Visit

The Virtual Study Visit was hosted online by the City of Rotterdam on 27 September 2022 (09:00 AM CET / 17:00 PM JST) and lasted two hours. This meeting was the last stage of the RUGGEDISED-Japan collaboration activity. It was conceived as a substitute of the planned bilateral missions – the Japanese delegation visit to Europe and the RUGGEDISED cities visit to Japan – which had to be cancelled due to travel restrictions related to the Covid-19 emergency. The session evolved around the concept of "**Digital City**" and how it relates to other topics as **governance**, **architecture** or **urban data platforms**.

For detailed presentations (see ANNEX IV) were followed by a session of Q&A.

5.1 Agenda

Time (CET)	*Time (JST)*	Duration	Topic	Presenter
09:00	*17:00*	10'	Opening & Introduction	*Albert Engels* *Kenji Matsuno*
09:10	*17:10*	30'	**Digital City & Governance**	*Roland vd Heijden* *(City of Rotterdam, program manager Digital City)*
9:40	*17:40*	10'	**Digital City & governance program Smart Cities**	*Frank Vieveen* *(City of Rotterdam, program manager Smart Cities)*
9:50	*17:50*	20'	**Digital city & urban data platforms**	*Marcel van Oosterhout* *(Rotterdam School of Management, Erasmus University Rotterdam)*
10:10	*18:10*	20'	**Architecture & Digital City**	*Bart de Lathouwer* *(City of Rotterdam, Digital architecture expert)*
10:30	*18:10*	30'	Questions & Answers	
11:00	*19:00*	5'	Wrap up	*Albert Engels* *Kenji Matsuno*

5.2 Summary of the study visit

The thorough presentations showed Rotterdam's approach to the **Digital City** concept, also covering several cross-sectional subjects such as **digital urban communities** – formed by social reality, physical reality and digital reality –; **digital twin** of the city; new services and smart applications; **open urban platform** and the governance of the digital ecosystem; **energy digitalization** and energy transition; digital disruption and digital economy.

The attendants were mainly interested in the **ownership and security of data** – on public or private platforms –; the digital control of **energy distribution** and supply/demand balances; and the importance of the city size when facing **investments** on digitalization.

5.3 Conclusions

The meeting was the final activity of the collaboration programme. The participants were able to deepen into several topics introduced by the speakers and get some valuable insights on all the aspects that concern the development of a digital city.

Though interesting, all the participants agreed that an online study visit cannot compete in intensity, interactivity, experience-wise or learning potential with onsite study missions, which had been deemed most valuable when the international cooperation activity was structured.

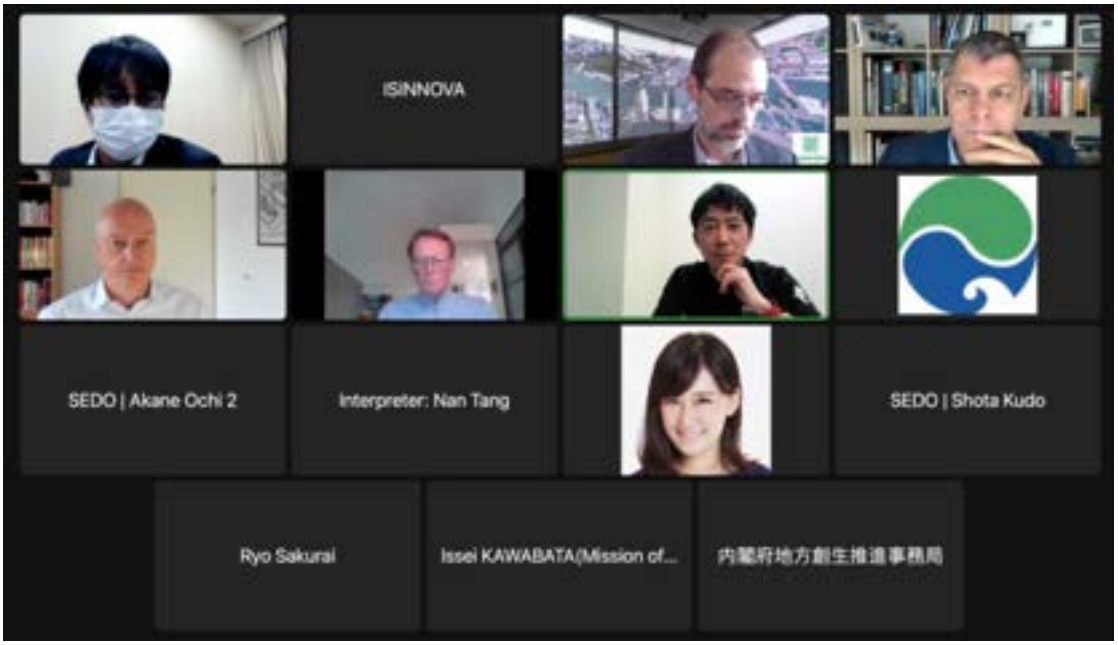


Figure 8: Virtual Study Visit snapshot

6. Conclusions and Lessons Learned

Summary of the collaboration experience

This section summarizes the activities of the RUGGEDISED international collaboration with Japan. Despite the impossibility to carry out the onsite study visits owning to Covid restrictions, visits that were very much at the heart of the collaboration, the knowledge exchange process fulfilled to a great extent the initial expectations for both Japanese and European cities. It established an environment that cultivated mutual understanding and inspiration between cities committed to unlocking sustainable growth and a higher quality of life for their citizens through the deployment of smart city technology.

The workshops and the virtual study visit also helped boosting the interaction in the subsequent meetings by highlighting and selecting the most interesting subjects among all those that were discussed. The 'digital city' and all the related aspects that allow for an improved smart city governance leading to more sustainable and participatory processes seem to be recognized as one of the topics which all the participants are eager to share experiences about and learn from each other.

Despite the language barrier the collaboration managed to establish a successful process of knowledge share between the two international city programs involved, to create a mutual flow of information between the RUGGEDISED and the Japanese cities, and to empower the cities through the aforementioned results. After the end of this programme, all the participants hope that the synergies between the participants can be sustained in the long term. Future cooperation opportunities will be discussed as Ruggedised is completed.

Active participation of citizens and the different European and Japanese approaches are some of the topics that would need further exploration in order to get the best insights from both worlds. Arguably, the main difference would be the wide European experience regarding the involvement of grassroots organizations and the more technologically advanced solutions already put in place in Japan. Active engagement of the ageing population is a sensitive issue in both geographies.

Digitalisation is here to stay, and all the participant cities have been able to show their experiences and learn from each other concerning digital solutions and urban platforms, which many insights on stakeholders' cooperation for smart mobility and the optimization of transportation services.

Lessons Learned and Recommendations

Albert Engels, Coordinator for the RUGGEDISED Project

"This original proposal showed that the urban issues and challenges in Europe and Japan turned out to be more similar than originally expected. Physical visits were not possible due to the ubiquitous Covid virus, the multiple online consultations have yielded interesting views on urban topics.

For example, the Japanese officials have made it clear that the enormous aging of their population has brought the cities to a certain extent into a survival mode. The decreasing tax revenues of the shrinking working generations are forcing the cities to choose what is minimally necessary to keep the city running. And that is an important reason why the cities in Japan use the possibilities of digitization as optimally as possible. So not because it is possible, as the assumption was beforehand, but because it simply has to be!

These consultations made it very clear that the Japanese aging population is the 'example' and wakeup call for Europe in the coming decades! The importance of the growing aging population in Europe and, in particular, the social impact should not be underestimated and should be placed much more explicitly on the European agendas than has been the case until now. That is an essential lesson and I consider it as my responsibility as a civil servant in the coming period to share this lesson with young and old generations and the EC where possible!"

Mario Gualdi, President of ISINNOVA

"The RUGGEDISED project, together with our Japanese partners, is committed to innovating and exchanging knowledge with kindred smart city programmes. After starting this dialogue in 2019, we have affirmed that cities face many of the same challenges – launching this cooperation partnership is a great opportunity for us to address these challenges and to share successes and opportunities. This will support all parties in making their cities smarter and increasing the quality of life of citizens."

Kenji Matsuno, Deputy Director of the Office for Promoting Regional Revitalization

"It is great to participate in this cooperation programme. Japan and the EU share common values based on the rule of law, and they both work towards sustainable, inclusive development. Cities are at the forefront of such efforts and this cooperation provides a great opportunity to enhance Japan-EU cooperation at the local level."

Brno

Brno thinks that it was a positive finding that Japanese cities are also very active in direct involvement of citizens in urban development. Not only to be transparent but also directly engage people to be active. The way Japanese cities use data to reduce the impact of potential natural disasters is also becoming increasingly relevant in Europe in light of the increasing fluctuations in weather patterns and the growing threat of extreme weather events. Last but not least, it was also an appeal towards the overall well-being of cities' inhabitants that I found very important as well.

According to Brno, the transfer of experience was limited by the fact that the workshops were only online. If we could see individual cases in person on site, the exchange of experiences would be more intense and beneficial. The format of the online workshops was otherwise perfectly fine.

Lukáš Grůza, project RUGGEDISED city coordinator

"As a strategic planner, this unique collaboration with Japanese cities has helped me to identify and focus more on two major topics that were not so far so pressing in the Czech Republic. Given the more and more extreme and less predictable weather patterns, the first topic is how to prevent and deal with natural disasters. The second topic relates to ageing and population decline – as in the Czech Republic we are only able to maintain population growth thanks to a positive migration balance. It was very useful to hear concrete examples and experiences on how Japanese cities are facing these challenges."

Parma

Parma states that ISINNOVA and CAO promoted a valuable mutual learning activity between RUGGEDISED and Japanese cities: it has been extremely interesting for them to showcase the results of the demonstration activities and what we have achieved within the project, and also to understand how Japanese cities worked on the smart cities concept to improve quality of life while also increasing energy efficiency and climate resiliency. It was impressive to see how advanced was the work done in the three Japanese cities of Kamakura, Hamamatsu, and Tamana and using ICT to address climate change and their ability to improve people's well-being in an ageing society.

Parma found very useful the online meetings with Japanese cities. Of course, having the possibility to have in-person meetings, in RUGGEDISED and Japanese cities, would have been better to see in person the measures presented during the online meetings.

Cristina Pellegrini and Marco Mordacci, RUGGEDISED project managers
"Advancing collaboration and exchange of knowledge between the EU and Japan on smart cities and climate change is an asset that should be further improved in the 2021-2027 programming period: EU and Japan share common interests and values and can mutually learn how to build a better economical, ecological, and social future."

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731198. The sole responsibility for the content of this document lies with the Ruggedised project and does not necessarily reflect the opinion of the European Union.

ANNEX I. Material from the Online Kick-off Meeting.

Rotterdam's presentation

RUGGEDISED
Designing smart, resilient cities for all

RUGGEDISED
International Cooperation with Japan

ロッテルダムへようこそ
Welcome in Rotterdam


International Cooperation with Japan
Presenting the cities
日本との国際協力
都市を提示する

Designing smart, resilient cities for all

RUGGEDISED & Smart Cities Community

RUGGEDISED

UMEÅ

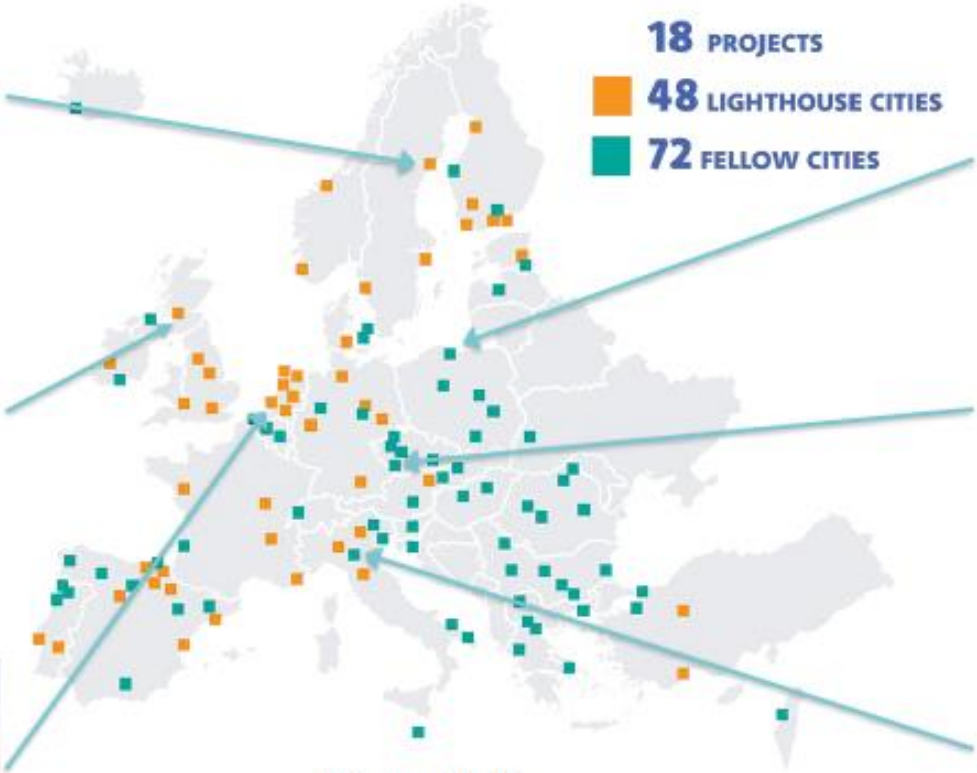
GDAŃSK

GLASGOW

BRNO

ROTTERDAM

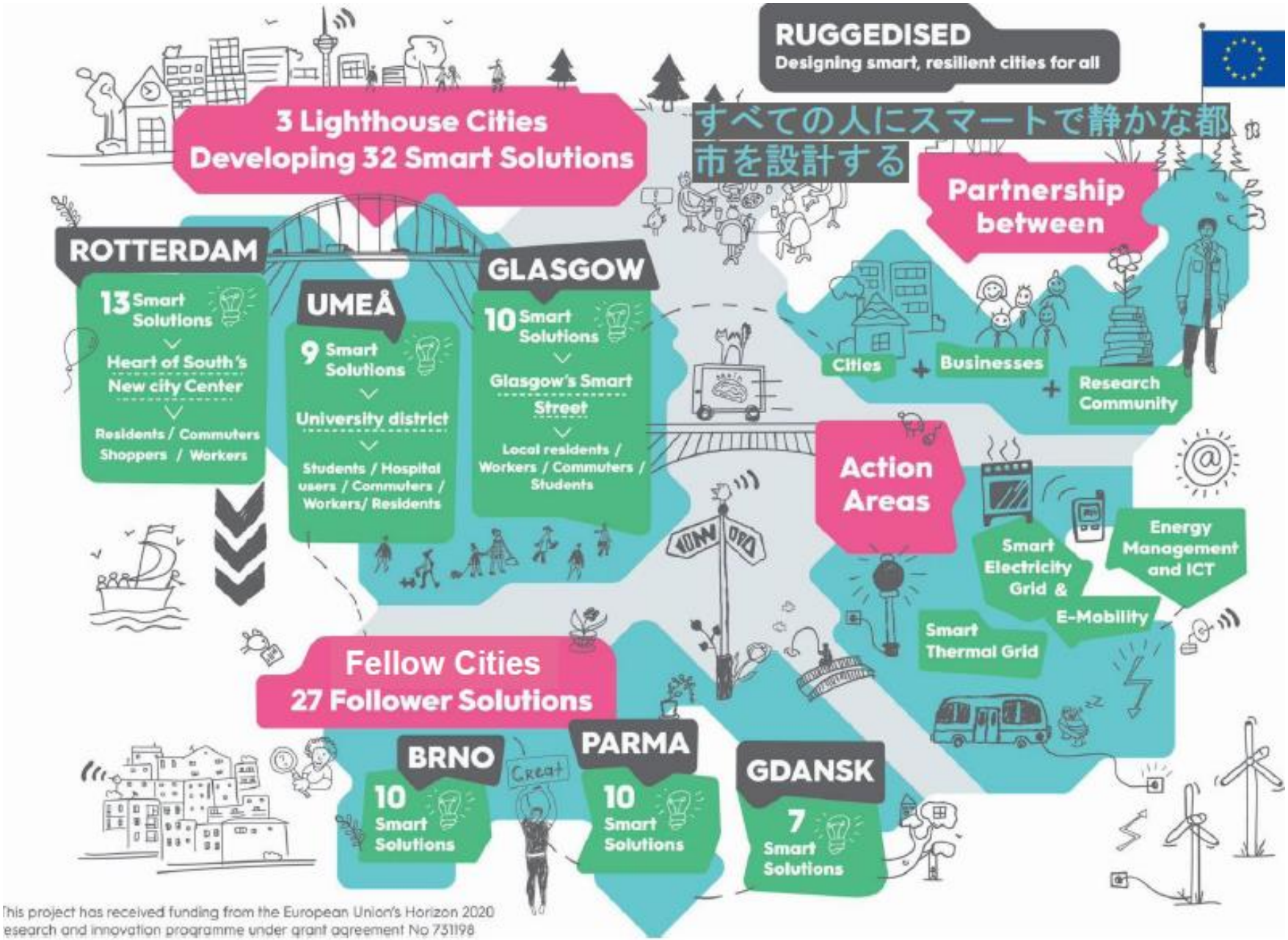
PARMA



- Triple Helix
- 3 Lighthouses
- 3 Fellow Cities
- ICT, Energy & Mobility
- New Collaborations
- Innovative solutions

08/10/2021

3



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731198

Designing smart, resilient cities for all

Facts and figures city of Rotterdam

Designing smart, resilient cities for all

Key smart city goals & challenges of Rotterdam

RUGGEDISED

Smart City & Resilience & Roadmap Next Economy

Holistic approach

- Social resilience
- Energy resilience
- Cyber resilience
- Climate resilience
- Critical Infra resilience
- Resilient Governance

Smart Digital Delta
Towards zero marginal costs

Smart Energy Delta
Towards zero carbon

Circular Economy
Towards zero waste

Entrepreneurial Region
Towards new productivity

Next Society
Towards an inclusive society

Narrative for city policy: New energy for Rotterdam

Thinking in transitions instead of evolution!

6

Designing smart, resilient cities for all

Key smart city project of ROTTERDAM

RUGGEDISED

Heart van South Sustainability

ロッテルダムの事実と数字

08/10/2021

Designing smart, resilient cities for all

Key smart city project of ROTTERDAM

RUGGEDISED

RUGGEDISED

Designing smart, resilient cities for all

Rotterdam, Hart van Zuid

ロッテルダム、ハート・オブ・サウス

Solutions in the Heart of South district

R1: Geothermal heat-cold storage and heat pumps
R2: Thermal energy from waste streams
R3: Surface water heat-cold collection
R4: Pavement heat-cold collector
R5: DC grid, PV and storage for mobility
R6: Smart Charging parking lots
R7: Optimizing the E-bus fleet
R8: Energy Management
R9: 3D City operations model
R10: LoRa-network
R11: Efficient and intelligent street lighting
R12: High performance servers in homes
R13: Smart Waste Management


Alkay


Woningbouw / house construction


Kenniscampus / arts building


Zwembad / swimming pool


Woningbouw / house construction

RET TNO kpn Eneco Ballast Nedam

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Designing smart, resilient cities for all

Key smart city project of ROTTERDAM

RUGGEDISED

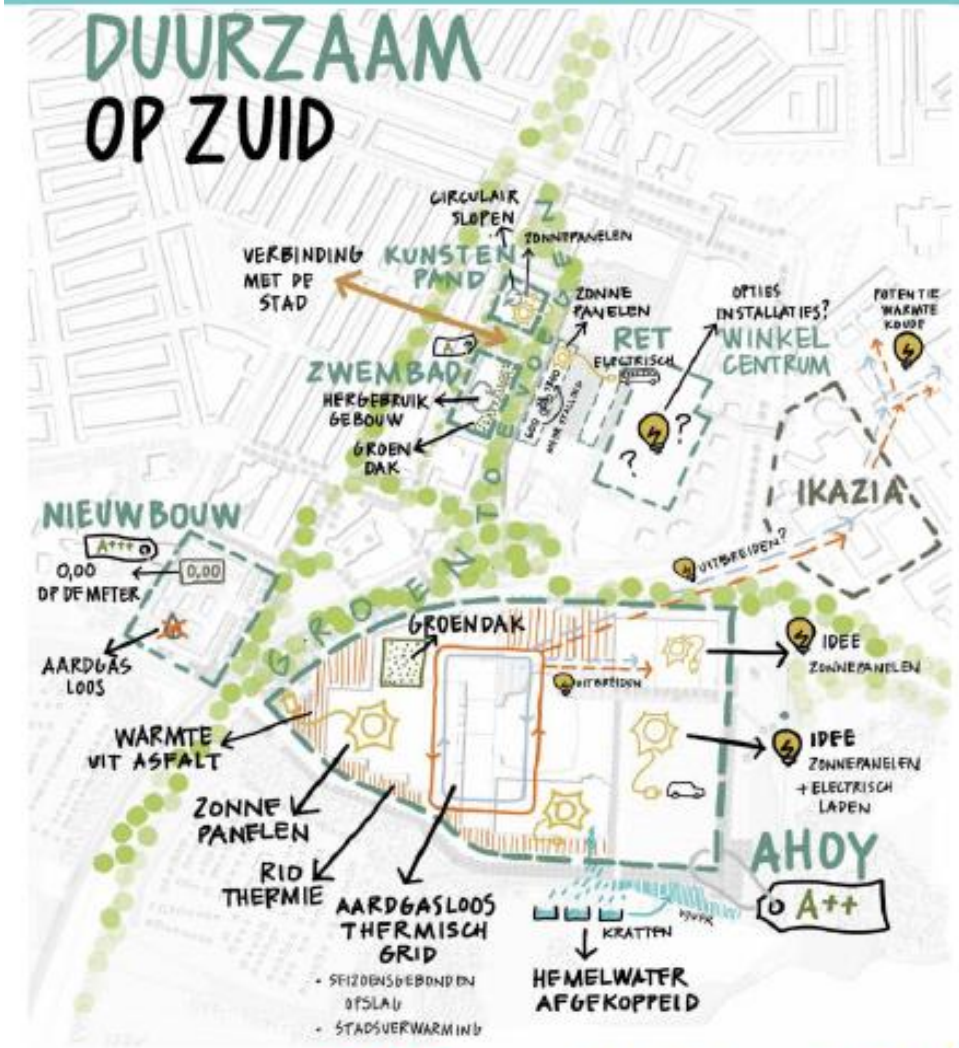
13 testprojects: ICT, Energy & Mobility

R1: 地熱熱冷蔵・ヒートポンプ
R2: 廃棄物流れからの熱エネルギー
R3:表面水冷集
R4: 舗装熱冷コレクタ
R5: モビリティ用 DC グリッド、PV、ストレージ
R6: スマート充電駐車場
R7: E バスフリートの最適化
R8: エネルギーマネジメント
R9: 3D都市運用モデル
R10: ロラネットワーク
R11: 効率的でインテリジェントな街路照明
R12: 家庭内の高性能サーバ
R13:スマート廃棄物管理

	ICT	Energie	Mobiliteit
R1: Geothermal heat-cold storage and heat pumps		V	
R2: Thermal energy from waste streams		V	
R3: Surface water heat-cold collection		V	
R4: Pavement heat-cold collector		V	
R5: DC grid, PV and storage for mobility	V	V	V
R6: Smart Charging parking lots	V	V	V
R7: Optimizing the E-bus fleet	V	V	V
R8: Energy Management	V	V	
R9: 3D City operations model	V		
R10: LoRa-network	V		
R11: Efficient and intelligent street lighting	V	V	
R12: High performance servers in homes	V	V	
R13: Smart Waste Management	V		V

Designing smart, resilient cities for all

Key smart city project of ROTTERDAM



1. **Climate-proof** (future temperature, water level rise, precipitation)
2. **Energy-supplying**
3. **Circular**
4. **Multimodal** (accessible and connected)
5. Strengthening existing values
6. Vital cohesion
7. **Natural gas-free**

Designing smart, resilient cities for all

Key smart city project of ROTTERDAM

RUGGEDISED

R13: Smart Waste Management

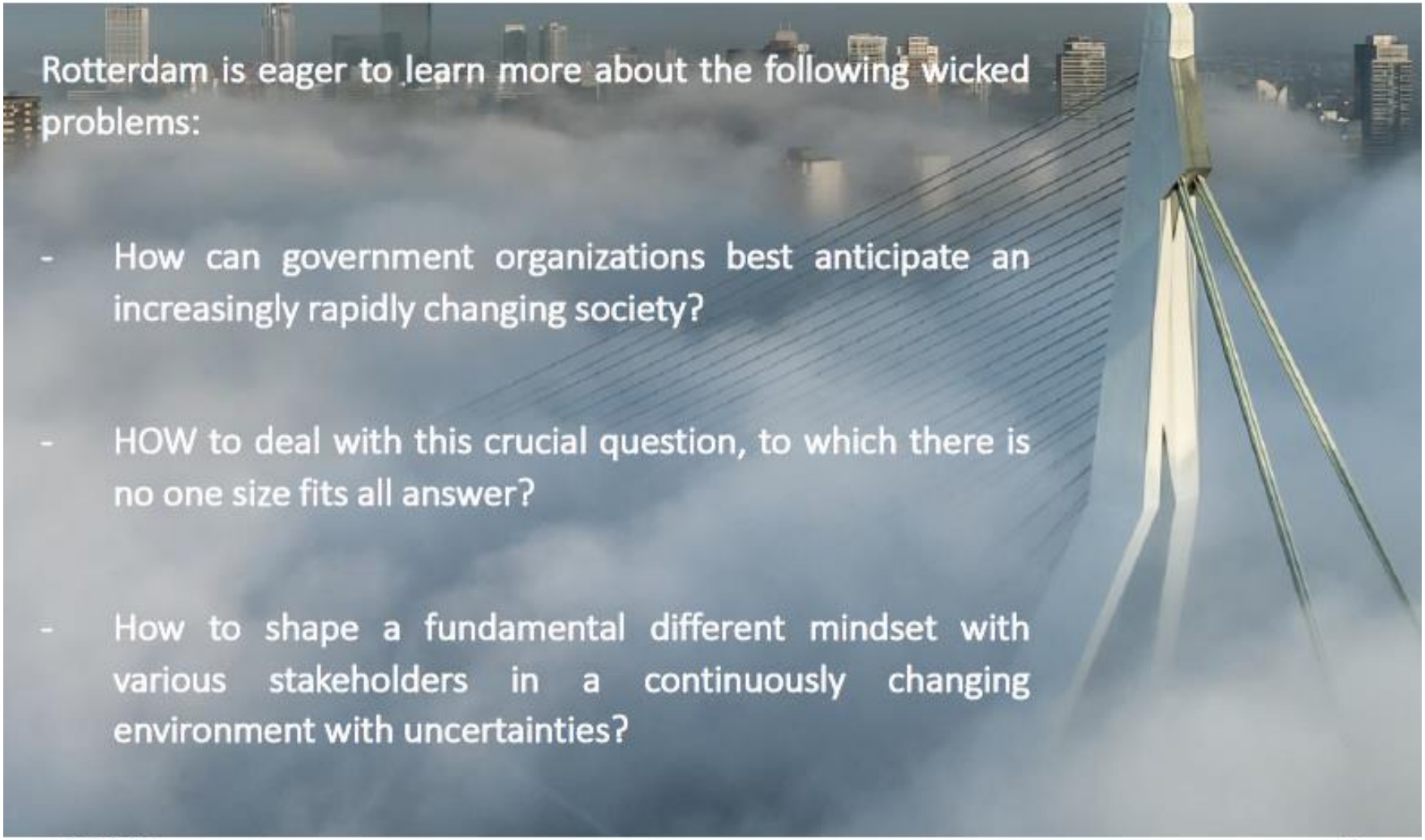
R7: Optimizing the E-bus fleet……

R9: 3D City operations model

Designing smart, resilient cities for all

Key smart city project of ROTTERDAM

www.allesisopzuid.nl
www.ruggedised.EU


Designing smart, resilient cities for all
What Rotterdam expects from this cooperation
RUGGEDISED
Rotterdam is eager to learn more about the following wicked problems:
- How can government organizations best anticipate an increasingly rapidly changing society?
- HOW to deal with this crucial question, to which there is no one size fits all answer?
- How to shape a fundamental different mindset with various stakeholders in a continuously changing environment with uncertainties?
08/10/2021
13

CONTACT

Name: Katelien van den Berge

Mail: k.vandenberge@rotterdam.nl

Name: Albert Engels

Mail: afrm.engels@rotterdam.nl

Name: Hans Langstraat

Mail: jp.langstraat@rotterdam.nl

Glasgow's presentation

Designing smart, resilient cities for all

RUGGEDISED

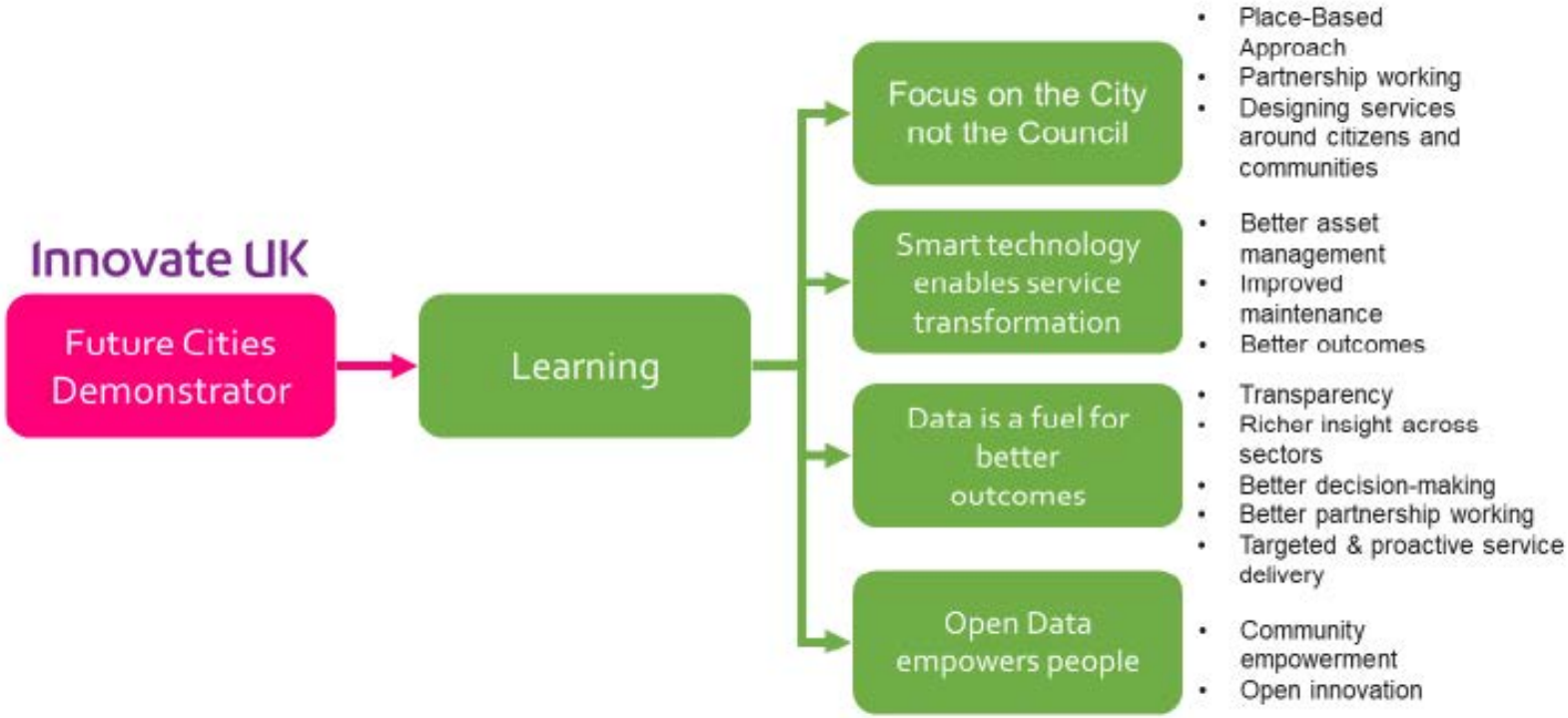
Facts and figures of Glasgow

- Population 635,640
- Highest population in Scotland
- Largest age group in city is 25 – 44
- City has 3 major universities & large student population
- 317,193 dwellings in city, which is the highest number in Scotland
- Host city for COP26
- 4th in the world in Global Destination Sustainability Index
- 2 centers for Smart City Innovation

08/10/2021

3

Key smart city ambitions of Glasgow



RUGGEDISED

Learning

Going beyond the Demonstrator

Focus on the City not the Council

Smart technology enables service transformation

Data is a fuel for better outcomes

Open Data empowers people

Transforming the City Programme

Principles

- Place-Based and Partnership Working
- Redesigning Services around Citizens and Business
- Better Outcomes
- Early Intervention/Prevention

Resources

- Property
- Fleet
- Infrastructure
- Information
- Technology
- Collections
- Open Spaces
- Energy

Ways of Working

- LEAN/Six Sigma
- Agile
- User Research/Service Design
- Open Innovation

Culture

- "Our Glasgow" (working for the city)

Learning

- Focus on the City not the Council
- Smart technology enables service transformation
- Data is a fuel for better outcomes
- Open Data empowers people

Going beyond the Demonstrator

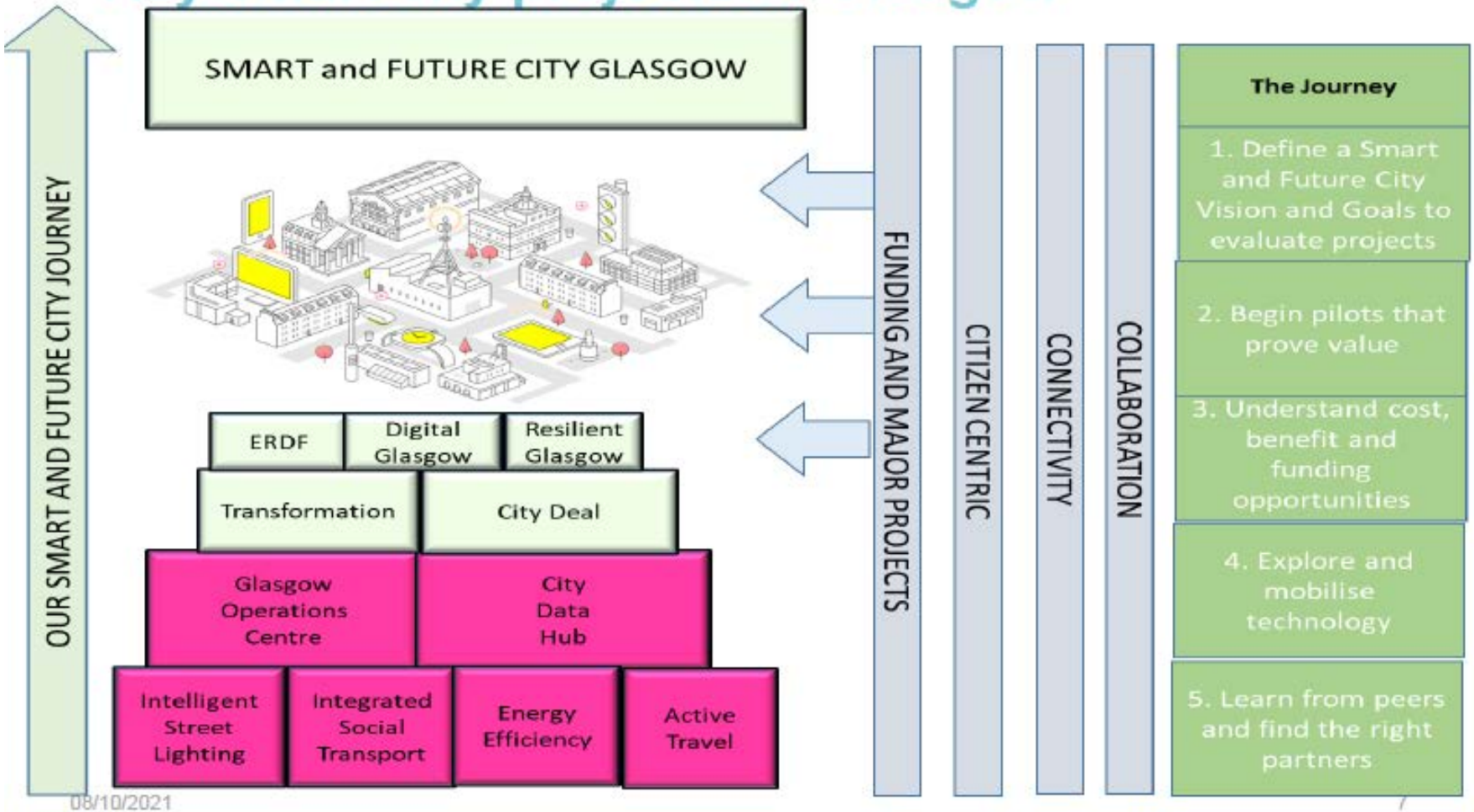
Scaling up Smart Infrastructure

- Investment in Intelligent Street Lighting
- Investment in Smart Bins
- Migration to Digital Telecare

External (EU) Investment in Innovation in Glasgow

- EU Ruggedised "Smart Street" Project

Key smart city projects of Glasgow




Glasgow Operations
Centre


Intelligent Street
Lighting

Key smart city challenges of Glasgow

- Moving beyond the demonstrator
- Managing stakeholder responsibility and ownership
- Working with innovators through public procurement
- Differentiating between solutions with problems and solutions to problems

What Glasgow expects from this cooperation

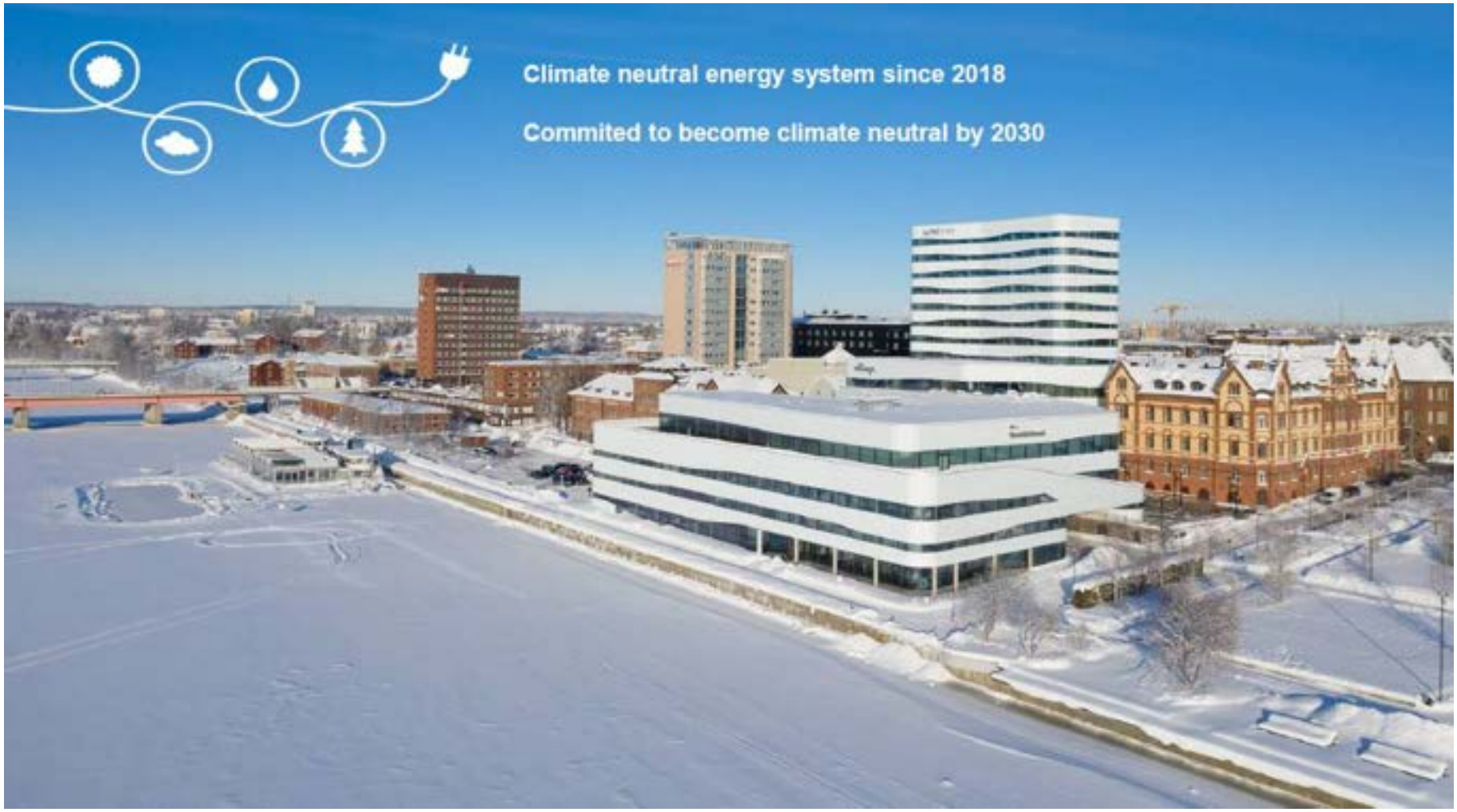
- Understanding of working use cases than can accelerate deployment in Glasgow
- Develop partnership with cities and technology partners
- Exposure to new and emerging solutions
- Sharing best practice and solutions to problems

CONTACT

Name: Gavin Slater

Mail: gavin.slater@glasgow.gov.uk

Umeå's presentation


Climate neutral energy system since 2018
Commited to become climate neutral by 2030

Designing smart, resilient cities for all

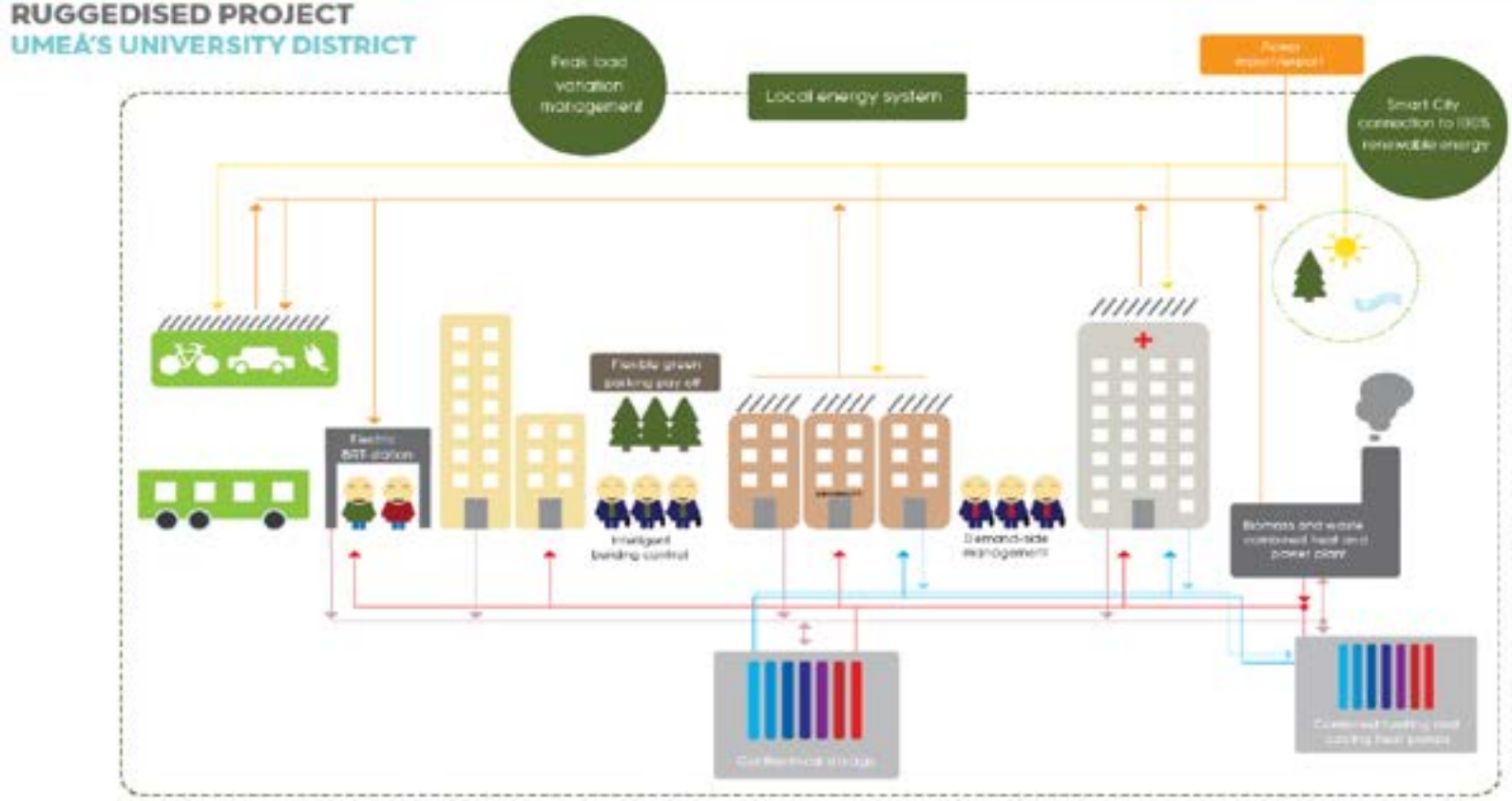
Key smart city ambitions of UMEÅ

Smart city thinking is at the core of the overall vision for Umeå's urban development:

- Sustainability, growth and quality of life as foundation
- Innovative partnerships around developing technologies and operations
- Use of data to create future solutions that involve business, supporting institutions and the citizens
- Using the city as a test facility for new technologies
- Attracting investments and talents to the city

06/10/2021

Key smart city projects of UMEÅ



Key smart city challenges of UMEÅ

Challenge #1 The complexity & fragmented ecosystem.

Challenge #2 Urban mobility

Challenge #3 Social Inclusion & engagement

Challenge #4 Coordination & cooperation

Umeå´s expectations:

- Exchange knowledge, experiences and ideas – to learn from each other.
- Innovation needs cooperation to move forward.
- Find challenges that we share as cities as well as between our companies…
- ..and new solutions - perhaps concrete projects
- Interesting & fun meetings!

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RUGGEDISED

Facts and figures of Brno

- 382 405 citizens
- 11 universities with 65k students
- Annual city investments in R&D - 100 milion CZK (509 milion JPY)
- Major industries: IT and cybersecurity, aviation and space industry, electron microscopy, digital gaming development, biotechnology

29/06/2022 3

Key smart city ambitions of Brno

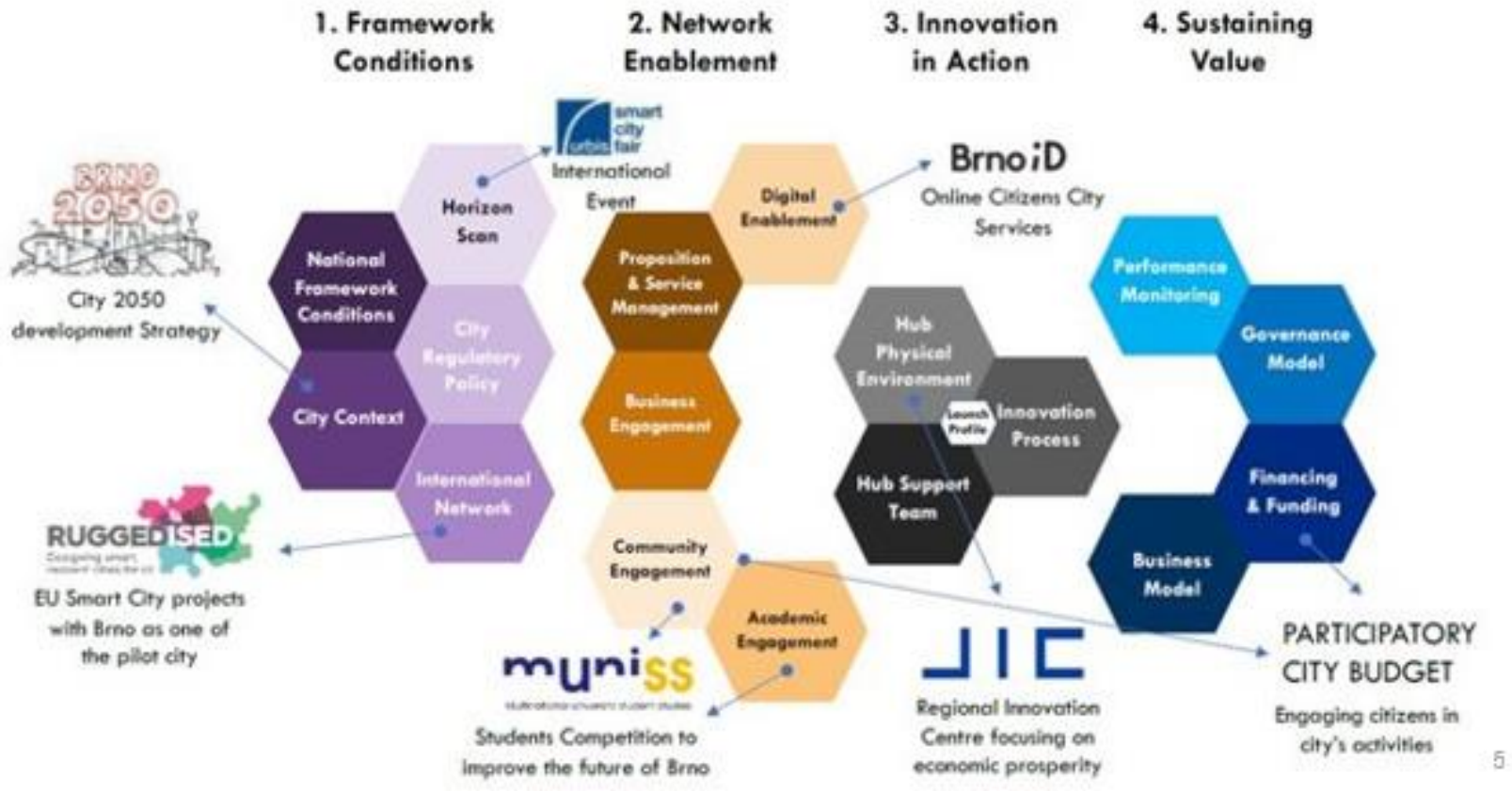
- Brno as a city of innovation
- Increase innovation in public administration
- Use the full potencial of UNI and R&D capacity for city development
- Pilot smart city district Špitálka

29/06/2022

4

Key smart city projects of Brno

7 Major Innovation Activities Happening in Brno



Key smart city challenges of Brno

Increase knowledge transfer between R&D centres and city companies on topics of:

- Smart road sign, one way street
- Chromacity of LED public lights
- Machine learning / AI
- Electric car chargers
- Recuperation of waste water

Brněnské komunikace

DPMB

LESY MĚSTA BRNA

POHŘEBNÍ A HŘBITOVNÍ SLUŽBY MĚSTA BRNA

SAKO

STAREZ SPORT BRNO

TSB

TEPLÁRNY BRNO

BVV Veletrhy Brno

What Brno expects from this cooperation

- Acquire new knowledge about implementation of innovative technologies and approaches, how they help in the daily running of the cities in Japan
- Discuss financing models of smart solution implementation

CONTACT

Name: Yuliya Ostrenko

Mail: ostrenko.yuliya@brno.cz

Name: Lukas Gruza

Mail : gruza.lukas@brno.cz

Gdańsk's presentation

Designing smart, resilient cities for all

RUGGEDISED

Facts and figures of Gdańsk

- capital of Pomeranian Voivodeship
- located on the coast of Baltic Sea
- part of Tricity agglomeration (with Gdynia and Sopot)
- more than 1.25 million inhabitants in Gdańsk metropolitan area
- area: 262 km2
- population: 464,000
- density: 1,772 inhabitants/km2

POLITECHNIKA GDAŃSKA

Wyższa Szkoła Bankowa w Gdańsku

PORT GDAŃSK

aiBAY

Gdańska Fundacja Przedsiębiorczości

PORT GDYNIA

UNIWERSYTET GDAŃSKI

UNIWERSYTET MORSKI GDYNIA

starter

30/06/2022

3

Key smart city ambitions of Gdańsk

Key smart city projects of Gdańsk

- **Intelligent Cities Challenge** – development of smart cities across the Europe
- **ACCUS** – cross-domain middleware platform to integrate urban systems (FP7/ARTEMIS-JU project, 2013-2016)
- **Tristar** – Intelligent Transportation System deployed in Tricity agglomeration, responsible for traffic management, transport infrastructure monitoring, public transportation management, parking management
- **open data platform** – access to public data for citizens and businesses to stimulate growth of bottom-up city smart services and ICT tools
- **participatory methods** – citizen panels to identify problems and design solutions; citizens involved in **strategic planning**

RUGGEDISED

Key smart city challenges of Gdańsk

Priority solutions

Efficient building
Energy efficient municipal buildings and removal of coal heating from residential buildings

RES local systems
Local energy systems based on RES including energy storage.

E-services 2.0
Unified customer journey in Gdańsk e-services

New open data solutions
Integrated, automated data flow inside and outside the organization

30/06/2022

Main roadblocks

- × Integration of data from the legacy IT systems
- × Lack of unified data governance policy
- × Limited human resources in the IT department
- × Access to efficient energy storage technology
- × Access to financial support for small installations

Potential cross-city collaboration areas

- SSO — Open data solutions for business and science
- Tools for building e-services
- Reskilling for RES technology
- RES in densely populated city
- Energy storage technology
- Business model in energy renovation

What Gdańsk expects from this cooperation

- **state-of-the-art patterns** of right tract development towards modernity both socially and technologically
- **spark off positive potential** in the most sustainable way means to track and follow the path of more matured partners
- **avoiding mistakes** and lost opportunities they previously encountered.

CONTACT

Name: Joanna Tobolewicz

Mail: joanna.tobolewicz@gdansk.gda.pl

Designing smart, resilient cities for all

RUGGEDISED

Facts and figures of Parma

198.341 inhabitants

20.347 enterprises

26.000 university students

3

Key smart city ambitions of Parma

The City of Parma:

aims to become more sustainable, competitive, participatory, creative, innovative and citizen-centric

started RUGGEDISED to develop a smart city concept able to ensure economic vitality and competitiveness, and to understand how this can be enhanced via **networks, resources and partnerships** in Europe and across the world

considers the idea of a smart city not as technology-driven, but **centred on its citizens**

23/09/2021

An ecosystem of projects, plans and actions for Parma

Key smart city challenges of Parma

The creation of a **Smart City task force** to gather existing projects under a single umbrella

People from different departments regularly working together on **cross-sectorial** topics.

Accelerate smart city initiatives through a **joint public-private approach**

Being a medium sized city, find our **own way for being smart** and **attract industry for innovative projects**

23/09/2021


Designing smart, resilient cities for all
RUGGEDISED
What Parma expects from this cooperation
Strengthen mutual complementary relations
Gather information on smart city, strengthen the cities and stakeholders in each country
deepening exchange on the topics of climate change initiatives, economic activities and promotion of culture, art and the creative city
cooperating with other cities aiming to become carbon-neutral on increasing their input of renewable energy and transitioning to a decarbonised economy
accelerate a concrete smart city project development with the Japanese cities involved in this exchange

CONTACT

Name: Cristina Pellegrini; Enzo Bertolotti; Marco Mordacci

Mail: c.pellegrini@comune.parma.it;
e.bertolotti@comune.parma.it;
m.mordacci@comune.parma.it;
parmafuturosmart@comune.parma.it

Hamamatsu's presentation

Designing smart, resilient cities for all

Hamamatsu City Facts and Figures

Features of Hamamatsu City

⊖ Government ordinance-designated city, considered a microcosm of Japan
- Second largest city by area in Japan
- Approximately 7 percent of the city's area is forested
- Home to a variety of natural and urban environments
- Approximately 5 percent of the city's area is sparsely populated

⊖ Top city in Japan in terms of healthy longevity
- Top for three consecutive terms for both men and women

⊛ Strong Manufacturing Capabilities
- Home to work sites for multinational corporations and manufacturing industry enterprises
- A Startup Ecosystem Global Hub City

SUZUKI YAMAHA HONDA The Power of Dreams
YAMAHA KAWAI Roland

Key Smart City Ambitions of Hamamatsu City

Hamamatsu City Digital Smart City Concept

Promotion through public-private partnerships

Vision For the Future

~Creating a Digitally Connected Future Together~

Vision (Fundamental Principles)

"Improvement in Citizens' Quality of Life" and "Optimization of the City"

Hamamatsu City Digital First Declaration

Essential Viewpoint 1
Open Innovation

Essential Viewpoint 2
Citizen Centered/Service Design Thinking

Essential Viewpoint 3
Agile Urban Development

- **Fundamental Principle 1** Open/Interoperability
- **Fundamental Principle 2** Inclusiveness/Diversity
- **Fundamental Principle 3** Transparency/Privacy
- **Fundamental Principle 4** Sustainability
- **Fundamental Principle 5** Safety, Peace of Mind/Resilience

Key Smart City Ambitions of Hamamatsu City

【Agency Formation】 Created 2020.4.1

Digital Smart City Promotion Division

Coordination

【Public-Private Sector Partnership】 Established 2020.4.1

Hamamatsu City Digital Smart City Public-Private Partnership Platform

Hamamatsu City Digital Smart City Public-Private Partnership Platform
Representative: Hamamatsu City Mayor, Secretariat: Hamamatsu City (Promotion Division)

Membership:141
(As of 2021.8.1)

Steering Committee
*Committees and subcommittees established as needed

- Digital Government Division — Hamamatsu City Administrative Jurisdiction Bureau
- Disaster Prevention and Safety Division — Hamamatsu City Administrative Jurisdiction Bureau
- Education and Child Rearing Division — Hamamatsu City Administrative Jurisdiction Bureau
- Tourism and Commerce Division — Hamamatsu and Lake Hamana Tourism Bureau
- Industry (Manufacturing) Division — Hamamatsu City Startup Strategy Promotion Council
- Health, Healthcare, and Welfare Division — Hamamatsu Wellness Lab, Hamamatsu Wellness Promotion Council
- Agriculture and Forestry Division — [Forestry] Forestry Research Center, Shizuoka Prefectural Research Institute of Agriculture and Forestry; [Agriculture] Preparation Committee, Hamamatsu Smart Agriculture Promotion Council
- Mobility Division — Hamamatsu City Mobility Service Promotion Consortium
- Energy Division — Hamamatsu City Smart City Promotion Council

30/06/2022

Designing smart, resilient cities for all

Key Smart City Projects of Hamamatsu City

Wellness Division

No. 1 in Healthy Longevity

Through public and private sector partnerships, this project promotes initiatives that aim to create a Preventative Care and Smart Wellness City where citizens can enjoy lasting good health and happiness.

<Example Projects>

○ Lifestyle improvement support program for those living with lifestyle-related diseases
○ Project to use big data in health checks

Mobility Division

Capitalizing on Hamamatsu City's large municipal area and thriving automotive industry, this project promotes initiatives based on the Hamamatsu version of the MaaS concept.

<Example Projects>

○ Hamamatsu telework park initiative
○ Creation of food delivery program
○ Promotion of cooperative transport

Energy Division

Hamamatsu Municipal Area RE100 Declaration

By making the most of Japan's largest installed capacity of renewable energy, and forming a platform consisting of industry, academia, government, and finance, we promote a variety of smart projects.

<Example Projects>

○ Microgrid project
○ Securing electric power by using an optimal mix of electricity

30/06/2022

Agriculture and Forestry Division

Promoting smart agriculture and forestry through the use of ICT to increase productivity and create added value.

<Example Projects>

○ Promotion of smart agriculture (subsidies)
○ Introduction of next generation horticultural facilities
○ Creation of a woodland path management system

Designing smart, resilient cities for all

RUGGEDISED

Key Smart City Challenges of Hamamatsu City

- ○ Deregulation and regional transformation
- ○ Facilitation of the understanding of data use (handling of personal data, value creation through open innovation)
- ○ Promotion of bold initiatives while avoiding overlapping investments in an environment of rapid change
- ○ Using digital technology to achieve human-centered service design
- ○ Creation of ecosystems through public-private co-development
- ○ Facilitation of cooperation between divisions and overall optimization due to the wide range of distinct divisions
- ○ Cross-coordination of the city's higher-level planning and sectoral policies

Hamamatsu City's Goals Through This Cooperation

- ○ Insight into European smart city initiatives, policy background, and the bigger picture
  - Positioning of smart city initiatives in overall city policies
  - Coordination with the urban planning department in particular
  - Division of roles between public, private, and national sectors in the promotion system
  - Status and position of data coordination infrastructure in each municipality
- ○ Structuring the characteristics of Japanese smart cities by means of comparing Japanese and European initiatives

CONTACT

Name: Yoichi TAKIMOTO

Mail: y-takimoto@hdsc.city

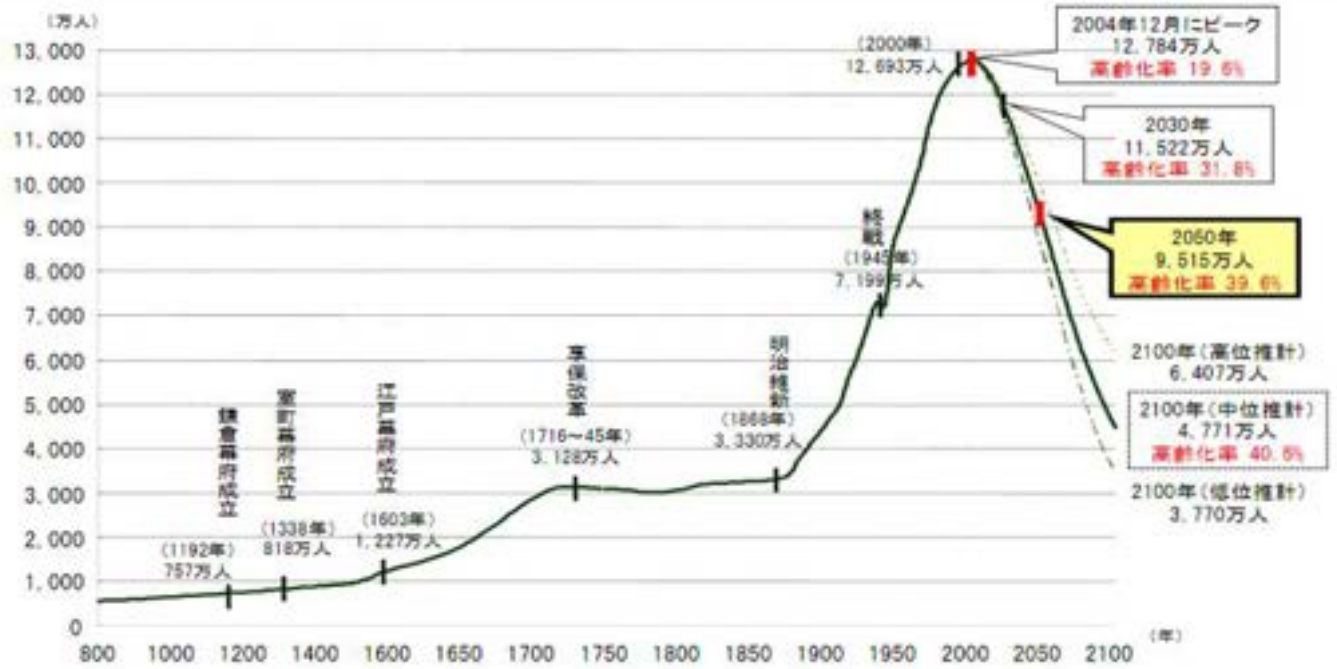
Kamakura's presentation

Designing smart, resilient cities for all

RUGGEDISED

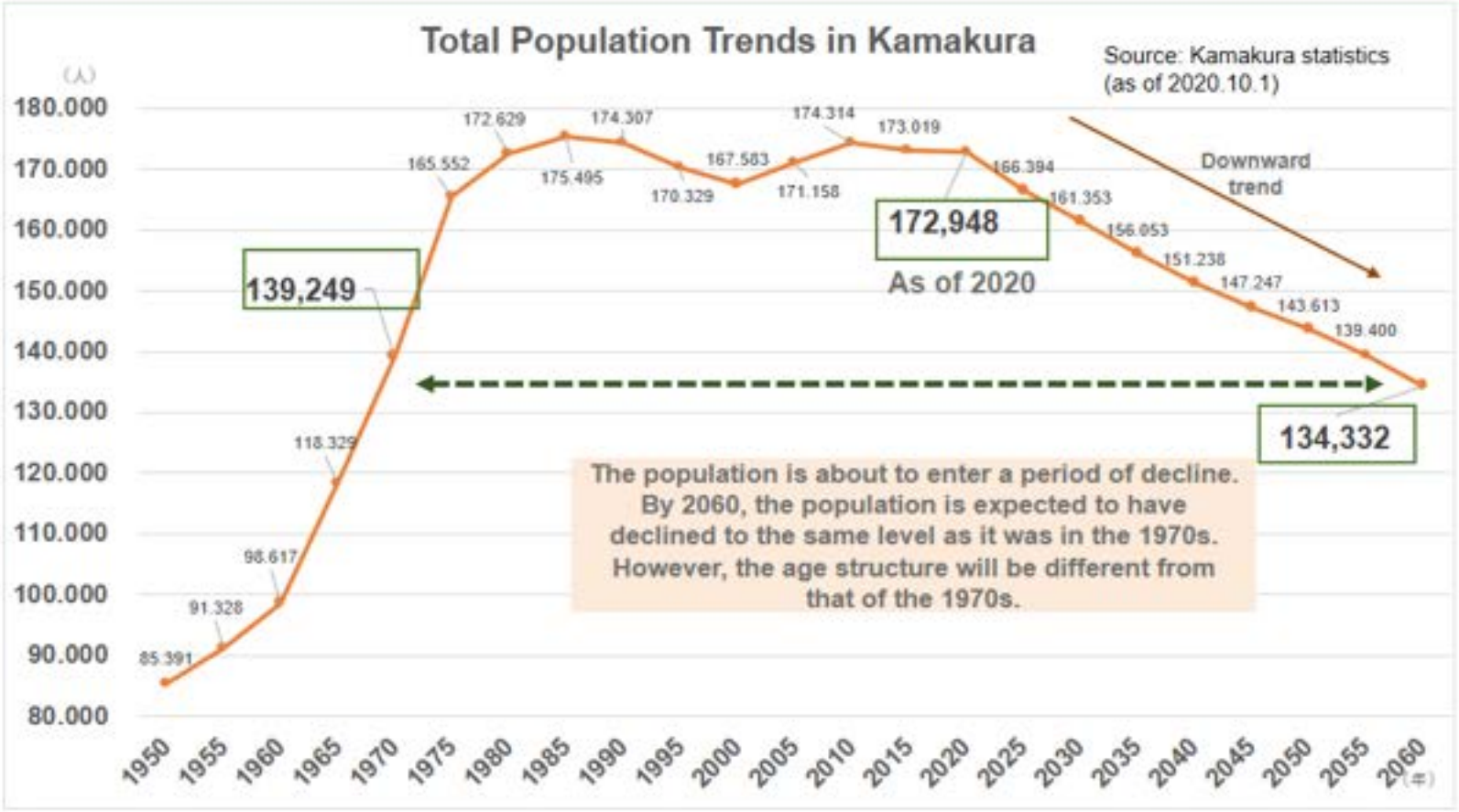
About Kamakura

Population Trends in Japan

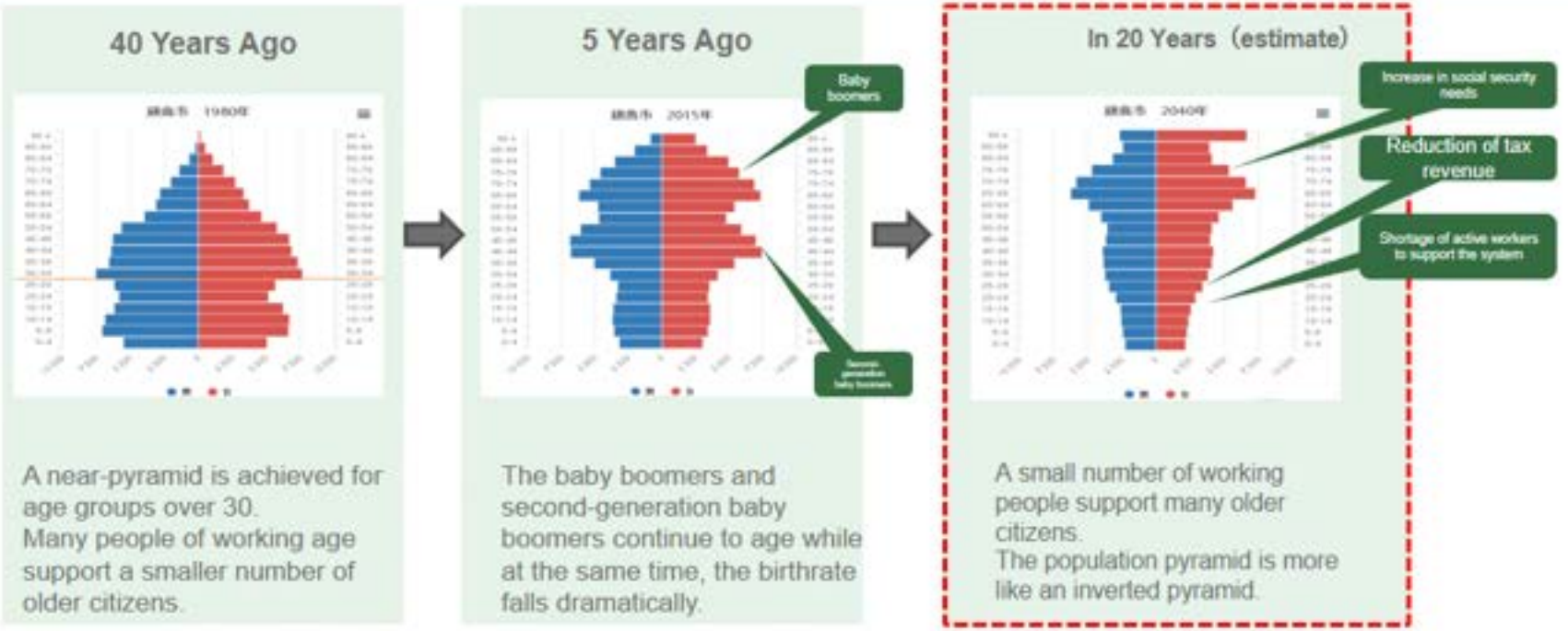


Japan's population peaked at 127,784,000 in December 2004. Those aged 65 and older compromised 19.6 percent of the population. By 2030, the population is expected to fall to 115,220,000, with older citizens making up 31.8 percent of the population. By 2050, the population is expected to fall to 95,150,000, with older citizens making up 39.6 percent of the population. The population is expected to continue falling, with mid-range estimates suggesting that by 2100, the population will have fallen to 47,710,000, with older citizens making up 40.6 percent of the population.

Population Trends in Kamakura

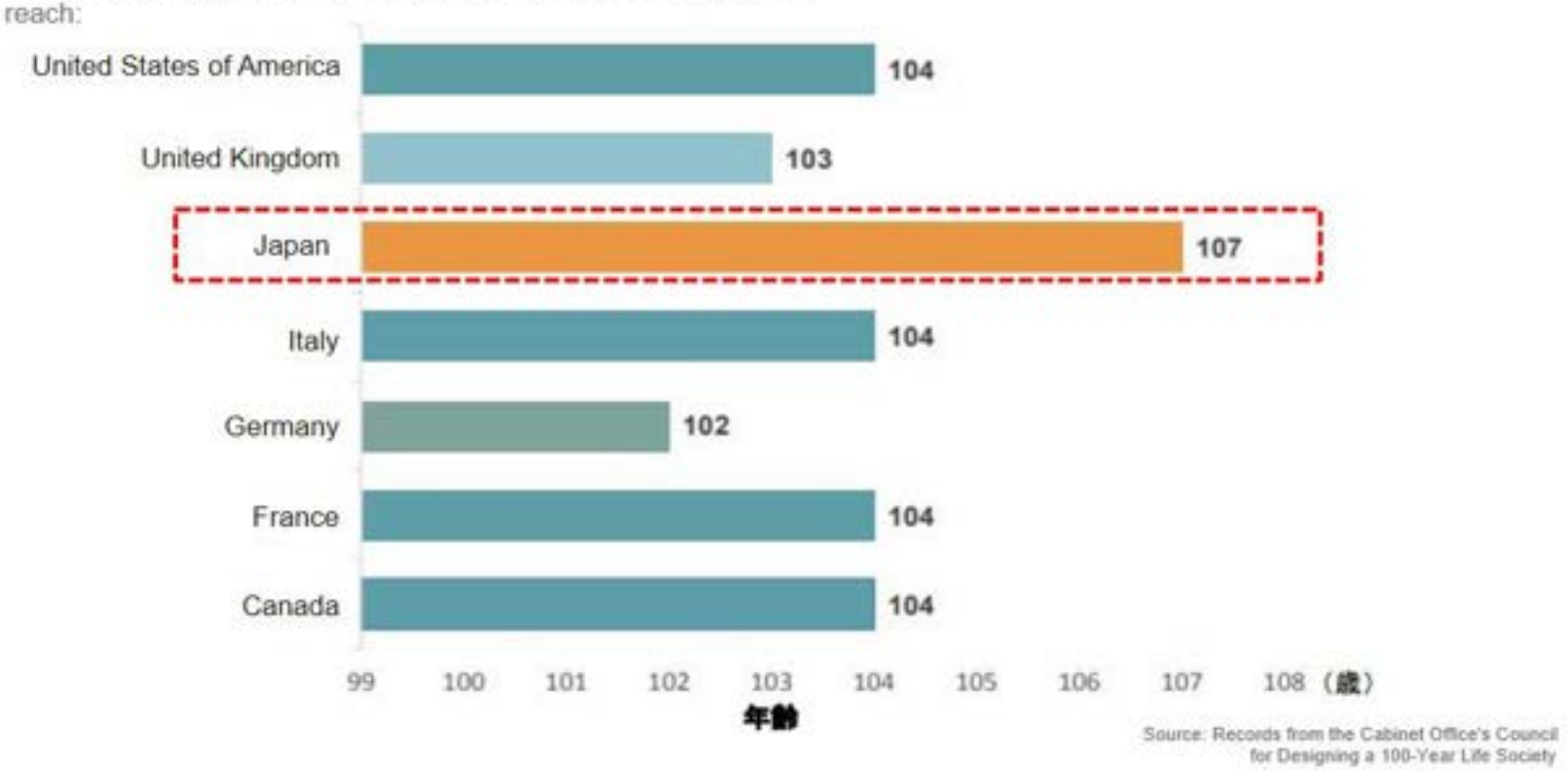


Kamakura Population Pyramid Trends



(Figures: Population Pyramids of Kamakura) (Source: Hinata GIS) (Data: Estimates based on the Ministry of Internal Affairs and Communications national census and data from the National Institute of Population and Social Security Research)

The Advent of the 100-Year Lifespan



Designing smart, resilient cities for all

Toward an Inclusive Society

Kamakura Ordinance for the Realization of an Inclusive Society (preamble)

Article 13 of the Constitution of Japan, which begins "All of the people shall be respected as individuals," provides for the dignity of the individual and the right to pursue happiness. We are all different in terms of our age, sex, sexual orientation, and gender identity; disability and illness; family status, occupation, economic situation, nationality, and cultural background. We aim to create a society in which diverse people are respected and can be true to themselves regardless of their position.

Let us contemplate the difficulties faced by those in our vicinity.

There are people who wish to live their truth, but who find it difficult to do so in a society where concepts of what is "normal" or "natural" are defined by the majority. This is because "normal" and "natural" mean different things to different people. It is only by being considerate of each other's differences that we can all live together. The first step towards an inclusive society is to be aware of not only the things that can be seen, but also those things that cannot be seen or put into words.

We have enacted this ordinance in order to create a society in Kamakura where people can live their truths in peace; where people accept diversity and care for each other.

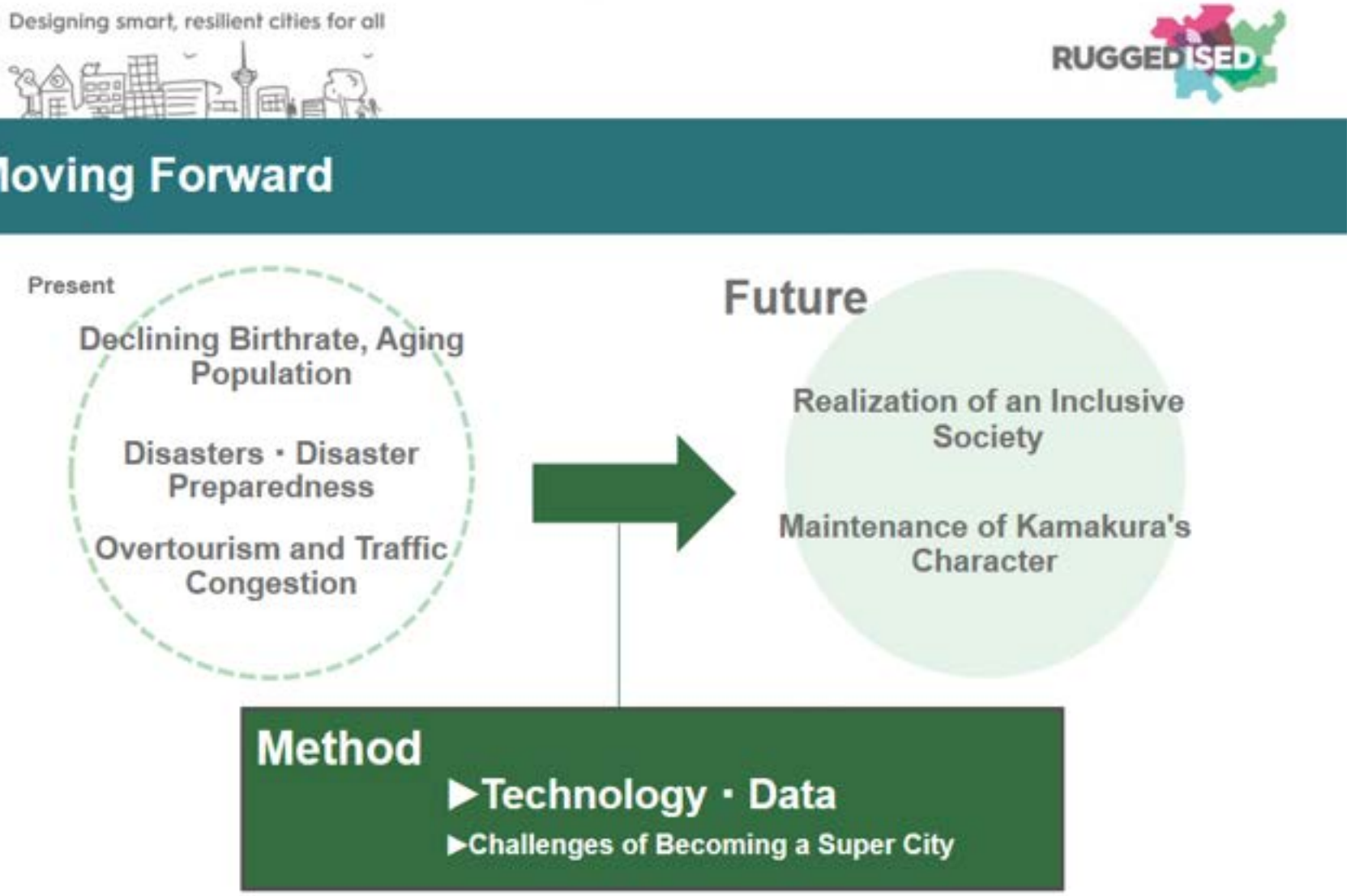
Barrier-free beach

Designing smart, resilient cities for all

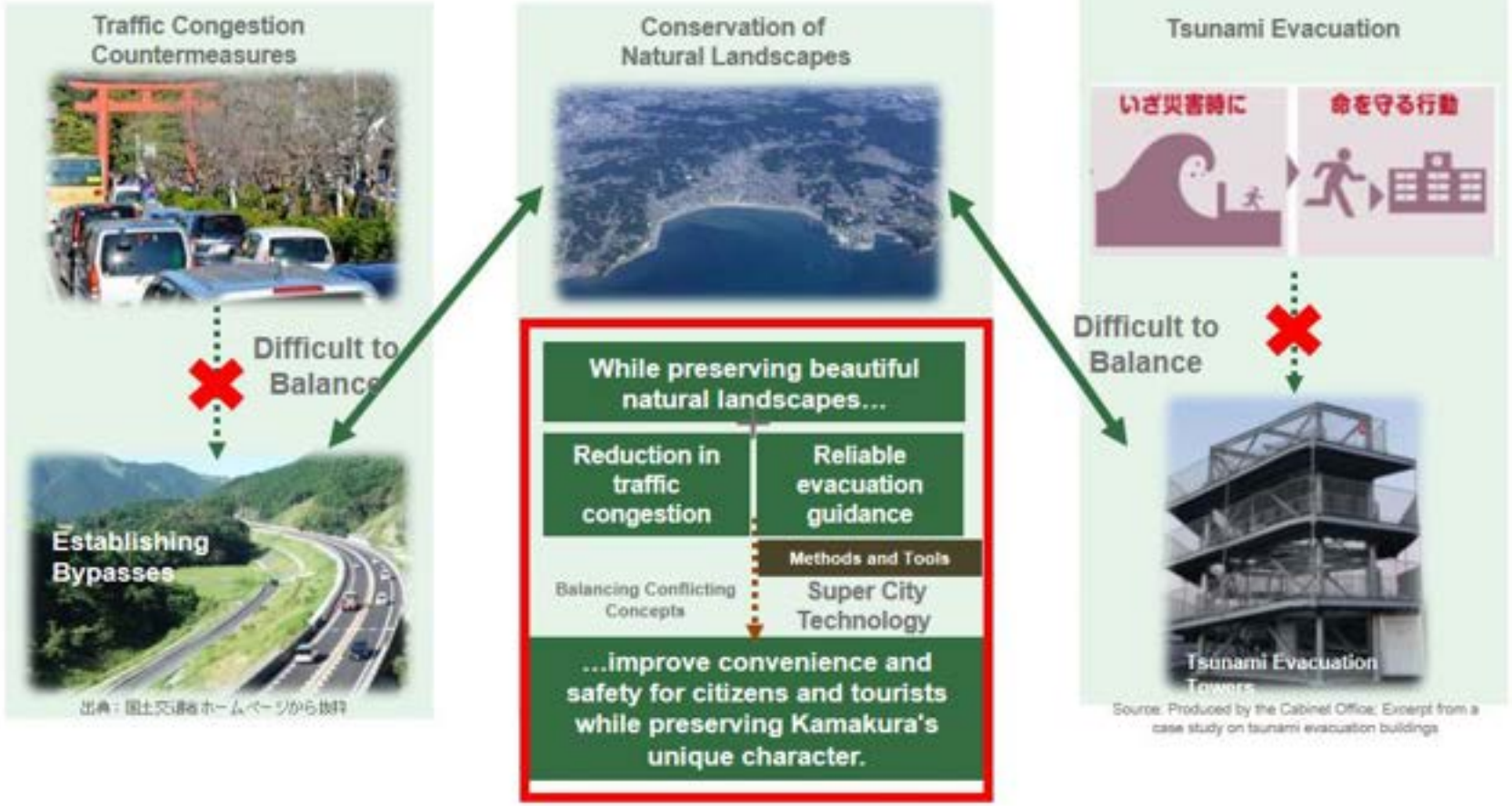
Schedule of Smart City Initiatives for 2021

30/06/2022

12


Designing smart, resilient cities for all
RUGGEDISED
Moving Forward
Present
Declining Birthrate, Aging Population
Disasters・Disaster Preparedness
Overtourism and Traffic Congestion
Future
Realization of an Inclusive Society
Maintenance of Kamakura's Character
Method
▶Technology・Data
▶Challenges of Becoming a Super City

Resolving Matters Previously Abandoned or Difficult to Balance

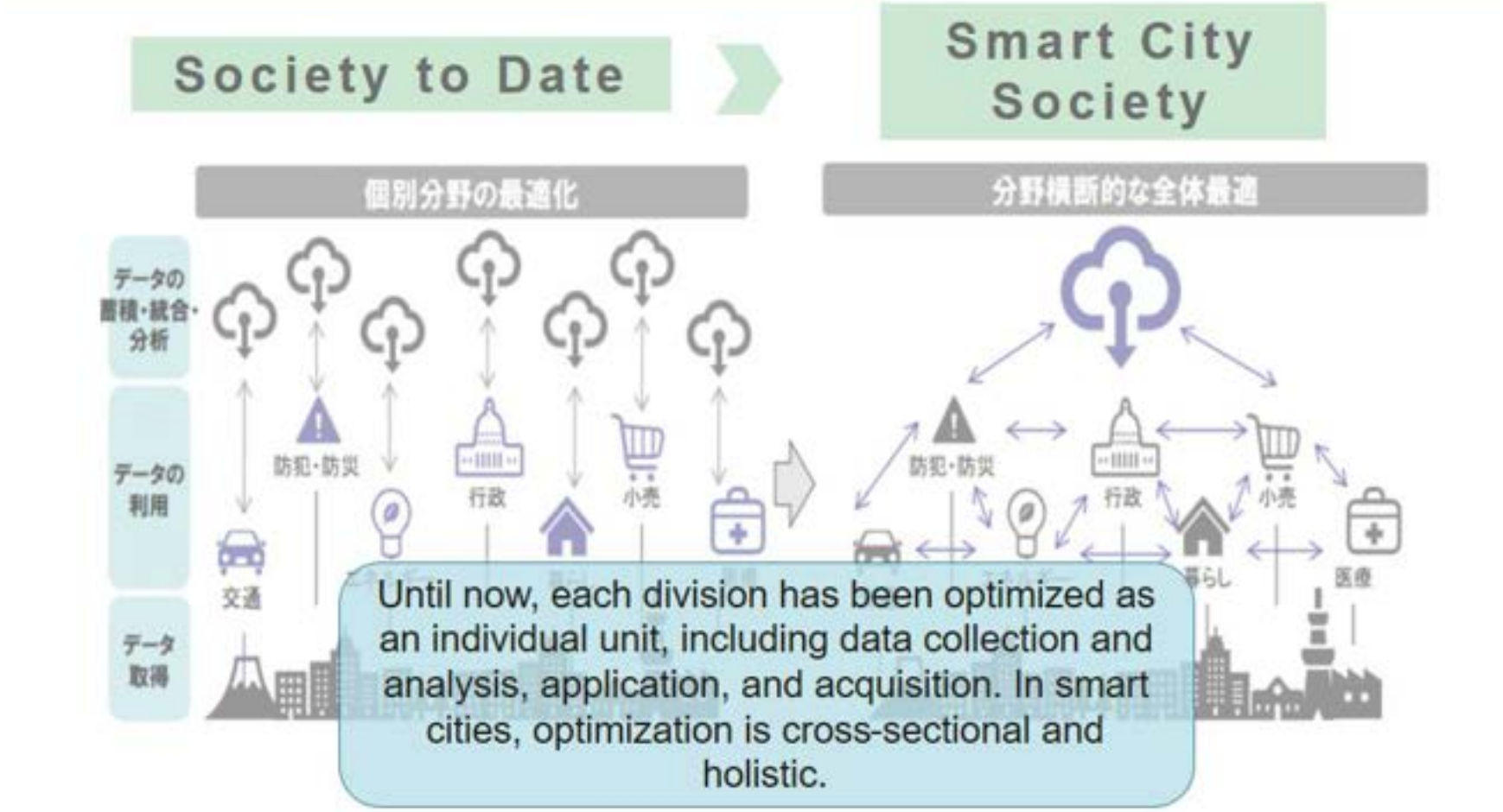


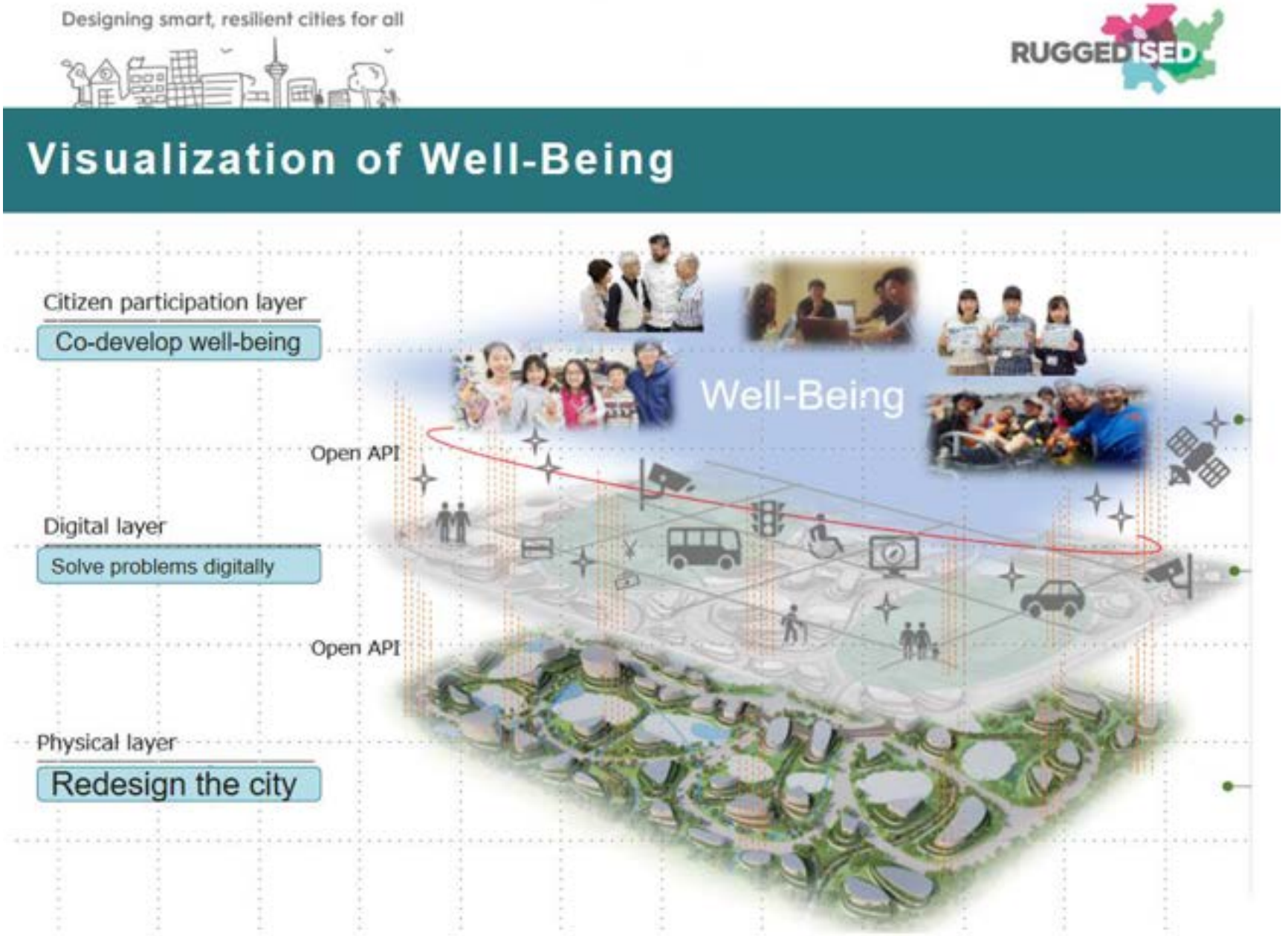
Example: The Next-Generation Emergency Medical System Demonstration Project

Patient information, including vital signs, is input into devices by voice and camera by EMTs and sent to hospital. The hospital is then able to quickly assess the situation and decide whether it can accept the patient or not. A QR code is created linking to the information, which can then be easily used by hospitals and EMTs.

Contact by Telephone → Voice Input→Data → Rapid Matching to Healthcare Center

From Individual Optimization to Total Optimization

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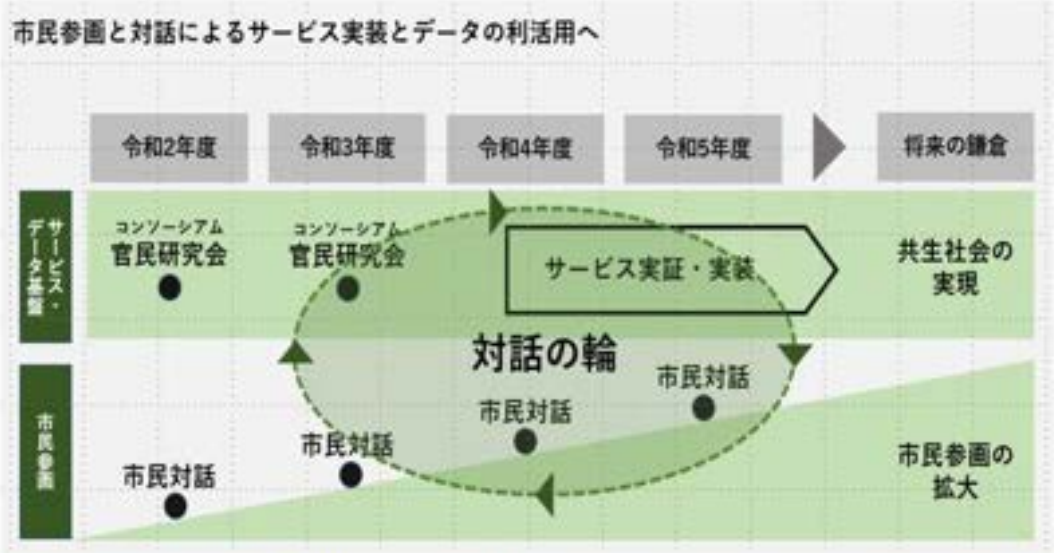
RUGGEDISED
Visualization of Well-Being
Citizen participation layer
Co-develop well-being
Well-Being
Open API
Digital layer
Solve problems digitally
Open API
Physical layer
Redesign the city

Designing smart, resilient cities for all

Towards a Smart City with Civic Participation

Towards Service Implementation and Data Utilization through Civic Engagement and Dialogue



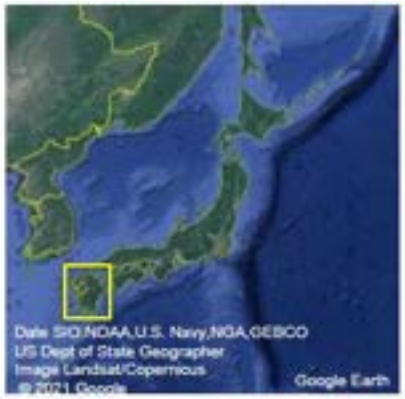
Continuous dialogue between citizens and government stretching across years, with service demonstrations and implementation, moving towards an inclusive society and high levels of civic engagement.

Tamana City's presentation

Designing smart, resilient cities for all

RUGGEDISED

Tamana City Facts and Figures



History

Prospered with the plentiful bounty of the Kikuchi River (Kofun period to Modern period)
⇒ primarily rice cultivation
Merger of one city and three towns in October 2005 (Tamana, Taimei, Yokoshima, Tensui)

Topography

Located in the northwestern part of Kumamoto Prefecture, the city is approximately 17 km from north to south and approximately 14.5 km from east to west and has a total area of approximately 152 km²

Population

[As of the end of August 2021]

Total	64,946
Men	31,135
Women	33,811
Households	28,174

Railways

JR Kagoshima Honsen (three stations in the city)
JR Kyushu Shinkansen (one station in the city), opened in spring 2011
No subway system

Roads, etc.

Municipal roads: 1,523
Actual length: approximately 843 km (as of March 2020)
Bridges: 832 (as of the end of September 2021)

30/06/2022

3

Key Smart City Ambitions of Tamana City

Interaction

"Interaction between people and interaction with nature"

- ○A hub of exchange and leader of development in the northern part of the prefecture
- ○Promotion of new interaction and exchange
- ○Promotion of urban development with a sense of unity throughout the city
- ○Consideration of how things are done beyond city limits
- ○Preservation and utilization of historical resources and the natural environment

Comfort

"Tamana: A livable city where people want to reside"

- ○An increase in the number of residents
- ○Raising in of uncontrolled urban expansion and efficient and effective renewal of the urban area
- ○Revitalization and revitalization of the city center
- ○Promotion of people-friendly urban development
- ○Improvement and strengthening of services for citizens
- ○Promotion of environmentally friendly urban development
- ○Promotion of urban landscape planning

Safety

"Realization of a safe, secure city/area"

- ○ Promotion of urban development with a focus on disaster prevention
- ○Creation of a disaster-resilient city
- ○Promotion of safe and secure urban development
- ○Establishment of community-wide safety and security

Self-Reliance

"Active participation of citizens in urban development"

- ○Promotion of cooperative urban development
- ○Maintenance of a vibrant local community supported by a sense of solidarity and love of home

Tamana, a city in the prefecture's northern reaches where people and nature thrive together

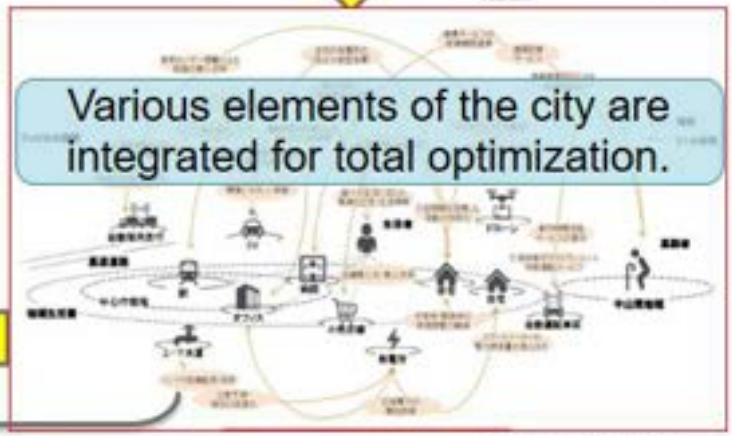
Vision of the Future, Tamana City Master Plan

Rural Revitalization Driven by SDGs

New technology applied in the urban development division

Smart City: A sustainable city or district where management (planning, development, management, and operation, etc.) is carried out while making use of ICT and other new technologies in order to achieve total optimization in regard to the various issues facing the city

Source: Website of the Ministry of Land, Infrastructure, Transport and Tourism



Source: Website of the Ministry of Land, Infrastructure, Transport and Tourism

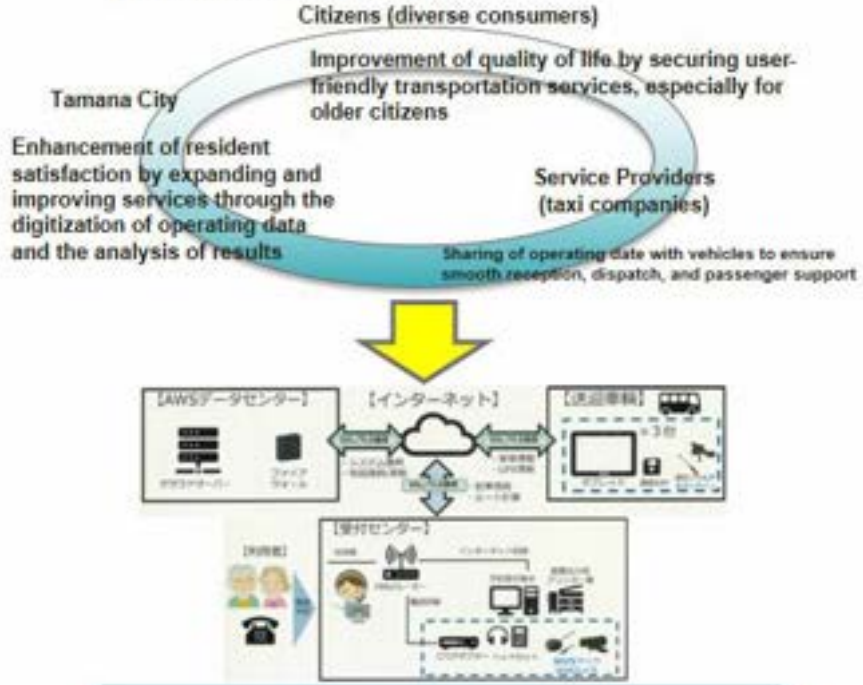
Net Zero Contributions

30/06/2022

4

Key Smart City Projects of Tamana City

Demand-Responsive Transportation System (implementation in progress)



ICT is used to optimize transportation services through the digitization of operating data.

Smart Infrastructure Maintenance (implementation in progress)

Key Smart City Challenges of Tamana City

Smart × Disaster Prevention and Mitigation (vision)

Source: Ministry of Land, Infrastructure, Transport and Tourism (PLATEAU)

Issue Disaster risk information is usually presented in two-dimensional form, such as hazard maps, making it difficult to visualize risk.

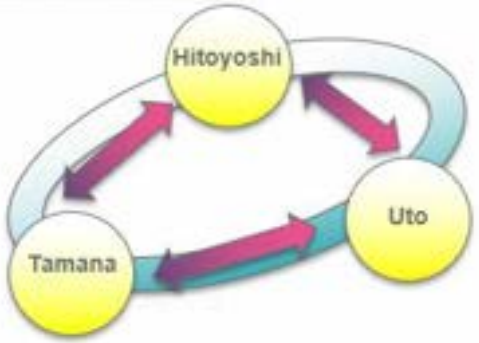
Advantages By displaying information in three-dimensional forms, intuitive, spatial, and concrete images can be created.

Challenges

In addition to traffic and foot-traffic data,

- Examination of evacuation routes, evacuation facilities, etc.
- Strengthening of regional disaster preparedness and disaster mitigation

Smart × Regional Cooperation (vision)



Issue Climate change has led to an increase in the frequency of catastrophic disasters and the need to strengthen various disaster response systems.

Advantages It is practical to pursue regional standardization and cooperation concerning priority tasks in emergencies and tasks affected by population decline.

Challenges

Urban OS (data platform)

- Development of a common model
- Roll out

Tamana City's Goals Through This Cooperation

According to data from the United Nations, Japan's aging population (the percentage of people aged 65 and over) is, at 29.1 percent, the highest in the world, and is 5 percentage points higher than Italy, which, at 23.6 percent, sits in second place. Furthermore, according to an investigation by the Ministry of Land, Infrastructure, Transport and Tourism, roughly half of all areas outside the three major metropolitan areas report that they are experiencing population decline.

Tamana has a population of less than 200,000. On average, Tamana's population is approximately 65,000, and the city is caught in the vicious cycle of population decline. (Reduced tax revenue results in a lower standard of administrative services and a reduction of living-related services.) For this reason, the promotion and evaluation of the results of the Tamana smart city project can serve as a use case example for the future not only in Japan but also in other developed countries.

Based on the current situation in Tamana, we are hoping for the following with this collaboration:

Current situation 1: Initiatives are partially optimized (case by case).

✓ **By adopting the smart city approach and technology, we aim for complete optimization and efficient municipal management. Furthermore, we wish to establish a cross-sectional system of administration.**

Current situation 2: Public participation is lacking (or awareness is poor).

✓ **We want to make a city-wide effort to become a smart city by educating citizens and adopting citizen engagement processes and techniques.**

Current situation 3: We don't know which initiatives and technologies are best suited to us.

✓ **By collaborating with other cities and participants, we can promote a smart city tailored to our needs and visualize the effects on smaller municipalities.**

CONTACT

Name: Nobuhiro Yasuda

Mail: toshi@city.tamana.lg.jp

ANNEX II. Material from the Online Workshop #1

Rotterdam's presentation


CITIZENS PARTICIPATION
IN THE SMART CITY
ROTTERDAM
RUGGEDISED
December 2nd 2021
ROTTERDAM. MAKE IT HAPPEN.
Gemeente Rotterdam

DUTCH OMBUDSMAN

Put the **citizen** in the **center** of the **smart city**

ROTTERDAM. MAKE IT HAPPEN.

Gemeente Rotterdam

ROTTERDAM KLIK! PROJECT

Contact in the right context and in the right time,

so **citizens** experience that we are there for them

ROTTERDAM.
MAKE IT
HAPPEN.

Gemeente Rotterdam

ROTTERDAM LIVING LAB SENSIBLE SENSOR

a **smart city** that makes sense

ROTTERDAM.
MAKE IT
HAPPEN.

Gemeente Rotterdam

KLIK! & LIVING LAB DESIGN RESEARCH

Ondergrondse afvalbak met sensor

In de afvalbak zit een sensor die met sonar meet hoe vol de bak zit. De sensor is niet zichtbaar.
De gegevens van de sensor worden twee keer per dag verzonden naar de leverancier van de sensoren.

Parkingang met sensor

In het Reyeroordpark komen 23 infraroodsensoren bij de ingangen van het park. De sensoren meten of iemand voorbijloopt.
Elk uur worden de gegevens verzonden naar de leverancier van de sensoren.

Lantaarnpaal met sensor

Aan de lantaarnpalen in Reyeroord zit een bewegingssensor om te meten of iemand in de buurt is.
Als er iemand in de buurt is, gaat de lantaarnpaal aan. Hiermee besparen we energie.

Veiligheidscamera

Veiligheidscamera's worden gebruikt op drukke plekken zoals uitgaanscentra, wegen en pleinen, of stations.
De camera's helpen bij het handhaven van de openbare orde.

Verkeerslicht met sensor

Bij een aantal verkeerslichten voor fietsers zit een warmtesensor. Deze sensor meet de warmte en weet zo of er veel fietsers zijn.

Als het druk is, gaat het verkeerslicht voor de fietsers eerder op groen.

Sensor voor grondwaterstand

De waterpeilsensor meet de grondwaterstand, hij zit onder de grond. De plekken waar de sensoren zijn, kun je vinden op straat en op de stoep.

What do citizens want to know about sensors in the public space and why?

emotion studio

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LISTENING TO CITIZENS

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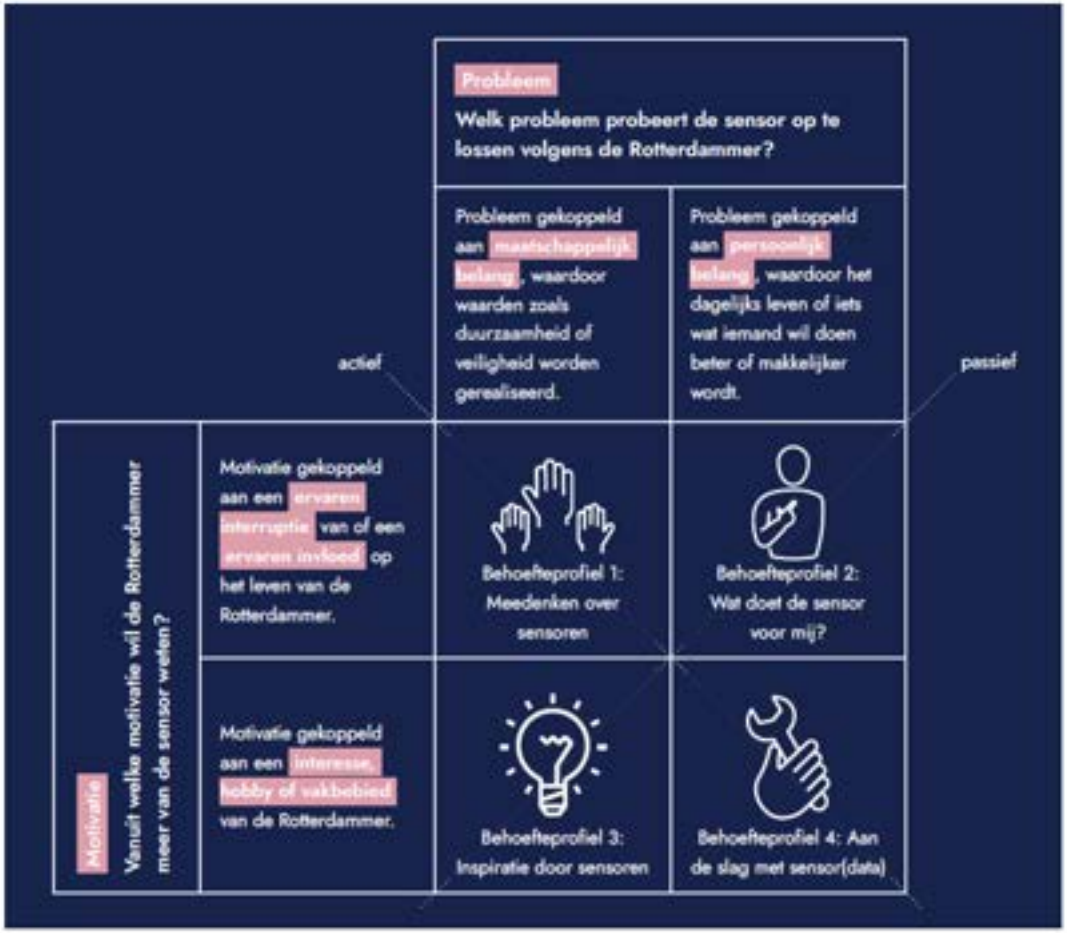
INSIGHT 1: HUMAN NEEDS MODEL



Complex combination of needs of citizens in the smart city:

Social
Personal

Impact
Interest

Active
Passive

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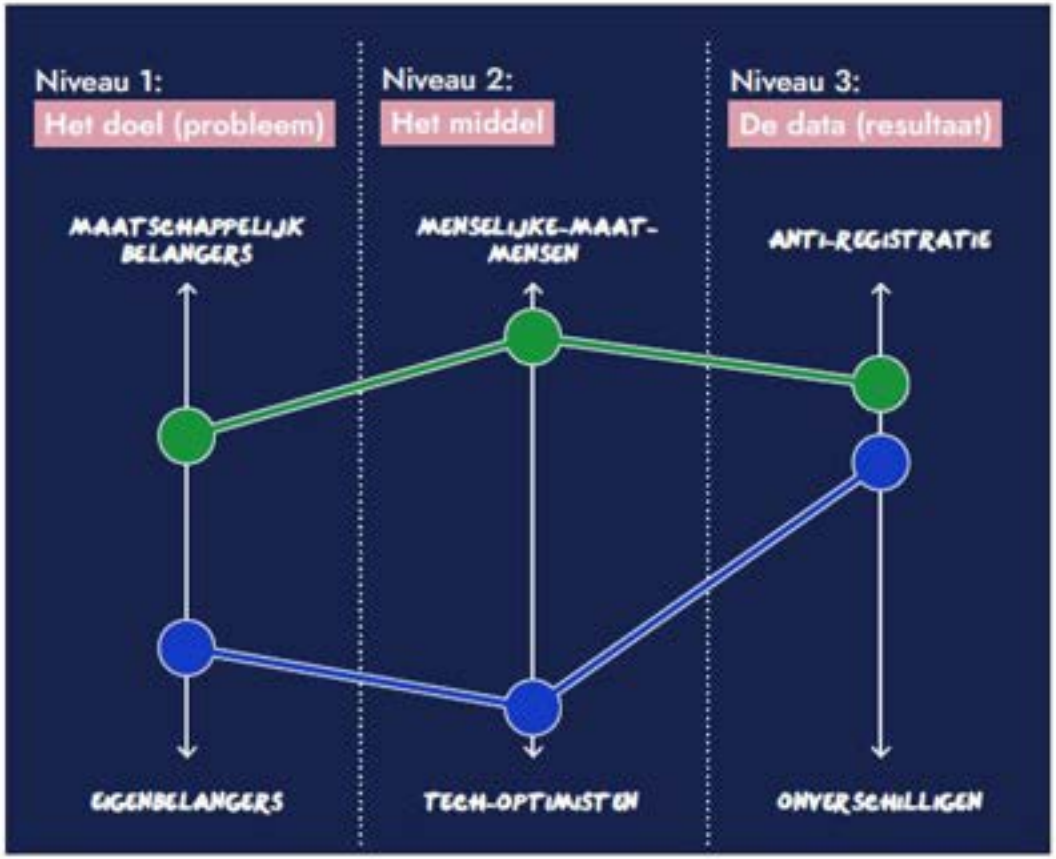
INSIGHT 2: POSITION MODEL



Changing positions of citizens in the smart city:

Even over one sensor during one conversation

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DESIGNING FROM TWO OPPOSITE POSITIONS

One group of citizens thinking as iBot (technology fan)

One group of citizens thinking as iQueen (privacy queen)

DIR VAN

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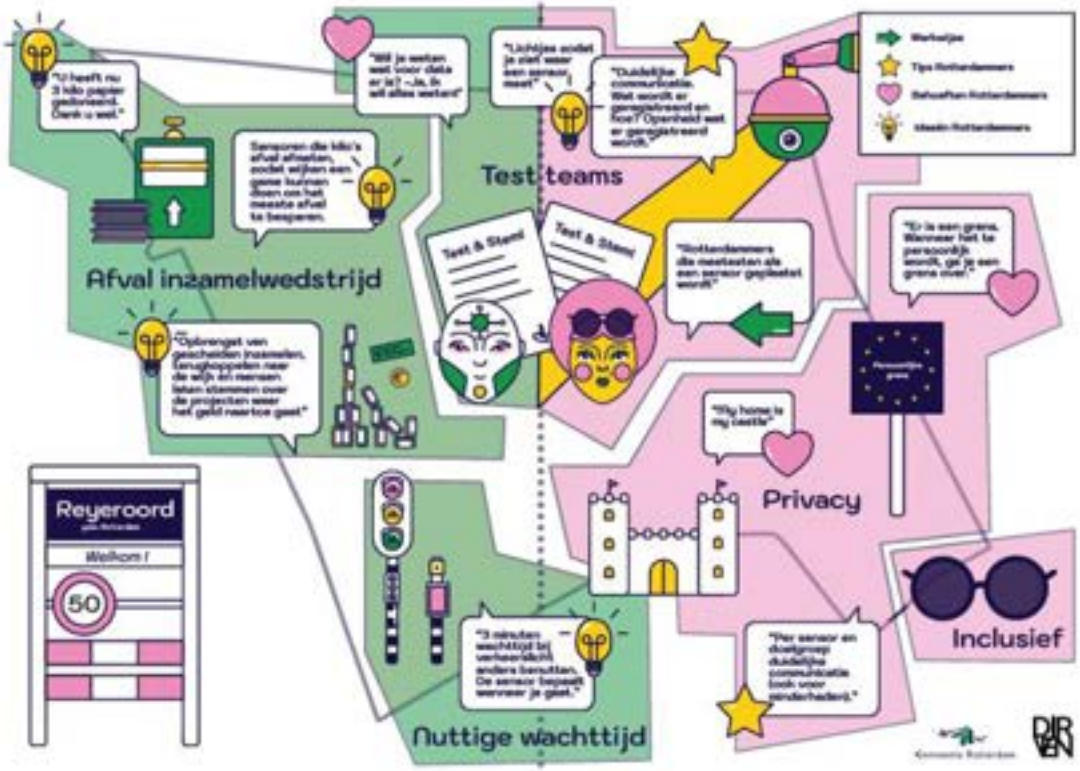
IDEAS FROM IBOT AND IQUEEN



Examples:

Testing sensors

Finding new purposes for a sensor

Don't forget people with a disability

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NEXT STEP 1

enrich image recognition in the smart city with knowledge of children with visual impairments

Visio

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NEXT STEP 2

from information to participation;

how can we activate cyclists on the street to share their knowledge (they are the experts)

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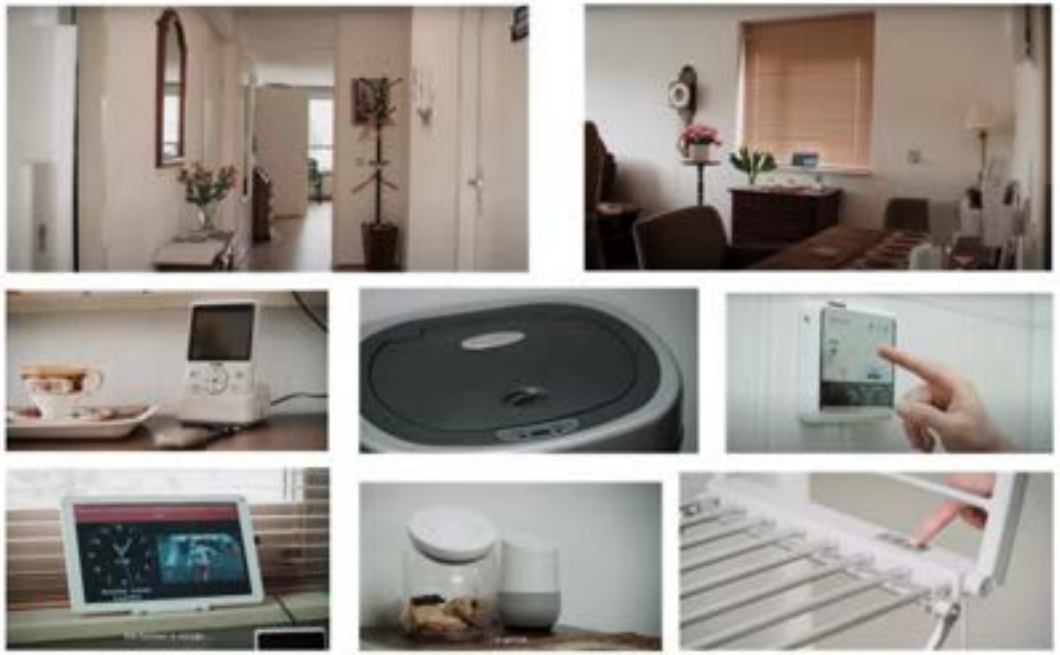
BONUS EXAMPLE IN ROTTERDAM



The comfort houses in several neighbourhoods:

making eHealth accessible with and for elderly citizens

https://comfortwoning.com/ and notitie58@gmail.com

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Kamakura's presentation


Kamakura Smart City Initiatives
(Public Dialogue)

Designing smart, resilient cities for all

First Session: Public Dialogue

Date and time: Sunday, August 22, 2021, 2:00–4:30 p.m. (online)

Objective: Create and Personalize an Image of the Lifestyle You Want to achieve in a Smart City

Schedule of Events

1. Deepening Our Understanding of Smart Cities

- Orientation and Participant Introductions
- Presentation by Kamakura: A vision of the smart city Kamakura is working towards
- Group Work, Part 1: What was exciting or interesting about the presentation, and what questions would you like to ask?

2. Describe a Smarter Way of Living Compared to the Present

- Group Work, Part 2: What daily issues would you like to solve for yourself and the people around you?
- Group Work, Part 3: What are some Kamakura-specific smart solutions for these issues?
- Conceptual Sketch: Create a scene set in the smart city. Who is the main character? When does the sketch take place? Where is the sketch set? What is the "smart difference" between the sketch and the present?

In the first session, high school and university students acted as facilitators.

Tools were used to visualize ideas and opinions.

3

Designing smart, resilient cities for all

Second Session: Public Dialogue

Date and time: Sunday, October 10, 2021, 2:00–4:30 p.m. (online)

Objective : Design a Smart City Based on Civic Engagement

Schedule of Events

1. To Understand the Overall Picture of the Smart City Concept (Proposal) and its Key Measures and Central Projects

- Presentation by Kamakura
- Objective of public dialogue
- The basic philosophy and principles of the smart city concept (proposal)
- Target areas for projects to be undertaken in 2022 (central projects)

2. To Consider how a Smart City Based on Civic Engagement Ought to Be

- Group dialogue
- What kind of stakeholders and roles are required to move specific projects forward?
- What structures, mechanisms, and platforms are required in order to involve citizens in the joint development of specific projects?
- In what ways do you want to be involved in a smart city based on civic engagement?

A vision of the smart city Kamakura aims to become.

Approximately 30 citizens participated in the event.

4

Theme: Towards a Functioning Regional Data Linkage Platform

（1）Creating Communities and Ecosystems

- Collaboration with Code for Japan

（2）Developing Real Use Cases

- Data Linkage Platform Proof of Concept Project （ORI-Project）

Designing smart, resilient cities for all

Towards a Functioning Regional Data Linkage Platform

（1） Towards Community Creation and Ecosystem Construction

ORI-Project, Hamamatsu's data linkage platform proof of concept project, has been designated as a pilot project as part of Code for Japan's Make our City smart city project, which invites citizen participation.

浜松市
HAMAMATSU CITY

×

Code for Japan

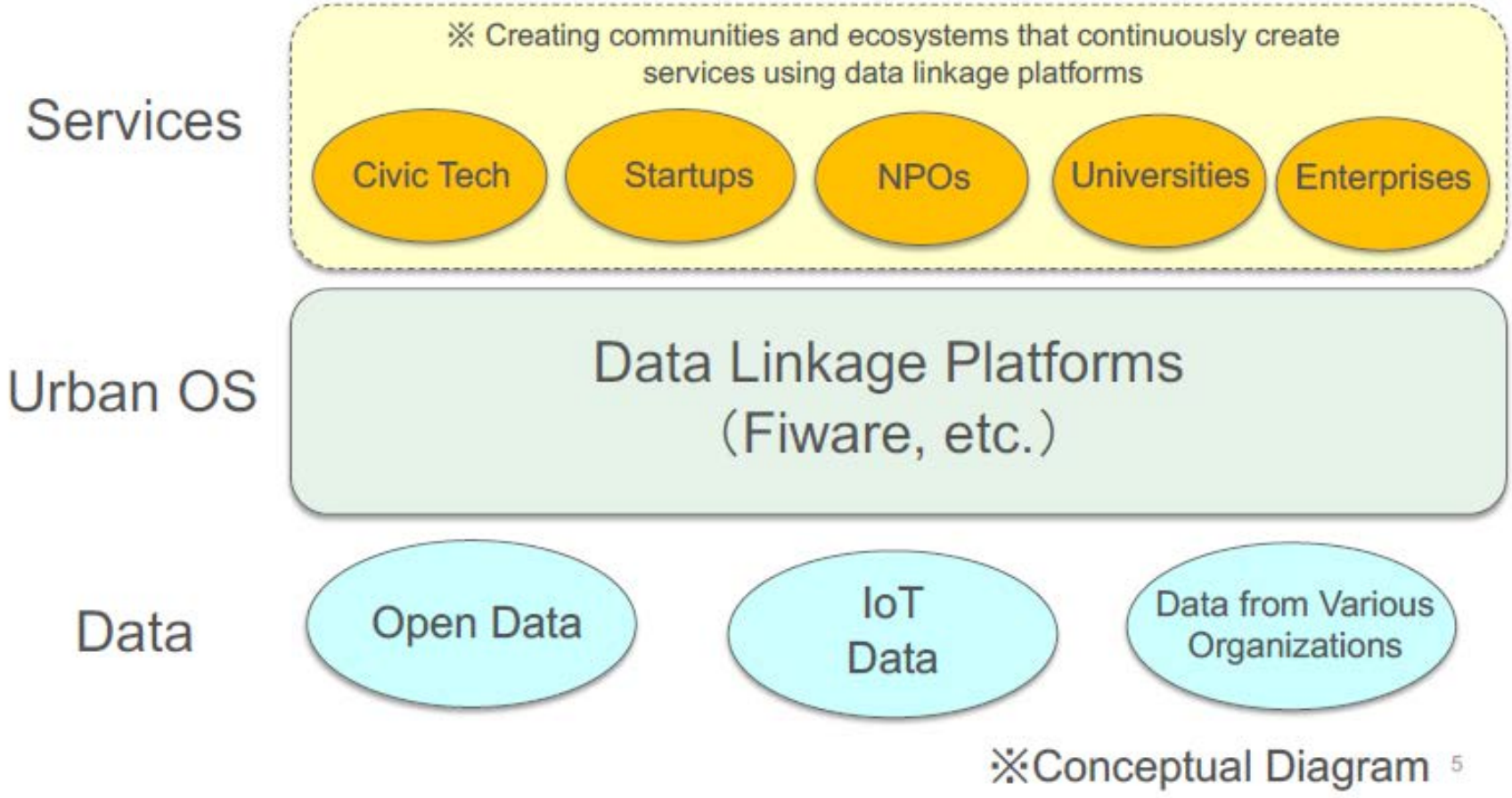
Make our City

Realizing well-being through community-centered urban development

4

Towards a Functioning Regional Data Linkage Platform

（1） Towards Creating Communities and Ecosystems



※Conceptual Diagram

Designing smart, resilient cities for all

RUGGEDISED

HAMAMATSU

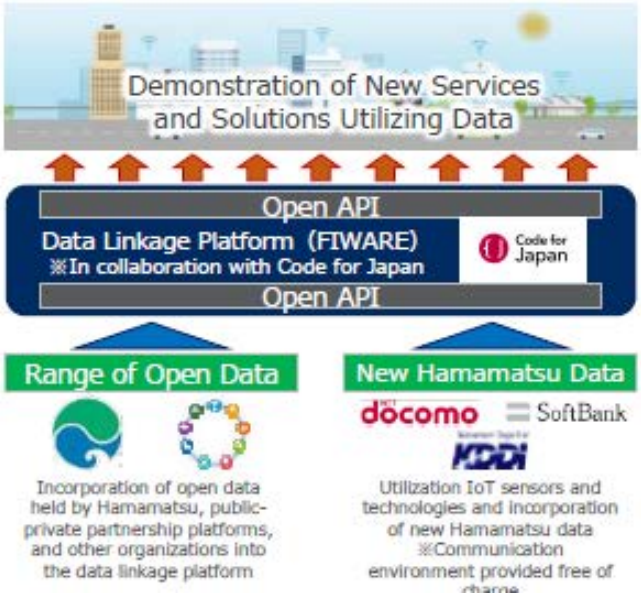
RUGGEDISED

Towards a Functioning Regional Data Linkage Platform

（2）Towards the Creation of Real Use Cases

- Hamamatsu ORI-Project -

- **Hamamatsu ORI-Project**
  (Hamamatsu Open Regional Innovation Project)
  Official name: Digital Smart City Hamamatsu Data Linkage Platform Proof of Concept Recruitment Project
- Creation of use cases using the data linkage platform as well as new applications and services



—— Selected Projects ——

- Seven of 13 projects submitted were selected

Theme	Proof of Concept Project Names
Smart Agriculture・Forestry	Operation support for use and application, maintenance, and disaster prevention inspection of logging roads using 3D point cloud data
Smart Agriculture・Forestry	Sixth industrialization project featuring the participation of citizens using food trucks
Well-being	D2D pilot study to simulate new coronavirus infections
Well-being	Recruitment of volunteers in times of disaster using town information sharing app
Well-being	Ascertainment of the true amount of plastic and other man-made waste transported to the sea (including Lake Hamana)
Well-being	Project to improve and visualize the city's level of happiness using AI
Other	Dokodemo Doer Project

ORI-Project Search

https://www.ori-project.hdsc.city/

Designing smart, resilient cities for all

CONTACT

Name: Yoichi TAKIMOTO

Mail: y-takimoto@hdsc.city

Stakeholders cooperation for Smart Mobility
an example from Umeå

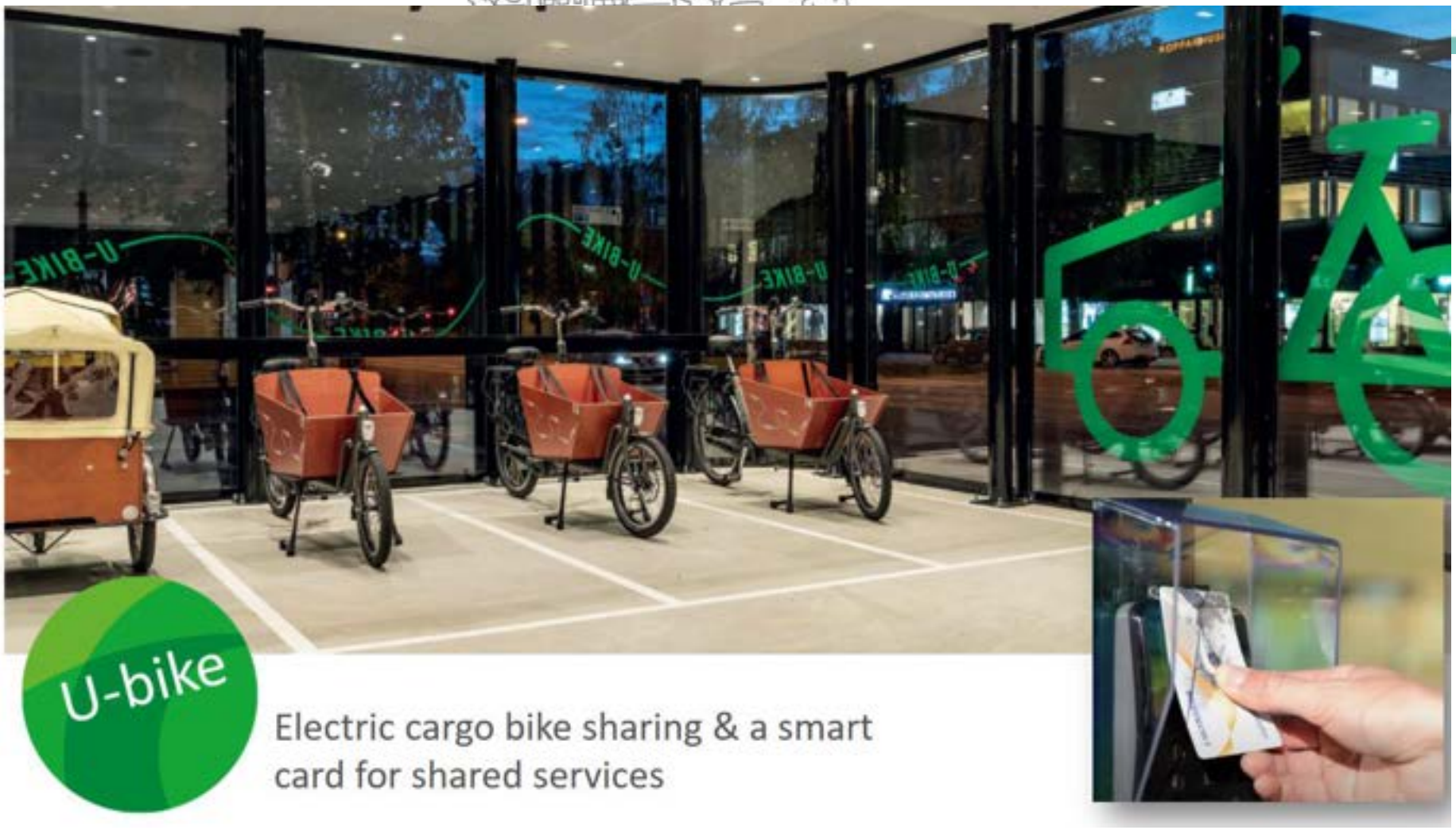
Five kilometer city – the dense city!

Smart mobility business model – "the offer";

Building permit is only possible if sustainable travel options are secured for the residents

Must secure a smart mobility-hub

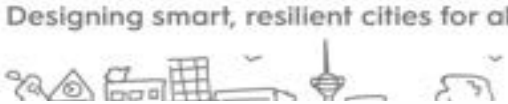
Public transport, electric car sharing & U-bike included in the rent


U-bike
Electric cargo bike sharing & a smart card for shared services

"99 times out of 100, U-bike is a better choice then a car"

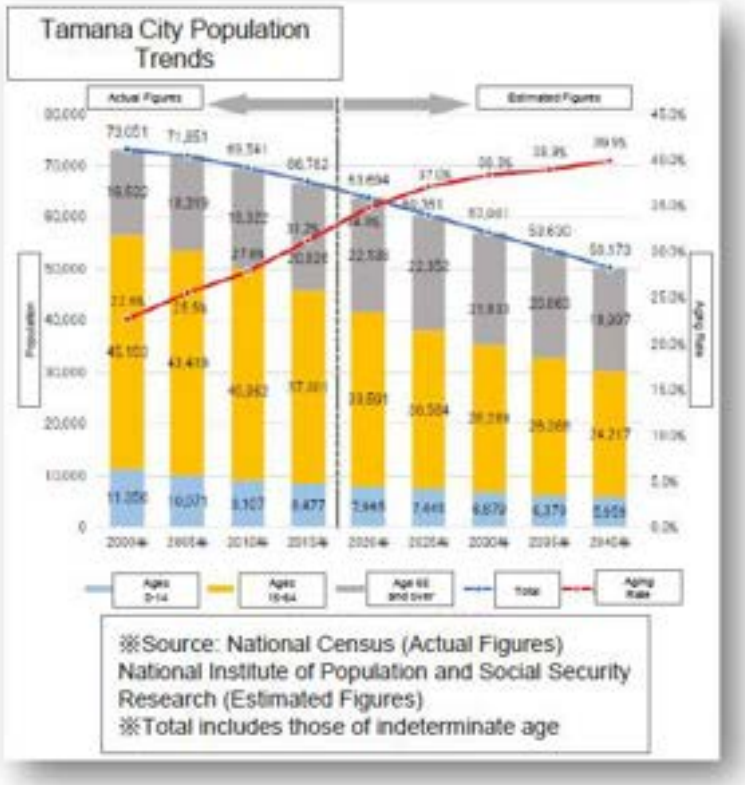
1. Excursions with the family
2. Weekly grocery shopping
3. Going to the recycle stations
4. Bringing the children to leisure activities
5. Bringing the children to pre-school

UMEÅ KOMMUN



Designing smart, resilient cities for all

Tamana City Facts and Figures



In 2040, the total population of the city is expected to be 50,173, with older persons making up approximately 40 percent of the population (39.9%). In short, two out of every five people will be 65 or older.

[End of August 2021]
Total population: 64,946
Male: 31,135
Female: 33,811
Households: 28,174
This represents a slightly slower decline than anticipated.

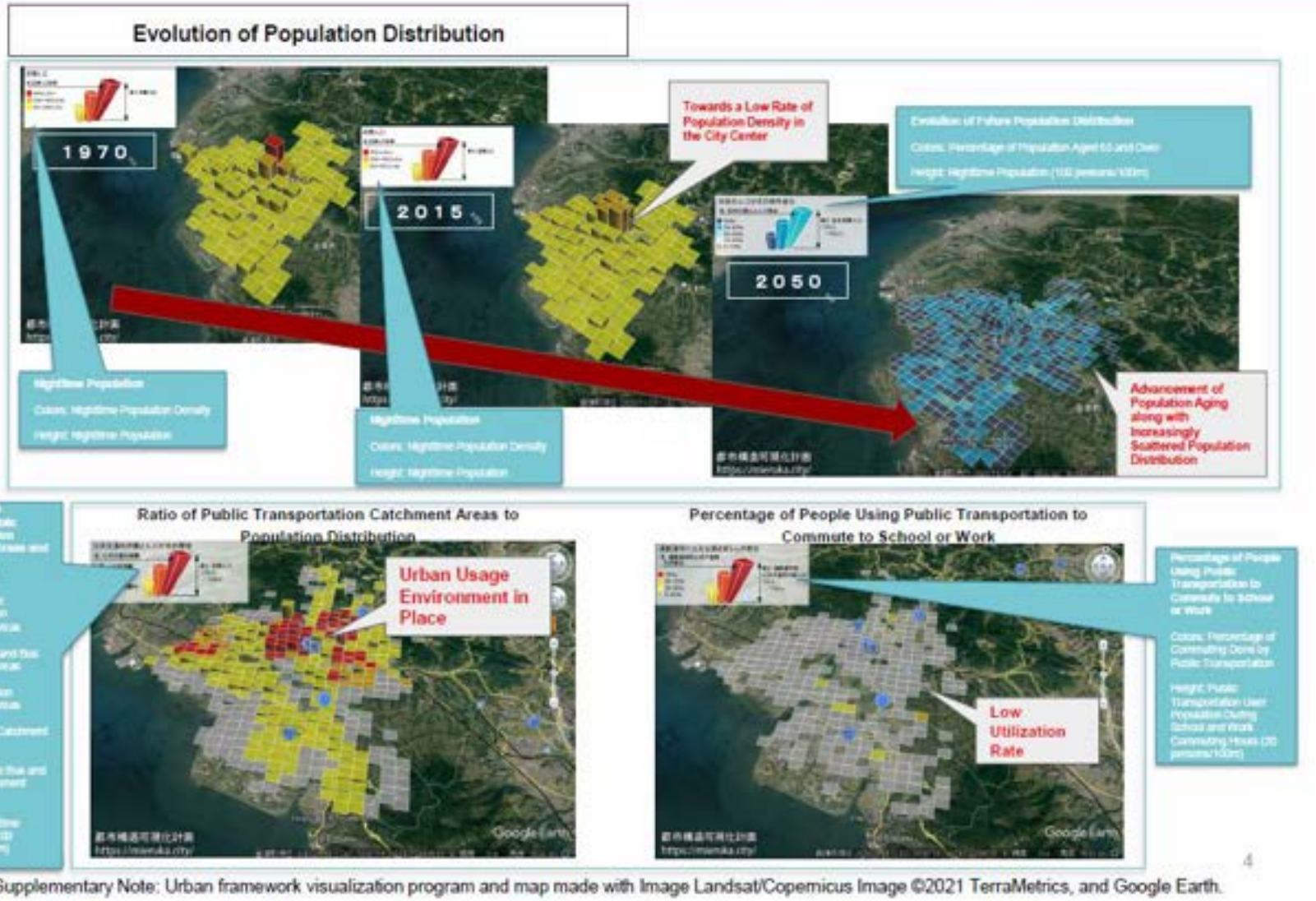
It is essential that older persons and others without access to their own vehicular transport have access to transportation services.

Recently, the number of older persons voluntarily surrendering their licenses has been rising.

3

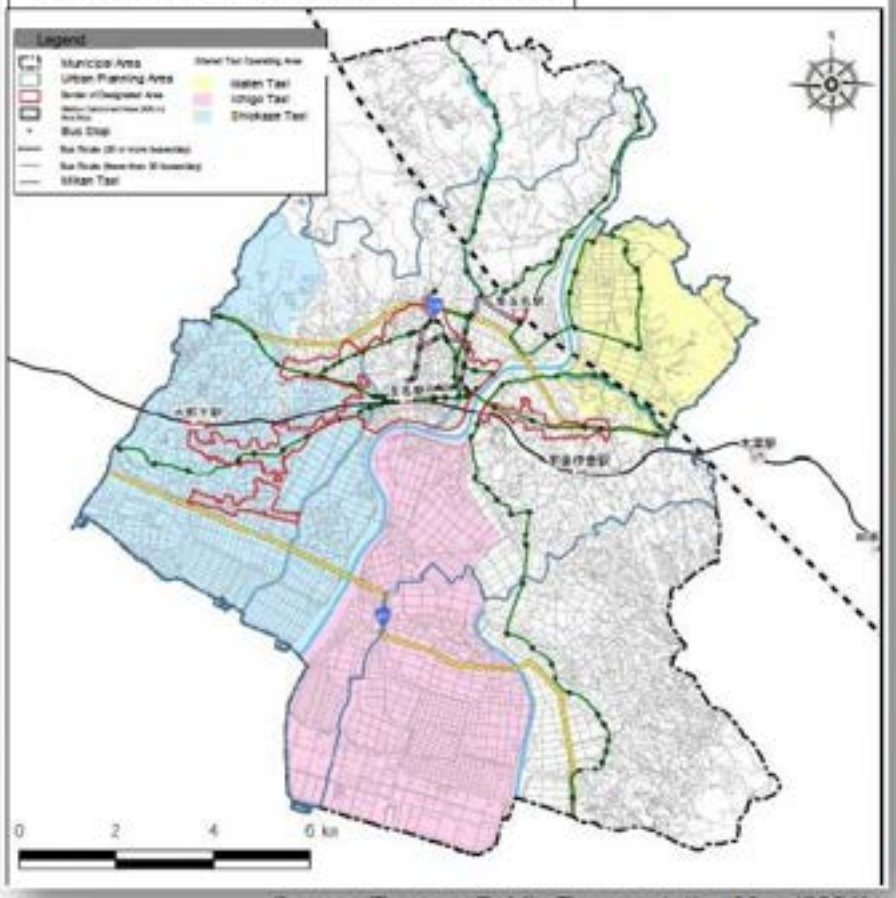
Designing smart, resilient cities for all

RUGGEDISED



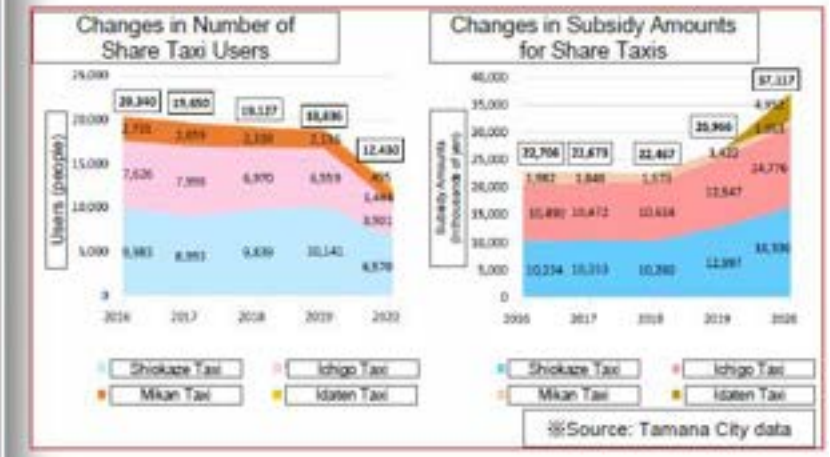
Designing smart, resilient cities for all

State of Public Transportation Operations

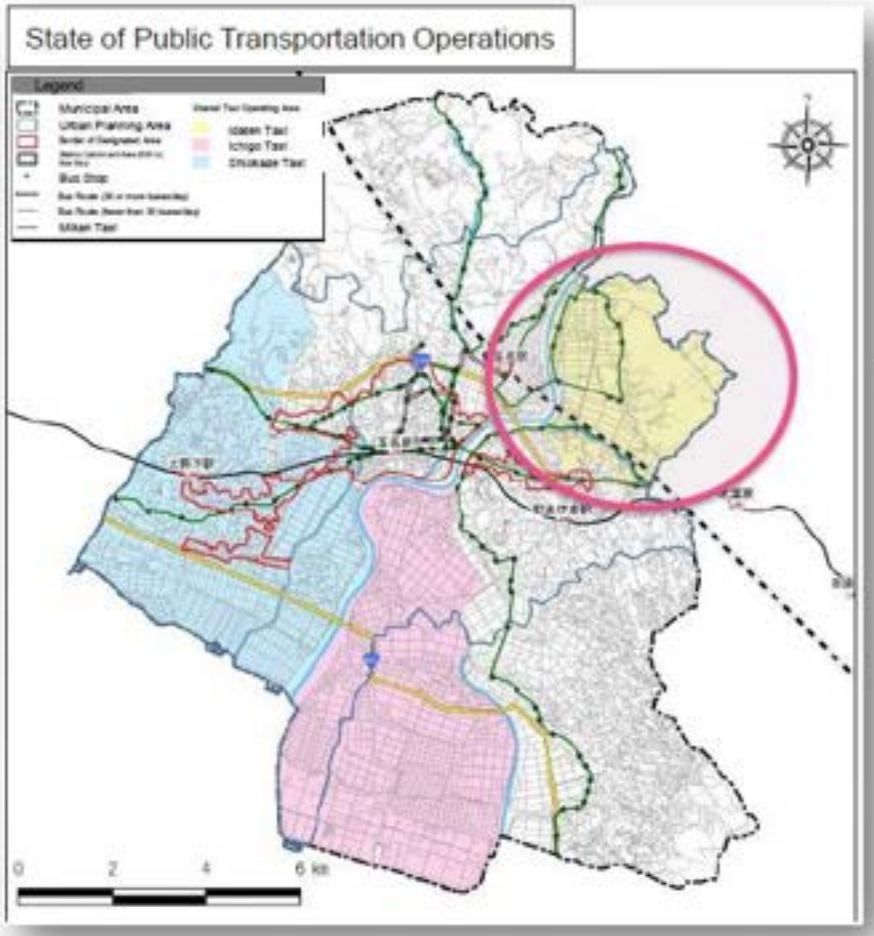


Source: Tamana Public Transportation Map (2021)

Changes in User Numbers and Subsidy Amounts



Designing smart, resilient cities for all



Source: Tamana Public Transportation Map (2021)

Demand-Responsive Transportation System (implementation in progress)

Citizens
(Diverse Consumers)

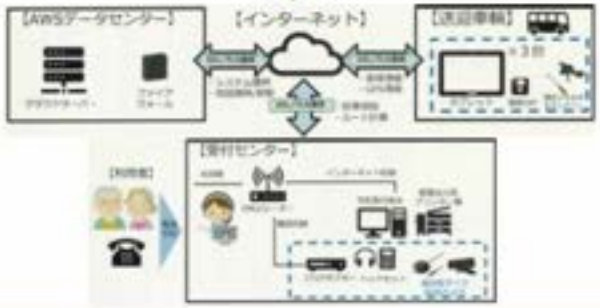
Improvement of quality of life by securing user-friendly transportation services, especially for older citizens

Tamana City

Improved resident satisfaction by expanding and optimizing services through the digitization of operating data and the analysis of results

Service Providers
(Taxi Companies)

Sharing of operational date with vehicles to ensure smooth reception, dispatch, and passenger support



ICT is used to optimize transportation services through the digitization of operational data.

6

Designing smart, resilient cities for all

Pre-implementation

Operators: reception decides route, provides instructions to drivers on paper (drivers required to return to the office each trip → inefficient)

Users: must book at least one hour before needed (early booking required → inconvenient for users)

Tamana City: monitors usage based on daily and monthly reports submitted by businesses (creates documents by inputting paper reports into computer system → inefficient)

Post-implementation

Tamana City: AI selects route and sends operating data to drivers (aggregate data can be extracted immediately → improved efficiency)

Drivers: receive operating data from the city on an on-board tablet device (drivers not required to return to the office → improved efficiency)

Users: can book up to 30 minutes before needed (extended reservation time → increased convenience)

※Implementation cost is approximately 3,500,000 yen (€27.259) (government subsidies cover 1/3 of eligible costs, which equals approximately 900,000 yen(€7.009)); operating expenses equal 800,000 yen(€6.230) per year (excluding cost of labor for operators)

7

Designing smart, resilient cities for all

Operational Challenges

✓ Tamana City: As the system is being introduced in areas with low usage rates to start, no major issues have arisen.
※From April 2022, the system will operate in an expanded area.
☞Issues may arise in future, for example, an increase in cost, user demands, etc.

✓Operators: To allow drivers to properly prepare, reservations for the following day and onwards should be reviewable in advance.
☞So that future reservations are not mistaken for same-day reservations, it is currently not possible to check.
→ In the evening, drivers are informed of the next day's reservations by phone.

✓Users: User requests are increasing.
☞ Requests for immediate service rather than service within the bounds of the 30-minute cut-off time are increasing.

Outlook

✓Booking with a smartphone app (in cooperation with each public transportation company) ⇒ Local version of MaaS
Average age of current users is 82 → digital divide is an issue

✓Shift from gas-powered to EVs in pursuit of net zero
Use of renewable energy as fuel for EVs → cost is an issue

✓Overall optimization through efficient combination of public transportation
⇒ sustainable operation
No council for smart city initiatives at the local level

8

Designing smart, resilient cities for all

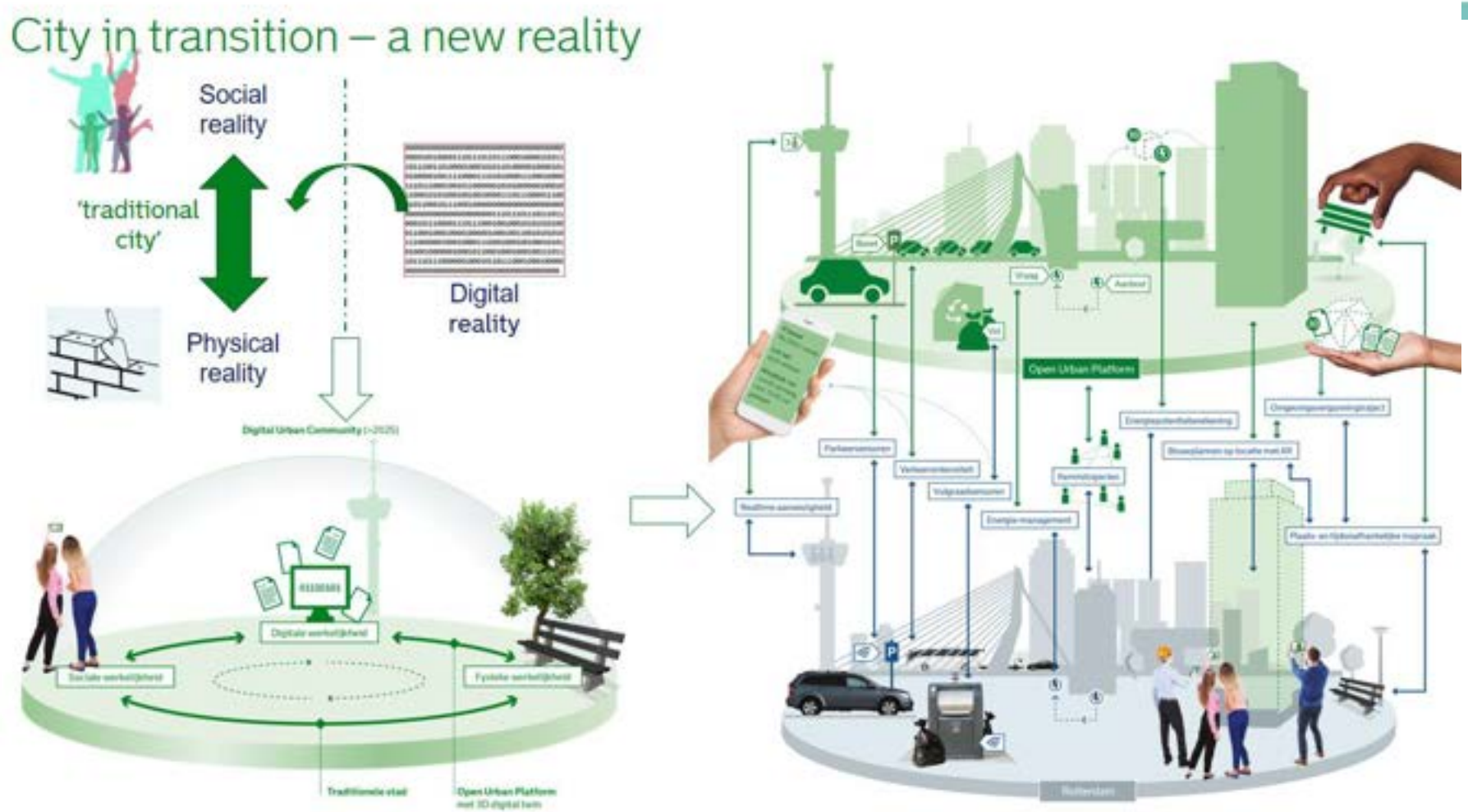
CONTACT

Name: Nobuhiro Yasuda

Mail: toshi@city.tamana.lg.jp

ANNEX III. Material from the Online Workshop #2

Rotterdam's presentation


City in transition – a new reality
Social reality
'traditional city'
Physical reality
Digital reality
Digital Urban Community (>2025)
Traditionele stad
Open Urban Platform met 3D digital twin
Open Urban Platform

The Digital Twin: a realtime representation of the (physical) reality

3D description of the physical reality

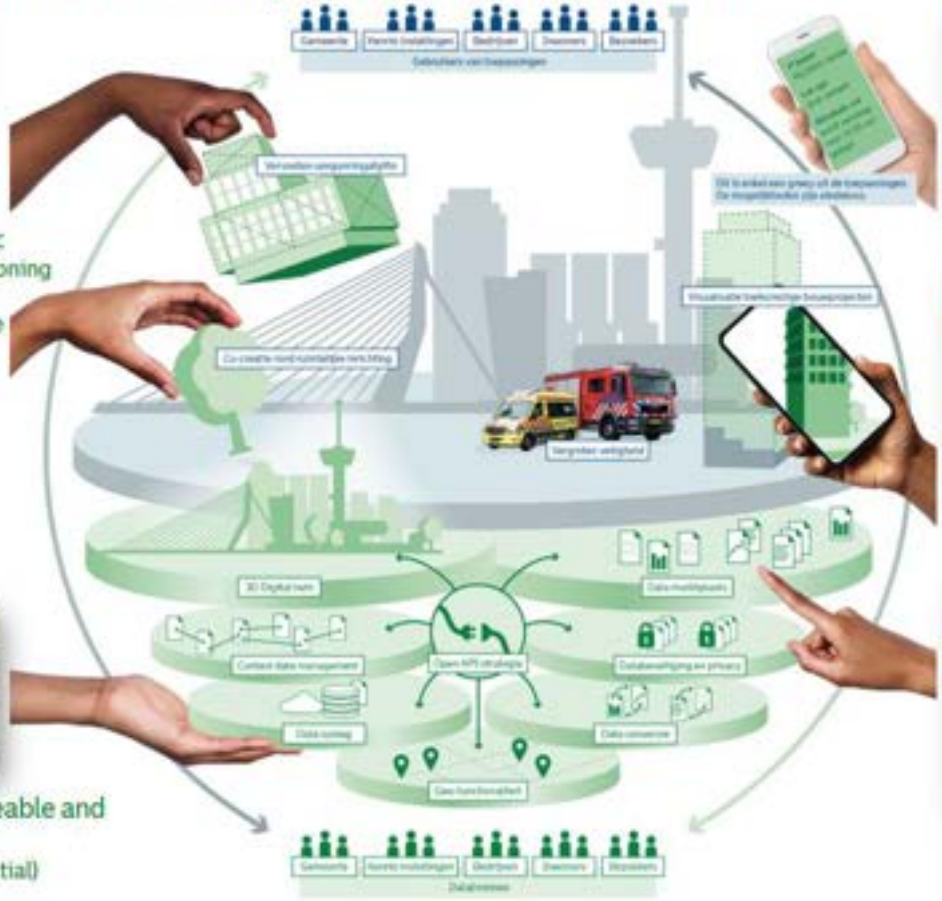
+

Dynamic data on how the city works

The OUP: a basis for new applications & services

Environment law:
- Speed up provisioning of permits
- Co-creation in the digital city

DT Sustainable & Generic, scaleable and manageable datasources
(energysaving potentials, solarpotential)

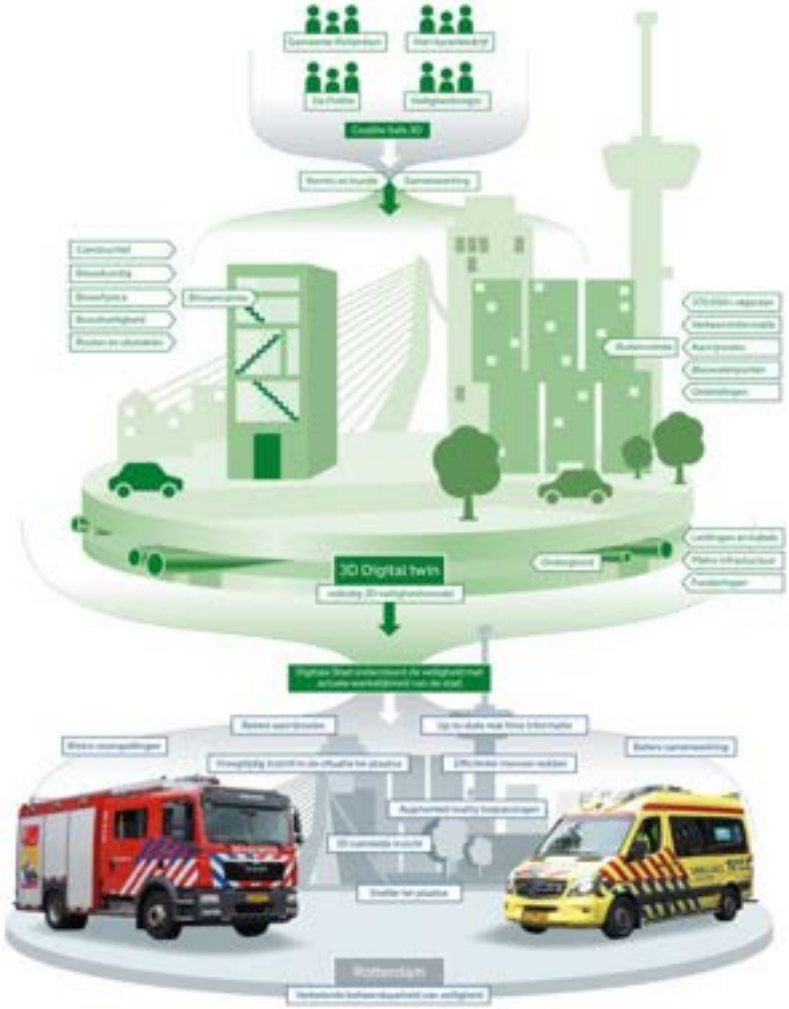


SAFE Rotterdam 3D

New built plans app

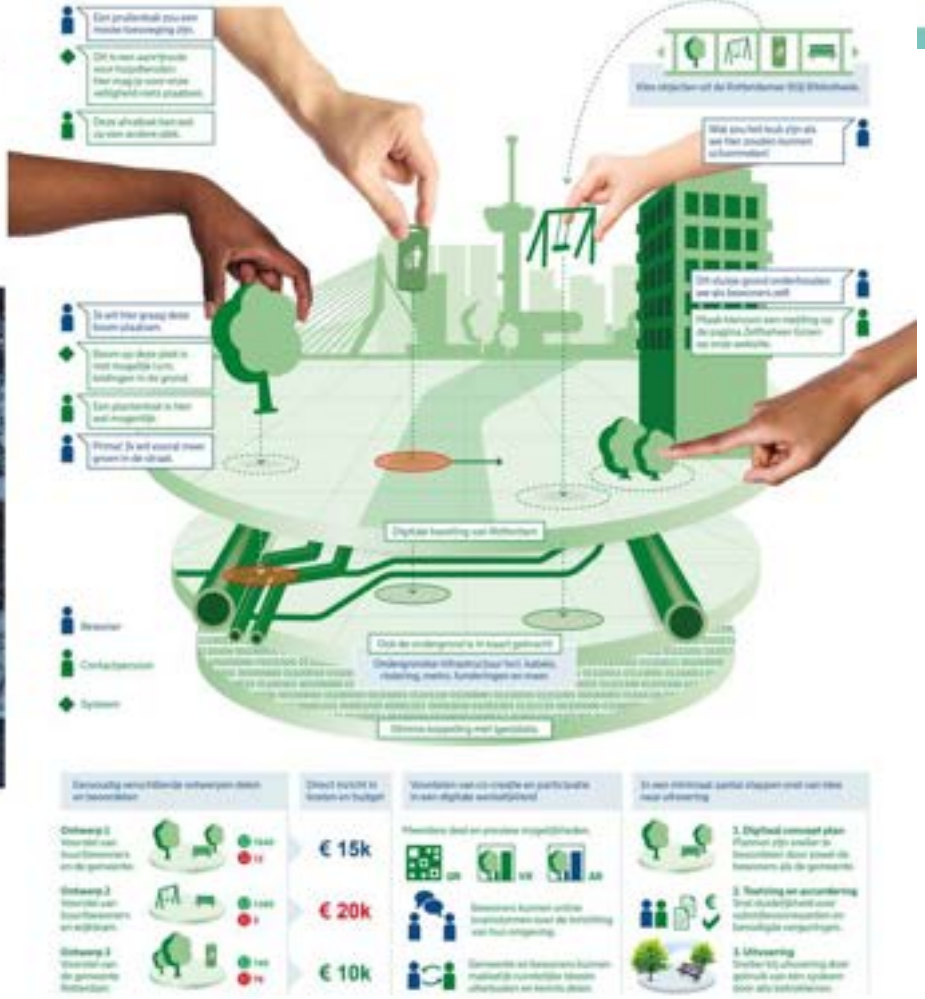
Regional collaboration with Den Haag en prov. South Holland

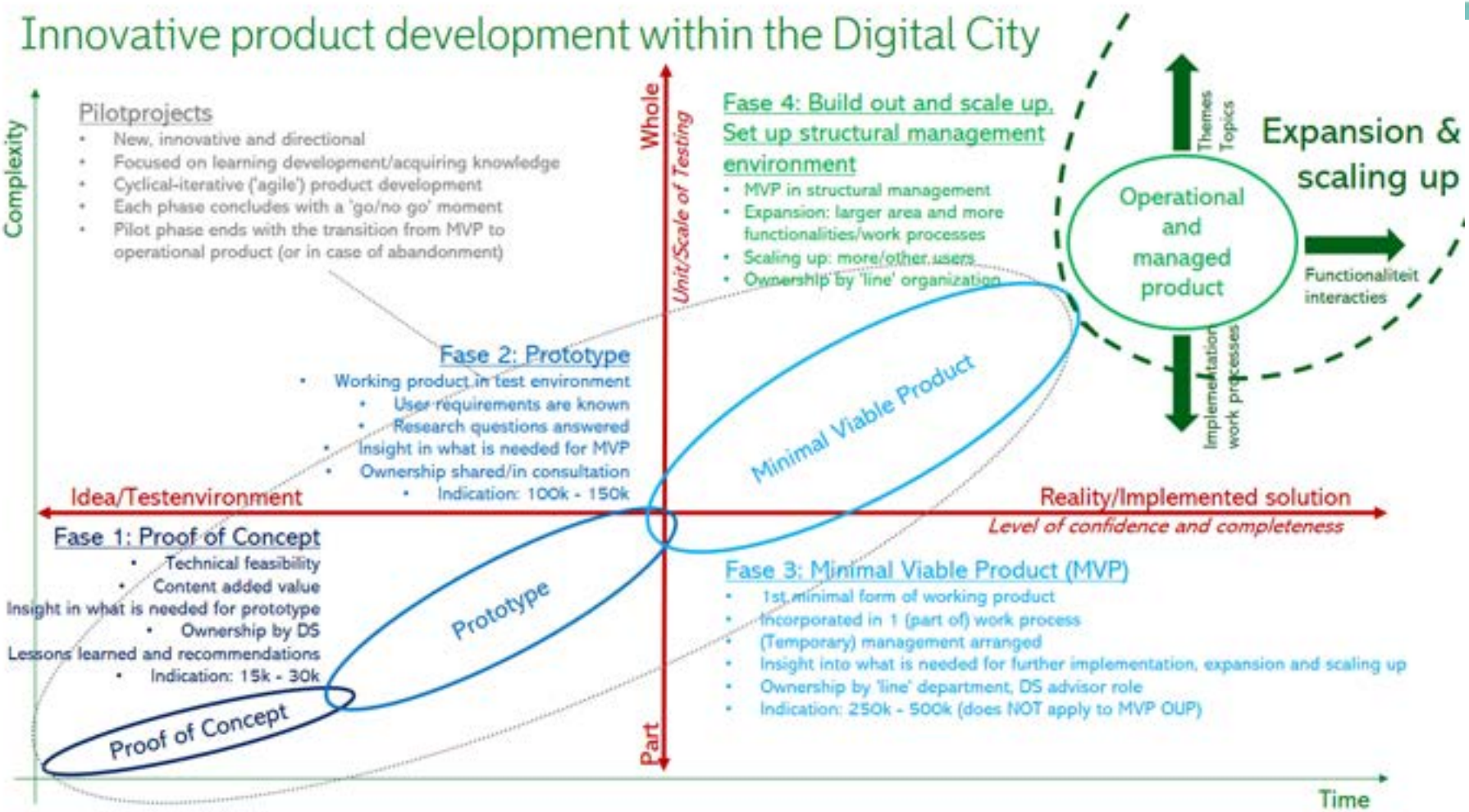
Pilot SAFE 3D Rotterdam



Pilot Building Permit check service

Pilot Co-creation in the Digital City




Innovative product development within the Digital City
Complexity
Pilotprojects
New, innovative and directional
Focused on learning development/acquiring knowledge
Cyclical-iterative ('agile') product development
Each phase concludes with a 'go/no go' moment
Pilot phase ends with the transition from MVP to operational product (or in case of abandonment)
Whole
Unit/Scale of Testing
Part
Fase 4: Build out and scale up, Set up structural management environment
MVP in structural management
Expansion: larger area and more functionalities/work processes
Scaling up: more/other users
Ownership by 'line' organization
Themes
Topics
Expansion & scaling up
Operational and managed product
Functionaliteit
interacties
Implementation work processes
Fase 2: Prototype
Working product in test environment
User requirements are known
Research questions answered
Insight in what is needed for MVP
Ownership shared/in consultation
Indication: 100k - 150k
Minimal Viable Product
Idea/Testenvironment
Reality/Implemented solution
Level of confidence and completeness
Fase 1: Proof of Concept
Technical feasibility
Content added value
Insight in what is needed for prototype
Ownership by DS
Lessons learned and recommendations
Indication: 15k - 30k
Prototype
Proof of Concept
Fase 3: Minimal Viable Product (MVP)
1st minimal form of working product
Incorporated in 1 (part of) work process
(Temporary) management arranged
Insight into what is needed for further implementation, expansion and scaling up
Ownership by 'line' department, DS advisor role
Indication: 250k - 500k (does NOT apply to MVP OUP)
Time

Finance the development of the OUP with DT

Funding 'underlying' data sources (including 3D city model) and development of new applications/services are not included.

Costs development OUP 1st and 2nd test phase (development PoC and prototype):

2016-2021:
2M - 2.5M (of which approx 25% covered by external grants (including EU projects ESPRESSO & Ruggedised))

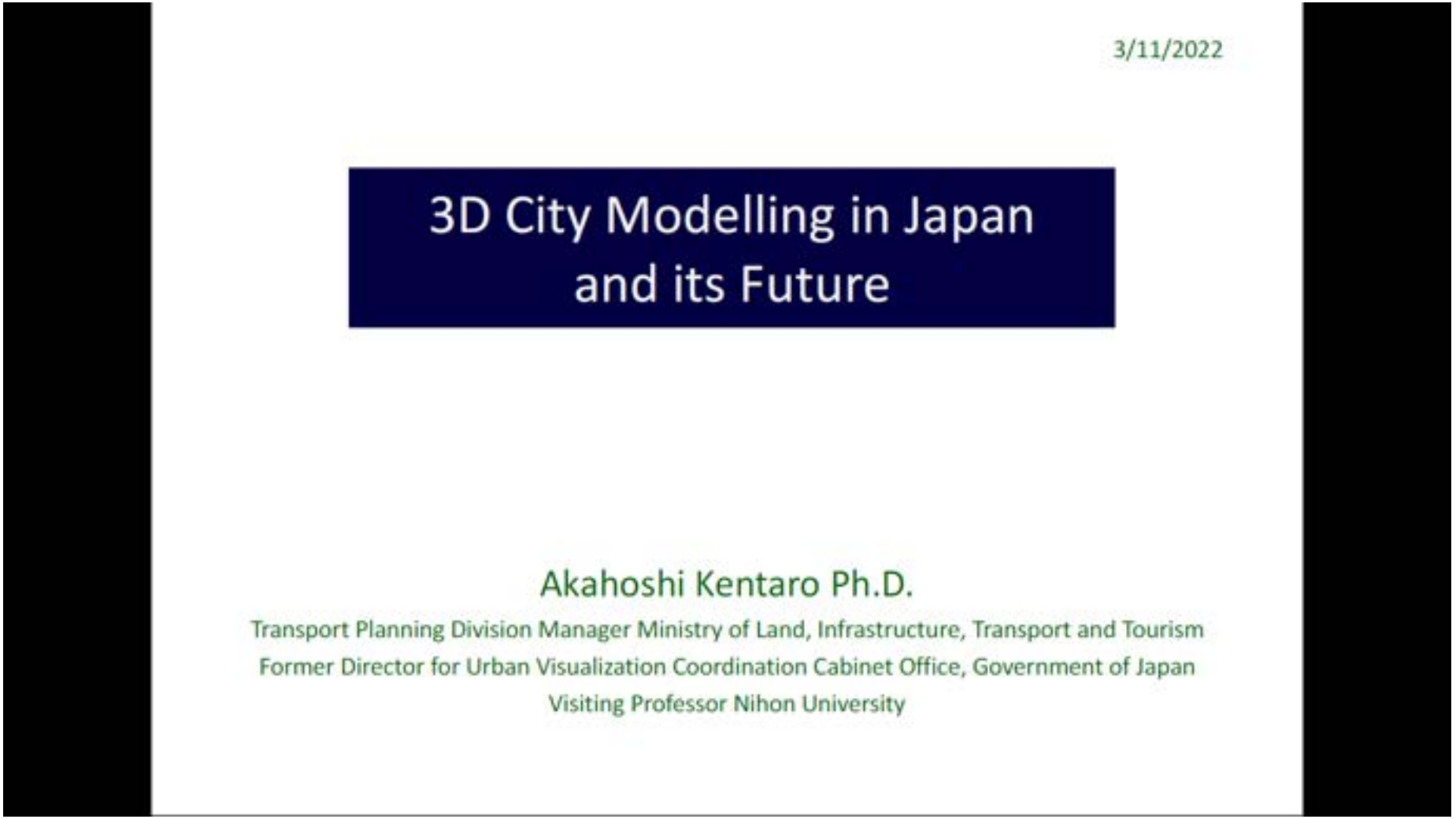
2022-2024:
1.5M process support costs
0.8M investment costs
1.5M - 3M contribution from market parties

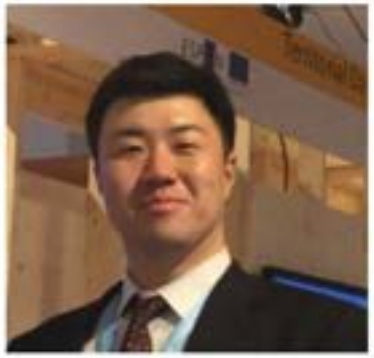
Operating costs: t.b.d.. (for the account of market parties)
Further development costs OUP (from DT to DUC/Digital Triple): t.b.d.
User costs for municipality: t.b.d.

DigitaleStad

Gemeente Rotterdam

MLIT's presentation





Akahoshi Kentaro

Director-General, Planning Office, Transport Policy Division, Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
Former Urban Visualization Coordinator, Cabinet Office
Former Planning Specialist, Urban Policy Division, City Bureau, Ministry of Land, Infrastructure, Transport and Tourism
Visiting Professor, Nihon University
Part-time Lecturer, Kyushu University
Super City Technical Investigation Committee Member, Cabinet Office
Etc.

1998 Joined the Ministry of Land, Infrastructure and Transport and Tourism
Since then, has worked in the field of national and municipal urban policy

2017 PhD (Social Engineering)
Information Technology Engineer (IT Strategist)
Information Technology Engineer (Project Manager)
Professional Engineer (Engineering Management)
Professional Engineer (Civil Engineering: Railway Engineering)
Professional Engineer (Civil Engineering: Urban and Regional Planning)
Level 1 Color Coordinator (Environmental Colors)

City GML (i-UR)

ISPRS Article: Applying CityGML Urban Planning

I-URBAN REVITALIZATION: CONCEPTUAL MODELING, IMPLEMENTATION, AND VISUALIZATION TOWARDS SUSTAINABLE URBAN PLANNING USING CITYGML

https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/V-4-2020/179/2020/

OGC Recommendations: Applying CityGML Urban Planning

Open Geospatial Consortium

CityGML Urban Planning ADE for i-Urban Revitalization

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3

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https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/V-4-2020/179/2020/

OGC Recommendations: Applying CityGML Urban Planning

Open Geospatial Consortium

CityGML Urban Planning ADE for i-Urban Revitalization

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3

Introduction


3D City Model (Lille)


3D City Model (Lille)

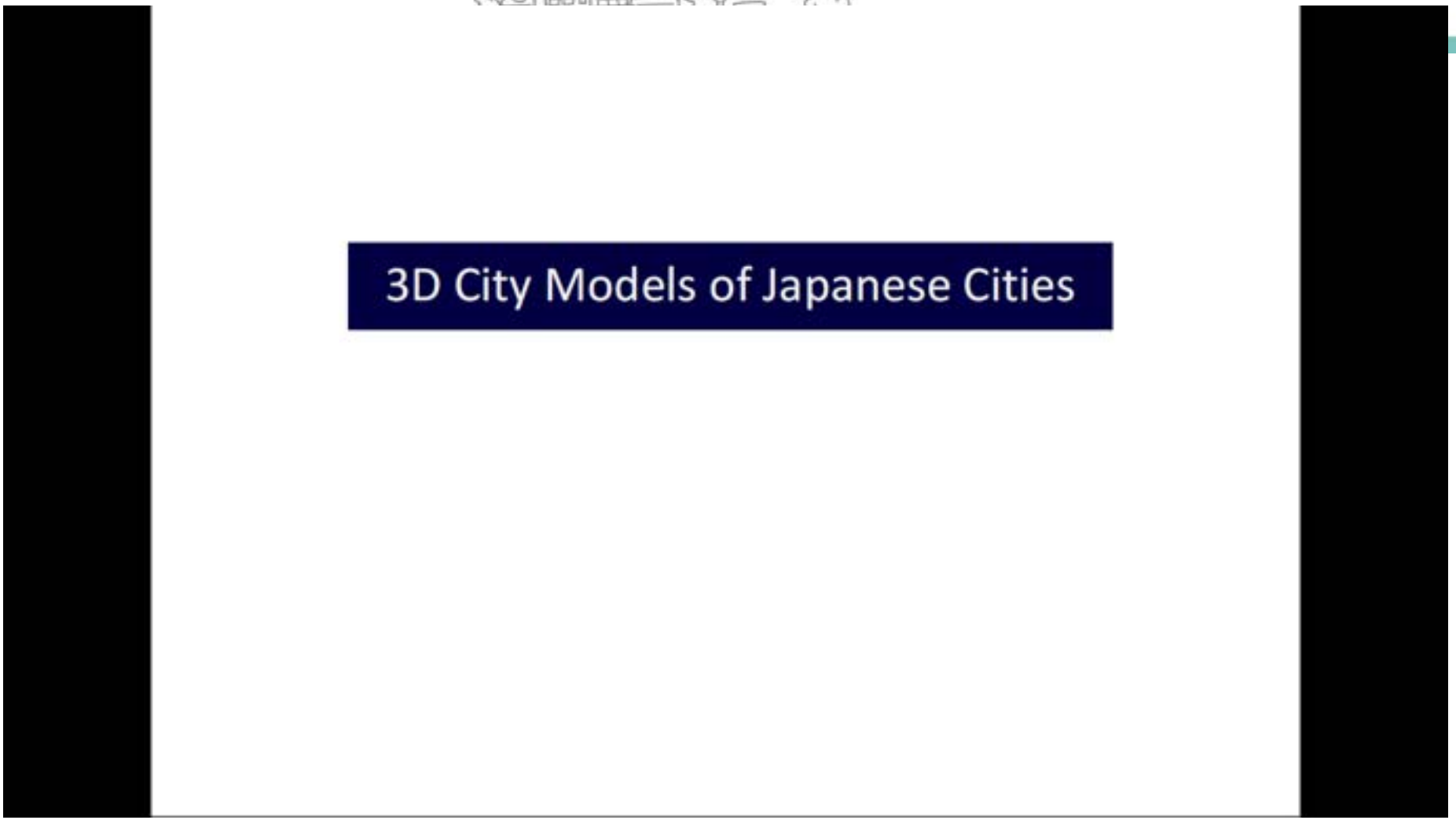

3D City Model (Lille)
BERGUES


3D City Model (Zurich)
ZÜRICHS STADTMODELL
Julia Sulzer, Leiterin Architektur + Stadtraum


3D City Model (Zurich)

Model of the Redevelopment of Germany's Potsdamer Platz (Berlin)

3D City Model (Helsinki)


3D City Models of Japanese Cities

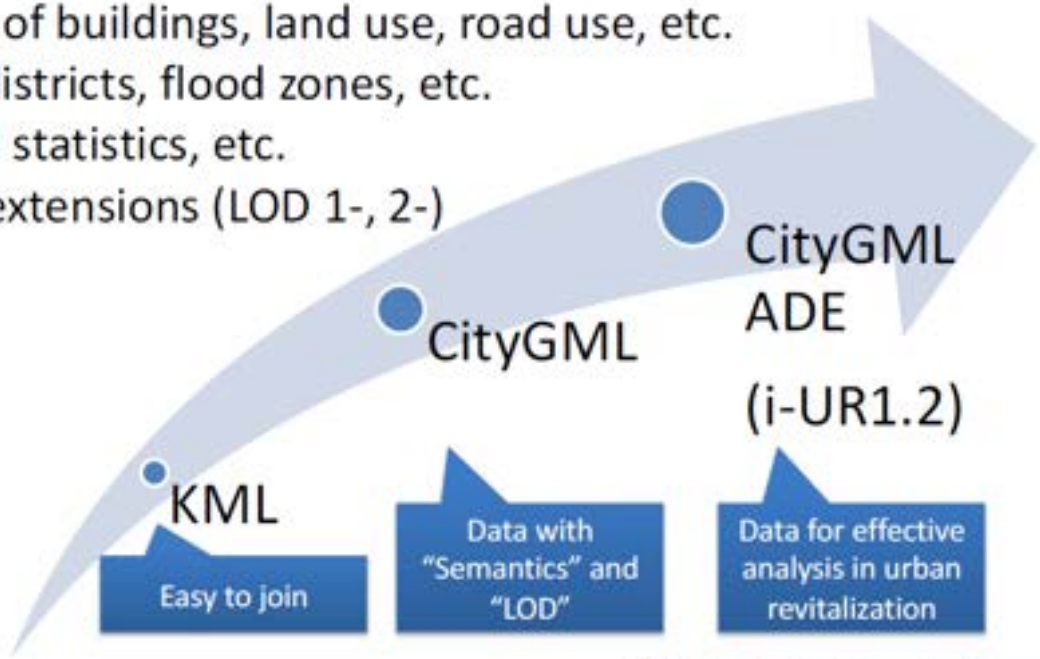

3D City Models of Japanese Cities (Fukui and Kashiwa)
Kashiwa
2009–
AQUOS
Fukui 2012–


City GML
Reality Mesh
Semantic CityGML
Semantics
Geometry
∅
Semantics
Geometry

City GML (i-UR)

Implementing CityGML for Urban Planning

- State of buildings, land use, road use, etc.
- Use districts, flood zones, etc.
- Mesh statistics, etc.
- LOD extensions (LOD 1-, 2-)



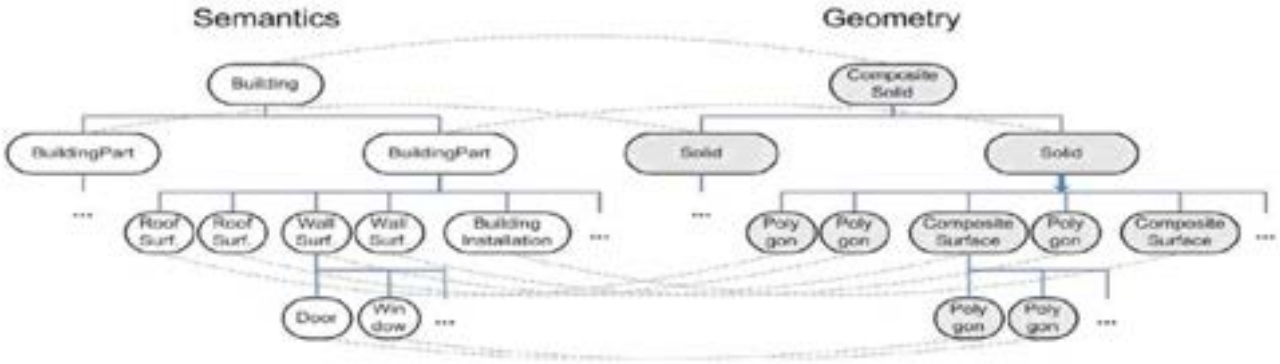
ADE: Application Domain Extension


i-Urban Regeneration (CityGML+i-UR)


i-Urban Exchange Conference 2020

City GML (i-UR)

- Advantage 1: Semantic
  - Structure of XML and ADE
    - = Can be defined as anything and is thus suitable for stock
    - MS Office and XML (Change the extension to zip and unzip the file.)
    - XML (GML) is also the standard of the Geospatial Information Authority
  - Can clearly see **what** is inputted, and **where**
    - = Can be easily converted into other formats and is thus suitable for stock

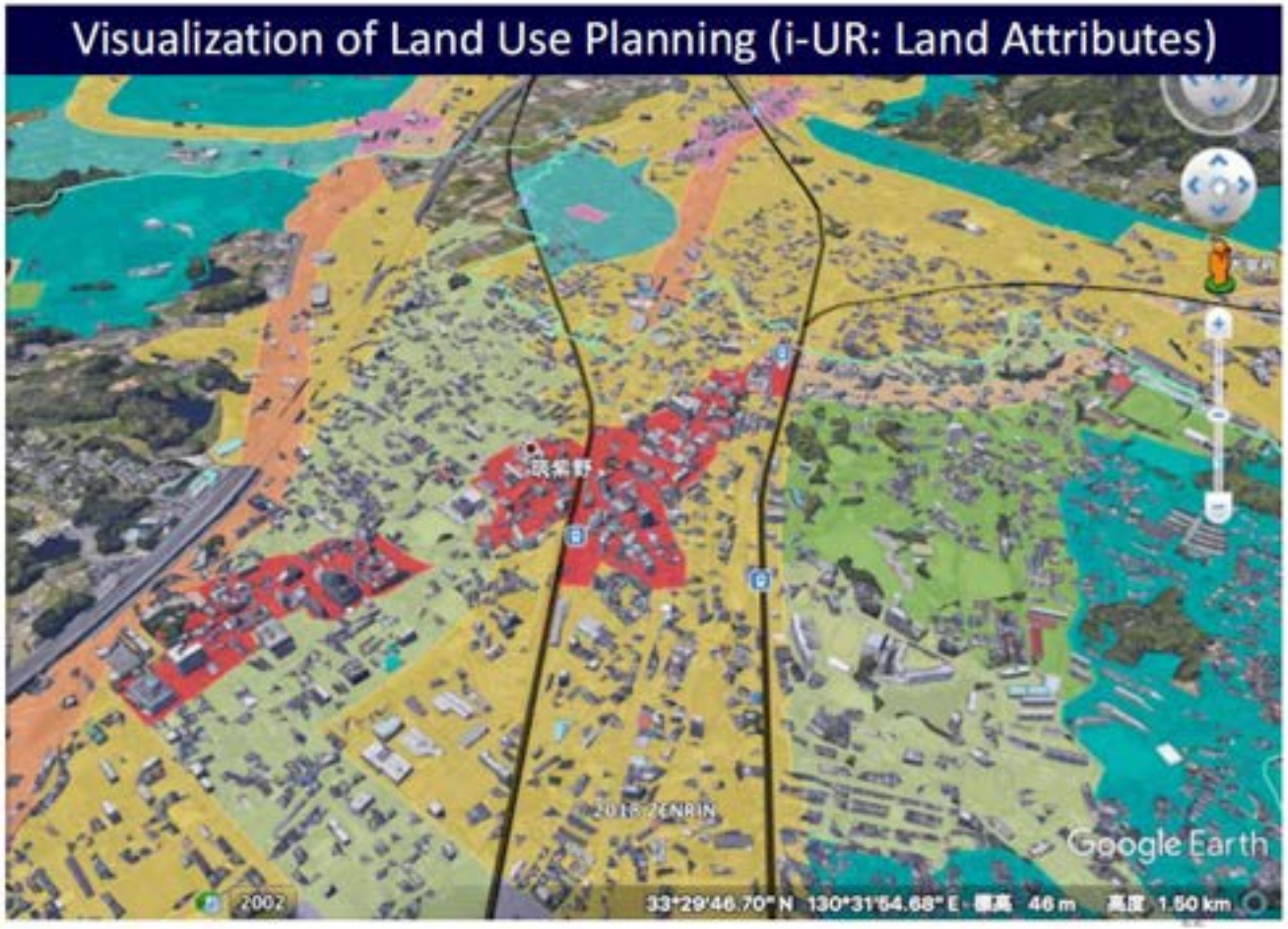


City GML (i-UR)

- Advantage 2 : LOD
  - Data of different resolution and accuracy can coexist, making it suitable for stock

City GML (i-UR)

- Advantage 3 : International Standard
  - Open standards developed by OGC
  - Free from proprietary lock-in and thus suitable for stock


Visualization of Land Use Planning (i-UR: Land Attributes)
Google Earth
2002
33°29'46.70" N 130°31'54.68" E
46 m
1.50 km

Visualization of Land Use Planning (i-UR: Land Attributes)

Location Optimization Plan

- Areas to be included in residential induction zones: areas to be added
- Areas not to be included in residential induction zones: areas to be withdrawn

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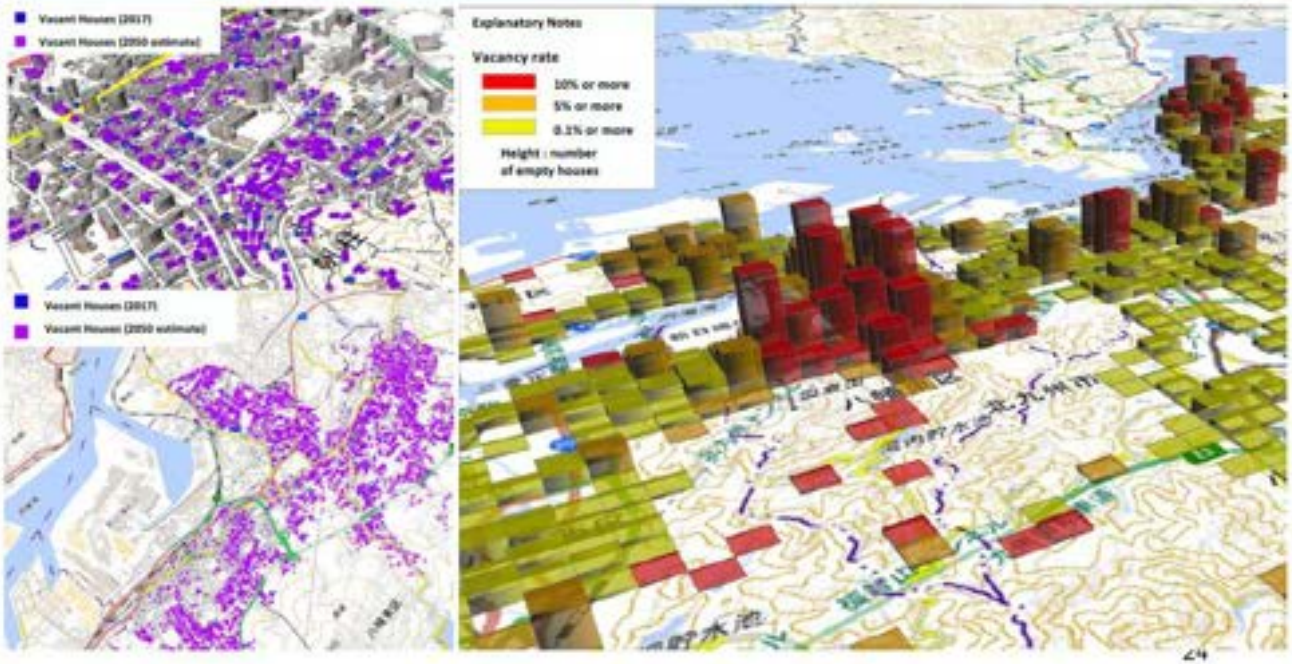
Visualization through Aggregation of Detailed Data (i-UR: LOD-)

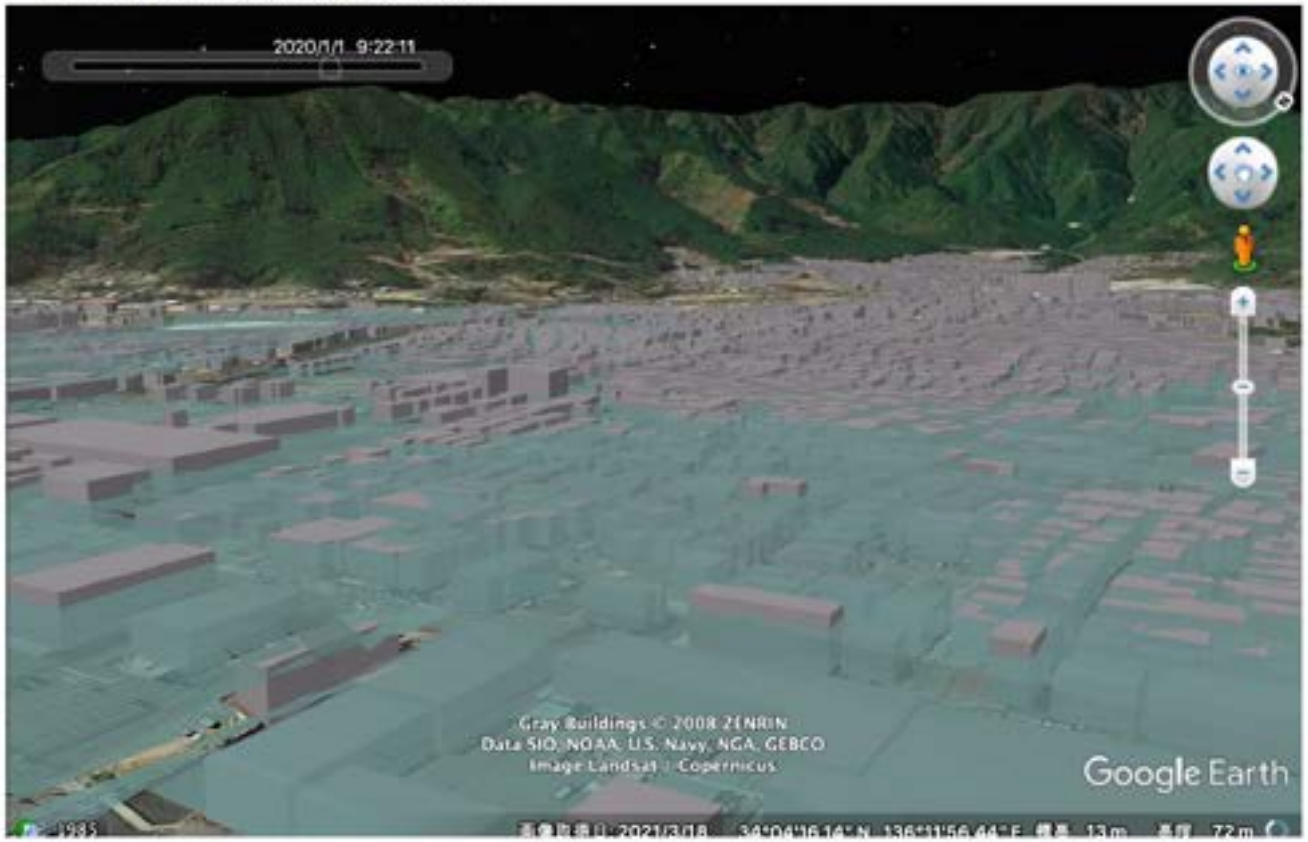
Visualization of Vacant Houses

- ◆Estimate future distribution of vacant houses based on the results of vacant house surveys
- ◆Tally and visualize distribution on a map and formulate appropriate countermeasures based on the characteristics of the area



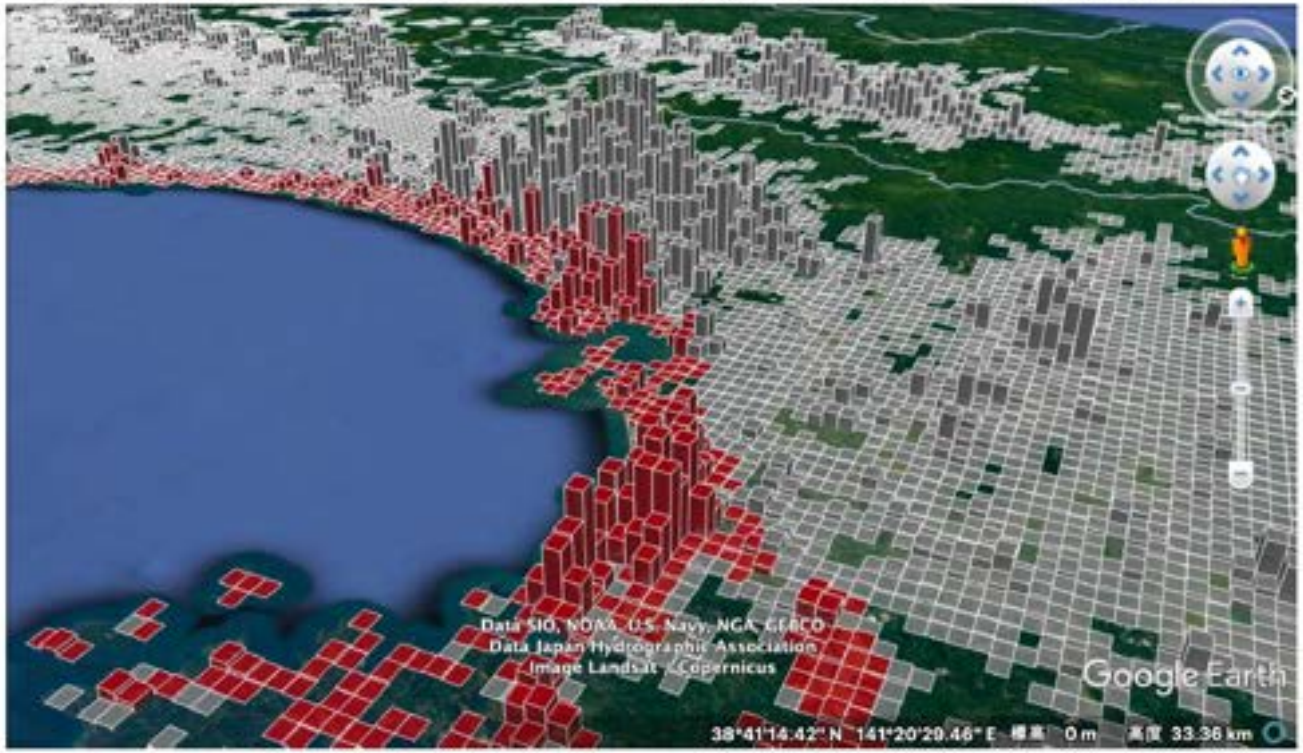
Visualizing Disaster Prevention

Visualization of Tsunami Damage



Visualizing Disaster Prevention

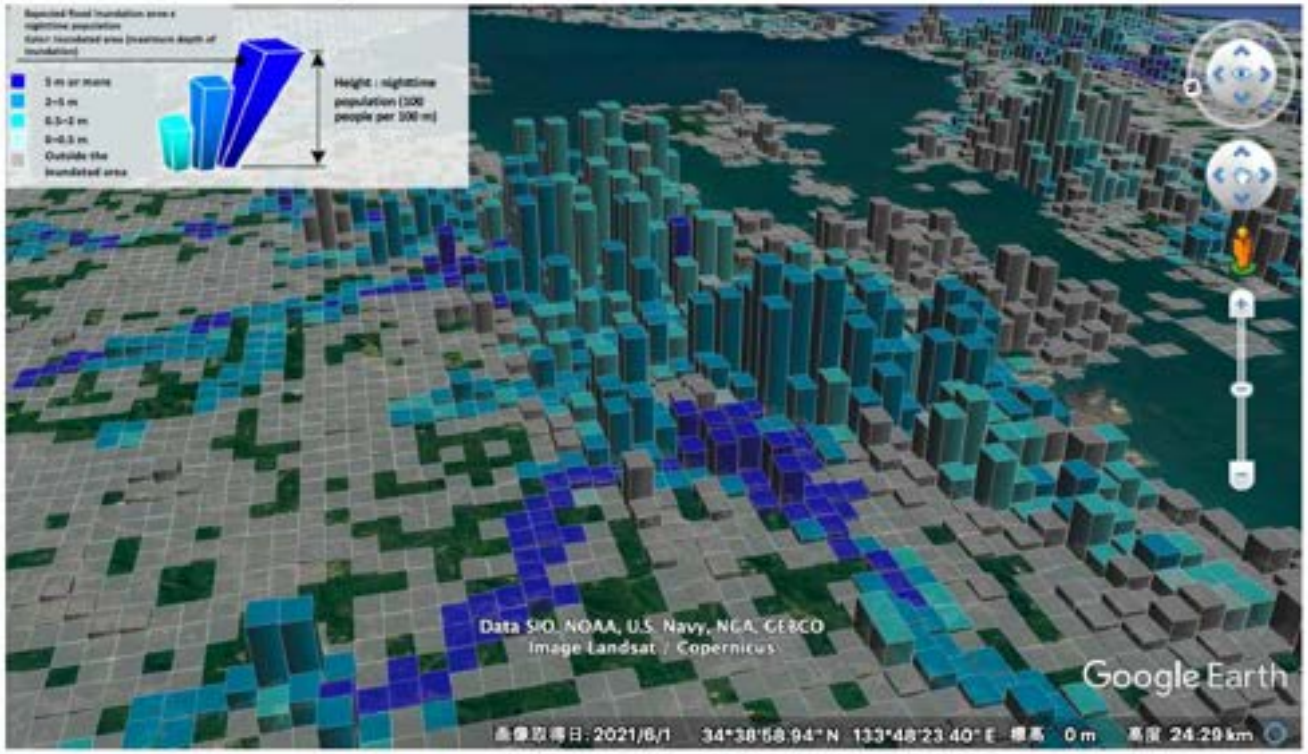
Relationship between the Great East Japan Earthquake and Tsunami and Urban Structures



https://v4.mieruka.city/tag/disaster/

Visualizing Disaster Prevention

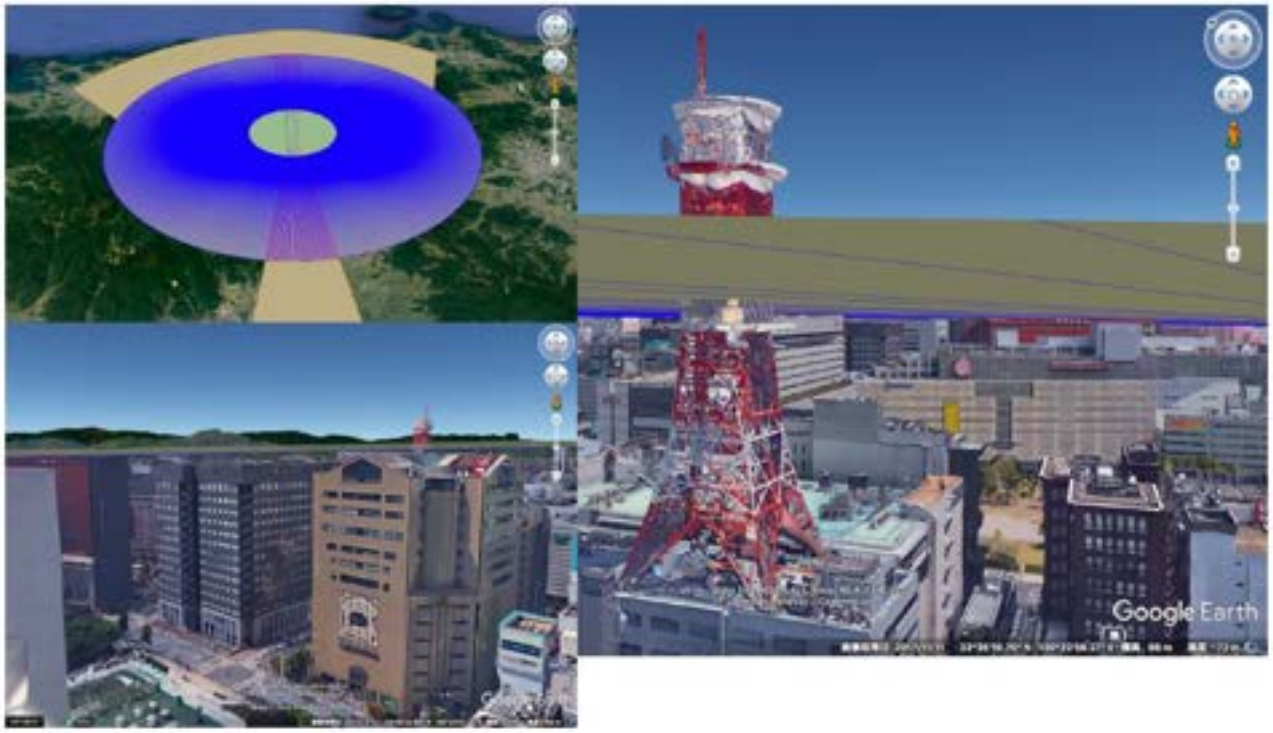
Relationship between Expected Flood Inundation Zones and Resident Population



https://v4.mieruka.city/tag/disaster/

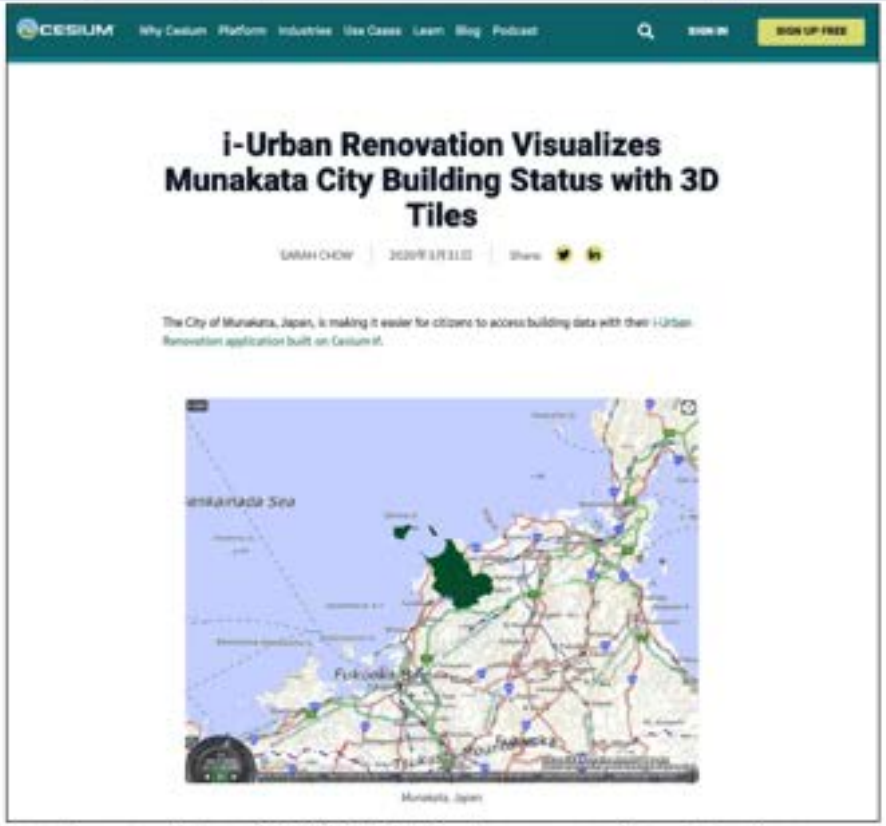
Height Restrictions around Airports

Visualizing the Height Limits of the Civil Aviation Act

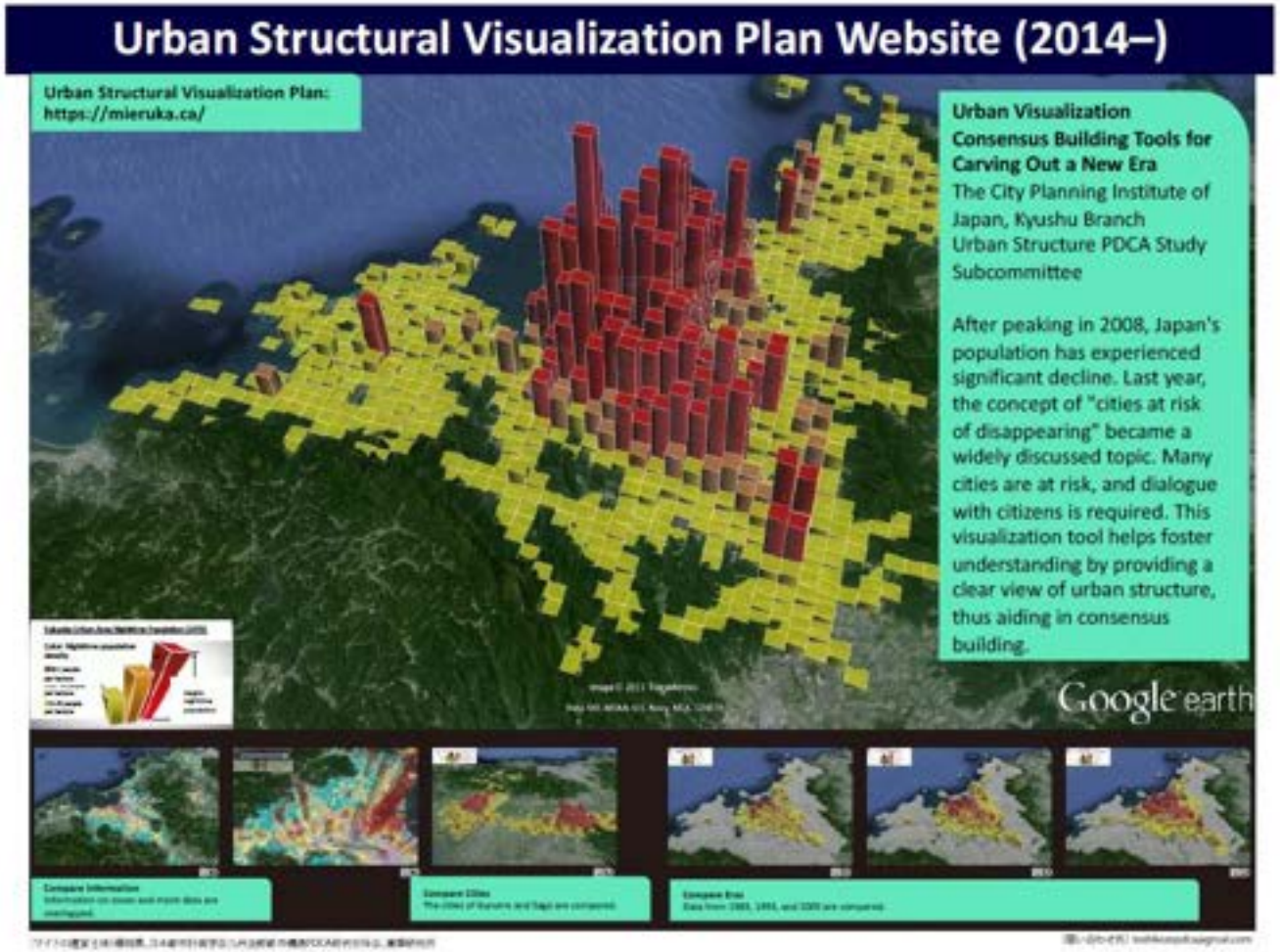


Example of CityGML Application and Publication (Munakata, 2019–)

Example of CityGML Application and Publication (Munakata, 2019–)



https://cesium.com/blog/2020/03/31/i-urban-renovation-visualizes-munakata/

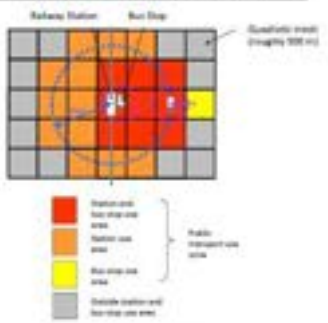

Urban Structural Visualization Plan Website (2014–)
Urban Structural Visualization Plan:
https://mieruka.ca/
Urban Visualization Consensus Building Tools for Carving Out a New Era
The City Planning Institute of Japan, Kyushu Branch
Urban Structure PDCA Study Subcommittee
After peaking in 2008, Japan's population has experienced significant decline. Last year, the concept of "cities at risk of disappearing" became a widely discussed topic. Many cities are at risk, and dialogue with citizens is required. This visualization tool helps foster understanding by providing a clear view of urban structure, thus aiding in consensus building.
Google earth

Visualization of Traffic and Urban Structure

◆Public transport use zones are represented by color and regional data by height.

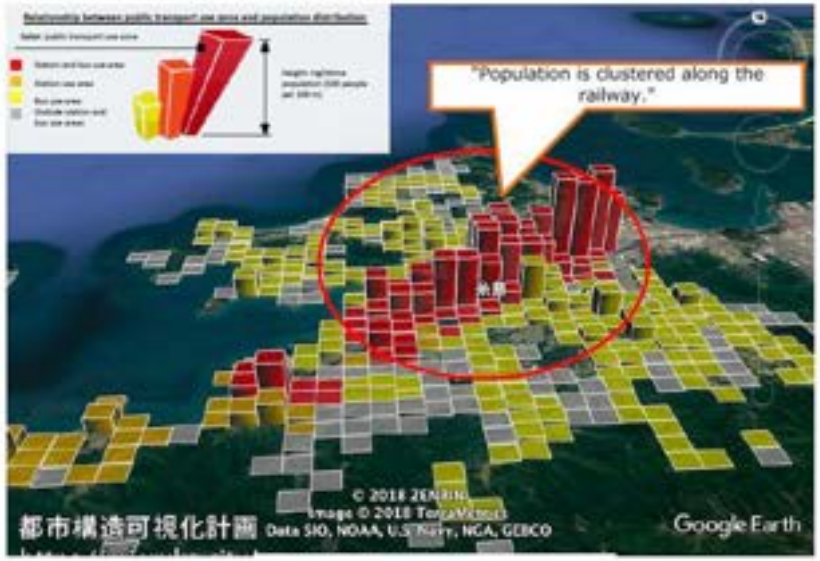
・Special regional characteristics (station area, bus area, number of trains, etc.) are indicated by color.
Regional data pertaining to transportation, such as population, retail sales, etc., are represented by height.

Relationship between public transport use zone and population distribution



Method for determining color-coding of public transport use zones

Height: national census (population)
Color: public transport use zone (refer to above chart)



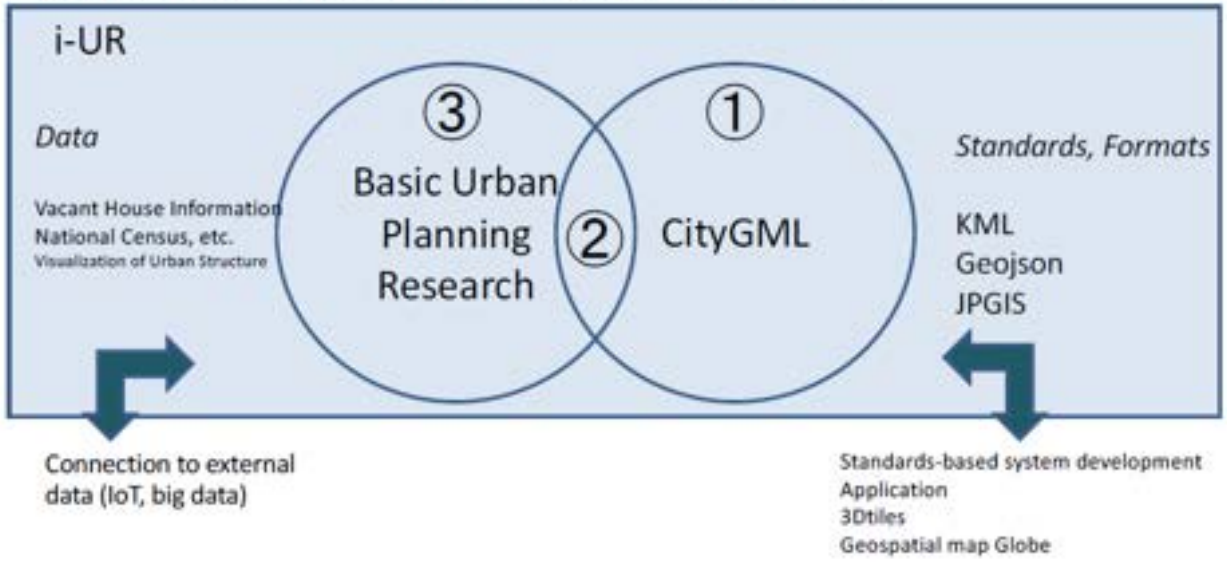
Urban Structure Visualization Plan

City GML (i-UR)

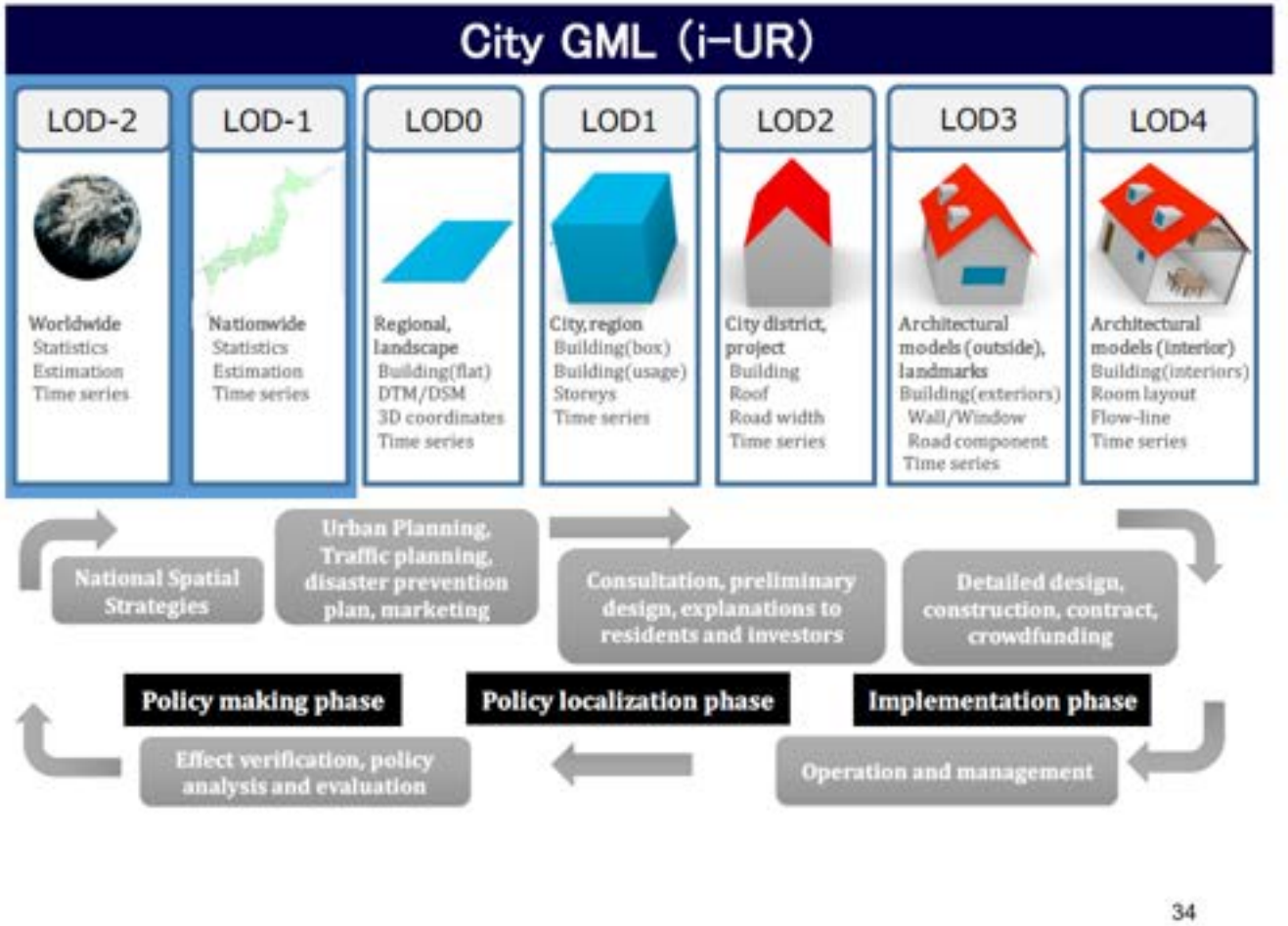
① Make basic urban planning research compatible with CityGML

② Create CityGML from basic urban planning research

③ Develop and publish CityGML's ADE (i-UR)



33


City GML (i-UR)
LOD-2
LOD-1
LOD0
LOD1
LOD2
LOD3
LOD4
Worldwide
Statistics
Estimation
Time series
Nationwide
Statistics
Estimation
Time series
Regional, landscape
Building(flat)
DTM/DSM
3D coordinates
Time series
City, region
Building(box)
Building(usage)
Storeys
Time series
City district, project
Building
Roof
Road width
Time series
Architectural models (outside), landmarks
Building(exteriors)
Wall/Window
Road component
Time series
Architectural models (interior)
Building(interiors)
Room layout
Flow-line
Time series
National Spatial Strategies
Urban Planning, Traffic planning, disaster prevention plan, marketing
Consultation, preliminary design, explanations to residents and investors
Detailed design, construction, contract, crowdfunding
Policy making phase
Policy localization phase
Implementation phase
Effect verification, policy analysis and evaluation
Operation and management
34

City GML (i-UR)

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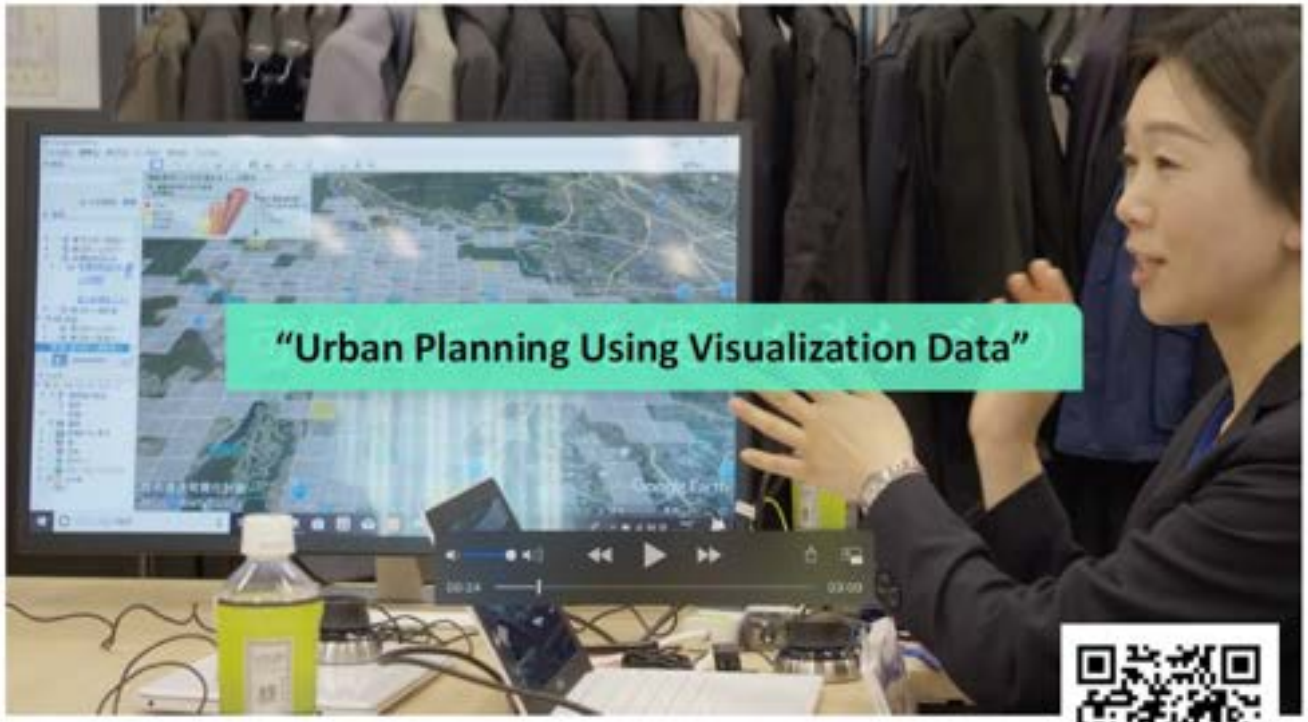
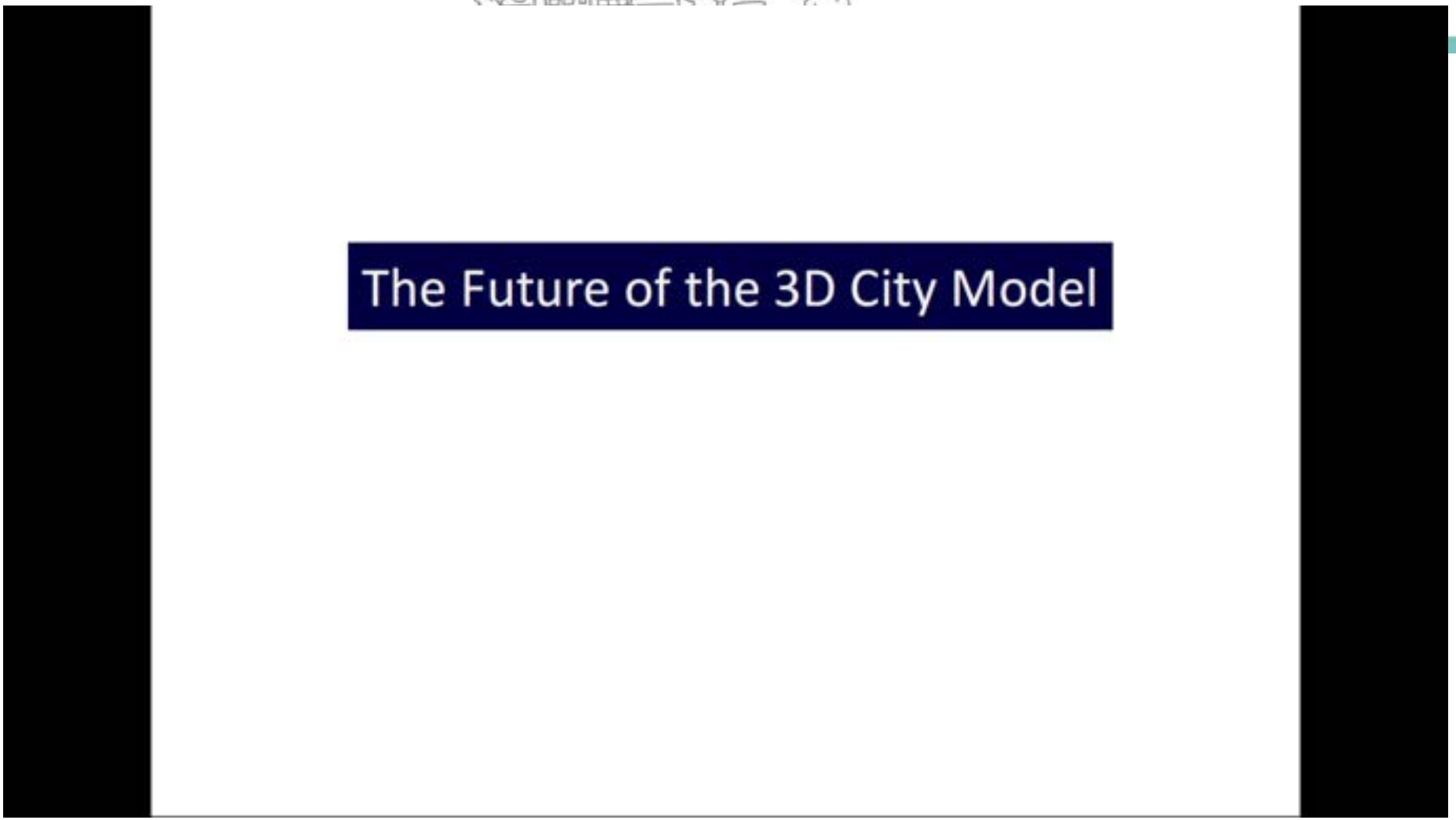
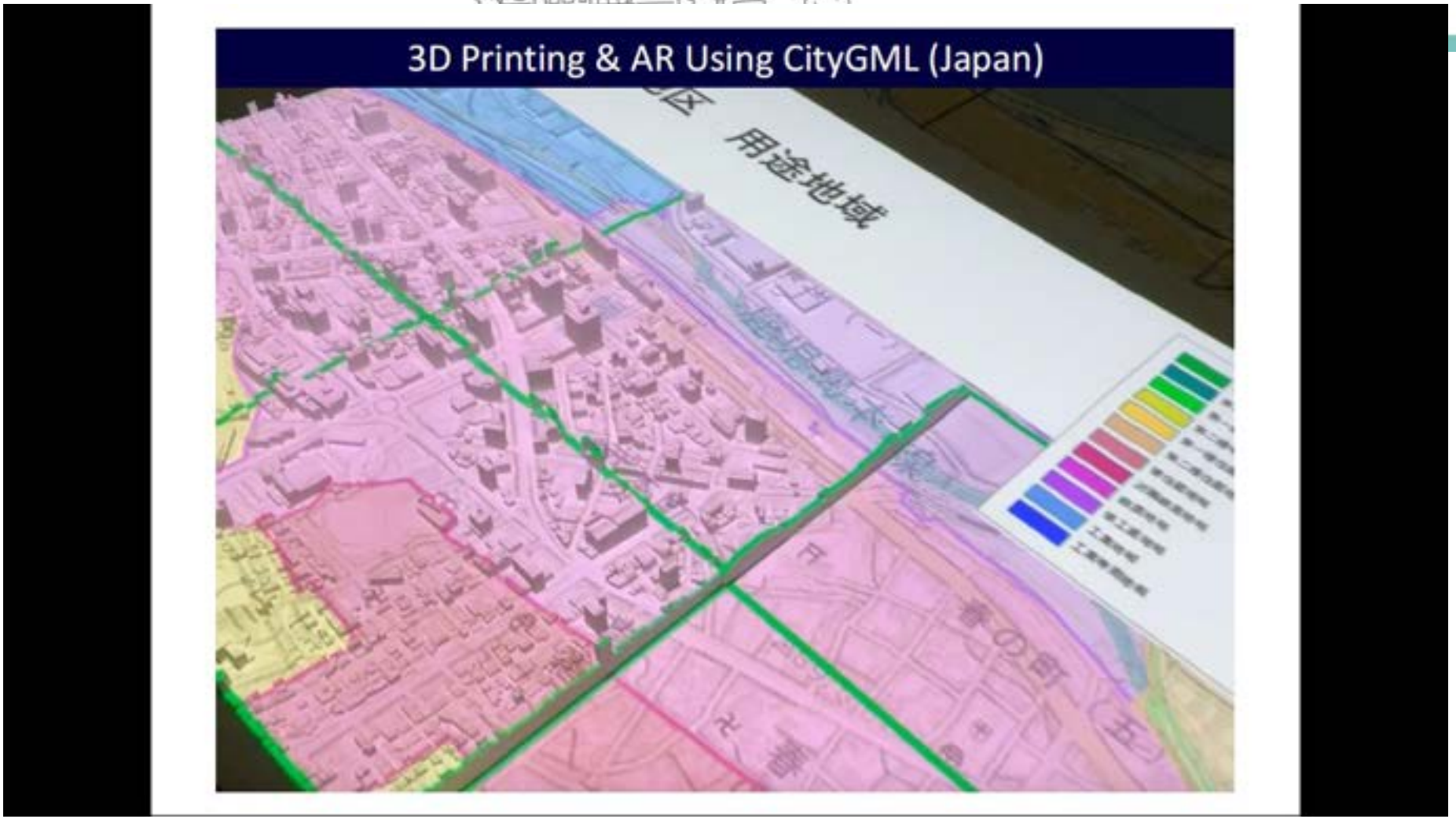
Start Visualization Right Now!



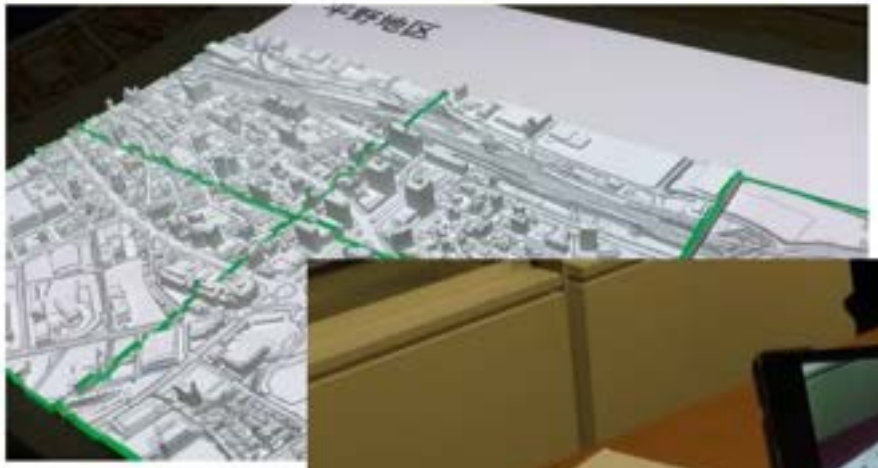
https://youtu.be/G9GpggxoT60


The Future of the 3D City Model

3D Printing & AR Using CityGML (Japan)


3D Printing & AR Using CityGML (Japan)
用途地域

3D Printing & AR Using CityGML (Japan)



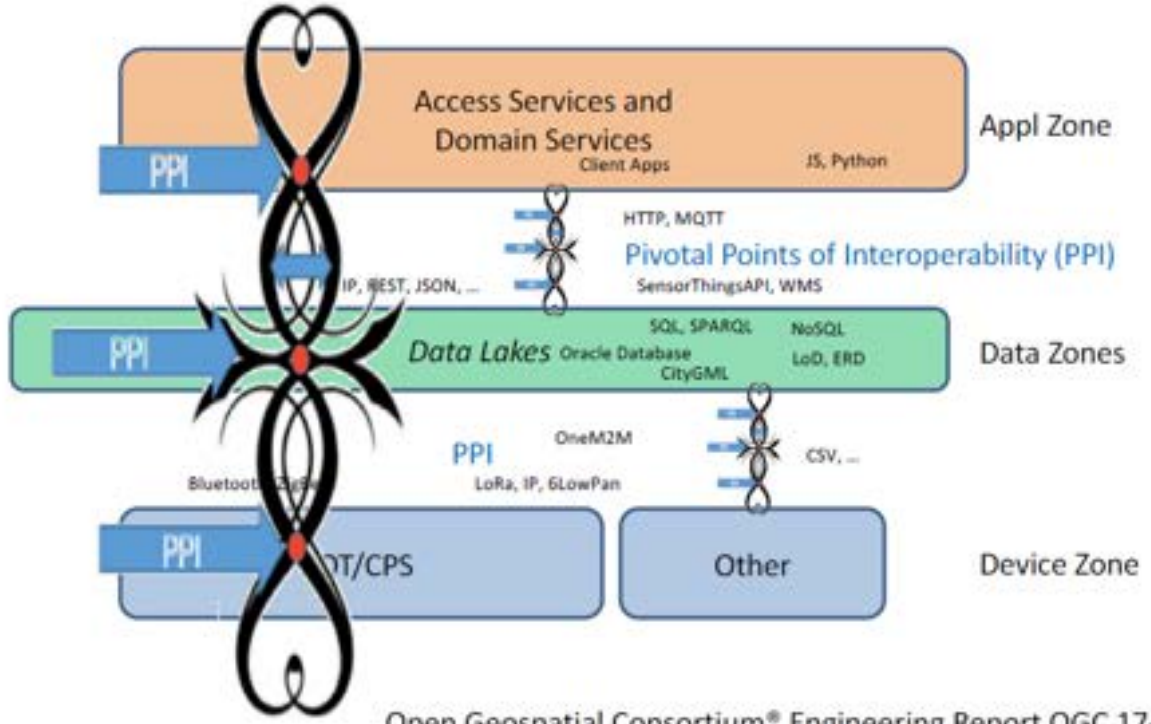
Recreation in Virtual Reality: Google Earth VR


Detailed Simulations: Cities:Skylines


Cities:Skylines Applications in Junior High Classrooms

Pivotal Points of Interoperability

- Important to establish key points for interoperability
- Important to be aware of stock in interchangeable data formats



Open Geospatial Consortium® Engineering Report OGC 17-091

"Visualize" Cities for Urban Development

- Basic data for planning and verification of policies
- Public-private cooperation across various fields, inter-regional cooperation, and consensus-building tools for inter-policy collaboration

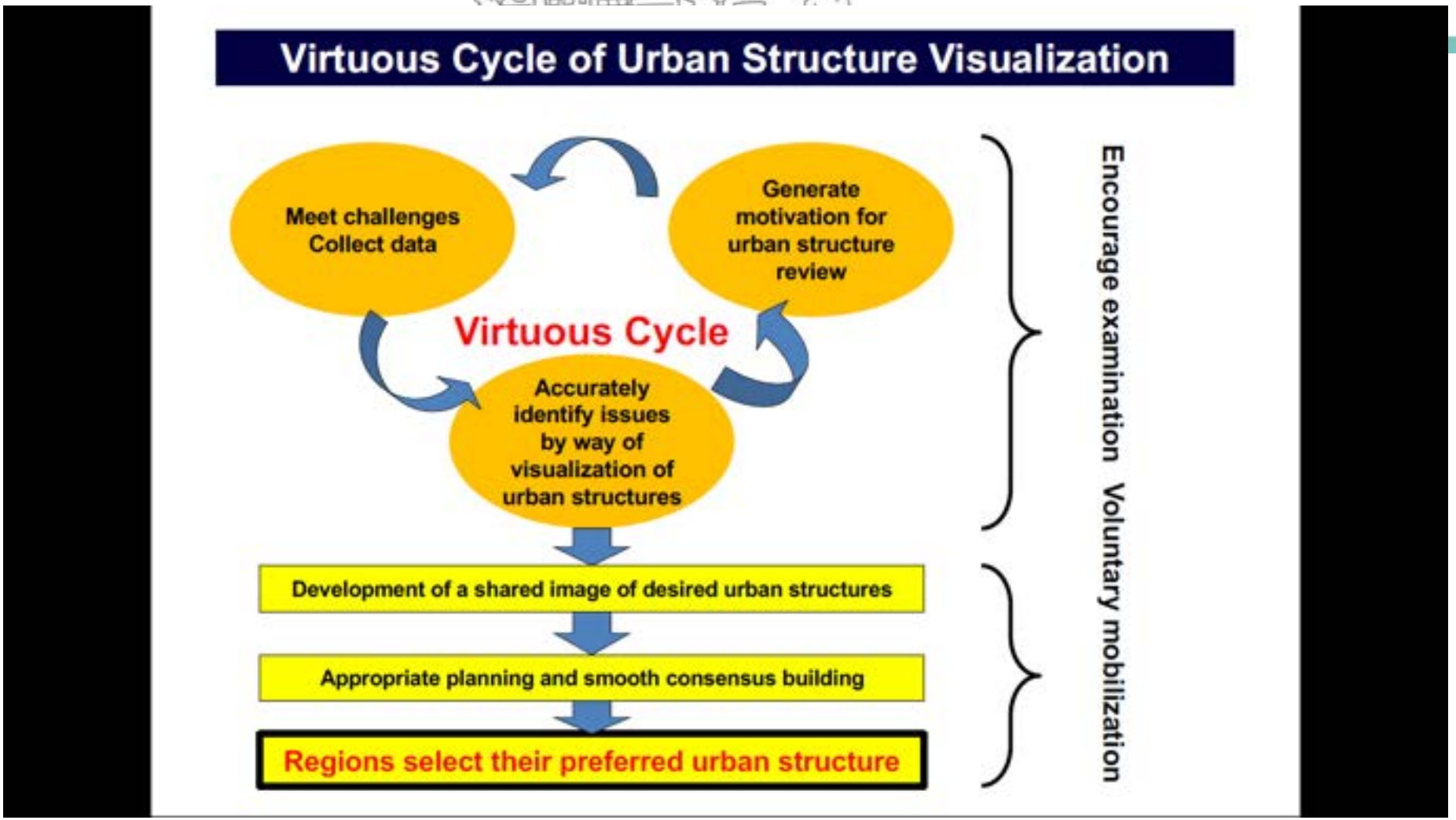
↓

Planning and development of policies

↓

Municipalities, businesses, and local residents share information and put special features of the region to good use

Promote sustainable urban development


Virtuous Cycle of Urban Structure Visualization
Meet challenges
Collect data
Generate
motivation for
urban structure
review
Virtuous Cycle
Accurately
identify issues
by way of
visualization of
urban structures
Development of a shared image of desired urban structures
Appropriate planning and smooth consensus building
Regions select their preferred urban structure
Encourage examination
Voluntary mobilization

Shu Ha Ri: From Learning to Mastery

守破離 Shu Ha Ri: The Three Stages of Learning

守 Shu: Practical use of the site, application on the ground, acquisition of qualification

破 Ha: Application of proprietary data, expansion into other sectors

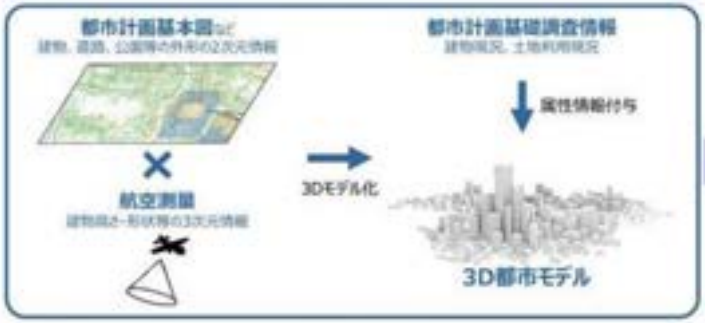
離 Ri: All activities based on principle of visualization

- Ideology on which the creative process of development and evolution in traditional performing arts is based. Examples: tea ceremony, martial arts, Embedded Technology Skill Standards (Ministry of Economy, Trade and Industry)
- Not stages of learning, but rather a word to express a state of mind

Project PLATEAU (2021–: Promotional Activities)

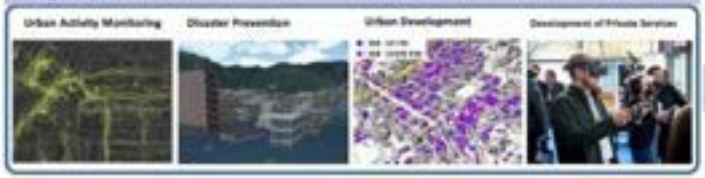
3D City Model Data Creation

2-dimensional image information (city planning maps, etc.) is multiplied by the height of buildings and geological features acquired by aerial surveys to create a 3-dimensional model.



3D City Model Use Case Development

Demonstrations and feasibility studies are conducted across Japan on the development of various use cases using 3D city models.



Open Digitization Triggering a Movement to Utilize Data

◆Support for local governments to create and utilize data

Preparation of various manuals, guidelines, etc., on 3D city models

Information disseminated across various media

◆Open Digitization

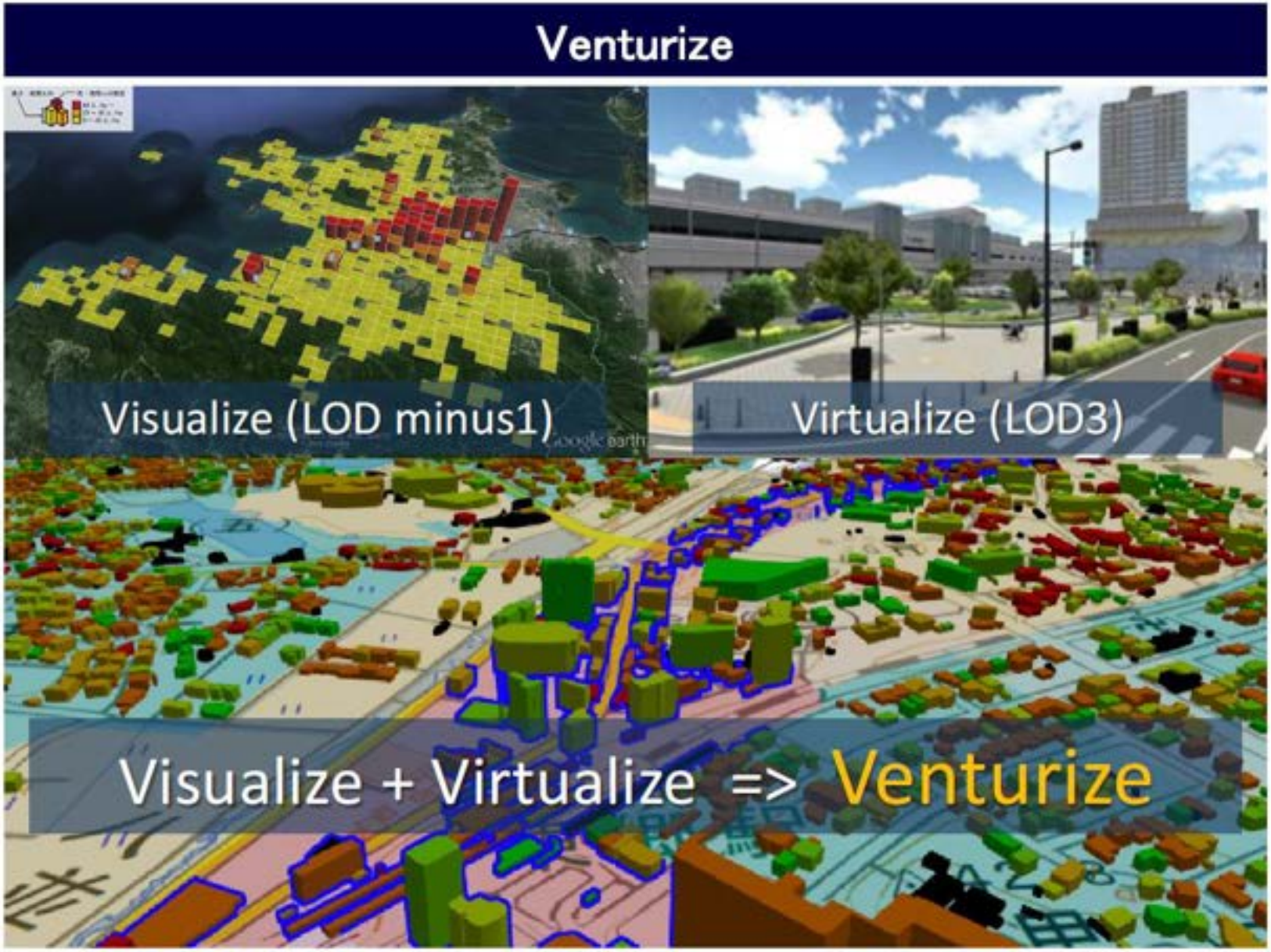
Across the country, approx. 50 3D city models are available to download in a format that anyone can use.

Agile urban infrastructure development and city development through overall optimization and citizen participation

1 - Overall optimization・sustainable urban development: Analyze disaster preparedness, environmental concerns, transportation, etc., promote development by way of integrated plans.

2 - Human-centered・urban development with citizen participation: Visualize current and future city with accuracy and ease, allowing many people to contribute to a city's development.

3 - Flexible and smart urban development: Reproduction and forecasting of data on urban activities, such as people flows, on static data of towns over the medium to long term.


Venturize
Visualize (LOD minus1)
Virtualize (LOD3)
Visualize + Virtualize => Venturize

RUGGEDISED STORIES

RUG U1 and U3.
Smart City connection to 100% renewable energy
Geothermal heating/cooling storage and exchange

Business Model Innovation

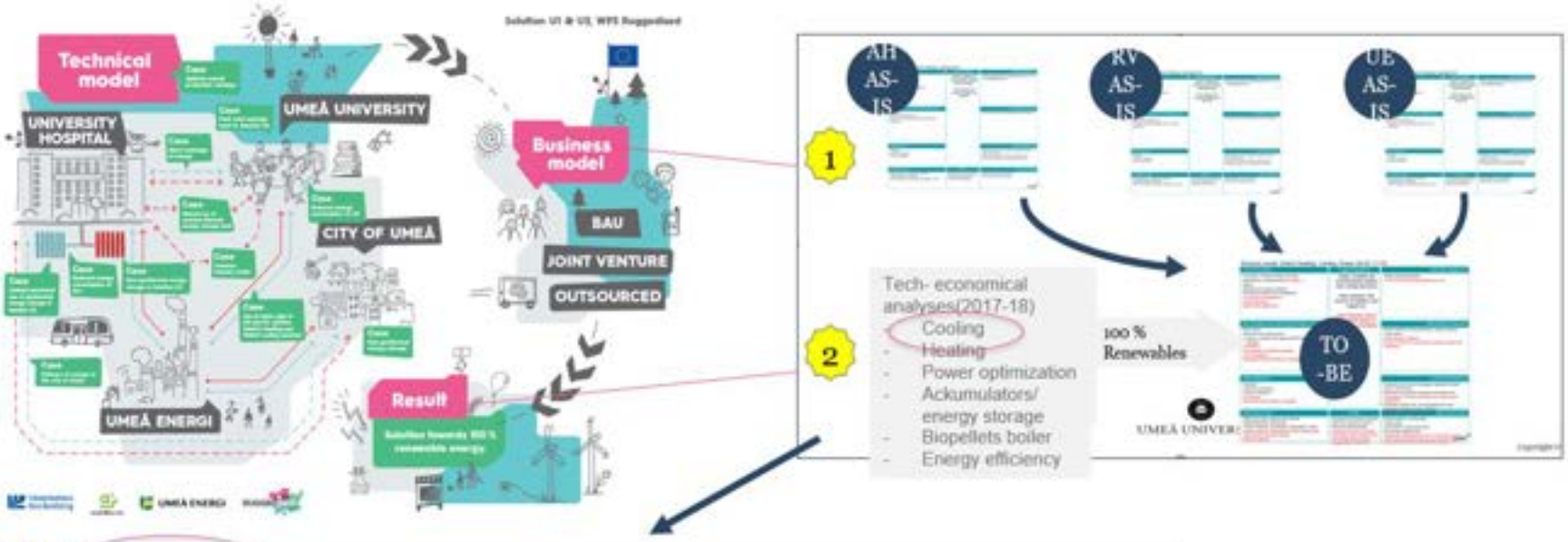
Umeå 2022-03-06

Jörgen Carlsson, Umeå Energi AB

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731198. The sole responsibility for the content of this document lies with the Ruggedised project and does not necessarily reflect the opinion of the European Union

Designing smart, resilient cities for all

Recap of the Business Model Innovation



3 Current steps:

- Pilot study of smart contracts and metering in reducing energy and climate impact.
- Prototyping and test site logics, interface, sensors etc.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731166. The sole responsibility for the content of this document lies with the Ruggedised project and does not necessarily reflect the opinion of the European Union.

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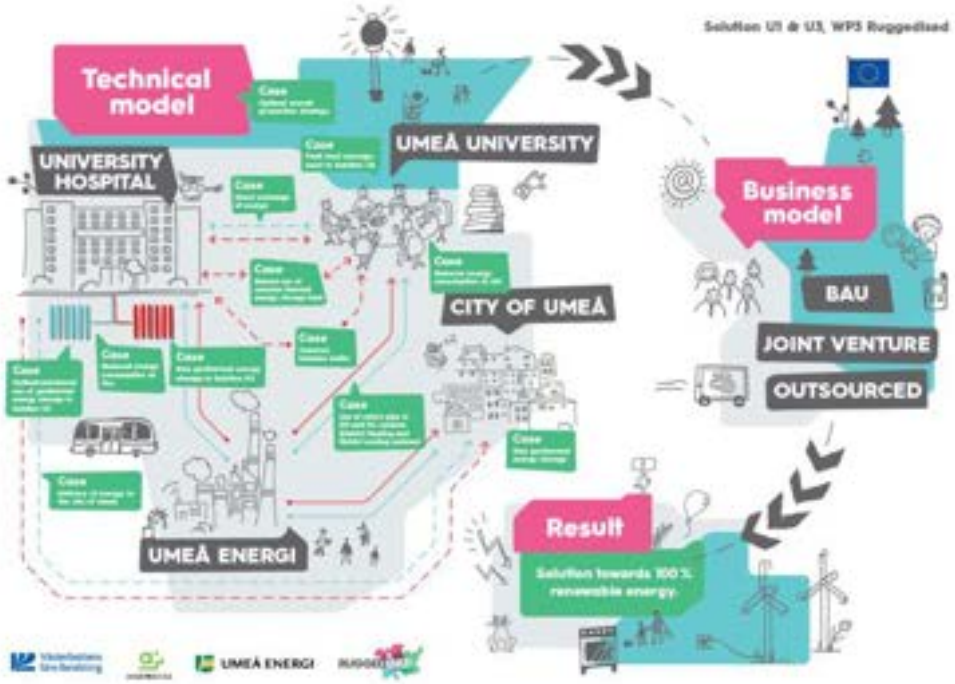
SIMULATOR ENGINE DESIGN



SIMULATOR ENGINE :

Functions

- Designed in Excel+
- Base line: Optimal operation strategi
- Update energy data of testbed componen
- Evaluation of different cases

Prerequisitions

- Baseline of energy data sets (hours/yrs)
- Open value network principe
- CO2-emissions are valued on emission factors and margin peak power
- District heating scaled to test bed

Parameters

- OPEX
- CAPEX
- CO2-emissions

Simulations output

Reduction of CO2 emissions per annum and cost (ton CO2 / SEK)

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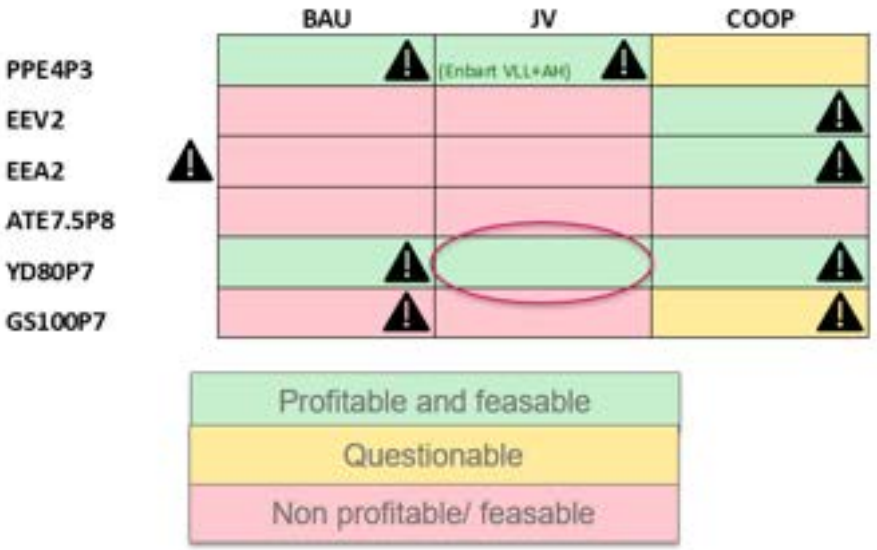
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731155. The sole responsibility for the content of this document lies with the Ruggedised project and does not necessarily reflect the opinion of the European Union.

SIMULATOR ENGINE OUTPUT

RESULTS:



Business Models

BAU- Business As Usual (Customer- supplier relation)
JV- Joint Venture (Partnership relation)
COOP- Cooperative (Prosumer relation)

Case

PPE4P3- BioPellet boiler 4MW, 3rd prio in duration
EEV2- Energy optimization 2% per annum, VCC
EEA2- Energy optimization 2% per annum, AH
ATE7.5P8- Heat water tank 7,5MW, 8th prio in duration
YD80P7- New supplier, 7th prio in duration
GS100P7- New Ground heat storage ,VCC

Results of simulations

- Triangles are profitable only for two of three partners
- JV opens other possibilities of cooperations (eg load shaving)
- The circled are of the most interest for all parties.

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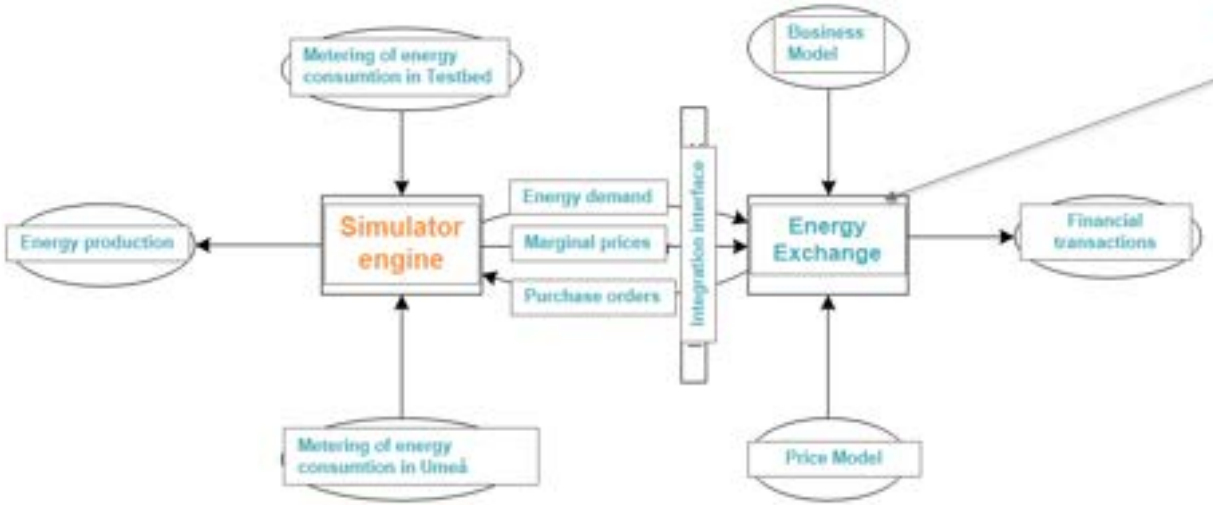
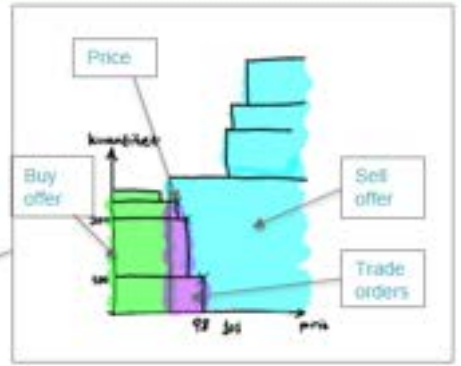
Design of prototype





5

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Conclusions

- Has to be understood and accepted of all participants

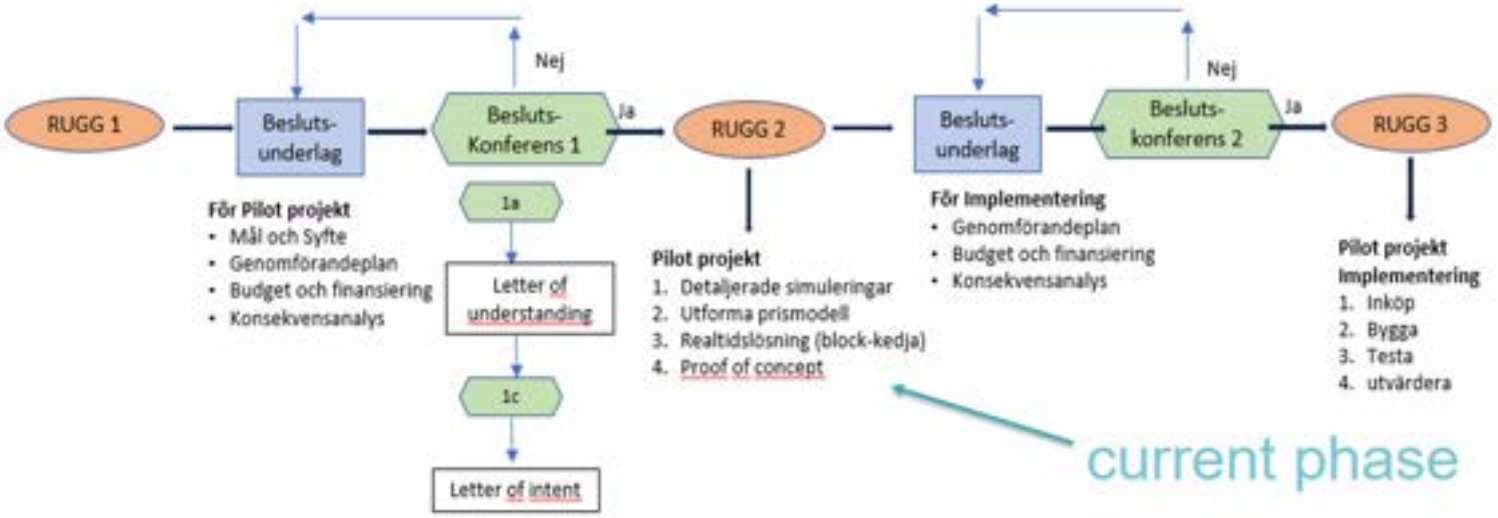
⇒ Early stages in manual. Visual and standing bids promotes transparency and buy-in by participants.

- Displays environmental impact of energy trading sets along with price gaps.
- Adaptable displays of energy- e.g. prices over days, weeks, of costs of storage etc.
- Compatible to industrial standard auto traders.

6

Designing smart, resilient cities for all

Next steps



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Tamana City's presentation

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Regarding the data that appears in this document

- Pages 4 to 8 of this document contain data that was automatically generated by a program administered by the Ministry of the Environment.
- The main data used in the analysis of the regional circular economy was derived from the following sources:

[Main data used for the preparation of data for regional circular economy analysis (2015)]

2015 Input-output table

2015 Prefectural input-output table

2015 Census

2014 Economic census - basic survey

2016 Economic census - activities survey

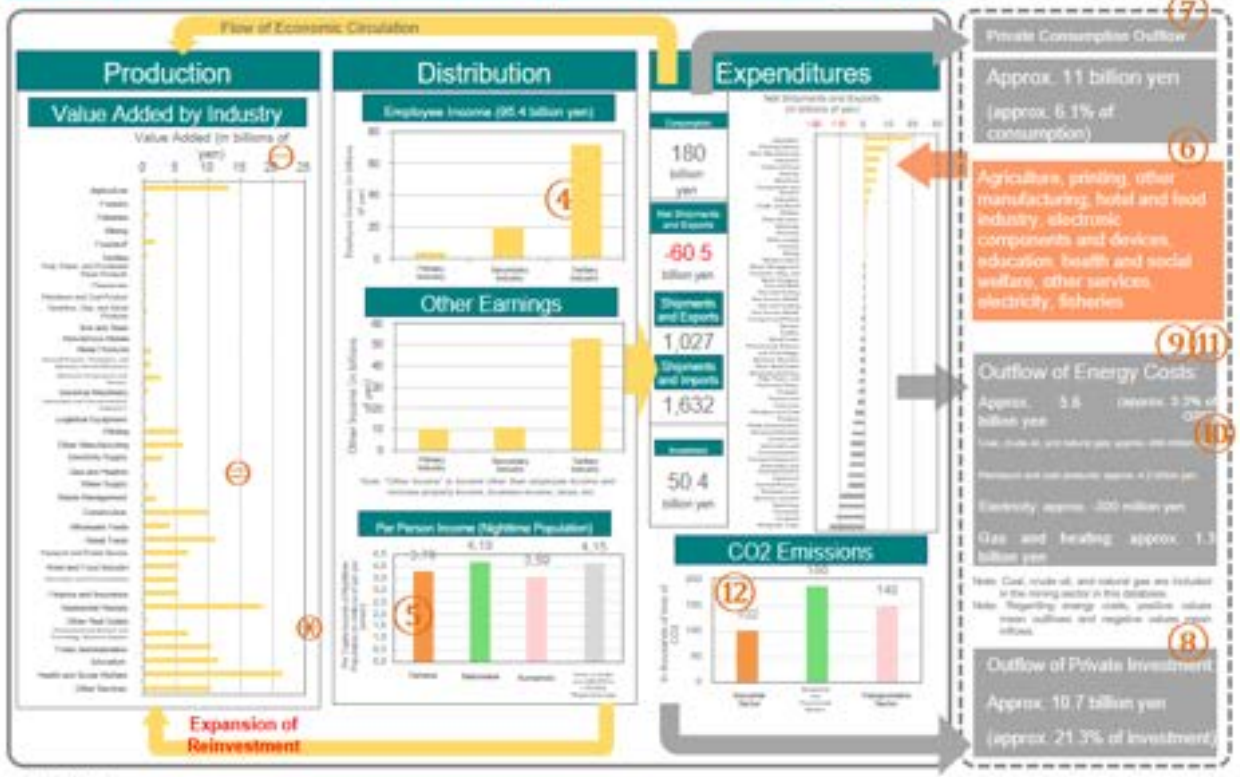
2015 Industrial statistics survey

FY2015 Municipal accounts settlement status survey etc.

Designing smart, resilient cities for all

Structure of Regional Circular Flow of Income㊀

Tamana Gross Production (total income/total expenditures) 169.9 billion [2015]



01/07/2022

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Structure of Regional Circular Flow of Income ㊀

	Regional Features	Content of Analysis
Production	㊀ The industry with the highest added value in Tamana is health and social welfare. ㊁ With regard to secondary industry, the industry with the highest added value is construction, followed by other manufacturing industries, and printing. ㊂ With regard to tertiary industry, the industry with the highest added value is health and social welfare, followed by residential rentals, and education.	▪ How much added value to the region was earned by establishments in the region over the year? ▪ Added value is gross profit from sales minus raw materials.
Distribution	④ Concerning employee income, tertiary industry contributes the highest amount of income in Tamana. ⑤ The per capita income of Tamana's nighttime population is 3.79 million yen, which is lower than the national average.	▪ Is the added value earned in terms of production distributed as wages and labor costs linked to the income of the local population (per capita income of the nighttime population) or not?
Expenditures	⑥ In Tamana, agriculture, printing, and other manufacturing industries generate income from outside the region. ⑦ Consumption flows outside the region, amounting to under 10% of the expenditures of the local population. ⑧ Investment flows out of the region, amounting to approx. 20% of the total investments of local residents and establishments.	▪ What are the industries in the region that generate income from outside the region? ▪ Does income earned within the region go to consumption and investment within the region or not?
Energy and CO2	⑨ In Tamana, energy costs of 5.6 billion yen flow out of the region, amounting to approx. 3.3% of the GRP. ⑩ With regard to energy cost outflows, oil and coal products have the highest outflows, followed by gas and heat supply. ⑪ The renewable energy potential of Tamana is approximately 0.15 times the energy used in the region. ⑫ Of the industrial, residential and commercial, and transport sectors, the residential and commercial sector has the highest CO2 emissions in Tamana, at 186 kilotons of CO2 emissions. Per capita CO2 emissions for the city's nighttime population are 6.53 tons of CO2, which is lower than the national average.	▪ How much of the local population's income flows out of the region by way of energy costs? ▪ How much renewable energy installation potential exists in the region? ▪ How much CO2 is emitted and by which sectors?

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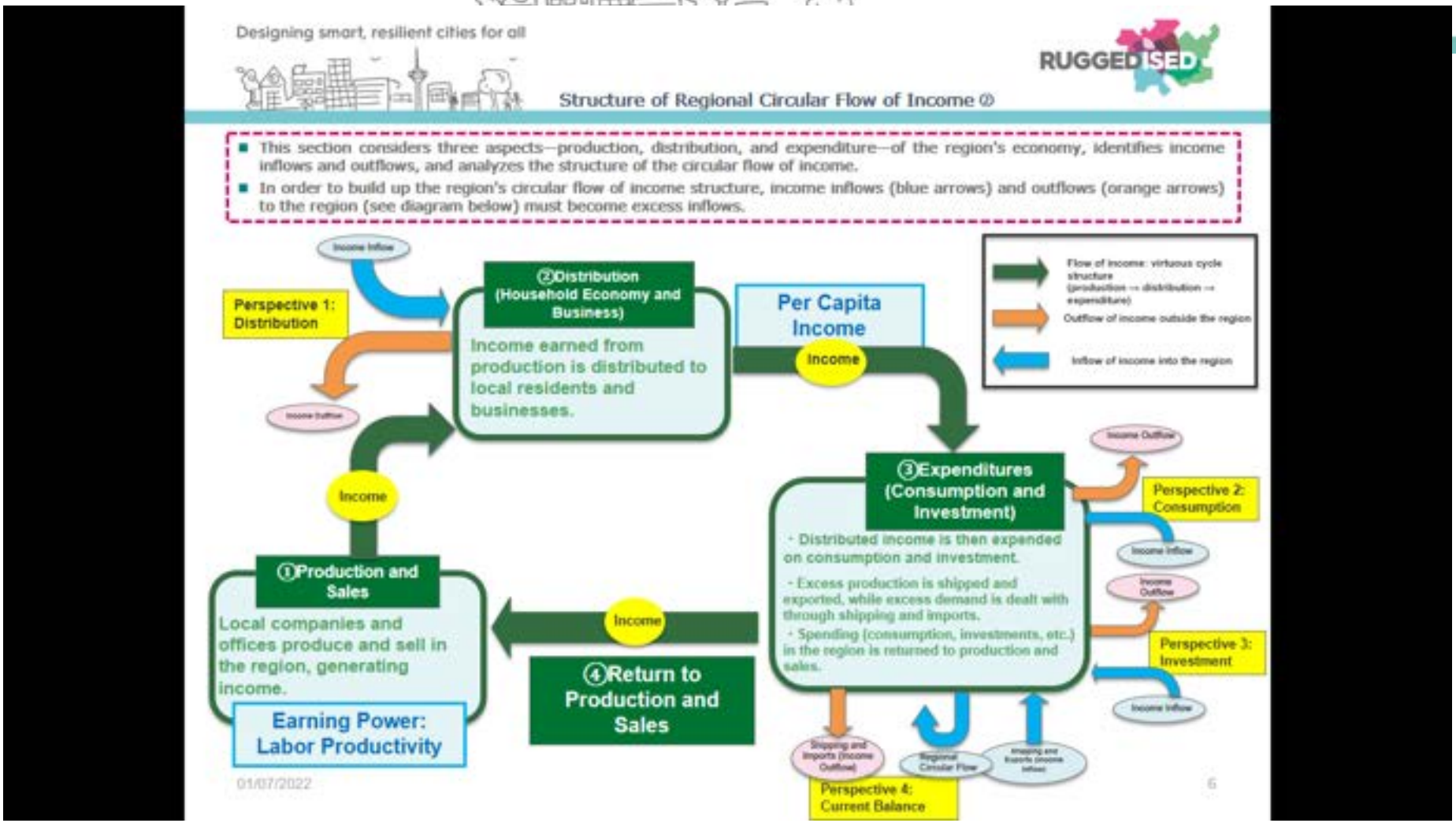
Designing smart, resilient cities for all
Structure of Regional Circular Flow of Income ②
This section considers three aspects—production, distribution, and expenditure—of the region's economy, identifies income inflows and outflows, and analyzes the structure of the circular flow of income.
In order to build up the region's circular flow of income structure, income inflows (blue arrows) and outflows (orange arrows) to the region (see diagram below) must become excess inflows.
Income Inflow
Perspective 1: Distribution
Income Outflow
②Distribution (Household Economy and Business)
Income earned from production is distributed to local residents and businesses.
Per Capita Income
Income
Flow of income: virtuous cycle structure (production → distribution → expenditure)
Outflow of income outside the region
Inflow of income into the region
Income
①Production and Sales
Local companies and offices produce and sell in the region, generating income.
Earning Power: Labor Productivity
Income
④Return to Production and Sales
③Expenditures (Consumption and Investment)
・Distributed income is then expended on consumption and investment.
・Excess production is shipped and exported, while excess demand is dealt with through shipping and imports.
・Spending (consumption, investments, etc.) in the region is returned to production and sales.
Income Outflow
Perspective 2: Consumption
Income Inflow
Income Outflow
Perspective 3: Investment
Income Inflow
Shipping and Imports (Income Outflow)
Regional Circular Flow
Shipping and Exports (Income Inflow)
Perspective 4: Current Balance
01/07/2022
6

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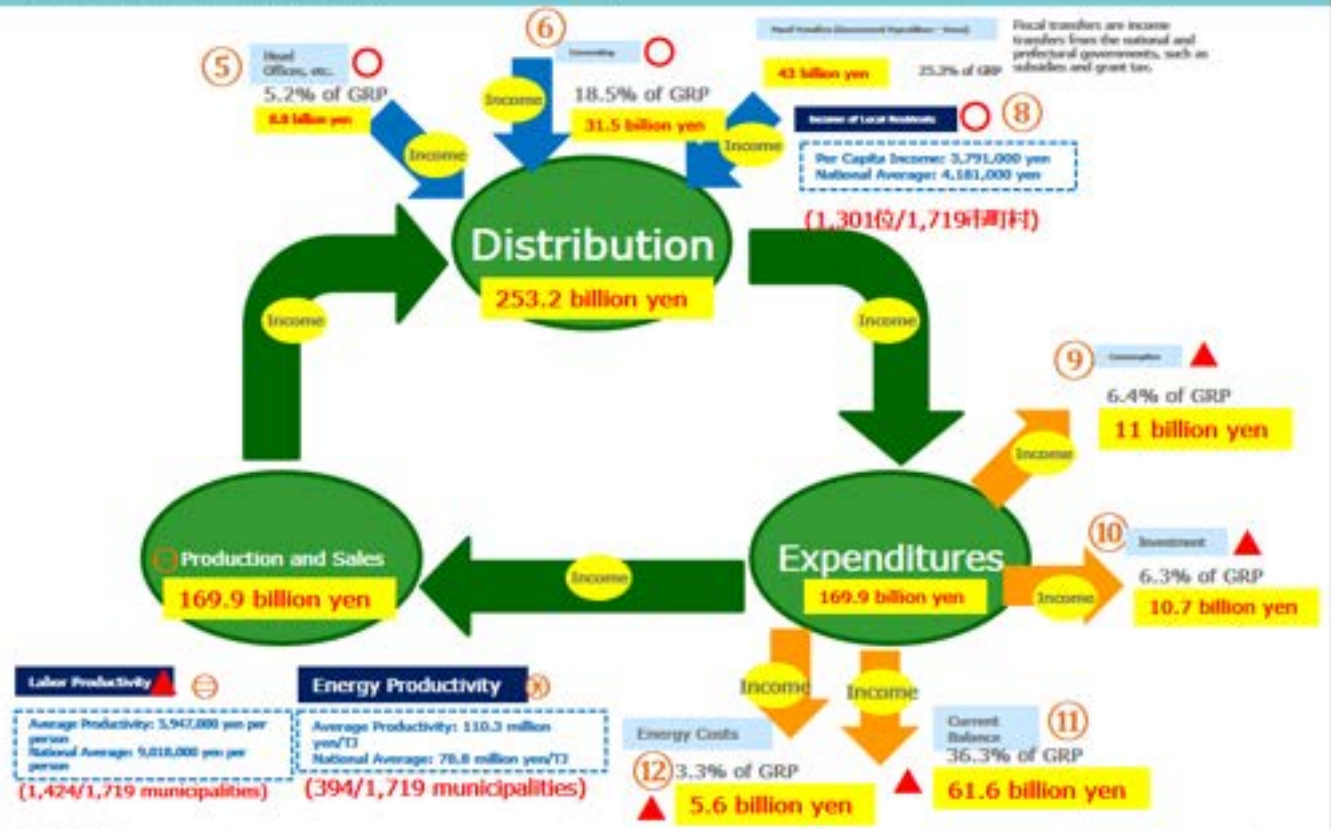
Structure of Regional Circular Flow of Income②



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Structure of Regional Circular Flow of Income②

	Regional Features	Content of Analysis
Production and Sales	⊖ In Tamana, 169.9 billion yen of added value is generated. ⊖ Labor productivity is lower than the national average, amounting to 5,947,000 per person and ranking 1,424th in the country. ⊛ Energy productivity is higher than the national average, amounting to 110.3 million yen/TJ and ranking 394th in the country.	▪ Are labor productivity and energy productivity compatible within the region? ▪ Energy productivity is the added value per unit of energy consumption.
Distribution	④Distribution in Tamana is 253.2 billion yen, which is more than production and sales, which amounts to 169.9 billion (⊖). ⑤In addition, an inflow of 8.8 billion yen goes to head offices, etc., accounting for 5.2% of the GRP. ⑥Furthermore, an inflow of 31.5 billion yen of income is generated from commuting, accounting for 18.5% of the GRP. ⑦Inflows of fiscal transfers amount to 43 billion yen, accounting for 25.3% of GRP. ⑧As a result, Tamana's per capita income is 3,791,000 yen, which is lower than the national average, ranking 1,301st in the country.	▪ Is the added value earned on the production side distributed as wages and personnel expenses linked to the income (per capita income of nighttime population) of the local population or not? ▪ Is there an outflow of income to head offices, etc., or commuters from outside the region? ▪ What is the extent of fiscal transfers?
Expenditures	⑨In Tamana, consumption outflows for shopping, tourism, etc., amount to 11 billion yen, accounting for 6.4% of the GRP. ⑩Investment outflows amount to 10.7 billion yen, accounting for 6.3% of the GRP. ⑪Inbound and outbound shipments amount to 61.6 billion yen, accounting for 36.3% of the GRP.	▪ Does income earned within the region go to consumption and investment within the region or not? ▪ Do inflows of consumption and investment enter the region or not? ▪ Is income generated from inbound and outbound shipments or not?
Energy	⑫In Tamana, the outflow of energy costs to outside the region amounts to 5.6 billion yen, accounting for 3.3% of the GRP.	▪ How much of residents' income is diverted out of the region by paying for energy?

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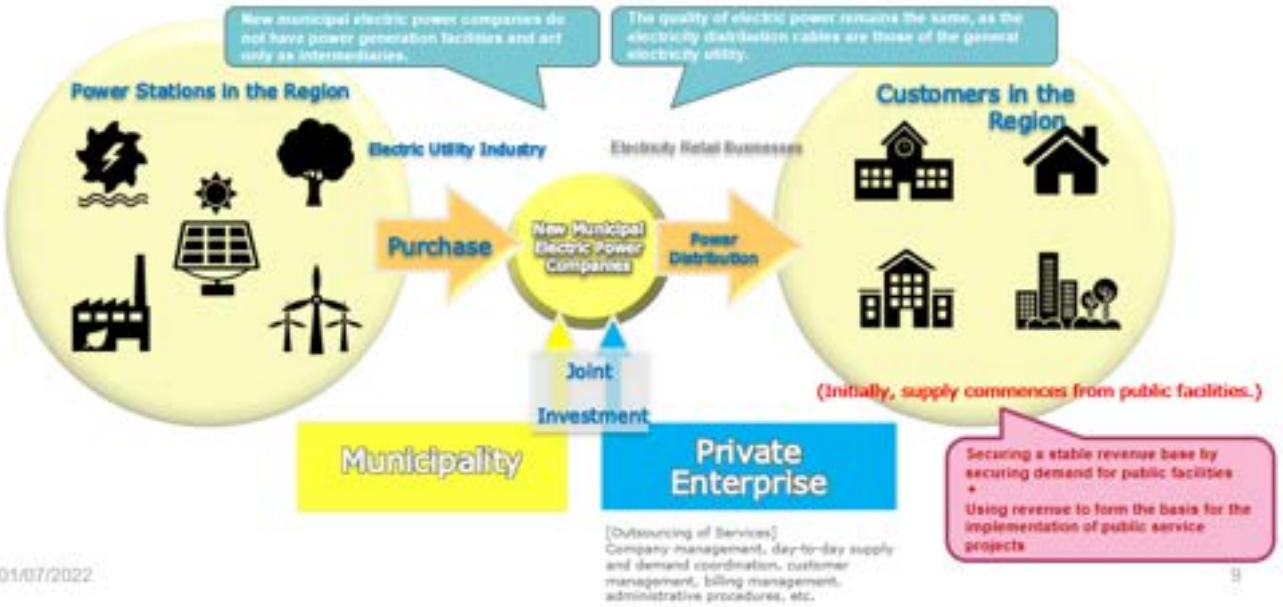
New Local Electrical Power

These are defined as: electricity retail businesses that maximize the use of electricity generated in the region and supply electricity primarily to public facilities, private companies, and households in the region.
Of these, those funded by municipalities are called new municipal electric power projects.

Examples of typical strategies for new municipal power programs



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9

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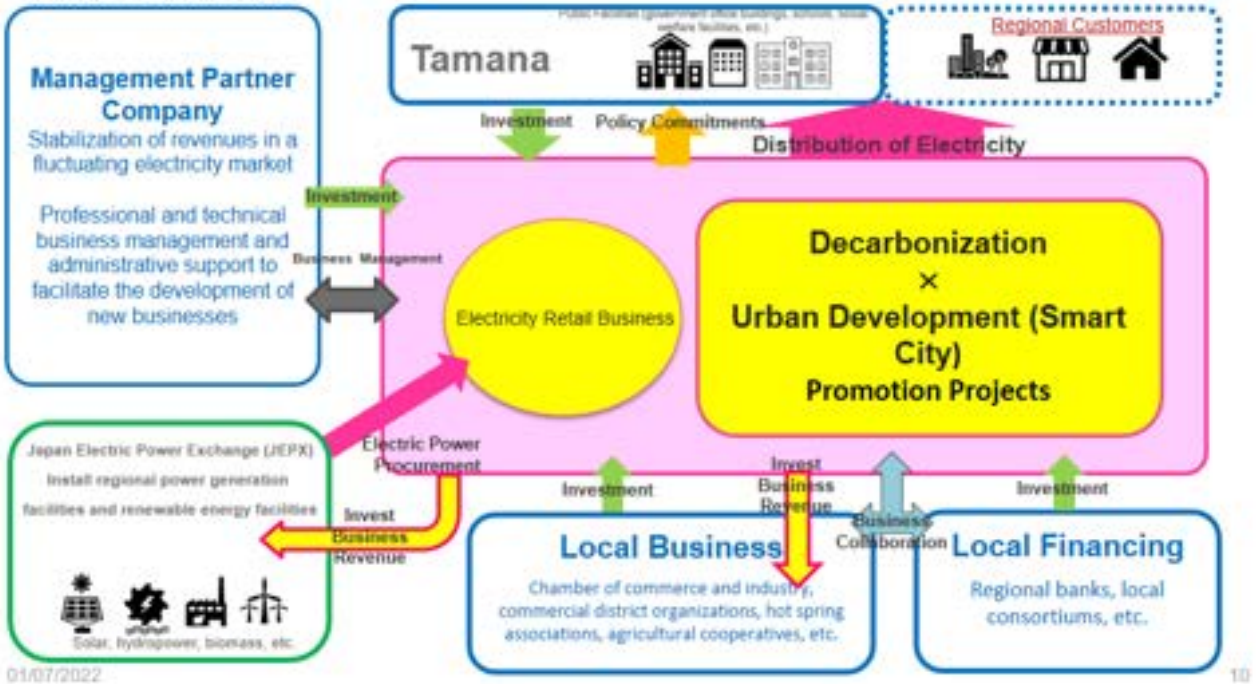
This is a community development company that promotes "Decarbonization × Urban Development (Smart City)" and strives for regional revitalization.

The company will begin as an electricity retail business, mainly supplying electricity to public facilities, and stabilize operations.

While returning revenue to the community, the company will develop new projects that contribute to decarbonization and urban development (smart cities).



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Project Schedule

	July to September 2021	October to December 2021	January to March 2022	April to June 2022	July to September 2022	October to December 2022	January to March 2023	April to June 2023
① Primary Feasibility Study								
② Agency Briefing and Agreement								
③ Selection of Partner Businesses (Proposal Preparation and Implementation)								
④ Operations: Research and Business Planning (Documents for Legislative Assembly)								
⑤ Selection and Determination of Investment Structure and Investors								
⑥ Advance Briefings for Members of Assembly								
⑦ Approval from Legislative Assembly								
⑧ Incorporation of Company								
⑨ Preparation for Supply (Registration as an Electricity Retail Company)								
⑩ Commencement of Supply								

This is where we are stalled.

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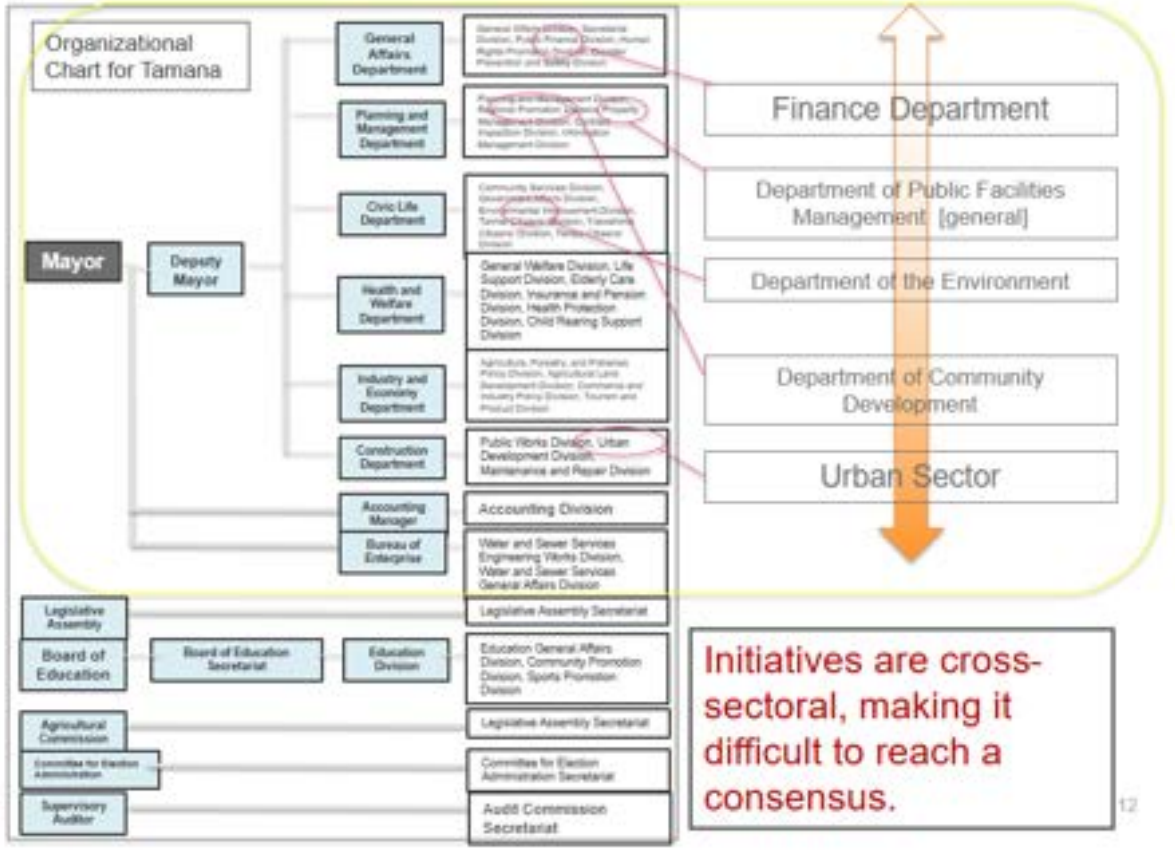
Organizational Structure



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Business Model Challenges

✓How to involve the private sector, and local businesses in particular?
☞ Align interests, etc.

✓As there are no power generation facilities in the region, management will rely on Japan Electric Power Exchange (JEPX) for the time being. Is sustainable operation possible or not?
☞ Generate renewable energy, etc.

✓How to link and integrate it with smart cities in conjunction with decarbonization?
☞ Build data infrastructure, etc.

Financing Challenges

✓ How will it be financed?

✓ The strategy does not directly distribute the proceeds to the investors as it gives back to the region.
☞ How to incentivize investment?

Designing smart, resilient cities for all

CONTACT

Name: Nobuhiro Yasuda

Mail: toshi@city.tamana.lg.jp

ANNEX IV Material from the Virtual Study Visit

Digital City & Governance

Digital City Rotterdam

Gemeente Rotterdam

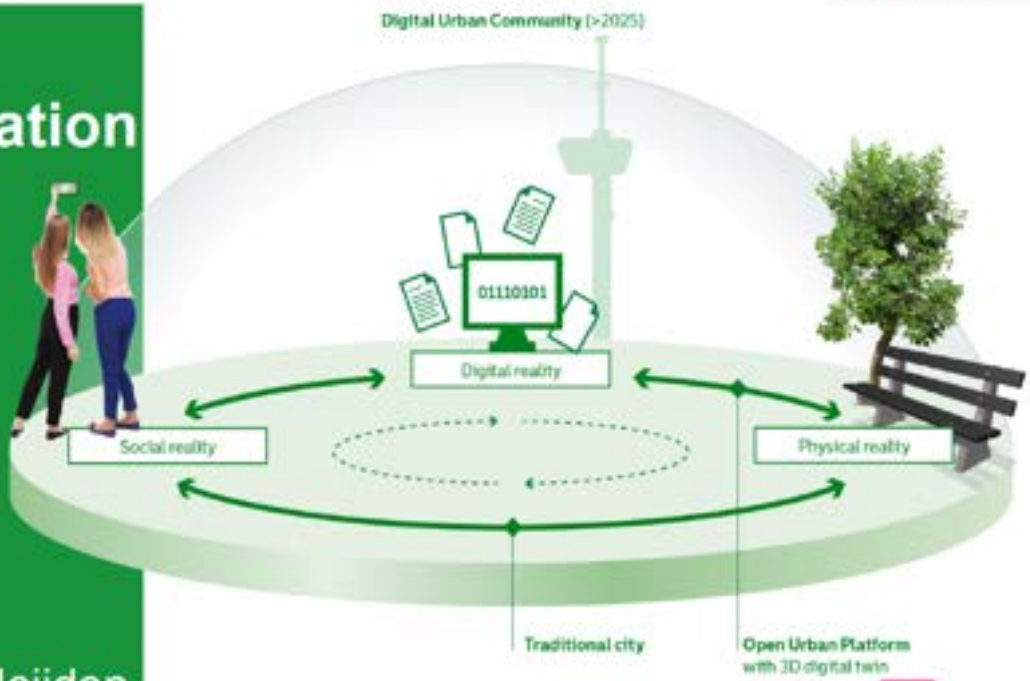
DigitaleStad

RUGGEDISED International cooperation with Japan

Study visit

September 26th, 2022

Roland van der Heijden
Program manager Digital City



EU

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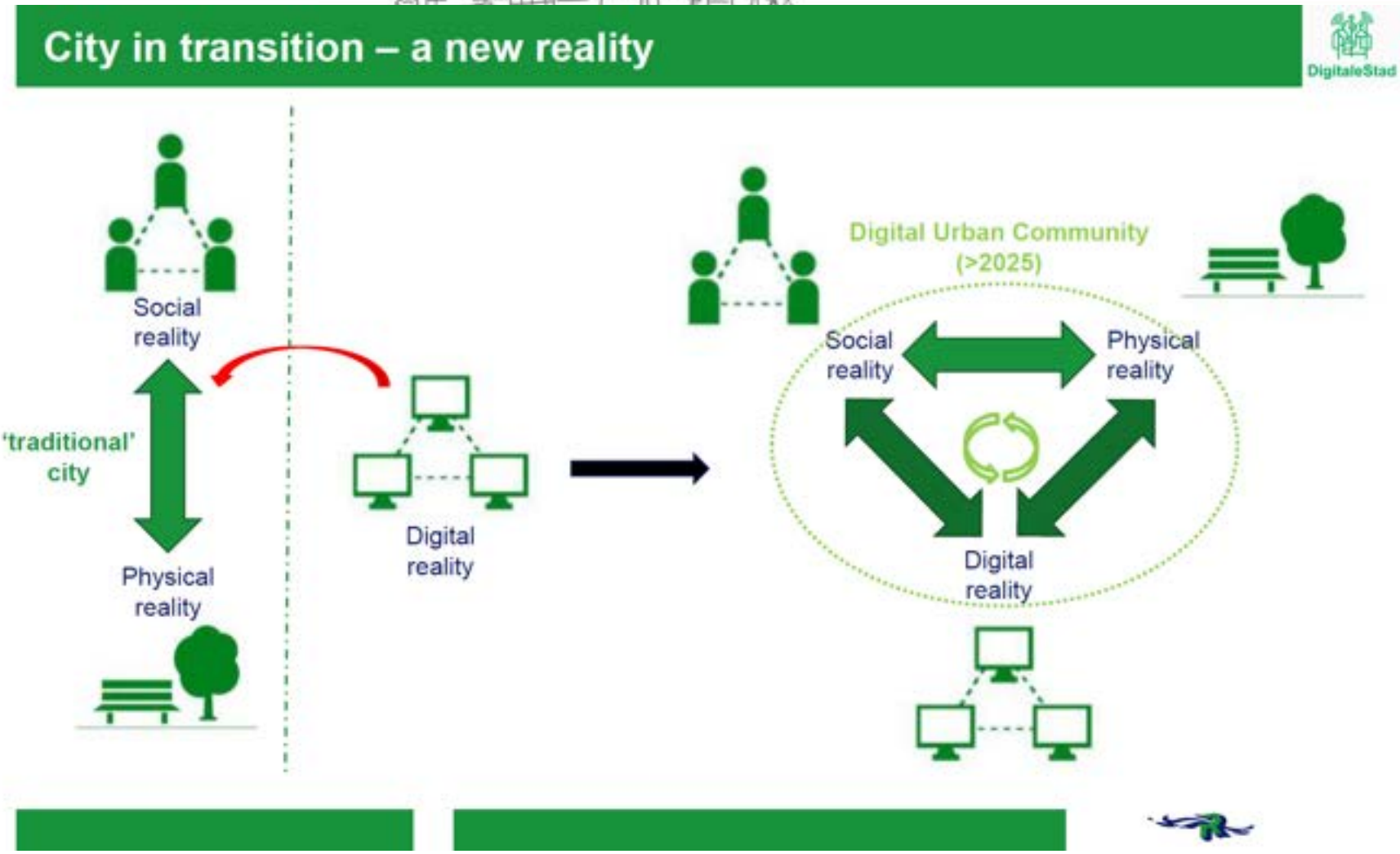
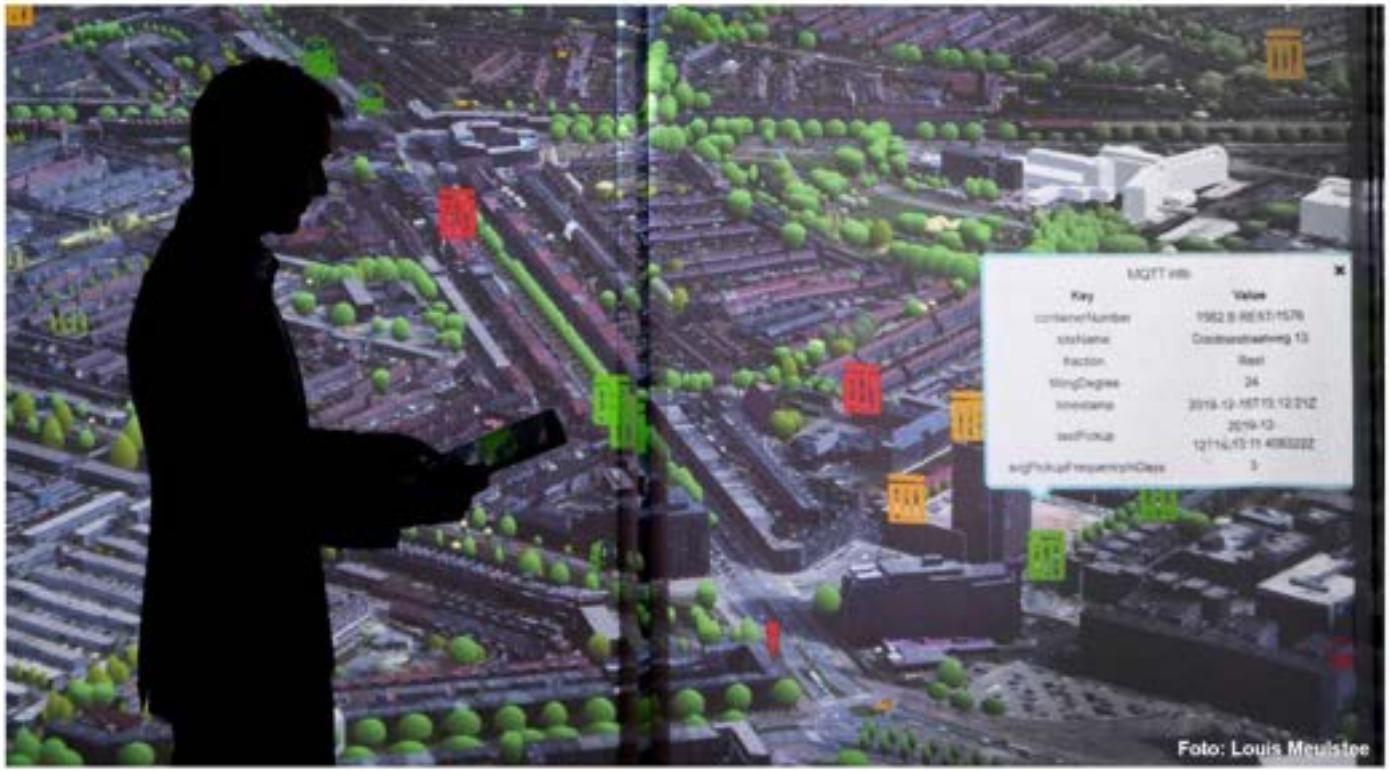

City in transition – a new reality
DigitaleStad
Social reality
'traditional' city
Physical reality
Digital reality
Digital Urban Community (>2025)
Social reality
Physical reality
Digital reality

Open Urban Platform with DT and the role of the government

The Digital Twin: a ‘smart’ 3D model of the city …

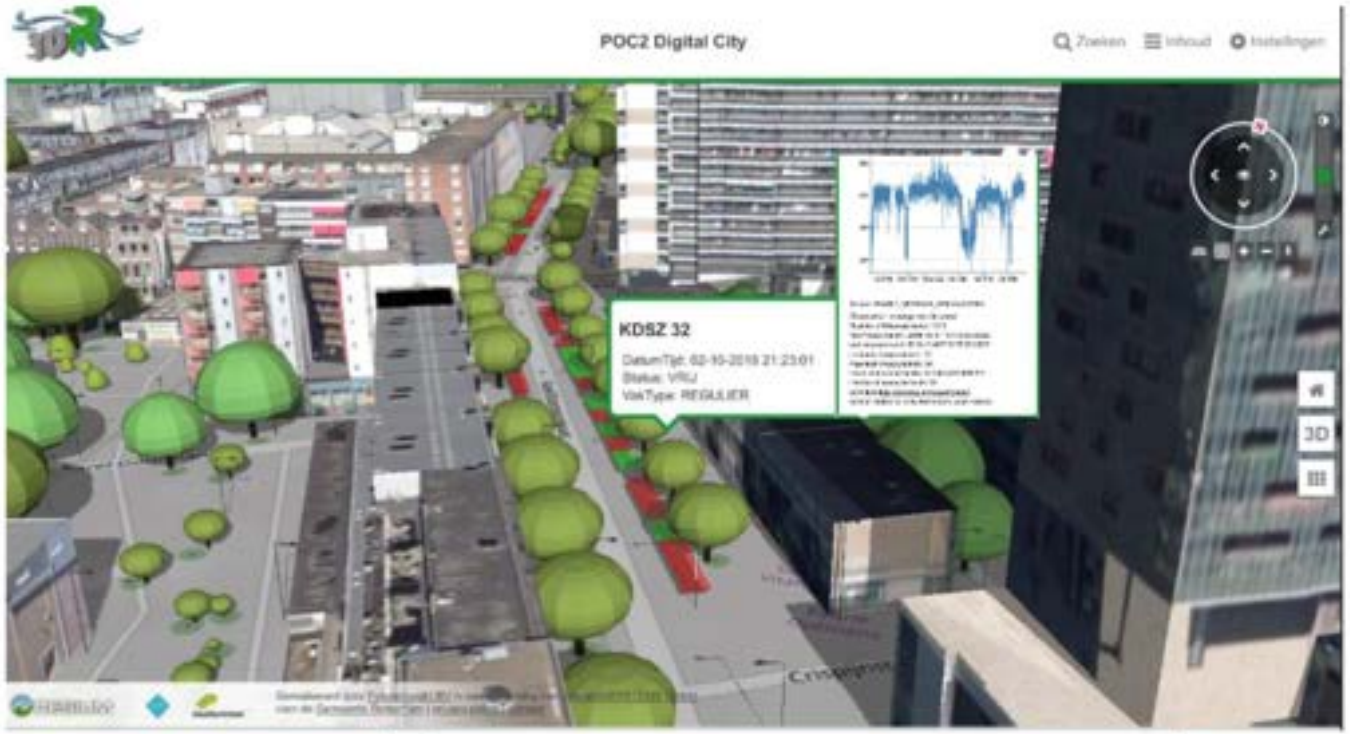
… combined with realtime data …



… forms an Urban Digital Twin of the city…

DigitaleStad

Digital Twin = a common and shareable view on current physical reality of a city, described by actual (realtime) data



...and is therefore *a basis for* new services & smart applications

DigitaleStad

Smart spatial planning:
- Building permit check service

- Co-creation in the digital city

Digital Twin Sustainability &
Generic, scalable and maintainable data sources

Not on this sheet: Digital Twin Underwater

SAFE Rotterdam 3D

New buildingplans app

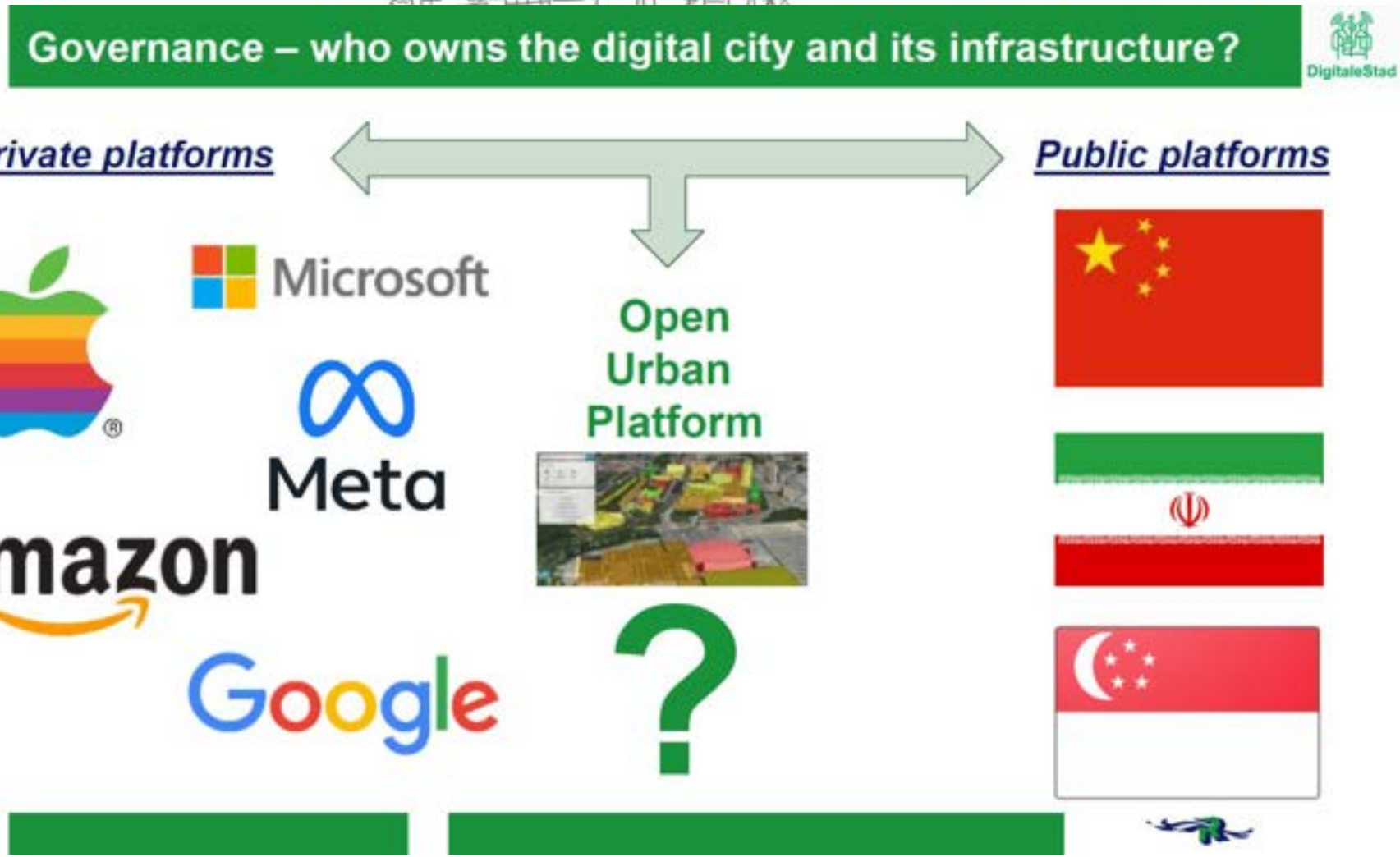
Grenzeloos
Datalandschap

Regional cooperation
'Borderless data landscape'


Time & place independent participation: Co creation in the digital city
DigitaleStad
AR
Geomagine
Explore
€ 15k
€ 20k
€ 10k

Generic, scalable and maintainable datasources

Demo omgeving


Governance – who owns the digital city and its infrastructure?
DigitaleStad
Private platforms
Public platforms
Microsoft
Meta
amazon
Google
Open
Urban
Platform
?

Governance – roles and principals

Development Open Urban Platform with Digital Twin

- 2018: delivery Proof of Concept (PoC)
- 2020: delivery prototype
- 2021: market consultation
- 2021: governance – 'roles'-paper
- 2022: 'green light' procurement

  'competative dialog':

  1. Selection phase
  2. Dialog phase
  3. Procurement phase
  4. Realisation phase
- Delivery Minimal Viable Product (MVP):

  'beta-verse' 2023, 'final' version 2024


Thank you for your attention!
Digital City Rotterdam
DigitaleStad
Gemeente Rotterdam
Contact: digitalestadBCO@rotterdam.nl
EU
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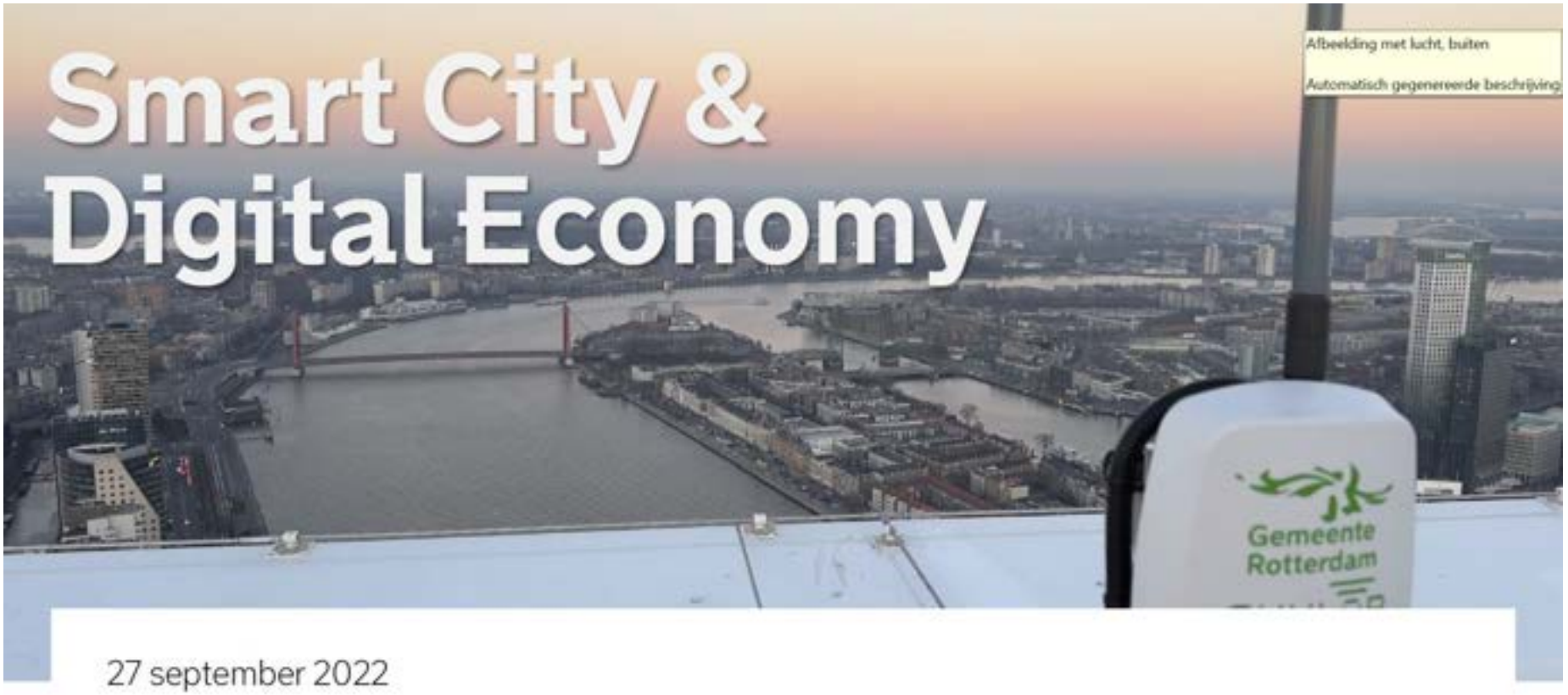
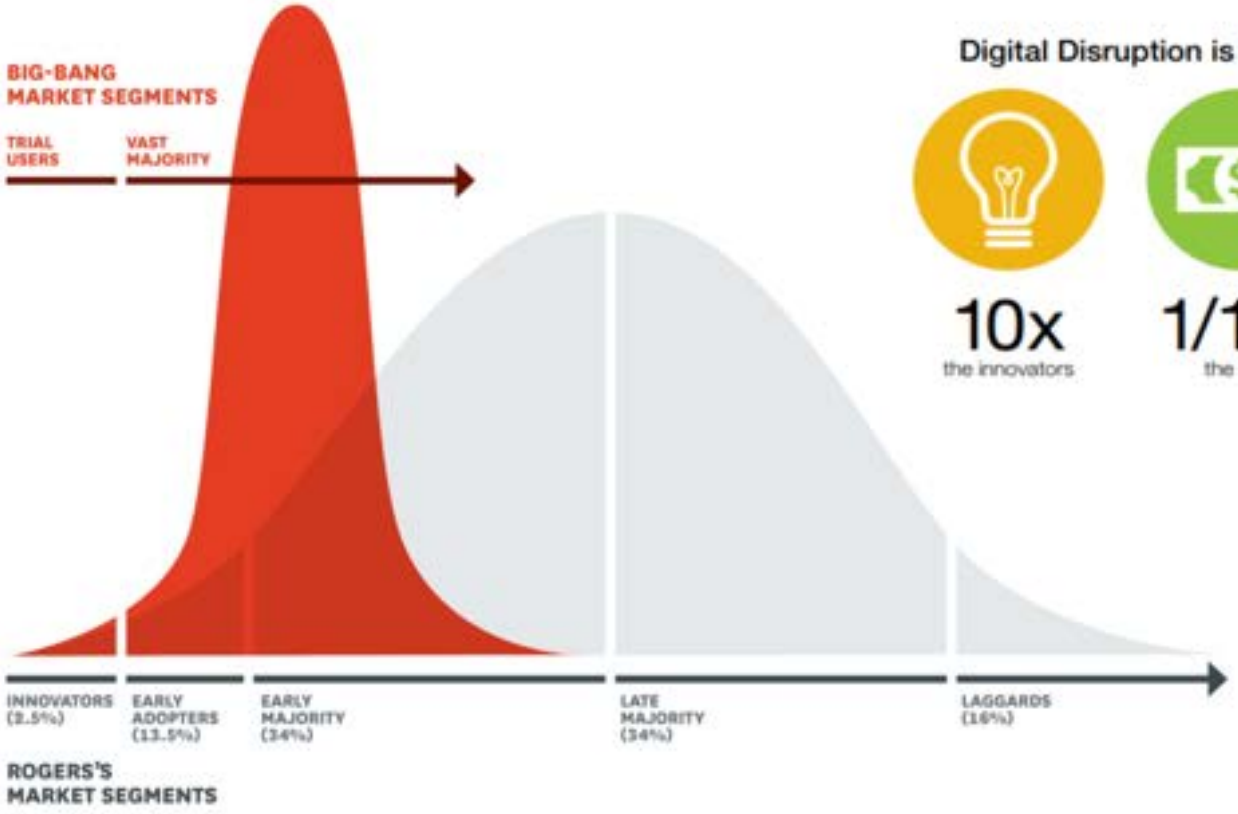
Digital City & Governance program Smart Cities



Digitale disruption



2

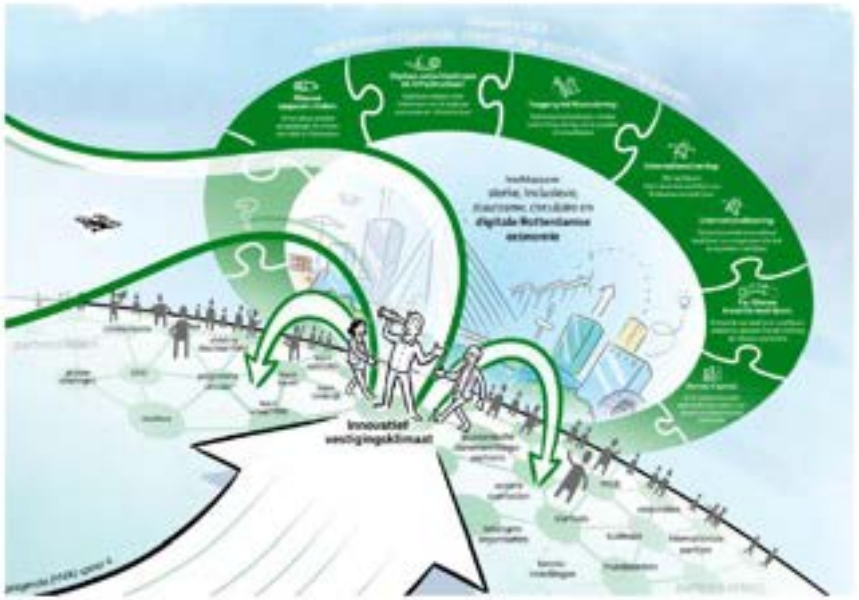
Our challenges

- We must learn how the city is used in the digital era
- What are the requirements for this increasingly digitalizing city
- How can we facilitate good things and prevent bad things happening
- What is our role as a local government and what is up to the market
- How can we deal with the ethical discussions of sensors, data and algorithms

outside in

Team Economic Innovation

- Exploring new technologies and innovation
- Digital activities and infrastructures
- Access to financing
- International:
  a – supporting Rotterdam companies setting up businesses abroad
  b – acquisition of international businesses and congresses
- Helping companies with their transition to the new economy
- Human Capital agenda, access to talent



Digital infrastructures

Good digital infrastructures are a basic condition for an innovative, attractive and future-proof living environment.

It also ensures that important digital applications and services (for example for healthcare, banking and shopping) work well and in a standardised manner.

Moreover, they are needed for the digital services of the future, such as Mobility as a Service and home automation.

- Fibreglass deployment
- 5G deployment
- Datacenters
- IoT
- Smart Lampost (www.cent-r.com)

Digital Economy

Digitization leads to significant changes in society. The (commercial) interaction between companies and consumers (also among themselves) is increasingly going digital.

But digitization also has major effects on existing business models and on the use of the city.

Companies are increasingly using data and algorithms. This helps them to offer new and innovative services and products that are indispensable. Examples are online platforms, search engines, Internet of Things and Home Automation.

- Digital Economy Program
- Human capital agenda, specifically focused on talent development:
  - IT Campus
  - We-IT program
- Campus development
  - Data campus
  - Quantum campus
- Cyber resilience en security
- Ethical policy framwork implementation
- Digital Inclusion program set-up

Our Ethical standards of sensors, data and AI in the city

- Question of the city council: why do we have set guidelines for the use of cameras in the city, but not for other devices and applications.

- One of the first cities in the Netherlands with an ethical guideline based on 5 principles:
  1 – Social values
  2 – Rights of sensors, data and algorithms regulated
  3 – Accessible and secure infrastructure
  4 – Parties involved
  5 – Transparency

APPROVED

- And develop tools like algorithm registry and governance

D66 rotterdam PvdA Rotterdam GROEN LINKS ROTTERDAM

Motie: Wie smart is moet ook slim zijn

De gemeenteraad van Rotterdam, in vergadering bijeen op 18 maart 2021 ter bespreking van Beleidskader Cameratoezicht.

Constaterende dat:
- Digitalisering en technologisering ontwikkelingen zijn met een grote impact, ook in Rotterdam;
- De gemeente steeds meer een 'smart-city' wordt waarbij met sensoren data worden verzameld, waaronder camerabeelden en geluidssensoren, maar ook data op andere manieren verkrijgt;
- Het college met het lokale beleidskader voor Gemeentewet 151c criteria heeft geformuleerd voor de inzet van (mobiel) cameratoezicht in de stad;
- Het lokale beleidskader Gemeentewet 151c alleen betrekking heeft op camera's en voor de inzet van andere en nieuwe sensor en data-toepassingen inclusief geavanceerde analyse technieken, ook wel genoemd Artificial Intelligence (AI) nog geen beleidskader bestaat;

Overwegende dat:
- D66 geen tegenstander is van de inzet van camera's en andere sensoren, en AI, maar dat hier wel de juiste waarborgen en criteria voor moeten gelden;
- D66 daarom blij is met de inspanningen van het college voor de totstandkoming van het lokale beleidskader Gemeentewet 151c;
- Het onduidelijk is binnen welke kaders de gemeente sensoren, data en AI inzet voor naastplaatsingen, verkeersoverlast of woninginbraken;
- Er sprake is van diverse proeftuinen, pilots en experimenten waarbij sensoren, data en AI worden toegepast;
- Het van belang is om voor alle sensoren-inzet, data toepassingen en AI gebruik een lokaal beleidskader te ontwikkelen zodat we de noodzakelijke waarborgen niet uit het oog verliezen;
- Dit kader, daar waar dat binnen de mogelijkheden van de wet toepasbaar is, ook van toepassing laten worden voor andere professionele partijen in stad.

Verzoekt het college:
- Voor de gemeentelijke organisatie tot een breed beleidskader te komen voor smart city oplossingen die voortkomen uit (toekomstige) sensor, data en AI-toepassingen;
- Dit beleidskader te doen toekomen aan de raad voor eind 2021.

En gaat over tot de orde van de dag.

Nadia Ansieni, D66 Rotterdam
Duygu Yildirim, PvdA Rotterdam
Stephan Leewis, GL Rotterdam

Ecosystems

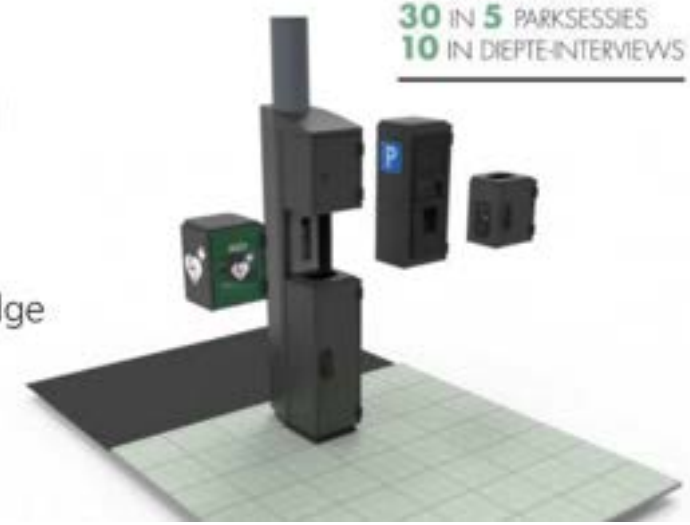
We must remain attractive as a city and region. That is why we need to further map the Rotterdam digital ecosystem, and coordinate with the parties involved how we can further strengthen each other. Because together we create more innovation capacity than individual companies, educational institutions and governments can offer.

In the relationship with the companies in Rotterdam, a clearer point of contact, a relationship and account management role is also needed.

- Eco-system development
- Relationship and account management
- Regional Digital Strategy
- Living Labs
- Congresses
- CityLab010
- Colleges & Universities
- Drones
- Europe
- CDO collaboration
- Other collaboration

Living Lab Sensible Sensor

If the outdoor space could talk, what would it tell you? The outdoor space is digitizing. In Rotterdam, the Living Lab Sensible Sensor Reyeroord was executed, where experience has been gained in the Reyeroord district with the use of sensors in the outdoor space. Residents, companies and knowledge institutions play a prominent role.



GEBIED REYEROORD

19 PROJECTEN
PILOTS EN ACTIVITEITEN

IN GESPREK MET BEWONERS:
30 IN 5 PARKSESSIES
10 IN DIEPTE-INTERVIEWS

SAMENWERKING MET MEERDERE PARTIJEN

21	5	45	8
BEDRIJVEN	KENNIS-INSTELLINGEN	PROFESSIONALS EN VELE ANDEREN!	TRAINEES EN STAGETRAJECTEN

211 DEELNEMERS DIE 1 OF MEERDERE WEBINARS BIJGEWOOND HEBBEN. AANTAL AANMELDINGEN PER WEBINAR:

77	Participatie & Design
105	Technische Toepassingen
105	Wet- en Regelgeving
93	Sensorarchitectuur
148	Living Lab Conclusies en vooruitblik

5 WEBINARS 29 SPREKERS

LIVING LAB SENSIBLE SENSOR REYEROORD

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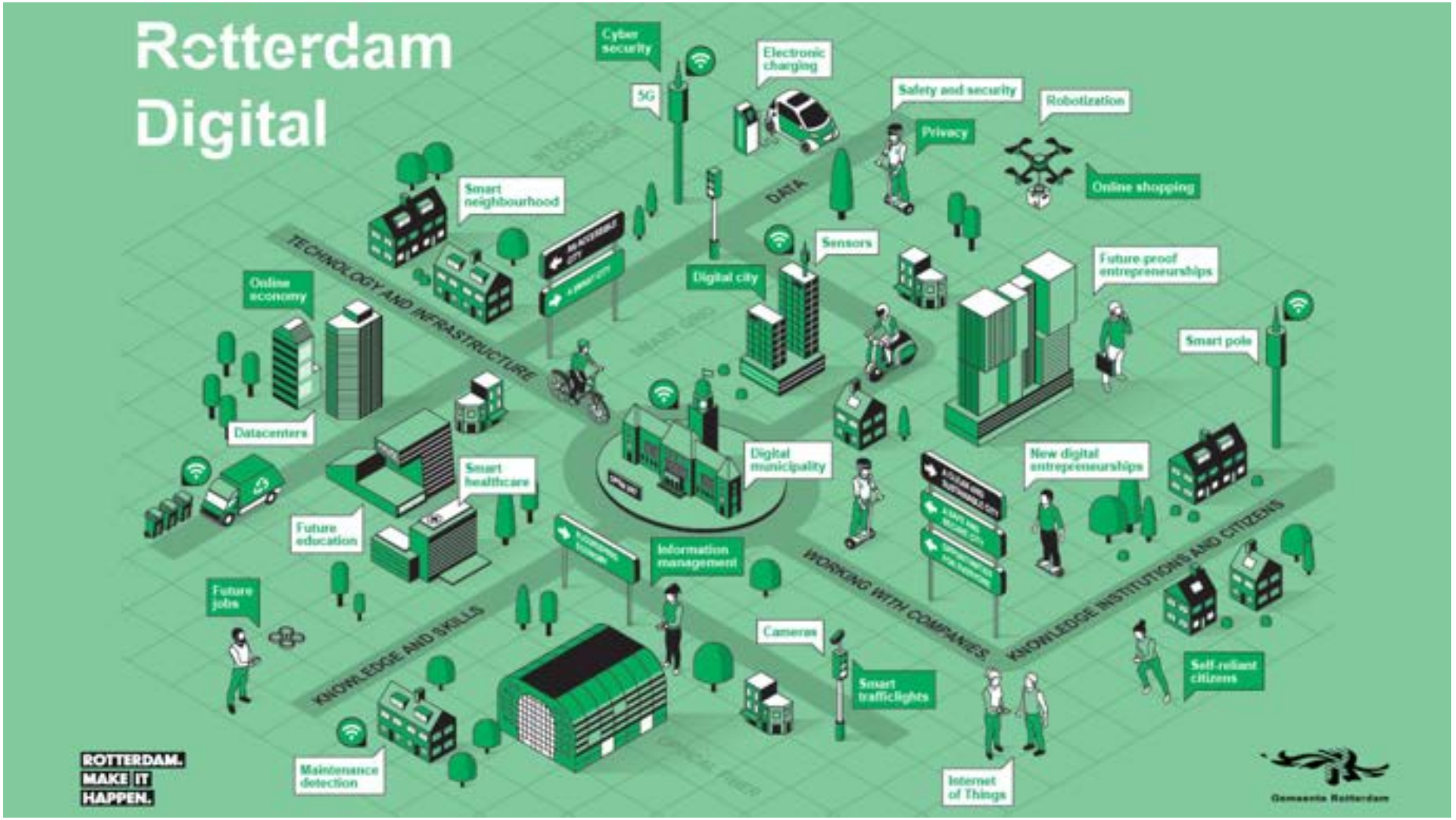

Rotterdam
Digital
Cyber security
5G
Electronic charging
Safety and security
Privacy
Robotization
Online shopping
Smart neighbourhood
DATA
Sensors
Digital city
Future proof entrepreneurships
Online economy
TECHNOLOGY AND INFRASTRUCTURE
Smart pole
Datacenters
Digital municipality
New digital entrepreneurships
Smart healthcare
Future education
Information management
WORKING WITH COMPANIES
KNOWLEDGE INSTITUTIONS AND CITIZENS
Future jobs
KNOWLEDGE AND SKILLS
Cameras
Smart trafficlights
Self-reliant citizens
Maintenance detection
Internet of Things
ROTTERDAM. MAKE IT HAPPEN.
Gemeente Rotterdam


Thank you for
your attention.
11

Digital City & Urban data platforms

Erasmus Centre for Data Analytics

Erasmus University Rotterdam

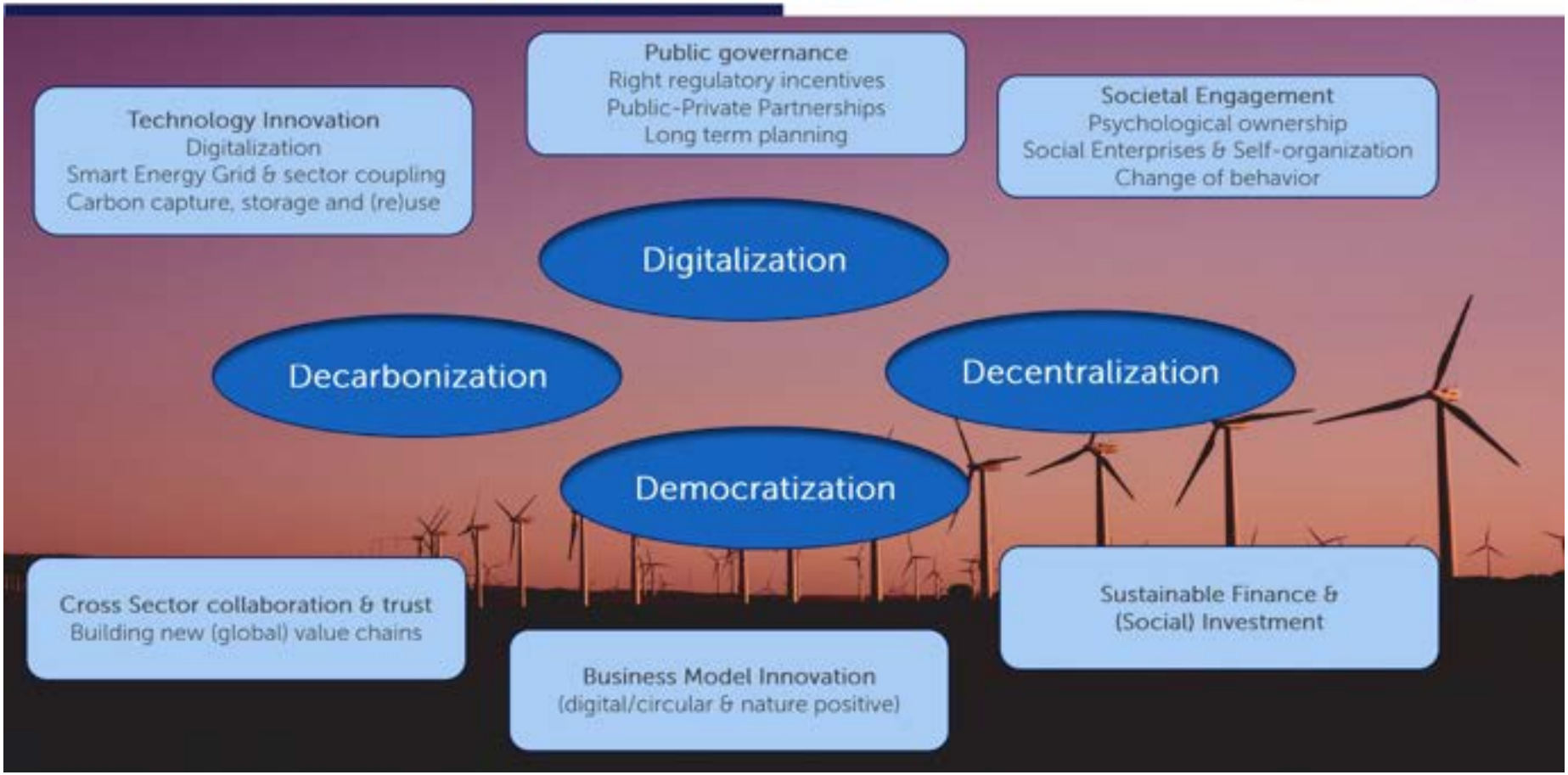
ecda.eur.nl

Digital worlds: How data and digitalization drive the energy transition - towards resilient and climate neutral cities – An introduction .....

September 8, 2022 | Recharge Earth Event | Dr. Marcel van Oosterhout, Erasmus Centre for Data Analytics

4Ds: Enabling pillars of the Energy Transition

Erasmus Centre for Data Analytics



Green Deal Ambitions

Erasmus Centre for Data Analytics

European green deal (Dec. 2019): Ambition of being the world's first climate neutral continent by 2050.

Key targets for 2030:
- At least 40% cuts in greenhouse gas emissions (from 1990 levels)
- At least 32% share for renewable energy.
- At least 32.5% improvement in energy efficiency

European Green Deal focuses on 3 key principles:

1. Ensuring a **secure** and **affordable** energy supply
2. Developing a **fully integrated, interconnected** and **digitalized energy market**
3. Prioritising **energy efficiency**, improving the **energy performance of buildings** and developing a power sector based largely on **renewable sources**

3 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/energy-and-green-deal_en

The promise of Energy Digitalization

Erasmus Centre for Data Analytics

International Energy Agency: iea

Digital technologies are set to make energy systems around the world more connected, intelligent, efficient, reliable, and sustainable.

- Data
- Internet of Things
- Analytics
- Artificial Intelligence
- Blockchain
- Platforms
- Augmented & Virtual Reality

Digitalized energy systems in the future may be able to identify who needs energy and deliver it at the right time, in the right place, at the lowest cost and the most sustainable way.

A big change in data ....

Erasmus Centre for Data Analytics

one datapoint per year per connection

one datapoint per 15 minutes (per device)

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Energy digitalization enables decision making everywhere

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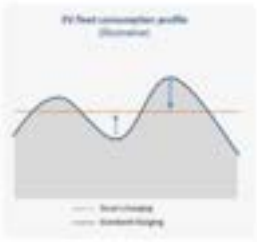
Strategy long-term decision-making

- Policy scenarios & Simulations
- Decision support on investment decisions & area (re)development
- Developing smart & sustainable buildings & infrastructure
- Citizen engagement

Tactical decision-making & operations

- Prediction of energy supply & demand
- Market predictions & trading support
- Energy systems coupling & optimization
- (Predictive) maintenance



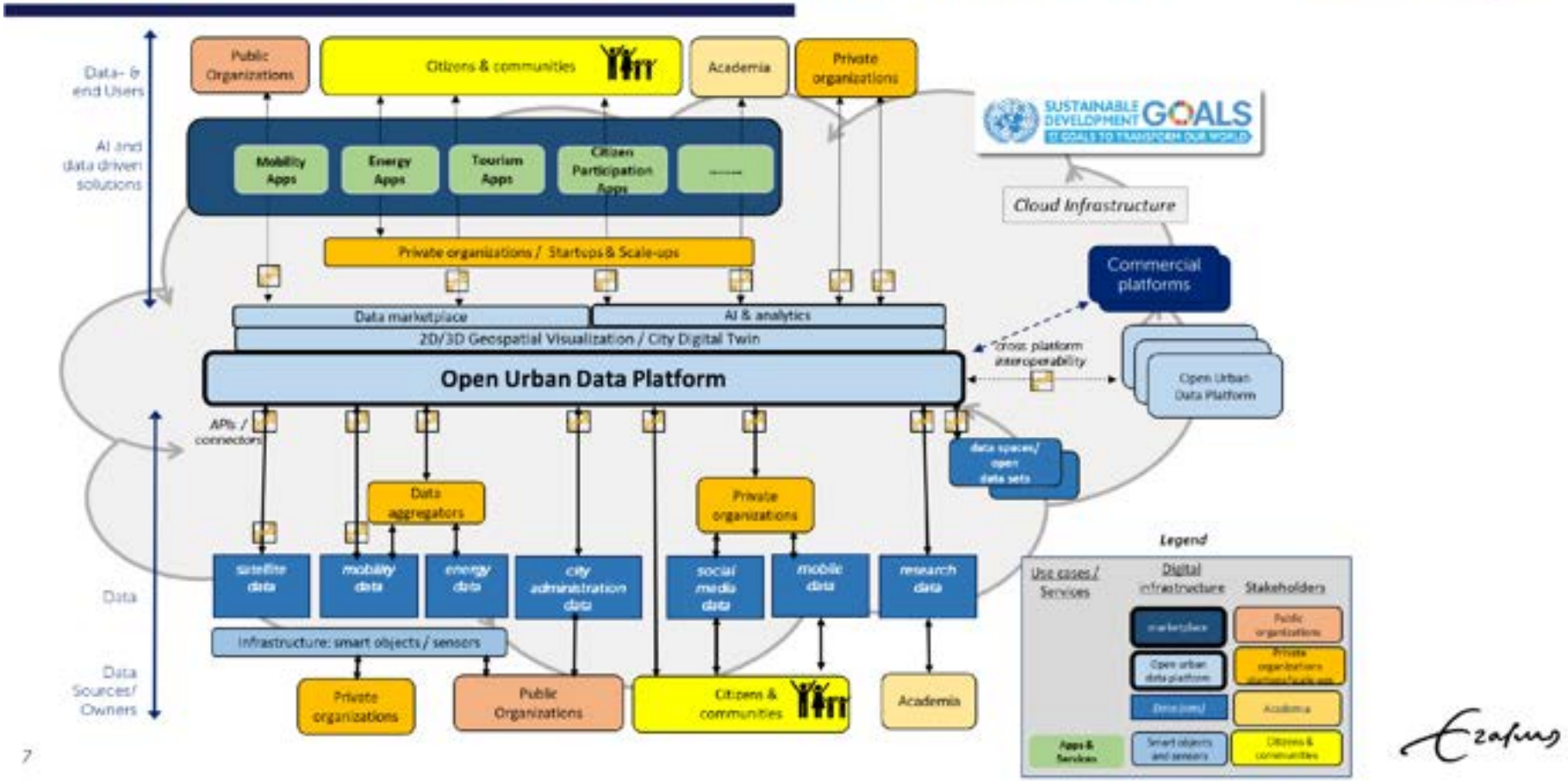
Operational decision-making

- Improving grid stability, sustainability, and efficiency
- Anomaly detection, safety & security monitoring
- Decision support for energy efficiency, demand-response measures
- Smart-shared mobility, smart charging of EVs
- Local distributed energy optimization (such as virtual power plant concepts)

6

Open urban data platforms and Digital Twins will have an important role

Erasmus Centre for Data Analytics



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Digital Twins – fed by data and using AI – will support decision making

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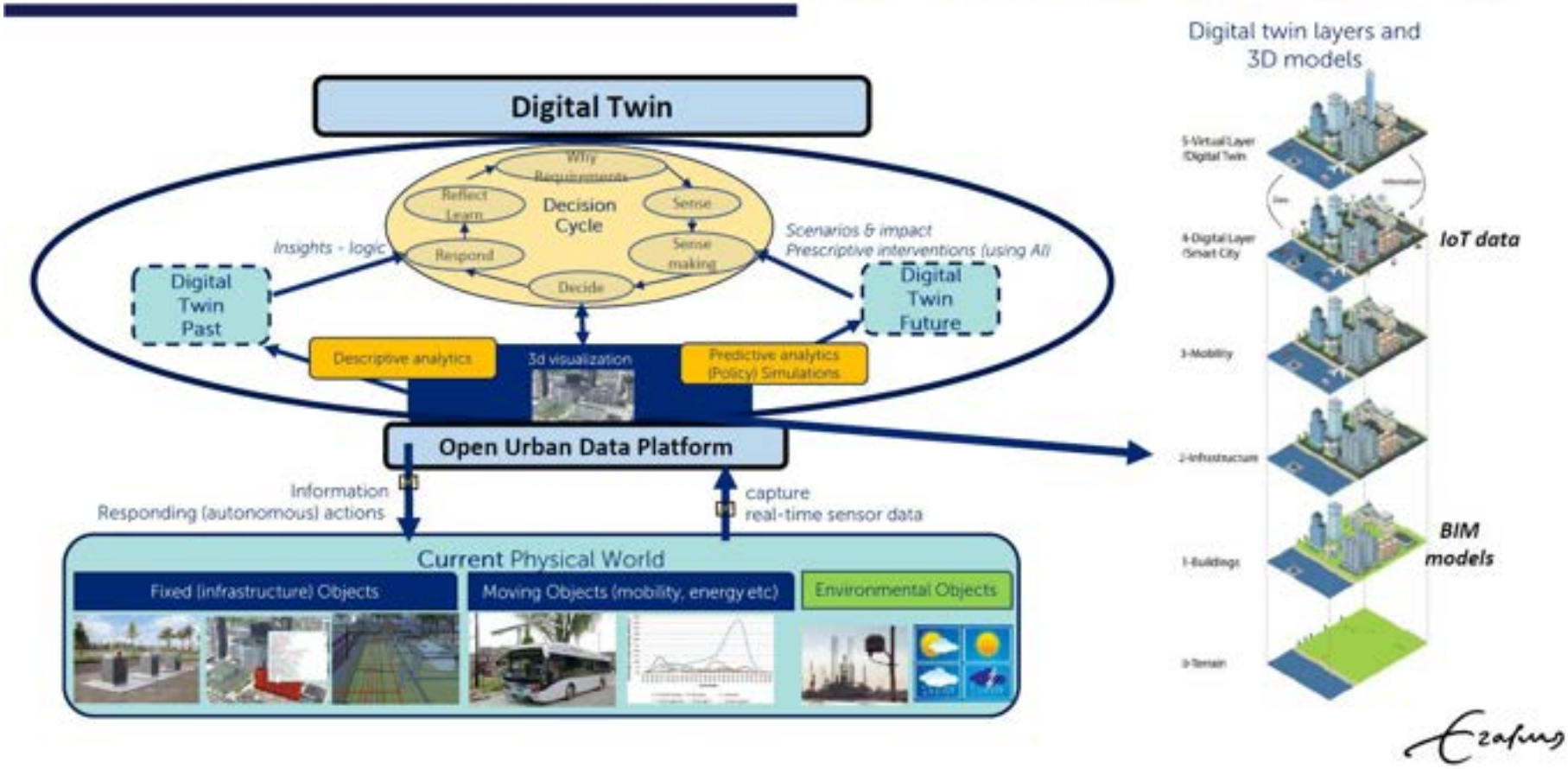


State of development UDPs & Digital Twins in Europe

Representative sample of 80 cities in Europe, with in total 105 respondents.
The study was executed in the period November 6, 2019 until January 10, 2020.
85 percent of the respondents were partner in one of the EU SCC projects, funded by the European Commission

Exploring & Planning for Urban Data Platform (44%)

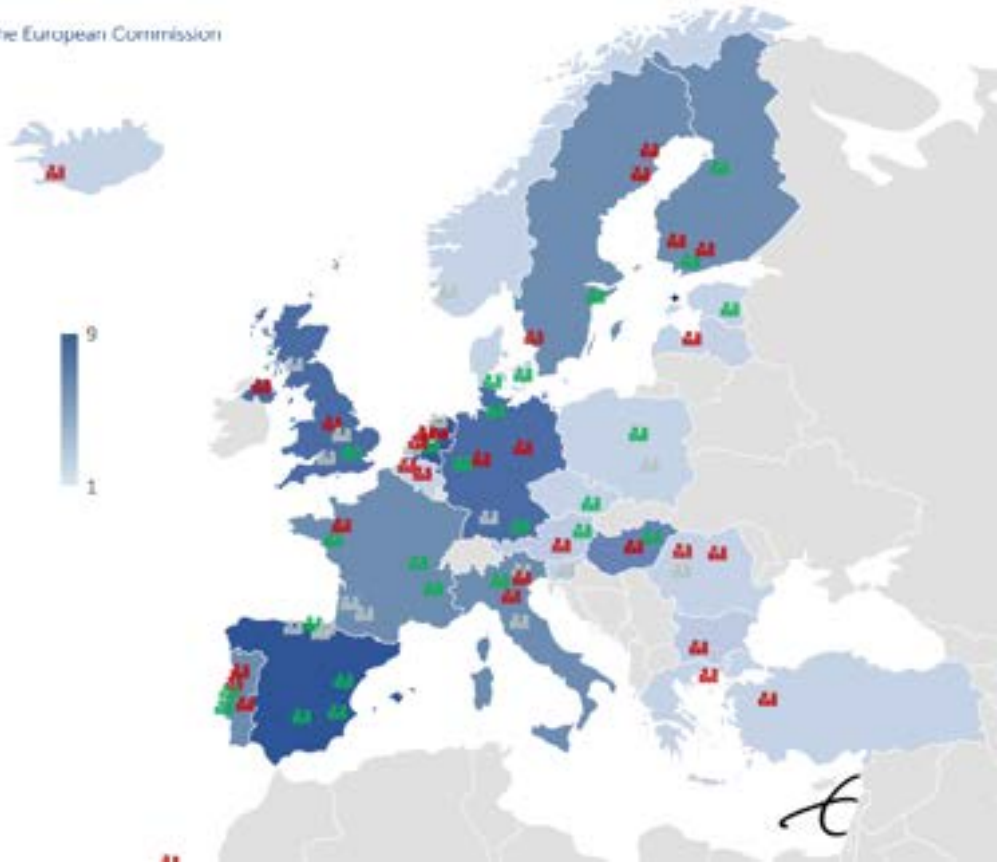
Alexandroupolis	Evora	Porto
Alkmaar	Genth	Rennes
Amsterdam	Gothenburg	Reykjavik
Bassano del grappa	Graz	Riga
Berlin	Kerava	Santa Cruz de Tenerife
Budapest	Leon	Skellefteå
Cluj-Napoca	Maia	Suceava
Derry	Manchester	Smolyan
Eskişehir	Oostende	The Hague
Essen	Parma	Umeå

Building & Implementing Urban Data Platform (25%)

Alba Iulia	Maribor	Stuttgart
Bilbao	Nottingham	Trento
Bordeaux	Pamplona	Tampere
Bristol	Rotterdam	Firenze
Groningen	Saint-Quentin	Glasgow
Lublin	Santander	
Linköping	Stavanger	

Operational Urban Data Platform (31%)

Albacete	Lisboa	San Sebastian
Barcelona	London	Sonderborg
Brno	Lyon	Stockholm
Cologne	Matosinhos	Tartu
Copenhagen	Milan	Utrecht
Grenoble	Munich	Valenica
Hamburg	Nantes	Vienna
Helsinki	Oulu	Warsaw



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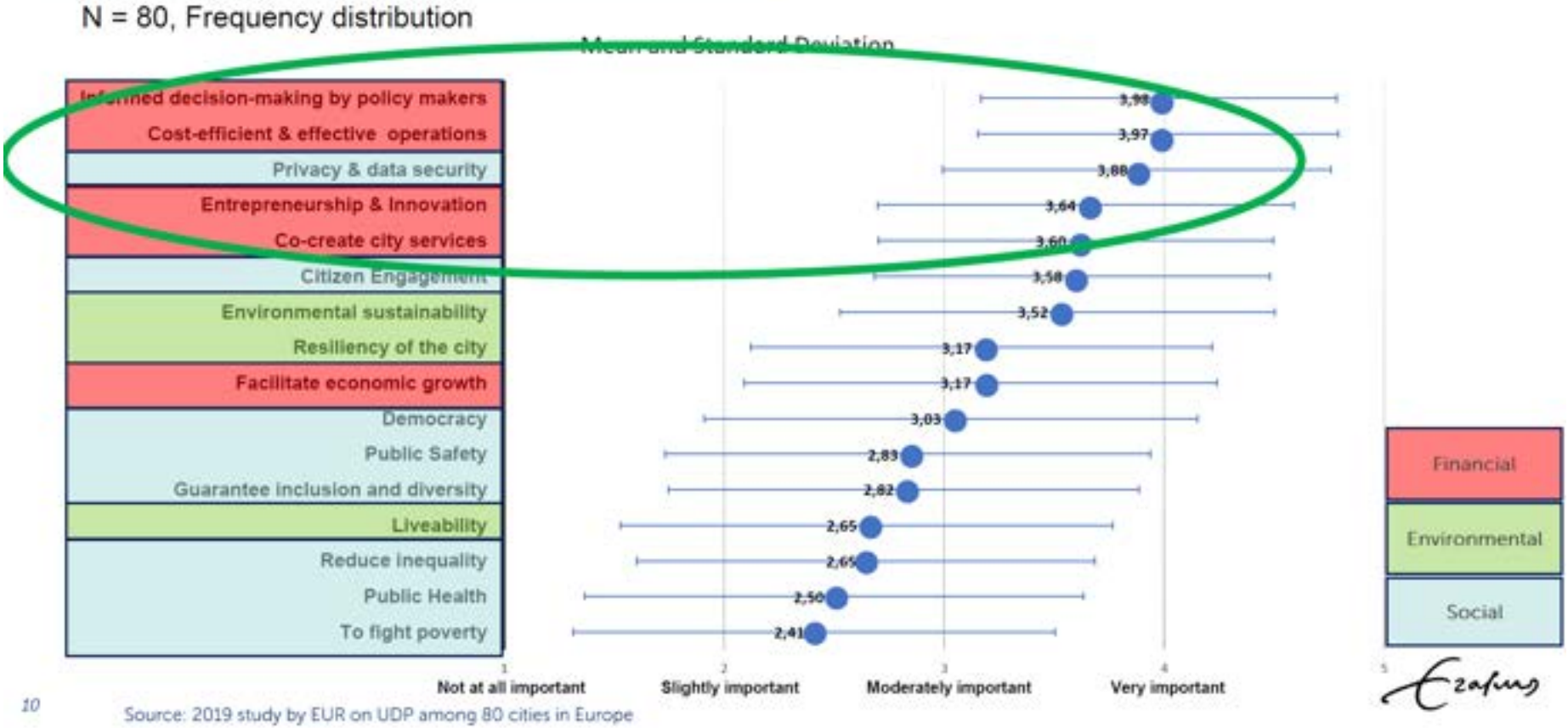
Purpose for Digital Twins and UDPs



10

Source: 2019 study by EUR on UDP among 80 cities in Europe

Trust is the core success driver of an UDP ecosystem
Capabilities – Collaboration – and Governance breed Trust

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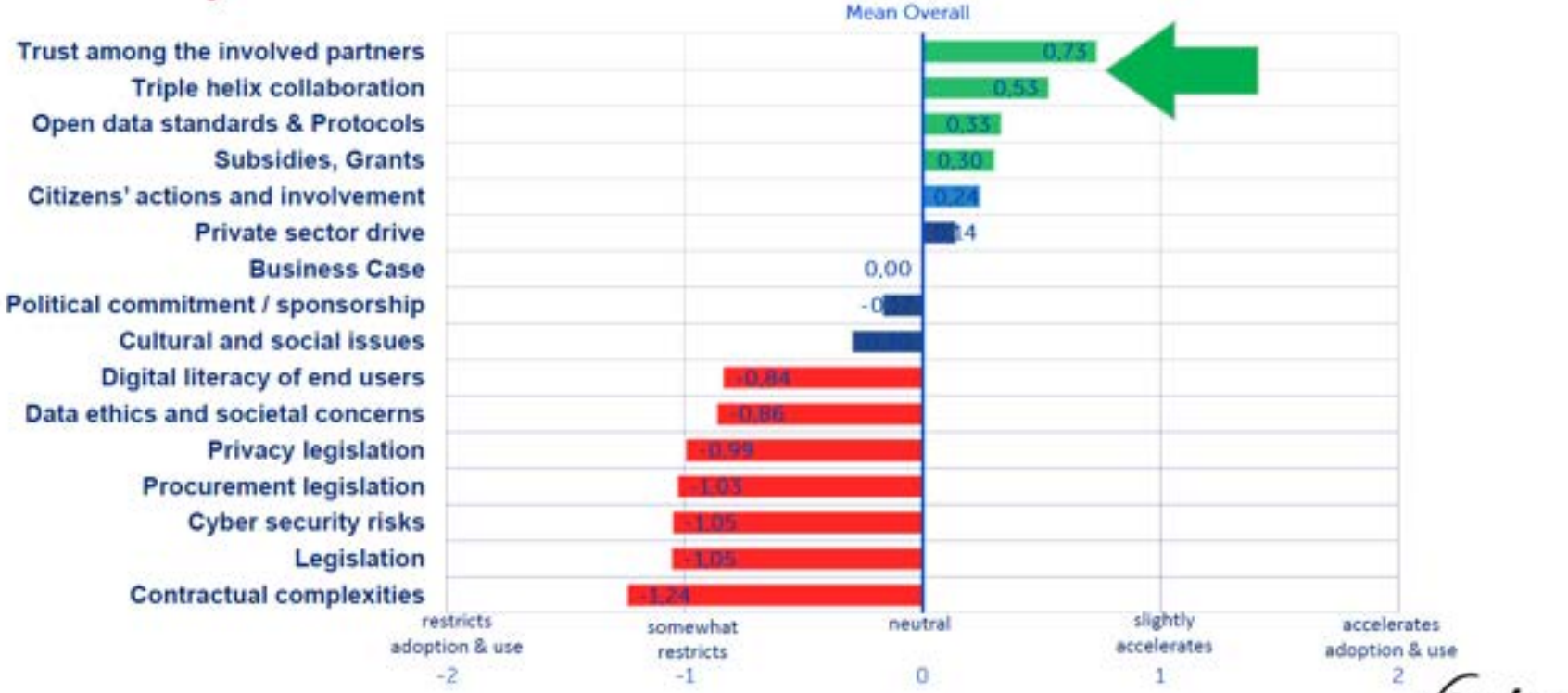
What are the key accellerators and inhibitors of UDPs?



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Source: 2019 study by EUR on UDP among 80 cities in Europe

Source: 2019 survey

Challenges for Energy Digitalization

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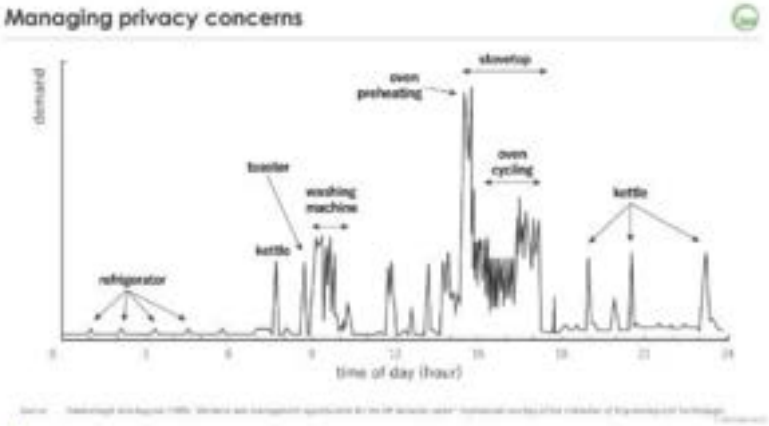
- Lack of public acceptance/trust with new technologies.
- Market design challenges
- Additional energy demand
- Cybersecurity
- Data ownership/privacy (e.g. energy demand profiles)
- Economic disruption and transformation (job losses)



Key take-aways

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1) Energy digitalization and data is one of the key pillars of the energy transition

2) This creates opportunities to
   1) improve energy efficiency
   2) facilitates system coupling
   3) enables required levels of flexibility needed to incorporate renewable energy

3) Energy digitalization applications enable strategic up to operational decision-making

4) Urban data platforms will be an important element of cities energy digitalization infrastructure

5) Trust, interoperability/standards and Quadruple Helix collaboration are key drivers

6) Use agile mind set and continuous improvement approach: Think big, start small and learn (from failure) fast!

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Erasmus Centre for Data Analytics

Passion provides purpose, but data drives decisions

Andy Dunn

moosterhout@rsm.nl

ecda.eur.nl

Architecture & Digital City