G20 REPORT ON PRACTICES OF INNOVATIVE PUBLIC PROCUREMENT FOR SMART CITIES AND COMMUNITIES

Report for the G20 Digital Economy Task Force

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G20 REPORT

PRACTICES OF INNOVATIVE PUBLIC PROCUREMENT FOR SMART CITIES AND COMMUNITIES[1]

Building on previous G20 Digital Economy Ministerial outcomes the Italian Presidency continued the G20 dialogue on smart cities providing a focus on innovative public procurement, an instrument at the disposal of policy makers that can foster the digital and sustainable transition of cities, enabling the modernization of public services with better value for money solutions. This report was elaborated by the Italian Presidency through desk research and contributions on practices by G20 countries.

The term public procurement (PP) identifies the set of processes and operations through which the public administration purchases goods and services. Given the relevance and weight that the phenomenon has on the economy (it represents about 14% of EU GDP, see OECD, 2017), PP has long been considered a relevant policy tool to achieve policy objectives such as: contributing to economic growth, creating employment, promoting the competitiveness of national companies, and compensating for negative cyclical episodes. Furthermore, public demand can indirectly stimulate innovation by influencing the size of the market, promoting the adoption of new standards and contributing to the competitive structure of the market (Edler et al., 2005; Cabral, 2006; Edquist and Hommen, 2000; Cave and Frinking, 2007; Uyarra and Flanagan, 2009).

In addition to traditional procurement, there are purchasing methods that encourage administrations to directly demand for innovation, in the form of innovative goods and services or research and development. Indeed, in an economic phase characterized by scarcity of available resources, innovation demand can contribute to improving the provision of public services by using fewer resources, while addressing complex social challenges, guiding the process of technology change towards socially shared objectives (European Commission, 2005, 2006 Edler et al. 2016).

Given the enormous challenges that cities will have to face in the near future, innovative public procurement can be a catalyst for local innovation, offering innovative services that address local challenges (such as energy, mobility, transport, climate adaptation and mitigation) and helping innovative suppliers to increase the technology readiness of their products. Smart cities can thus benefit from innovative procurement in order to improve urban life through more sustainable, integrated solutions.

Taking this into consideration, this report identifies nine main criteria that should be incorporated in the PP's practices in order to be responsive to present and future challenges.

The following analysis and examples of practices are drawn from literature, desk research and cases provided by G20 member countries.

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[1] This document does not prejudge nor represent necessarily the positions of G20 members.

Stakeholders' engagement

Stakeholder engagement and transparency in procurement procedures help to create a level playing field for suppliers, foster competition, and open channels for civil society participation. Undeniably, scrutiny and participation of citizens, civil society organisations, and urban communities create positive incentives for public officials to ensure government accountability and establish control mechanisms.

Best practices have been adopted to increase public participation by many cities and communities. Below the example of the "Social Witnesses" is represented, introduced by the Ministry of Public Administration of Mexico.

MEXICO	
Sector	All
Name of public procurer	Ministry of Public Administration
Type of public procurer	National
Background. Since 2009, Social witnesses are required to participate in the stages of public bidding procedures above certain thresholds and in those cases determined by the Ministry of Public Administration, taking into account the impact that the contracting has on substantive government programs, as a way of to promote public scrutiny. In 2021, these thresholds are 448 million pesos (approximately 23 million dollars) for acquisitions, leases and services, 896 million pesos (approximately 45 million dollars) for public works, and for projects related to Public Private Associations 2,724 million pesos (approximately 137 million dollars).	
Areas of need • The procurer wanted to address the following needs: • Increase public participation; • Increase transparency in the procurement process.	
Procurement description Social witnesses are non-government organizations and individuals selected by the Ministry of Public Administration (SFP) through public tendering. SFP keeps a registry of the approved social witnesses and evaluates their performance; unsatisfactory performance potentially results in their removal from the registry. When a federal entity requires the involvement of a social witness, it informs SFP who designates one from the registry.	
Results SFP notes that "the monitoring of the most relevant procurement processes of the federal government through social witnesses has had an impact in improving procurement procedures by virtue of their contributions and experience, to the point that they have become a strategic element for ensuring the transparency and credibility of the procurement system". An OECD-World Bank Institute study (2006) indicates that the participation of social witnesses in procurement processes of the Mexican Federal Electricity Commission created savings of approximately USD 26 million in 2006 and increased the number of bidders by over 50%.	

Available examples suggest that innovative public procurement should be integrated within a broader strategy for human-centric, inclusive, accessible, and transparent smart cities and communities. To enable community empowerment in the implementation of innovative public procurement models, citizens, local businesses and research institutes play a strategic role in the development and execution of procurement processes.

The implementation of transparent and regular dialogue with city suppliers and local business associations is equally important, as well as an effective communication plan.

Finally, maintaining an adequate level of scrutiny, and providing that confidentiality, equal treatment and other legal obligations are present in the procurement process, is relevant to offer opportunities with appropriate promotion for the direct involvement of relevant external stakeholders in the procurement system reaching beyond the local sphere.

On these aspects, below there is an example from Argentinathat demonstrates how transparency in procurement procedure can be reached with specific dedicated platforms.

ARGENTINA	
Sector	Health and other sectors related to the response to the COVID-19 pandemic.
Name of public procurer	National Office of Public Procurement, Secretariat of Public Innovation of the Chief of Cabinet of Ministers' Office.
Type of public procurer	National or provincial
Background. In the context of the emergency due to the COVID-19 pandemic, the National Executive Power established "Acordar", the platform for managing National Agreements, which enables direct and simplified procurement in cases strictly related to the attention of the health emergency. It promotes transparency, due to the fact that it offers information on the products and services whose certification is carried out in a centralized way by the National Procurement Office regarding the location, price and quantity offered, the amounts awarded and the suppliers contracted through this mechanism. These offers are displayed on the platform and can be booked and purchased by the national and provincial governments. In addition, the platform encourages the inclusion of interested actors, providing equal opportunities for suppliers from all over the country to offer their products.	

Areas of need. The procurer wanted to address the following needs:

- Answer to the health emergency caused by the COVID-19 pandemic in a fast and efficient manner.

- Increase transparency during the process of public procurement.

- Foster inclusion and stakeholders' engagement in public procurement processes.

- Even opportunities of procurement between the central administration and provincial governments in times of limited supply and infinite demand.

- Set up a georeferenced observatory of prices

- Allow for participation without the obligation of being a supplier for the national government.

Procurement description. A call is published in the Official Bulletin and in "Comprar" and "Acordar" platforms so suppliers from all the country can offer the products and services needed to face the health emergency. Secondly, the interested stakeholders offer their goods and services on the "Comprar" platform indicating prices, quantities and location, where national, provincial and the City of Buenos Aires (CABA) governments can find them. A compromise to make offers available for all agencies is established. The offers' prices must adhere to those informed and can not exceed in 10% the values established by the National Auditing Office (SIGEN) or the maximum prices set by the Ministry of Productive Development. The last stage is the simplified purchase in which national, provincial and CABA governments have the same offers to evaluate, reserve purchase quotas and allocate according to each jurisdiction's regulations. While the agreement is in effect, suppliers can increase their offers in accordance to the agreed conditions and prices. The information regarding the agreements, the offers and the direct procurements made through the National Agreements mechanism is available in the "Acordar" platform.

Collective initiatives

When dealing with public procurement activities, there is a risk that if public officials solely assess which are the priorities for a community this could hamper the process and limit the impact on society. The involvement of citizens who express their needs and demands is crucial to attain efficient and sustainable impacts.

Recently, a few projects have started developing innovation platforms that allow the exchange of information between procurers and citizens or b-to-b and these examples are a matchmaking place for supply and demand. The example from the City of Copenhagen is reported below.

EUROPEAN UNION - DENMARK	
Sector	All
Name of public procurer	City of Copenhagen
Type of public procurer	National

Background. By 2025, Copenhagen's ambition is to become a carbon neutral country. With this aim in mind, in October 2013 the Copenhagen Cleantech Cluster and the City of Copenhagen instituted a strategic partnership to explore new actions for using public procurement. The outcome was the setting up of a platform where businesses could meet and get to know each other, and where they could apply their expertise and skills to develop solutions jointly.
Procurement description The project was based on a Public-Private Innovation, a model that can be divided into several periods: • Identifying and prioritizing challenges: the public authority identified and prioritized challenges clearly stating its intention to become a smart country.
• From the big challenge to specific problems: the public authority collected information about the issue together with ideas on how to solve it. In this process, experts, entrepreneurs and other stakeholders were invited to study the challenge in more detail breaking it down into specific problem areas. As the most important issues emerged citizen engagement and data availability. • Innovation teams: then partners and stakeholders with the expertise to contribute to solve the challenge were identified and possible solutions and obstacles were explored in more detail. The topics tackled ranged from data availability, open vs. closed standards, building models for establishing a digital infrastructure, to waste management, water management, transportation, energy consumption etc. • Procurement and implementation: After gathering all the information, the following step was to issue a new tender to solve the challenge. The identity of the procurer is however not given it might be a public authority as well as an association with public sector backing.

In addition, also open Innovation platforms can enable the entirety of urban stakeholders - city administrators; start-ups & innovators; industries; incubators; academia; and citizens - to cocreate thereby reducing transaction costs of ideating & discovery of solutions, helping in the expansion & diversification of the market for urban solutions. Open innovation platforms that help cities in the easy discovery of innovative & technologically advanced solutions by matchmaking solution seekers with providers. The example of City Innovation Exchange, an open innovation platform of the Ministry of Housing and Urban Affairs, India is reported below.

CITY INNOVATION EXCHANGE – SMART CITIES MISSION, INDIA	
Sector	Urban Innovation Procurement
Name of public procurer	Indian Smart Cities (100)
Type of public procurer	Local/Municipal Government

Background. India is witnessing the rise of a vibrant innovation ecosystem enriched by technology, talent and entrepreneurial spirit, offering enormous potential to address the toughest urban challenges across the nation. However, due to lack of aggregation of their capacities and inability to flow outwards, the benefits of their existence have not been harnessed by the urban ecosystem. The few potentially new ideas and solutions that arise are not always put into practice due to reluctance of cities to fund ideas that are unproven and risky. The existing government procurement processes have hindered procurement of innovative solutions.

Smart Cities Mission, Ministry of Housing and Urban Affairs envisions the emergence of a national scale ecosystem for fostering open innovation to co-create technologically advanced solutions/services and translating these innovations into commercial solutions suitable for adoption by the urban masses. As the first step towards this initiative, a Digital Platform namely "City Innovation Exchange" (CiX) has been developed for enabling faster and cost-effective scouting of solutions, transparency, visibility, and ease of collaborations among the different stakeholders.

"City Innovation Exchange" aims to match urban solution seekers to innovators for cocreation of better urban solutions. CiX, will empower cities and urban stakeholders to test and validate solutions, reducing the perennial problem of risk of procurement. For the innovators, CiX will be reducing barriers to access cities and public sector organisations, and get their solutions tested in real world environment.

Areas of need The CIX platform wants to address the following needs:

- An institutional 'Sandboxes' for testing & validating solutions and reduced risk of solution failure.

- Streamlining procurement of 'emerging technology' solutions

- A coherent platform for the 'discovery' of innovative solutions and 'connect' to users in Cities.

- Reducing market barriers for innovations

- Institutionalising Innovation Co-Creation in Cities involving all urban stakeholders

- Market conditions and regulations to promote public procurement from startups & MSMEs.

Procurement description

CiX is envisioned as a digital marketplace housing innovative solutions which helps instutionalise a buyer-seller engagement model specifically for ease of procurement in the urban ecosystem.

The CiX platform will be supported by a robust and innovation-streamlined 'SmartProcure' framework, a policy guideline for procurement of innovation. It supports direct and simplified procurement from innovators. The platform will expand a demand-driven market for urban solutions and enhance ease of business. The platform incorporates institutional safeguards, digital process chain and a framework for piloting, incubation, acceleration and solution validation. Through mechanisms such as plan compensation the platform stimulates IP generation and protection in cities. The platform envisions a lab-to-land transfer of ideas through sandboxes in cities.

Results

The platform in two months of launch has received significant traction from all target stakeholders. 100 Smart Cities have sought solutions for 153 challenge statements across 10 sectors. The platform has participation of 518 innovators showcasing 158 solutions. The platform has deep linkages with innovation initiatives across India such as 'Startup India' and 'Atal Innovation Mission'. Process re-design has helped cities identify validated solutions from across the country and quickly localise them for deployment.

The last example provided in this criteria is the case of the Public Procurement Service (PPS) in Korea, which has run a platform called "Inno-KONEPS", where supply and demand is inventively tackled. At this platform any citizen, business or public entity can suggest innovative ideas, putting forward opinions in a community involving experts, companies, and other stakeholders to convert ideas into goods. As soon as the ideas are embodied, products built on the ideas can be identified (or designated) though public announcements and then provided to client agencies in this one-stop system.

PUBLIC PROCUREMENT SERVICE KOREA	
Sector	Procurement process
Name of public procurer	*Public Procurement Service(PPS)*
Type of public procurer	National procurer

Background. The Public Procurement Service(PPS) selected and proceeded with 'Innovation on Public Procurement' as a task for the 2019 comprehensive innovation plan in order to offer services satisfying people's needs by taking advantage of the economies of scale. The procurement agency also aimed for bolstering technological innovation and growth built on that, fostering innovative products of small and medium sized businesses from an early stage.

Areas of need The procurer wants to address the following needs:
▪ Full participation of the people, businesses and public bodies
▪ Build the public procurement market making timely response to rapid changes to society and technology
▪ Save national budgets with the best value purchase
▪ Create a new procurement market with public bodies preemptively buying innovative solutions of MSMEs.
▪ Ensure transparency in the government procurement process

Procurement description. The conventional government procurement system usually worked centering on tendering between government and business. At the innovative procurement platform titled "Inno-KONEPS," however, any citizen, business or public entity can suggest novel ideas. And the ideas can be embodied into real solutions after going through consultations among stake-holders in a community at the platform. PPS set up a dedicated mall for the innovative products at the platform where those goods are traded. Plus, PPS has gathered requests for R&D projects from end-user bodies in need of them and conducted the pilot purchase project where the public entity preemptively buys the products identified as innovative for their broader commercialization. To sum up, the procurement agency has operated Inno-KONEPS to match supply with demand for innovative goods since it set up the platform in February, 2020. This one-stop system encompasses the entire process from creating demand for innovative solutions through to identification and purchase of the fitful products.

Results

- As of May in 2021, 461 innovative products were identified and provided to public bodies through Inno-KONEPS.
- 45 innovative products(about 12million USD) to compose smart city systems were also identified(designated) and then offered to the people through public organizations

* **(Innovative solutions related to Smart City)** The smart traffic management system, the smart cities information system with video analysis technologies based on artificial neural networks, the AI-based traffic data collector, etc.

Market engagement

Strong engagement with the market to procure sustainable and innovative solutions for smart cities is essential. With the aim to satisfy their complex procurement needs, smart cities have to follow dynamic strategies and engage in a constructive dialogue with the private sector, startups and micro, small and medium-sized enterprises (MSMEs).

Public administrations could identify via technical dialogue, market consultations or by other means what is actually available on the market, before deciding whether and what to buy.

In addition, suppliers could increase the technology readiness and maturity of their products by testing them in a city or community environment. Practices involving projects on market engagement have been developed in many cities. The example of the University of Sheffield is reported below.

SHEFFIELD – UNITED KINGDOM	
Sector	Services
Name of public procurer	University of Sheffield
Type of public procurer	Local
Background. The vending services market consists of over 10,000 companies across Europe, providing a massive 3.7 million vending machines. Suppliers are both local and multinational, varying hugely in size from specialist small and medium sized enterprises (MSMEs). This market has experienced limited innovation over recent years, particularly in the area of energy efficiency. The vast majority of vending services suppliers do not manufacture their own vending machines and this was cited by suppliers as limiting their ability to innovate. The University had previously procured concessions contracts for vending services, which had consistently resulted in the incumbent supplier being awarded the contract.	

Areas of need The procurer wants to address the following needs: •
    Rethink the vending requirements and contract structure;
    • Simulate eco-innovation;
    • Explore alternative service delivery methods.	

Procurement description Initial desk-based research was performed by the Procurement Team to understand the products and services available on the market at the time. A cross departmental project team was instituted to steer the procurement and a survey of staff and students who used the campus was undertaken. This survey yielded the demand for healthy and low carbon options in the vending services provision. Following this consultation, a basic outcomes-based specification was produced.

The outcomes-based specification was shared with the market as part of a market sounding prospectus and questionnaire. Potential suppliers were given six months to respond to the questionnaire to ensure that all potential suppliers were given an opportunity to participate.

Then, a list of companies who had responded to the market sounding questionnaire was published online along with their basic company information with the aim of encouraging collaboration between the companies to innovate and meet the University's needs.

On completion of the market sounding, suppliers who had responded to the PIN were invited to a supplier meeting.

Following the supplier meeting, a Market Engagement Report was published prior to issuing the Pre-Qualification Questionnaire (PQQ). This report detailed all of the findings from the market sounding questionnaire and supplier meeting. Publication of this report was important in maintaining fairness and transparency prior to commencement of the procurement.

Results The results were that in the contract notice energy consumption of the vending machines was scored as part of the commercial considerations. As was intended from the start of the supplier engagement, a Competitive Dialogue process was undertaken with a higher number of suppliers participating if no supplier engagement had been undertaken. This contract structure will be used to incentivise continuous improvement through the use of key performance indicators, particularly in the area of carbon reduction.

Practices suggest that public administrations can cooperate with companies that will deliver the service or product, so that they can highlight their needs and allow companies to therefore offer a more tailored service meeting cities' need. In addition, the technical dialogue will also become an opportunity for local companies and service providers to know the PA's purchasing plans in advance and therefore to better define their strategies and develop products and services in order to be competitive during future tendering processes.

A specific involvement of micro-small and medium enterprises (MSME), startups and innovators in the procurement process can be beneficial for introducing innovative products and services, by inducing a higher level of competition and participation and by favouring MSMEs' inclusiveness in the digital economy.

Here we report the case of the Government of Spain on the introduction of innovative public procurement for cybersecurity products and services procured by innovators and the Government of Moscow on the introduction of innovative processes in the procurement procedures of 'smart cities', including small-scale procurement.

SPAIN	
Sector	Cybersecurity services and products in the public administration
Name of public procurer	Spanish National Institute of Cybersecurity, depending of the Secretary of State for Digitalisation and AI, Ministry of Economic Affairs and Digital Transformation.
Type of public procurer	National

Background. The Government of Spain has a great commitment towards cybersecurity and therefore wants to establish it as one of the main axes of its recovery plan after the COVID19 pandemic. Spain holds the 2rd position in the European Union and the 4th worldwide in

the ranking of countries with the highest levels of Cybersecurity maturity as recognized by the Global Cybersecurity Index issued by the International Telecommunications Union.

Over the next three years, the Spanish Ministry of Economic Affairs and Digital Transformation will channel a total of 224 million euros to the market through Public Procurement of Innovation (PPI) contracts.

This investment will promote a transformation of cybersecurity in the public sector as a whole, in SMEs and in strategic sectors, such as energy, transport or infrastructures, and collaborate in the creation of competitive, demanded and lasting solutions in all these areas, as well as their application in companies and Public Administrations.

Areas of need The procurer wants to address the following 7 key areas:
- Strategic R&D programs for the development of disruptive technology projects by companies in the cybersecurity industry, which respond to long-term challenges.
- Technological solutions for the main challenges of the public sector.
- Technological solutions for cybersecurity in SMEs.
- Cybersecurity technological solutions for strategic sectors (energy, transport and infrastructure, among others).
- Technological solutions for the improvement of cybersecurity infrastructures and INCIBE's own equipment.
- Technological solutions linked to the training or development of capacities and skills of the Spanish citizens.
- Public purchase of innovation of small projects promoted by start-ups, micro enterprises and SMEs.

On the basis of conversations and the analysis, the product or services could be improved and tailored to the needs of the public sector at the same time the procurer becomes a solid client to cybersecurity innovators in Spain.

Activity description

To carry out its action plan the procurer is going to prepare an Early Demand Map (a list of needs without a current solution in the market detected in the field of cybersecurity) in which actions, instruments and possible projects to be tendered through Public Purchase of Innovation will be identified.

The objectives of this preliminary market consultation are:

- To inform the market of the actions that will be promoted through this Public Procurement of Innovation.
- To know the proposals for specific projects that —in each of these actions— will allow INCIBE to design an Early Demand Map.
- To provide INCIBE with the necessary information to for the detailed design of the instruments for executing the identified actions (procedures, specifications and contracts).

After analysing all the projects presented, the instruments for the execution of each one of the actions identified will be developed. In mid-October 2021, a list of contracts, known as the Early Demand Map, will be published so that they can start immediately with the first tenders.

Results

Because of this investment, the procurer will boost the already growing Spanish cybersecurity ecosystem while improving the levels of cybersecurity in SME's, strategic sectors, the Spanish public administration and Spanish citizens.

At the same time, the efficiency and effectiveness of the Spanish public purchasing processes will improve through innovation. And this innovation will also pursue the search for high added value solutions for the development of the cybersecurity industry.

MOSCOW – RUSSIA	
Sector	All
Name of public procurer	Government of Moscow
Type of public procurer	Regional

Background. The Supplier Portal (https://zakupki.mos.ru/en) is a digital mechanism for automatization of small-scale public procurement. The Supplier Portal was developed to cover small-scale operational procurement of the Government of Moscow and is now available for public bodies from 37 regional of the Russian Federation. Today more than 224 000 suppliers offer their goods and services to more than 8 000 procurers. 90% of suppliers are MSMEs.

Areas of need The procurer wants to address following needs:

- Reduction of expenses by participation in mini-auctions;

- Support of MSMEs' inclusiveness in the digital economy;

- Increase the number of competing participants;

- Increase automation of planned public purchases.

Procurement Description

The Supplier Portal is a digital platform designed to automate the activities of participants of state procurement and select categories of legal entities and individuals for transaction purposes. For suppliers it is **a free opportunity** to offer their products to more than 10,000 public procurement authorities.

The Portal provides an increased competitiveness of potential suppliers, as well as the possibility of an objective assessment of the existing market offers and analysis of

information provided by the government and commercial customers about the fulfillment of obligations by suppliers.

In 2017 an AI-based recommendation service was launched on the portal to solve the problem of resource-intensive process of manual contract tracking. The service analyzes previous contracts made by suppliers and recommends them potential procurement opportunities via personalized e-mails.

Results

More than 224 000 suppliers from 37 regions of Russia are registered on the Supplier Portal, the catalogue contains more than 1.2 mln of SKU (Stock Keeping Unit), and more than one thousand contracts are concluded daily.

Sustainability

Nowadays, cities are facing a growing number of urban challenges as environmental threats, the supply of resources, the rise of inequality, the spread of technology, the increase in city population[2], and the development of governance structures. Within the next decade, it is likely that there will be opportunities for the public sector to drive investment in smart technologies through public procurement by, for example: setting up carbon-neutral cities, preventing and counteracting water pollution, increasing the number and the surface of accessible green areas, improving eco-efficiency of cities and communities, and developing sustainable transport.

Practices in the implementation of sustainability criteria have been adopted by many cities and governments. Examples of these practices come from the city of Denver and China.

DENVER – UNITED STATES OF AMERICA	
Sector	Services
Name of public procurer	City of Denver
Type of public procurer	Local
Background. The City's purchasing Office is strongly committed to reduce the environmental impact, as well as to achieve societal and economic benefits. For that purpose, the Purchasing Department established an Environmentally Preferred Procurement (EPP)[3] program to focus on sustainable solutions in its solicitations. With the EPP program, purchasing focuses on identifying environmentally friendly products and services and strategically implementing sustainable procurement practices throughout the City.	
Areas of need The procurer wants to address the following needs: • Reduce costs of sanitary supply; • Achieve higher standards of environmental impact.	
Procurement description Some achievements have already been made thanks to the EPP program, for instance, the recent bid to purchase the City's Car Wash Soap.	

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[2] 68% of the world population is projected to live in urban areas by 2050 according to the UN

[3] https://www.denvergov.org/Government/Departments/Purchasing-Division/Sustainability?lang_update=637553421251208012

The Purchasing Staff coordinated with the Department of Environmental Health to evaluate the annual bid submittal from Waxie Sanitary Supply. The bid was for car wash soaps and cleaners, floor cleaner, petroleum cleaner, and dumpster and compactor cleaners. These products use microorganisms to "liquefy and digest organic and petroleum hydrocarbon waste." These bioactive products are now used in the truck washes and to clean the floors and drains at the Roslyn and Central Platte fleet facilities, Cherry Creek Transfer Station, and Denver International Airport. All these products are certified compliant with an Eco-Logo for reduced environmental impact.
Results These eco-friendly products helped to reduce costs by 38% and to reduce and eliminate unwanted organic materials in water drainage systems. By reducing maintenance costs of the car wash bays, the system performance also improved.

Country：China	
Industries/ Sectors	Involving multiple sectors such as electronics, furniture and building materials.
Name of public purchasers	Purchasers from government agencies at all levels, institutions, universities, etc.

Types of public purchasers	National government agencies, institutions, universities, etc.

Background:

In 2003, the Chinese government put forward the concept of "adhering to peopleoriented, establishing comprehensive, coordinated and sustainable development concept, and pursuing comprehensive development of economy, social and human". The *Government Procurement Law* also clearly stipulates in Article 9 that government procurement shall be beneficial to the national economic and social development policy objectives, including protecting the environment, supporting underdeveloped regions and ethnic minority areas, and facilitating the development of small and medium-sized enterprises. As a crucial element of social and economic activities and national public expenditure management, government procurement not only affects the implementation of sustainable consumption but plays an important role in promoting sustainable production, which has special significance in driving sustainable development. Government green procurement is a key entry point for establishing a sustainable consumption system. The internationally accepted concept of government green procurement is that government procurement should take consideration of the whole life cycle of products, and choose products that are less harmful to human body and that are beneficial to the environment. China's environmental labeling products require the whole life cycle management of products from design, production, use to disposal and even recycling to ensure the greenness and sustainability of products. Based on the common goal of promoting China's green procurement, reducing environmental pollution and improving the supply of green products in China, the former State Environmental Protection Administration and the Ministry of Finance jointly issued the *Opinions on Implementation of Government Procurement of Environmental Labeling Products* and released the first phase of China's government procurement list of environmental labeling products in 2006. The Opinions required that government procurement should give priority to the procurement of China's environmental labeling products, which signified the start of official

implementation of the Chinese government's green procurement. By 2021, government procurement of China's environmental labeling has been carried out for 15 years.

According to the latest *Government Procurement List of China Environmental Labeling Products* jointly released by the Ministry of Finance and the Ministry of Ecology and Environment in 2019, more than 90 categories of China environmental labeling products were involved on the list, including office equipment (computers, printers, scanners, projectors, etc.), motor vehicles, construction materials (water-based paints, waterproof paints, cement, concrete, etc.), furniture, textiles, plastic pipes and copy paper. Every year, nearly 1 million product models get access to the scope of government procurement of China's environmental labeling products.

Procurement demand areas: government agencies, institutions, universities, etc.

Procurement case description:

Opinions on Implementation of Government Procurement of Environmental Labeling Products came into effect from the date of its release, which all government procurement activities shall abide by; where any procurement agency (person) fails to implement activities according to the requirement, the financial department can refuse to pay the funds; in the daily supervision and management, when it is found that any government procurement process does not follow the government procurement policy on environmental labeling products, the procurement agency (person) will be punished.

In the past 15 years, purchasers from all sides have been carrying out government green procurement through a variety of methods such as centralized batches and electronic procurement platforms. According to the requirement, in despite of varied procurement methods, priority should always be given to China's environmental labeling products through different forms. According to statistics, the purchase amount of environmental labeling products in government procurement has gradually increased, and its proportion has also seen a rapid growth. In 2019, the scale of government procurement of environmental labeling products in China already rose to 71.87 billion yuan, accounting for 88% of government procurement of similar products. The purchased products involve various product categories, including office equipment (computers, printers, scanners, projectors, etc.), furniture, copy paper, textiles, construction materials (water-based paints, waterproof coatings, cement, concrete, etc.) .

Plastic pollution has become one of the global prominent pollution. Along with highquality growth of China's economy, plastic pollution has grown into an increasingly serious issue. Especially in recent years, disposable plastic products have seen continuous increase in consumption with the emerging of new business formats such as express delivery and takeaway. In June 2020, the Ministry of Finance, the Ministry of Ecology and Environment and the State Post Bureau jointly released the *"Notice on the Issuance of "Government Procurement Requirements Standards for Commodity Packaging (for Trial Implementation)" and "Government Procurement Requirements Standards for Express Packaging (for Trial Implementation)"* (hereinafter referred to as the "Notice"). The Notice requires that "where the government procurement of goods, works and services projects involves commodity packaging and express packaging, the government shall refer to the packaging requirements standards, and specify the specific packaging requirements in the procurement documents for government procurement suppliers to provide products and related express services. "

In recent years, in order to drive local sustainable development, reduce pollution and carbon emissions, improve the eco-efficiency of cities and facilitate the green transformation

of enterprises, and by summarizing the experience of government procurement implementation of China environmental labeling, many local governments have released various government green procurement policies, including mandatory procurement of China environmental labeling products and ban on procurement of disposable non-degradable plastic products in government procurement,

Achievement:

China's environmental labeling products evaluate the environmental performance of the product from its entire life cycle. The design, raw materials, production, use, consumption and disposal of the product must all meet the relevant environmental protection requirements to enable the sustainability of the product. Among the more than 90 categories of products currently on China's government procurement list of environmental labeling products, there are energy-saving products and resource-reuse products, but more listed are products that are beneficial to cut down environmental pollutant emissions. According to incomplete statistics, in the government procurement in 2019 alone, nearly 75,000 tons of volatile organic pollutants were reduced due to the purchase of environmentally-labeled office furniture; 782.58 tons of sulfur dioxide, the same amount of nitrogen oxides and 108.6 tons of particulate matter were cut down due to the purchase of environmentally-labeled office electronic products; and 1,280 tons of chemical requirements (COD) were saved due to the purchase of environmentally-labeled copy paper. It proves that the implementation of China's government procurement system of environmental labeling products has contributed a lot to reducing air and water pollutants and improving the ecological rate of cities.

While reducing pollution emissions, China's environmental labeling product standards guide the direction and development of the market and promote the green upgrading of the industry. The standards make provisions for products raw materials, production process and technology, waste recycling of products and maintenance guarantee, and the standards give limit value requirements for hazardous substances in raw materials. These requirements help to drive enterprises to reform production processes and improve their production environment, and assist enterprises to green upgrade, which will facilitate the sustainable development of the enterprise supply chain. Taking printing enterprises as an example, according to 2016 statistics, among the enterprises certified with green printing environmental logo, there were 210 printing enterprises passing the clean production audit, 30% of the enterprises upgraded from traditional printing to green digital printing, and 25% of the enterprises integrated upstream and downstream green supply chains including environmental protection materials manufacturing, logistics and transportation, and creative design. Through the implementation of environmental labeling of green printing, the working conditions of nearly 55% of the employees in the printing industry have been improved.

Through 15 years of government green procurement, not only the procurement personnel of government agencies, institutions and universities have a profound understanding of China's environmental labelling products and government sustainable procurement, but also the public's awareness and acceptance of environmental labelling products and government sustainability have seen rapid enhancement. According to a survey report on China green consumption status in 2019, consumers' awareness of "China Environmental Labelling" has risen to 70.95%; 61.41% of the interviewed companies believe that "China Environmental Labelling" can best reflect the environmental protection characteristics of the product; 82.06% of the respondents are willing to pay the same or even higher price for the "China Environmental Labelling" certified products. It proves that consumers can indeed sense the environmental superiority of environmentally-labelled products and actively choose to purchase these products. Conversely, through the public's consumption choice, environmental labelling products can serve as the bond bridging the public and sustainable development. Sustainable consumption is thereby further promoted.

> Since the implementation of government procurement of China's environmental labelling, the regulation has played an active and significant role in promoting the sustainable development of cities, reducing environmental pollution, saving resources, lowering carbon dioxide emissions, and raising public awareness of sustainability.

Examples suggest that where public authorities have clear environmental impact reduction strategies and targets in place those can cascade down to procurement mandates/strategies and budgets.

Social innovation for smart cities and communities

Since traditional tendering methods have mostly focused on allocating the procurement of a product or a service to the supplier offering the lowest price, not focusing on its impact on the environment and society, a new stream of public procurement of innovation, namely social innovation procurement has emerged. In these cases, cities' authorities engage in socially responsible public procurement using public tenders to create decent work, job opportunities, better conditions for disabled and disadvantaged people and social and professional inclusion.

Practices implementing social aspects in public procurement have been adopted by cities. The example from the city of Loures is reported below.

LOURES – FRANCE	
Sector	Services
Name of public procurer	Loures Municipality
Type of public procurer	Local

Background. The Loures Municipality considers that sustainable public procurement means taking into account economic, environmental and social criteria in all phases of the procurement process. However, these positive impacts rely on knowledge, supply chain transparency and supplier integrity in the case of social criteria.   The Municipality wanted to go further than merely specifying a Code of Conduct, therefore it developed and implemented a process which would enable its staff to verify the claims made by their suppliers.
Areas of need The procurer wants to address the following needs: •   Verify the claims made by suppliers;   • Ensure the abiding of social criteria.
Activity description In order to monitor the adherence of suppliers to their Code, Loures uses an internal multidisciplinary team (Verification Group). It consists of representatives from four different technical areas within the Municipality which are relevant to SRPP.   The actions undertaken by the Verification Group were the following:

- Apply the Code of Conduct for Suppliers to all processes relating to the acquisition of textiles, construction works, food, and electronics.

- Ask the suppliers to fill in a monitoring questionnaire after the formalisation of the supply contract.

- Plan visits to the premises of supplier and collect evidence and documents.

- When non-compliances instances are identified, a Corrective Action Plan is prepared and negotiated between the supplier and the municipality of Loures.

Results By engaging with suppliers, the Municipality encourages an ongoing process of communication on social standards and working conditions. Suppliers are made aware of these relevant issues. A working group has been formed with other public organisations within a country-wide grouping called the National Network of Socially Responsible Organisations to discuss the theme of SRPP.

Solutions on standards of social criteria could be integrated when a Code of Conduct is not present. Further, the organisation of visits to businesses and the setting up of monitoring questionnaires could help in the process.

This could even include the development of user-friendly guidelines, templates and standards, which also support the exchange of best practices and the dissemination of knowledge among cities and administrators. In this framework of sharing information an important role is played by innovation brokers as innovation centres that facilitate the uptake of innovations.

Capacity of the Public Administration

A significant barrier to innovation procurement is represented by the lack of know-how and experience among public procurers. Furthermore, risk aversion of public procurers is often detrimental for the strategic use of public demand.

National and local authorities have, therefore, set up measures to improve the status quo by making one-stop-shops easily accessible to public procurers, typically coordinated by a competence centre on innovation procurement.

Practices incentivising the adoption of innovative public procurement in the public administration have been taken on board by many countries and cities. The example from the Netherlands is illustrated below.

THE NETHERLANDS	
Sector	Services
Name of public procurer	Dutch Ministry of Economic Affairs
Type of public procurer	National

Background. The Public Procurement Expertise Centre (PIANOo) was created in 2005 by the Dutch Ministry of Economic Affairs as a knowledge network to boost the professionalism of public procurement in the Netherlands. It helps facilitate the management and democratisation of knowledge on that field, crossing the line between practices, science, law and policy, and at the same time between countries and between governments and markets.
Areas of need The procurer wants to address the following needs: • Increase professionalism of public procurers;   • Incentivize the exchange of knowledge.
Procurement description The first step taken was the introduction of the website, a discussion platform where public sector officials and contracting authorities could exchange experiences, ask questions, take part in discussions, share files, collaborate on documents and plan projects. Due to the informal nature of the community and the high volume and diversity of the information exchanged, members asked to summarise discussions, draw conclusions and to intervene when answers were not law abiding.   Later on, the decision was taken to evolve the platform into an expertise centre providing statements on certain matters. Policy makers are incentivised to become members of the community and regular meetings take place to discuss policy-related topics.
Results The platform has proven itself as a success story and it has been decided to create a similar platform on a European scale.

Accordingly, a set of actions can be adopted to promote to smart cities and communities: (i) develop handbooks and guidelines on innovation procurement for public procurers, (ii) provide trainings and workshops on innovation procurement, (iii) implement networking activities among public procurers, (iv) arrange assistance activities to prepare and implement innovation procurements, and (v) offer tender template documents for innovation procurements for public procurers and coordination activities to pre-approve and/or coordinate innovation procurements across the country.

In addition, in order to reward the risk taken by public authorities, the use of financial incentives could reduce the financial risk for procurers to undertake more innovative procurements.

Monitoring activities

Smart cities need to be able to identify and procure the best technical solution for their communities and businesses whilst demonstrating the local economic benefit of that procurement. In order to make the correct decisions policy makers need to have evidence about the progress on innovation procurement made so far. The lack of systematic monitoring of progress on innovative procurement tends to limit policy makers to set more ambitious targets for innovative procurement spending.

Practices implementing monitoring systems into public procurement have been adopted by Cities. The example of the City of Ottawa is reported below.

OTTAWA - CANADA	
Sector	IT

Name of public procurer	City of Ottawa, Supply Branch of the Department of Finance within the City Manager's Office
Type of public procurer	Local

Background. In 2013 the Supply Branch published the Sustainable Purchasing Guidelines and Toolkit to support departments' consideration of sustainability criteria in their procurement decisions. For each tendering process and purchase order over 10,000 Canadian dollars (CAD 10,000), departments require the Supply Branch to create for approval by the client departments a Contract Approval Request which summarises the procurement process including the identity of the successful bidder(s)/ contractor(s), a description of the requirement, the basis of the award, the contract period, contract pricing and the basis of payment.

Areas of need The procurer wants to address the following needs:
- monitoring sustainable public procurement institutionalisation in the culture of the organisation;
- monitoring actual procurements with sustainability criteria.

Description of activity In January 2013, the Supply Branch worked with the Information Technology Department to integrate the sustainable public procurement monitoring system in the existing system in order to easily record and monitor the progress of consideration and inclusion of the four sustainability pillars in procurement decisions. Based on the information in the previous system, the Supply Branch can easily generate reports and obtain the following indicators:
- procurement processes – both tendered (competitive) and non-competitive – that consider and/or include sustainability criteria in total and according to each of the four sustainability pillars (in number and economic volume).

The Supply Branch publishes summary sustainable procurement data in the "Purchasing Year-in-Review" report submitted annually to the City Council. The Supply Branch also distributes summary reports to each department and continues to work with client departments to increase the level of reporting to reflect actual levels of sustainable procurement.

Results The impacts were: According to the reporting summary for 2013, of the more than 2,800 new purchase orders created by the Supply Branch that year client departments considered SPP in 40% of the processes and translated that into specific sustainability procurement criteria in almost 30% of them. Of the four sustainability dimensions, the ones included in the highest number were economic and environmental criteria (70% and 60%, respectively).
Comparing the results for 2013 with those for the first semester of 2014, the increase in SPP is approximately +30 percentage points in number and +35 points in economic terms for both the consideration and inclusion of sustainability in procurement processes.

Implementing such a monitoring system helps set a systematic regular benchmarking of the innovation procurement policy framework and of investment levels across countries, inspiring governments to structure their own systems for the measurement of innovation procurement and evaluation of its impacts.

Data Protection

Smart cities are answering to their continued growth partly by procuring innovative technologies and smart solutions that enable more citizen-centred services and progress to create more sustainable, inclusive, and open cities. In order to achieve these goals city governments should ensure that data generated by these technologies about citizens and their communities is correctly protected and secured.

However, public procurement specification often does not include specific provisions for the ownership of data, access to data, or usage rights. Since contract specification can be defined by public authorities at the tendering stage, cities and municipalities procuring smart city services could introduce data protection and privacy requirements already at that stage. To this purpose, privacy impact assessment (PIA) policies can be useful to identify issues to be addressed and processes to be followed to mitigate privacy risks when an innovative solution is procured (Global Smart Cities Alliance, 2020). As many cities would function as data controllers, they have to ensure that the data protection and privacy requirements are respected when a smart solution is procured.

Practices implementing data protection measures have been adopted in many cities. Examples from Japan and the G20 Global Smart Cities Alliance are illustrated below.

KAKOGAWA – JAPAN	
Sector	Services
Name of public procurer	The City of Kakogawa
Type of public procurer	Local

Background.

The City of Kakogawa has participated the G20 Global Smart Cities Alliance (GSCA) as one of the 36 pioneer cities. The city is promoting smart city initiatives to improve citizen's satisfaction whilst putting value on 5 principles set by the GSCA. The city has achieved the crime rate reduction by utilising monitoring cameras whilst respecting portrait rights and privacy of citizens.

In order to develop and maintain a social infrastructure which is a basis of effective, efficient, safe and secure life of citizens, the City of Kakogawa in Hyogo prefecture proactively utilises the ICT such as monitoring cameras. The cameras have been installed for the whole city, especially in school zones, and are used for a monitoring service to share the location information of the people such as small children and persons with dementia.

Areas of need The procurer wants to address the following needs:

  • Prevent crimes by installing monitoring cameras whilst respecting portrait rights and privacy of citizens

Description of Activity

1.　　With the Act on the Protection of Personal Information and other related ordinances in mind, the City of Kakogawa enacted the ordinance and its enforcement regulation pertaining to installation and operation of monitoring cameras.

2.　　At the procurement stage, the City of Kakogawa stipulated the obligation to respect privacy and protect personal information in the specification, and requested the suppliers to elaborate their attitudes and the implementation methodologies in their proposals.

Results

The criminal offence rate of the city has improved in 3 years in a row. The rate of improvement outpaces that of Hyogo prefecture.

G20 GLOBAL SMART CITIES ALLIANCE	
Sector	Procurement process
Name of public procurer	City government
Type of public procurer	National

Background. Smart cities have to weigh their own need to use and share data to conduct business keeping in mind public welfare and individual privacy interests building and

maintaining public trust. If that public trust is lost, the advantages of smart city technologies will be eventually unsustainable. Therefore, smart cities have to invest in policies and practices that assist individuals, local communities, and technology providers maximize the gains of responsible data use while minimizing privacy threats to individuals and communities.

The G20 Global Smart Cities Alliance proposes to implement Privacy Impact Assessment (PIA) policies. When doing so, smart cities should take into account the following 6 foundations:

1. Organizational values and risk: the smart city should identify public values, priorities, and privacy principles, the legal standards and authority, and take into consideration also ethics, equity and public engagement when assessing risks and benefits.
2. Scope and timing: an initial assessment should be conducted and if needed a full or updated PIA considering all data collected by a technology or service.
3. Tools and components: the initial assessment should contain a preliminary assessment of privacy risks but also a risk response determination and requirements and selected controls that enable the City to meet applicable legal obligations.
4. Roles and responsibilities: these are the following roles that need to be designated: a senior official, an agency official, an executive or senior official such as a City Manager, additional City officials and external stakeholders.
5. Monitoring and recordkeeping: initial assessments and PIAs should be documented in writing, classified and categorized, an official should review the PIA policy annually, and city departments should conduct internal audits, program reviews, and program evaluations.
6. Transparency and engagement: PIAs should be made available to the public on an easily accessible website, and the city should develop additional mechanisms to communicate data processing purposes, practices, and privacy risks.

It appears crucial to develop PIAs that identify issues to be addressed and processes to be followed in order to identify and mitigate privacy risks. The following actions are proposed: articulate purposes for data and technologies together with privacy risks and mitigation measures, and evaluate them against the city's values, priorities, and legal rights. The PIAs could be integrated in the full project and data lifecycle, address all data collected by a technology or service, facilitate cooperation and communication about privacy practices, encourage innovation by incentivising ethical decision-making and enhance beneficial use of data, and incorporate opportunities for public engagement. **Action plans**

Innovative and responsible public procurement starts with building an Action Plan which shall take into account the needs of cities and communities, including economic, social and environmental objectives. Action plans define the degree to which policy ambitions for innovation procurement can be operationalised by each city. A dedicated action plan mobilises resources to implement specific measures that are not covered by other horizontal enabling policies or sectoral ones and to coordinate measures covered by different policies and actors.

Practices featuring the introduction of action plans have been adopted by many cities. The examples of the City of Cape Town and Esenler (Istanbul) are reported below.

CAPE TOWN – SOUTH AFRICA	
Sector	Transport, Energy and buildings, and Waste
Name of public procurer	City of Cape Town
Type of public procurer	Local
Background. Cape Town aims to become the greenest city in Africa and therefore aims to ensure that its significant buying power is focused on environmentally responsible products that are locally manufactured where possible, in order to promote local economic development and more sustainable consumption and production. In 2020, the City of Cape Town finalised a Green Procurement Action Plan. The overall aim of the action plan is to define a set of principles to guide green procurement decision-making, define a set of desired objectives and outcomes for the City to strive towards achieving, and lay out the specific actions required to effectively transition towards green procurement in all of the City's operations and purchasing decisions.	
Areas of need The procurer wants to address the following needs: • Renewing the City vehicle fleet; • Promoting resource efficiency and quality of life for the occupants for housing developments; • Replacing monitors of the City with more efficient technology.	
Activity description There are four key principles, outlined in the Green Procurement Action Plan: 1. Life-cycle approach: Procurement decisions should consider the whole life-cycle of a product or service. 2. Preventing, Minimising, and Mitigating Impacts: Procurement decisions should ensure that any potential negative environmental and social impacts of a product or service to be procured are prevented, and where these cannot be completely prevented, minimised or mitigated. 3. Resource Efficiency: Procurement decisions should ensure that products and services take into account the need for resource efficiency, both in terms of services that the City provides to the public and the day-to-day running of its own operations. 4. Circular Economy: Procurement decisions should ensure products and services take into account the three principles of circularity, namely: design out waste and pollution; keep products and materials in use by purchasing for durability, reuse, remanufacturing, and recycling; and regenerate natural systems.	

Results The City has included sustainable procurement criteria (energy efficiency criteria and Euro emissions standards) into its vehicle fleet tenders, where possible. The entire bus fleet currently meets Euro 4 standards for emissions, and newer buses within the fleet comply with Euro 5.

The City has retrofitted more than 57% (as at 2018) of its large corporate buildings, including 40 large administrative municipal buildings. All City traffic lights have been retrofitted with efficient light-emitting diodes (LEDs). This has reduced the electricity consumption of traffic lights to very low levels. This was an investment of R23 million, but results in annual savings of R11 million (with a four-year payback period) and carbon reduction of 9 224 tonnes of CO2 equivalent per annum.

TURKEY-ESENLER (ISTANBUL)	
Sector	All
Name of public procurer	Ministry of Industry and Technology, Ministry of Environment and Urbanization and Esenler Municipality
Type of public procurer	National

Background. The project started in 2019; with the joint protocol of the Ministry of Environment and Urbanisation, Ministry of Industry and Technology and Esenler Municipality. Within the scope of the project, smart city applications will be implemented in the urban transformation area of the Esenler district. Smart city applications will be exemplary practices for actions included in Turkey's National Smart Cities Strategy and Action Plan. To realize the application of smart city technologies in the urban transformation area, a pilot project has been started in the area of 8 million m2. The activities for smart city technologies and software will be carried out in the Technology Development Zone. Smart City Specialized Technology Development Zone will be established on an area of 40.800 m². The project area will be intertwined with green areas, commercial areas and social and cultural facilities. Scientific studies in the fields of artificial intelligence and architecture will be carried out within the scope of the project with the cooperation of the public and academia.

Results In the reserve area of 8 million m^2, the project population has been calculated as 177,040 people. A smart city with 60.000 residences is being built. Feasibility studies are carried out for 106 smart city applications in total under the headings of disaster and emergency, environment, economy, energy, security, people-oriented smart city, health, transportation, smart building and governance mechanism, which are planned to be implemented within the project and then spread throughout the country.

Developing national and local action plans for smart cities can help in fixing targets for innovation procurement. These action plans can: identify a responsible procurer and a decisionmaking structure, feature dedicated sections of coverage, provide commitment to

concrete actions, indicate dedicated resources, define expected results and a clear timeline, as well as fix measures to pool demand.

ITALY	
Sector	Innovation and Technology
Name of public procurer	Ministry of Economic Development, Ministry of University and Research, Minister of Technological Innovation and Digitalisation
Type of public procurer	National

Background. The three ministries developed a program called 'Smarter Italy' which aims at improving the quality of life of communities and citizens through the experimentation of	
emerging technological solutions in the areas of mobility, environment, individual wellbeing and cultural heritage. The program started with the participation of 23 municipalities, of which 11 cities defined as "Smart Cities" and 12 small centres defined "Borghi of the future". The program is based on the instrument of the innovative public procurement through which the State stimulates operators and businesses to create solutions based on emerging technologies to answer to the needs of services expressed by the territories. Furthermore, it is endowed with 90 million Euros.	
Areas of need The areas of intervention are: • Smart mobility for the substantial improvement of the services for the mobility of people and goods in urban areas; • Cultural heritage, for the economic and tourist promotion of areas of historical and artistic importance; • Social and personal well-being for the improvement of the psycho-physical state of citizens; • Environmental protection for the improvement of the environmental situation in all its aspects.	
Activity description The program is divided into the following steps: 5. Definition of the thematic areas of intervention. 6. Definition and qualification of the innovation needs (smart needs) through market consultations between the Public Administration and the market operators 7. Execution of the innovative procurement process: pre-commercial procurement, public procurement of innovation, competitive dialogue, partnership for innovation, competitive procedure with negotiation.	

Action Plans for smart cities and communities can also be defined throughout a large participation of stakeholders, from private citizens to companies and research institutions. We report the case of Brazil as a good practice of stakeholders' engagement for the definition of an action plan.

BRAZIL	
Sector	All

Name of public procurer	Ministry of Science, Technology and Innovation, Ministry of Regional Development
Type of public procurer	National

Background. The Ministry of Science, Technology and Innovation (MCTI) and the Ministry of Regional Development (MDR) coordinate a forum with broad participation of the private sector, academia, science and technology and urban planning and development institutes, as well as other relevant actors in the urban development ecosystem and technologies of information and communication, with the aim of bringing members closer together, listing and discussing priority themes, seeking synergies, aligning actions, articulating and proposing initiatives to raise the quality of life in cities through the adoption of technologies and practices that enable integrated management of services for the citizen and the improvement of mobility, public safety and use of resources. Both ministries highlight the elaboration of the Action Plan of the City Council 4.0 and the launch of the Brazilian Charter of Smart Cities.

Areas of need In the context of the Chamber of Smart Cities 4.0, the stakeholders proposed the Intelligent Platform and Methodology of Brazilian Sustainable Smart Cities, in line with the Brazilian Charter of Smart Cities. This platform will contribute to the identification of current conditions in the municipality, bringing a picture of the skills and needs that these cities have, in order to direct the recommendations of the diagnoses that will be made. Several platform applications will then be provided, such as: citizen security, facial recognition, monitoring microclimate, monitoring the level of rivers and streams, notification system, electro mobility and distributed energy resources.

Procurement description The Brazilian Charter for Smart Cities has the following objectives: 1) Establish the City Council (goal achieved); 2) Searchin an innovative way the urban and sustainable development of Brazil, with emphasis on

Smart Cities, creating alternatives for large, medium and small municipalities; 3) Define parameters for evaluating Brazilian municipalities regarding maturity with respect to Smart Cities; 4) Organize innovation forums; 5) Promote technology centers in order to foster, in a coordinated way, technological research and development and the emergence of new businesses; 6) Foster the development of new technologies, promoting the adoption of new products and services linked to Smart Cities, products that serve small, medium and large municipalities; 7) Promote the diffusion of innovation, disseminating technologies that contribute to increasing the productivity and competitiveness; 8) Consolidate a base of qualified technical skills for supporting the development of new technologies; 9) Develop and support technical studies; 10) Encourage creation and development of a technologybased company (startup) focused on Smart Cities and in sustainable urban development 11) Establish that the participants will guide, within the scope of City Chamber 4.0, the priorities to be carried out by the instruments and actions to support the carrying out of research,

projects, promotion, commissions and dissemination for technological and digital innovation and for sustainable urban development.

Results It is a recent initiative, as it was established only in 2020. However, some projects are already in motion, such as a Research Center applied to Artificial Intelligence–AI focusing on Smart Cities; Maturity System for Smart Cities; Cooperation Agreement with the Brazilian Industry Development Association; collaborative Dojot Platform for Smart Cities; Projects and Products of the National Bank for Social and Economic Development supporting smart cities.

Finally, concrete actions can be taken using digital services provided by local governments and municipalities to address businesses and citizens' needs. Below we present the practice from Indonesia.

INDONESIA	
Sector	All
Name of public procurer	Indonesian Ministry of Communications and Informatics
Type of public procurer	National

Background

Smart Cities Movement is the extension of Indonesian 100 Smart Cities Movement aimed to aid 47 municipalities/cities government in 10 super-priority tourism destinations, as well as new capital city areas in developing their masterplan of smart cities. The main objective of this program is to solve complex issues in urban areas, such as growing population, climate change, poverty, crimes, natural disasters, and traffic congestion. Subsequently, the concept of smart city is designed to be contextual and applicable to the characteristics and needs of each area.

Specifically, the program is envisioned to strengthen economic resilience and productive growth in the targeted areas, through which tourism opportunities are invigorated. The Indonesian Ministry of Communications and Informatics carries out this program by collaborating with other line agencies, including Ministry of Internal Affairs, Ministry of Public Work and Housing, Ministry of Administrative and Bureaucratic Reform, Ministry of Tourism, Ministry of National Development Planning, Ministry of Finance, Presidential Staff Office, and Coordinating Ministry for Economic Affairs.

Areas of need

The procurer wants to address the following needs:

1. Municipality/City government to incorporate the view of economic, population, government, mobility, and environment in implementing their smart city programs.
2. Municipality/City government to control and integrate their infrastructures— roads, bridges, tunnels, railway, subway, airports, communication, water, electricty, and building management. This is done by optimizing the available resources along with preventive planning. On the other hand, the people are given the responsibility to support the maintenance and security of the running infrastructures.
3. Municipality/City government to connect and integrate physical infrastructure, IT infrastructure, social infrastructure, and business infrastructure, to increase the development in each areas.
4. Municipality/City government to maximize the use of smart computing in developing smart city facilities to be more connected and efficient, such as in education, health, public safety, smart transportation.
5. Municipality/City government to develop an efficient and liveable Smart Municipality/City.

Activity description

The implementation of this program seeks to cover the following 6 dimensions:

1. **Smart governance**: the smart city should apply a smart procedure to deliver a business process that is quick, effective, efficient, communicative, and constantly improving.
2. **Smart branding**: the smart city should innovate to market its area by carrying three elements, such as tourism, business, and city branding.
3. **Smart economy**: the smart city should improve the economic ecosystem to be adaptive in the fast-moving era of digital technology.
4. **Smart society:** the smart city should take a human-based approach as the physical and virtual interaction between people are moving towards a more intensified sociotechnical ecosystem.

5. **Smart environment**: the smart city should consider the environmental cost of its development plan to ensure a sustainable development.
6. **Smart living:** the smart city should ensure an adequate standard of living for the people, which could be measured from three elements, such as standard of lifestyle, standard of health qualities, and standard of transportation modes to support mobility of people and goods in a city.

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