LOTI Guide to Designing Smart City Projects

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Contents

Introduction

London boroughs are interested in exploring the potential for smart city tools and approaches to improve services and outcomes for their residents, generate new insights and potentially save costs.

Yet there are a number of challenges to using such technologies and methods well. In this guide, we'll explain:

- How LOTI defines and thinks about smart cities;

- How boroughs can determine whether or not a smart city approach is right for them;

- How smart city projects can be designed to deliver the maximum benefit for Londoners while also being transparent, ethical and secure.

By the end of the guide, you'll understand how and why LOTI believes that all smart city projects should follow the following five principles:

Principles	Practice
Smart city projects should...	To fulfil this principle, boroughs should...
1 - Be driven by achieving outcomes that meet the needs of citizens, not the desire to use a specific technology.	Use LOTI's outcomes-based decision tool and methodology to help you identify if a project lends itself to using smart city approach.
2 - Be conducted openly, transparently and ethically.	Use our recommended data ethics frameworks and the guidelines in London's Emerging Tech and Data Charters.
3 - Enable collaboration between different boroughs, systems and service providers.	Use open standards, standard contract terms and share non-personal data with the London DataStore by default.
4 - Be secure by design.	Follow NCSC, DSIT & CPNI guidance and accurately assess and mitigate current and future risks.
5 - Recognise that technology and data alone are rarely the whole solution.	Ensure smart city projects work alongside wider organisational innovation.

What's a smart city anyway?

The world of smart cities is typically framed around the use of advanced, and particularly internet-of-things (IoT), technologies in public places.

This includes areas like high streets and parks, as well as publicly owned buildings, such as social housing. Common examples include smart lamp posts that measure air pollution, moisture sensors that check for damp conditions in buildings, and smart river sensors that monitor and help predict when flooding may occur.

In virtually all examples, smart technologies collect data that can be analysed to better understand what's going on, spot trends and patterns over time, and support the creation of models to do useful things like targeting resources and predicting and preventing things from happening.
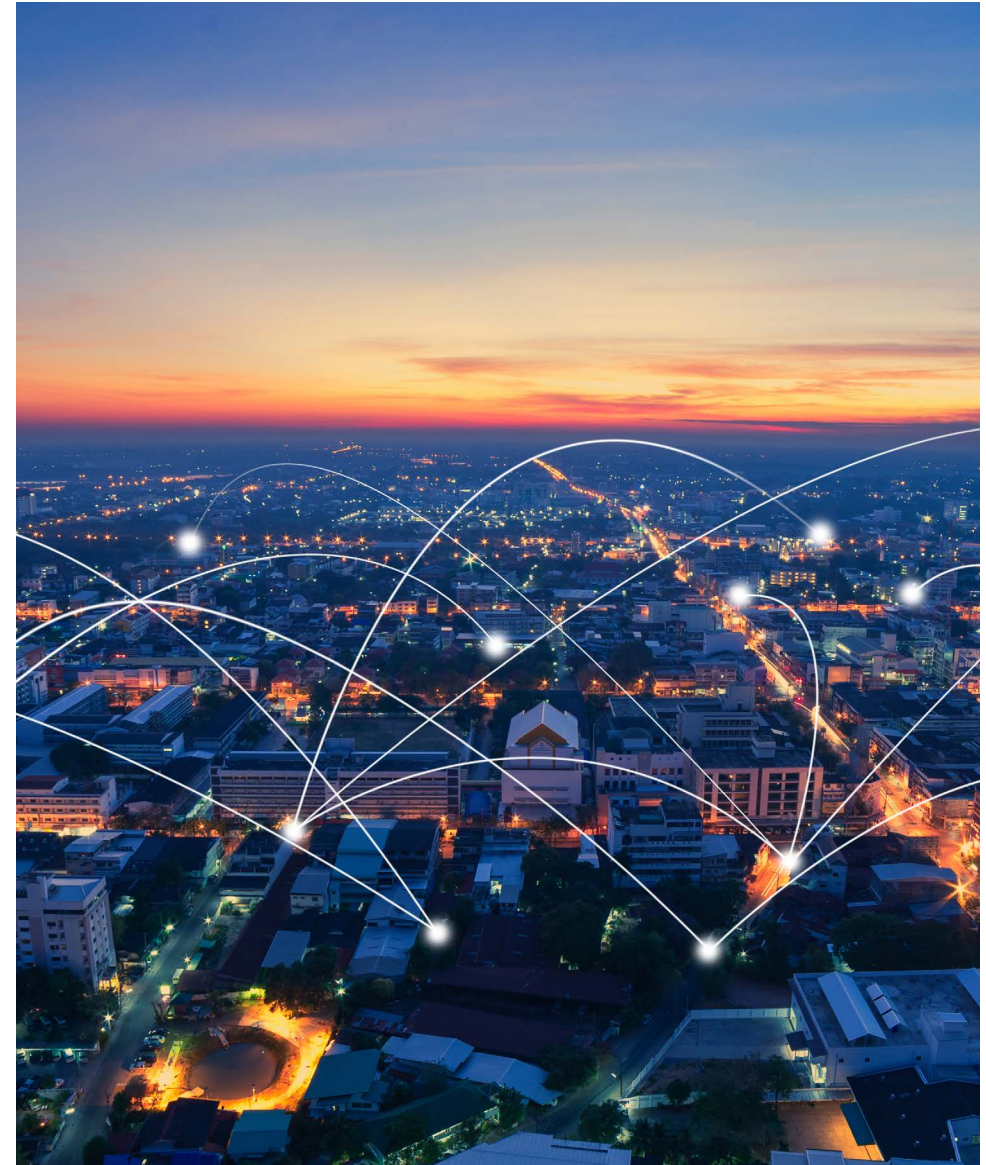
Technologies associated with smart cities

Internet of things (IoT) technology is a significant part of many smart city projects. IoT refers to computing devices embedded in objects that enable them to send and receive data. A typical IoT system would include the following components:

Data Processing

The systems and techniques used to generate insights from large data sets. This includes analytics and machine learning.

Data Storage

The hardware that stores data collected by sensors and other endpoint devices.

Network Infrastructure

This includes gateway devices that connect to sensors in the field and the communications infrastructure and protocols that enable data to be shared. These include 5G, Narrowband IoT (NBIoT), Long Range Wide Area Networks (LoRaWAN) and more traditional broadband connections.

Sensors

The devices that collect information about the world around them. For example, temperature, people and vehicle counters, air quality monitoring and water levels.

Insights and Actions

The dashboards, applications and automations that the insights enable.

While the use of IoT and other emerging technologies is certainly a key feature of smart city projects, there are risks to assuming that such projects are just about deploying the right technology, or indeed that becoming a 'smart city' is the main objective.

If we were to ask the residents of any borough what they most wanted from their local authority, it's unlikely that their answer would be for their area to be the "smartest". Rather, they want a liveable city, a functional city; somewhere where services run well, where it's great to work, live and visit. This means tackling some of the real challenges that impact everyday life such as fly-tipping and ensuring the most vulnerable in society are provided with the right support.

If local government is truly committed to being led by the needs of its residents (as per our commitments in the **Local Digital Declaration**), we should start with their outcomes in mind, not a desire to be 'smart' as an end in itself. Starting with real-world outcomes is also a core part of LOTI's philosophy and **methodology**.


Local Digital Declaration, Principle 1:

1. "We will go even further to redesign our services around the needs of the people using them. This means continuing to prioritise citizen and user needs above professional, organisational and technological silos."

Instead of framing smart cities as an end goal to reach, LOTI regards them as a set of tools and methods.

Today, local authorities have access to a large number of different innovation methods to make good things happen, from crowdfunding to behavioural insights, and from systems thinking to challenge prizes (see diagram, right). Just as councils ask themselves when those other methods are helpful for achieving a given goal, they should ask the same of smart city tools and approaches.
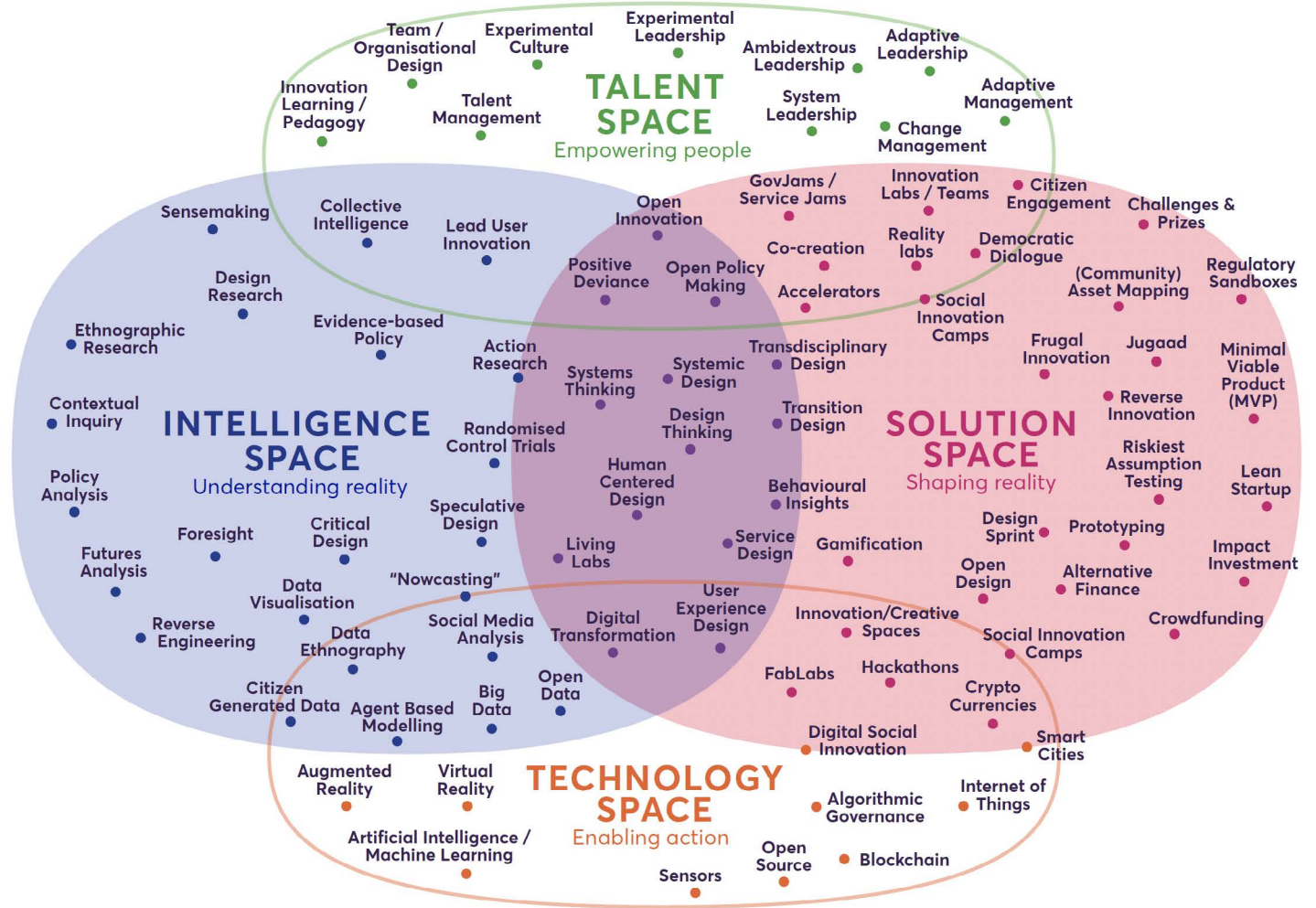
This guide will equip you with the right questions to do just that.

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Finally, it's worth emphasising that smart city approaches are not a totally new domain of activity for councils, where completely novel rules should apply.

Rather they're an extension of councils' existing work on data and digital. As a result, all the lessons we've learned over the past decade about using digital and data well - starting with user needs, using multi-disciplinary teams, thinking about processes, ways of working, culture and mindset as well as technology - are deeply relevant.

Naturally, there are some relevant differences and design considerations based on the fact that smart city approaches use technology in public spaces, are spread over wide geographic areas and involve many different suppliers and stakeholders. Where those differences really matter, this guide will highlight the implications.

Summary points:

• The term "smart city" is not an end state to aim for, it's a set of tools and approaches.

• Just as councils ask themselves when innovation methods like behavioural insights or crowdfunding are a useful means to achieve their desired ends, they should ask the same questions of smart city approaches.

• The field of smart cities is not completely new - rather it's an extension of councils' existing work on data and digital.

Why is LOTI interested in smart cities?

LOTI is working in the field of smart cities because we know that realising the full potential of these powerful tools and approaches in London depends on collaboration.

This is true in at least three areas.

1. Addressing Pan-London Issues

The types of issues that smart city tools and approaches are apt to address, such as pollution, congestion and energy consumption, do not neatly confine themselves to borough boundaries. Without some coordination, there is a risk that each borough implements a completely different approach, creating new data silos and preventing the creation of insights and services that could work across boundaries and benefit all Londoners. (Londoners will not thank us if we have 33 separate pollution maps!) LOTI can help boroughs work together to ensure data collected about similar things across boroughs is shared consistently to build up a pan-London picture.
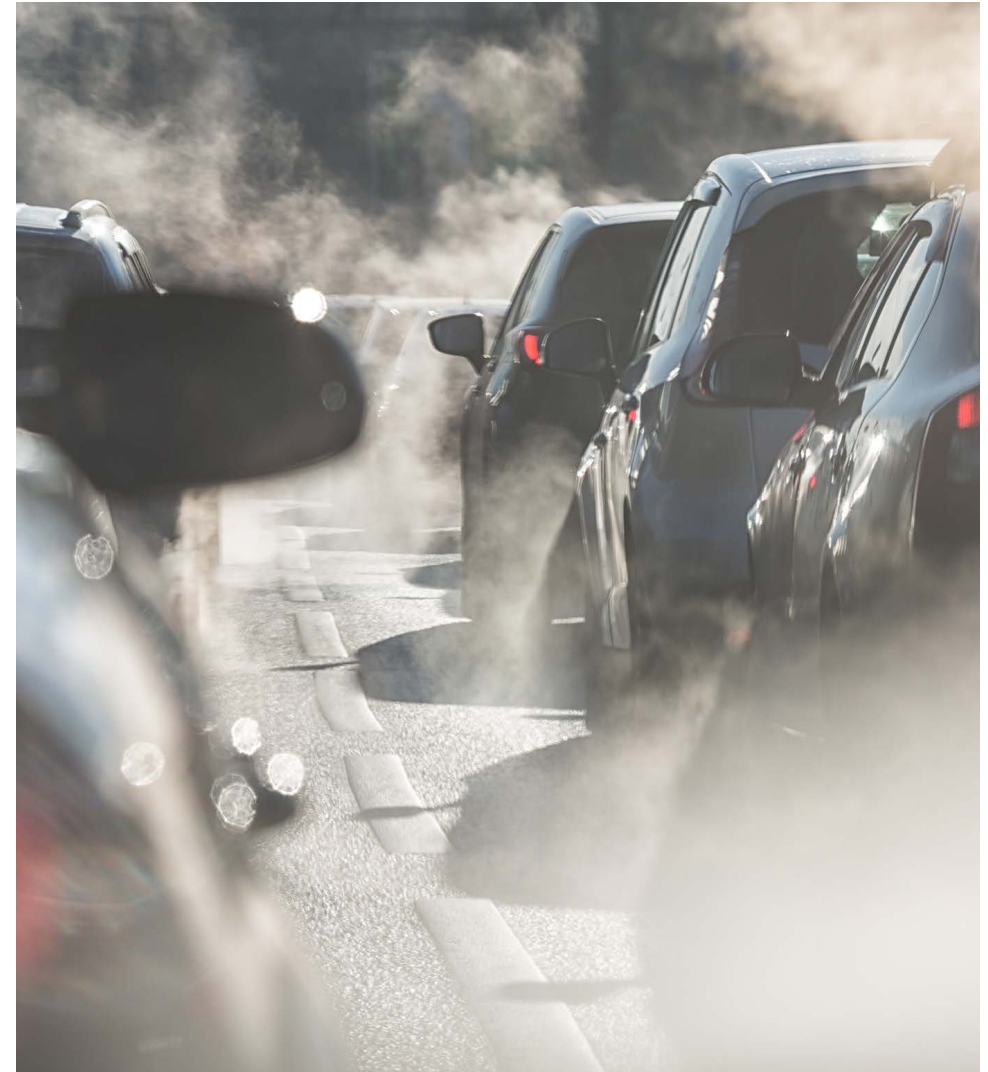
2. Promoting Innovation

By collaborating on smart city projects, boroughs can support stronger innovation on at least two fronts. First, by coordinating and sharing lessons from their various experiments, boroughs can reduce the time, cost and risk of trialing new smart city innovations. This way, all get to learn faster. Second, by implementing some common standards and principles, such as aggregating non-personal data at a pan-London level, they can make London a more attractive place for innovative companies to trial their products, and enable a greater number of innovators to build useful products and services with their data.

For reference, consider **TfL's Unified API**, which has more than 600 apps and services built on top of it due to the fact that it has a pan-London reach.

3. Protecting privacy and reputations

All boroughs take data privacy and ethics extremely seriously. Yet the use of new and innovative tools and approaches in the field of smart cities presents new complexities for managing data well.

LOTI can help boroughs by sharing design principles and guidance to implement smart city projects openly, ethically and securely to ensure they are worthy of Londoners' trust, confidence and support.

One final, and more specific, reason for LOTI's involvement relates to our work on climate change.

Smart technologies have many applications across local government services, but they are expected to play a particularly big role in making London more environmentally sustainable. By understanding needs and aggregating demand across the city, we can pool capacity, procure at scale, and potentially create new partnerships with the private sector to meet big challenges like energy retrofit, carbon reduction and improvements to air quality.

Case Study

The Importance of a joined-up approach - EV Charge Points

LOTI worked closely with boroughs, London Councils, the GLA, and private sector partners to develop a dynamic dashboard showing the location and patterns of usage for electric vehicle (EV) charge points in London.

We recognised that London would struggle to invest in this infrastructure in the places most needed by drivers without having more data from across the whole city to inform and coordinate their decisions. Yet this was hindered by the varying data quality and different datasets provided by operators and the fact that data was only provided via spreadsheets on a quarterly basis.

To address this, we focused on using the **London DataStore** as a central point for sharing all EV charge point data and developing **common data and API standards** to automate and improve this process. This leaves boroughs with complete autonomy to work with whichever providers they wish, while ensuring that consistency of data allows for pan-London insights to be created.
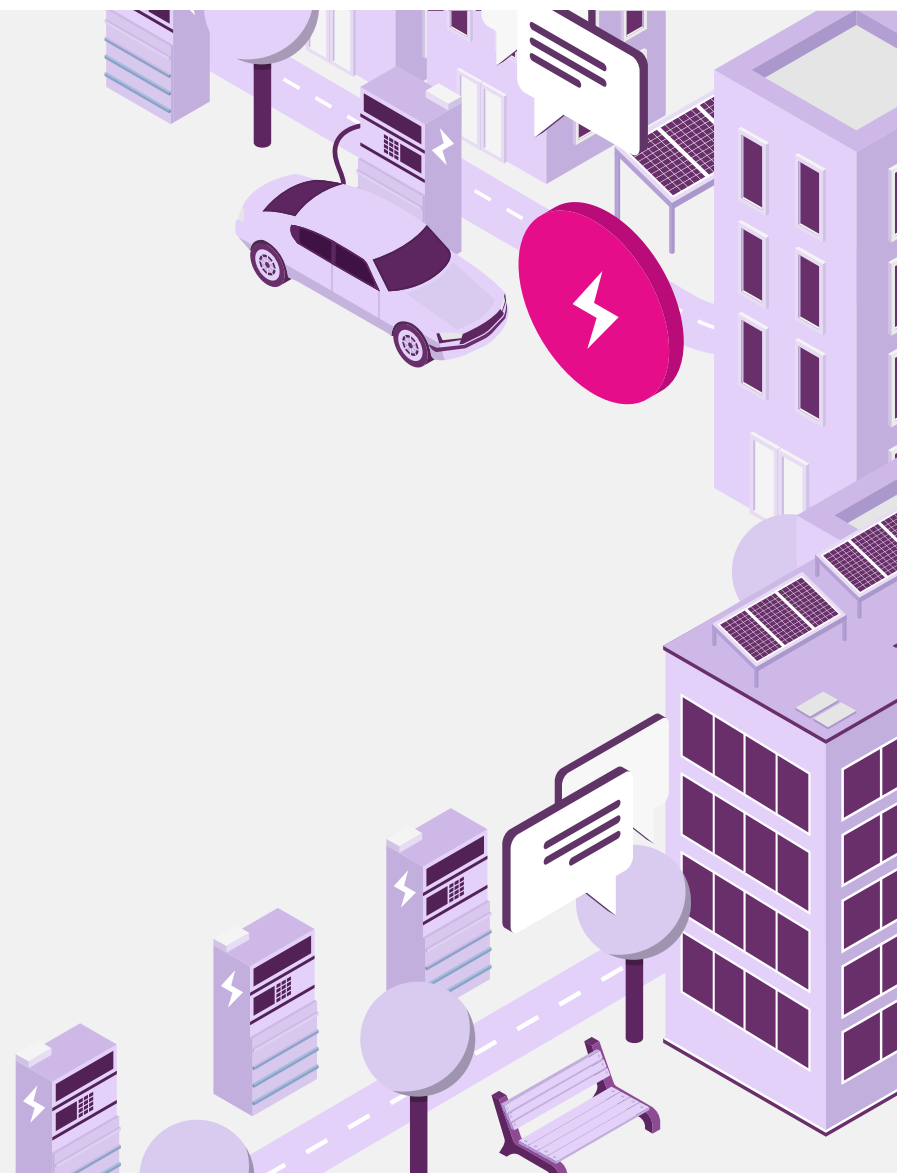
LOTI's Smart City Design Principles

LOTI recommends that smart city projects follow the five principles below.

The rest of this guide will explain why these principles are important, and how boroughs can put them into practice.

Principles	Practice
Smart city projects should…	To fulfil this principle, boroughs should…
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1. **Be driven by achieving outcomes that meet the needs of citizens, not the desire to use a specific technology.**

The first step to using smart city tools and approaches well is to determine whether or not they are a good fit for what you're trying to achieve.

Some people like to start projects by defining a specific problem to solve. Others like to propose a solution from the outset. At LOTI, we recommend starting all projects by framing the real-world outcomes we want to achieve.

Being clear on the change you want to see in the world can provide the motivation to get a project done, help unite different partners who may have differing views on the underlying problems, and prevent teams from jumping to potentially false assumptions about what solutions will work.

With this in mind, LOTI recommends using a four-step method to help decide if smart city tools and approaches can help deliver the outcomes you wish to achieve.

Yes

Proceed

Actions

Data

Who do we want to be better off in what specific ways because we acted?

Does that outcome depend wholly or in part on specific people or system(s) having access to be better information

In what form would those people or system(s) need to consume that information in order to act differently?

Can that insight only be generated by smart city technologies?

Outcomes

Insight

• **No**

• **No**

You don't need a smart city project

You may not need a smart city project

Let's explore each step in turn.

Outcomes

As with any other digitally-enabled project, it's vital to start by being clear on what real-world outcome you want to achieve. Asking "Who do we want to be better off in what specific ways because we acted?" helps ensure that a project starts with a clear idea of what should be tangibly different if it succeeds. The outcome statement should not mention technology or data, but rather focus on the real-world change that will result from solving the challenge identified.

✓ Start with this	✕ Not this
"As council staff, we want to be able to identify social tenants suffering from fuel poverty so we can target support to them."	"We want to add temperature sensors to all our social housing."
"We want to make it as easy as possible for residents and visitors using our high streets to find local information about shops, walking routes and other services"	"We want smart lamp posts to interact with passersby to tell them local information"
"We want to be able to more rapidly respond to flooding in our area."	"We want to add sensors to our river banks and local waterways"

Actions

To understand if a smart city approach is relevant for achieving your desired outcome, you first need to determine if access to better or more timely information is key to enabling its realisation. Ask: "Does achieving that outcome depend wholly or in part on specific people or systems having access to better information?"

You can phrase this with an IF / THEN statement: "If [specific group of people or systems] had access to [specific Information] THEN they could [SPECIFIC ACTION]."

If [specific group of people or systems]	Had access to [Information]	THEN they could [Action]
Social housing managers	Details of which houses were consistently under 18°C	Provide fuel poverty support to those most in need.
Automated flood gate system	Live river levels and predicted rainfall	Open overflow waterways preemptively to avoid flooding

If you cannot think of a specific person or group of people (e.g. whether council staff, partner or resident) or systems (e.g. automated traffic lights or flood gates) - that could make a better decision or take a better action as a result of having access to more information, smart city tools and approaches are unlikely to help. After all, the core purpose of most smart city tools is to generate new data; they are therefore useful only when more or better data is needed.

If you can think of an action that can be enabled by better information, proceed to the next step.

Insight

Before you can have a sensible conversation about what data you need, it's helpful to explore what insight is required. Successfully deploying a smart city approach requires understanding how the data collected will be consumed by the people or systems that will take the action defined in the previous step. Ask: "In what form would those people or systems need to consume that information in order to enable that action?" and "How would that insight enable those people or systems to solve the problem?"

For information that needs to inform human decision making, this might be a map, a heatmap, a prioritised list, a dashboard or an alert. For a computer, this might be a message that is only received when a certain threshold has been reached (e.g. "there is a cue of traffic"; or "water levels have reached a certain level"). We call this the 'data product'.

Defining it allows us to have a much more targeted and productive conversation about what specific datasets we'll need in the next step.

| Who	Action	Insight
Social housing managers	Deliver fuel poverty support to those most in need.	At-risk properties are identified flagged and tickets raised for customer contact team to contact the resident. **Predictive insight:** Data is analysed over time to understand which other factors are linked e.g high number of repairs and high probability of fuel poverty.
Automated floodgate system	Open overflow waterways preemptively to avoid flooding	River level data is analysed and thresholds defined to enable automated operation of floodgates. Predictive insight: Data on river levels combined with other environmental data such as tree planting to understand flood mitigation measures.

Data

Ask: "Can the insight identified in the previous step only be generated by putting in place smart city technologies?" This final question is what helps determine whether you need a standard data project (see **LOTI's Outcomes-Based Methodology for Data Projects**), or specifically a smart city project.

You can potentially avoid the technical, ethical and legal complexities, as well as the added cost and risk of a smart city project if existing datasets can provide equivalent or good enough insights.

Therefore, be sure to check whether open data, existing council data, or data sources from other public, third and private sector organisations can meet your needs.

For example, the **High Street Data Partnership** has been able to understand the busyness of high streets across London by using aggregated and anonymised data on mobility from O2 and credit card spending from MasterCard. This data is suitable for understanding which high streets are most active without the need for deploying people counting sensors in every one of the 600+ high streets in London.
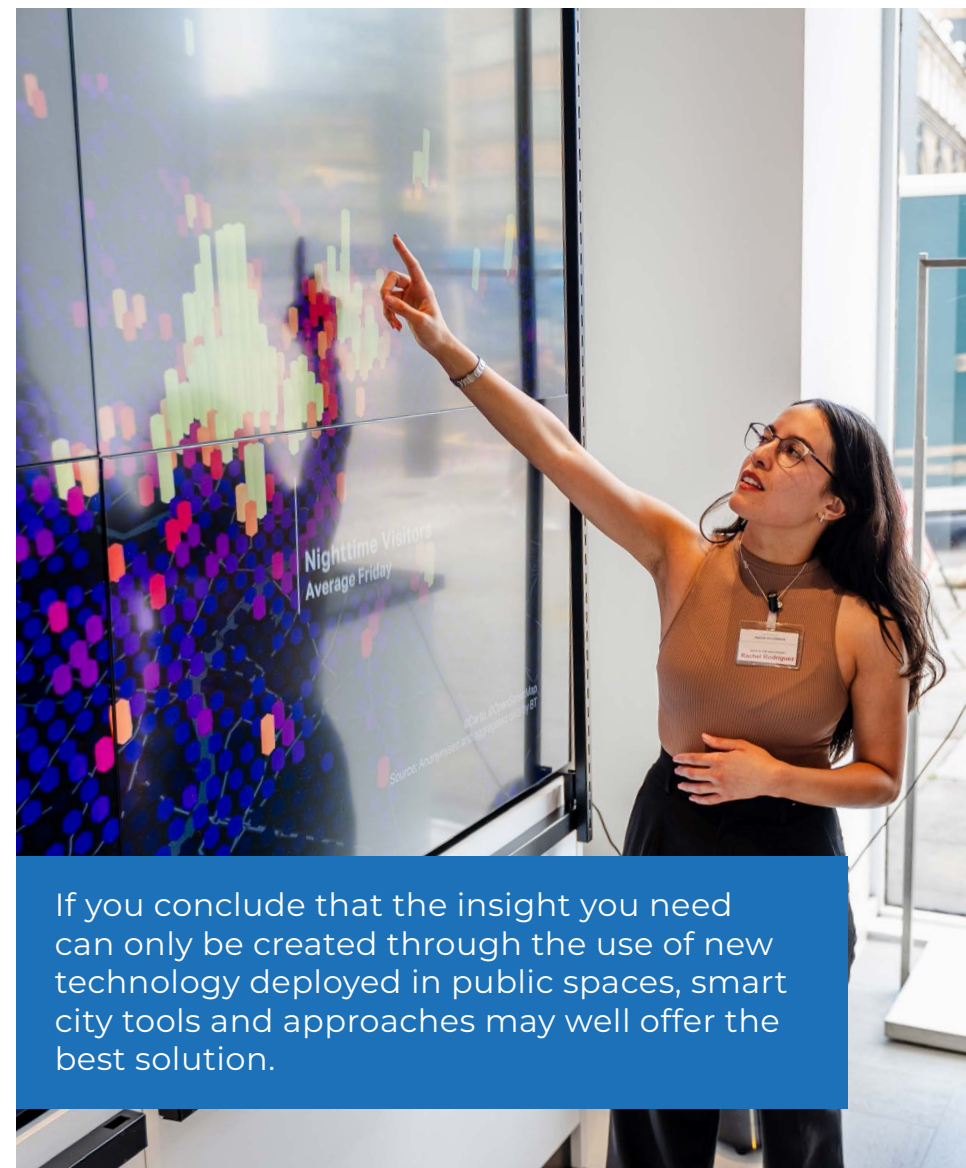
If you conclude that the insight you need can only be created through the use of new technology deployed in public spaces, smart city tools and approaches may well offer the best solution.

Case Study

High Street Data Partnership - using existing data sources instead of sensors

The GLA developed a tool in partnership with borough economic regeneration and planning teams and Business Improvement Districts (BIDs) to understand and support high street growth and recovery following the Covid pandemic.

The **High Street Data Partnership** has been able to understand the busyness of high streets across London by using aggregated and anonymised data on mobility from BT, credit card spending from MasterCard and Premise type and Unit Vacancy data from Experian. This data is suitable for understanding how high streets are performing compared to their peers, including where visitors are coming from and how long they are staying. The Spending and footfall levels at different times of day and across days of the week and the type of business operating in each high street.

Raw data is available alongside analysis and visualisations to support the many teams working to ensure London's high streets are vibrant and successful. All this can be done without the need for deploying people counting sensors in every one of the 600+ high streets in London.

The explorer allows users to look at footfall and spend data across London's 600+ High Streets.

Why it's important

As well as confirming whether or not a smart city project is needed, starting with a clear outcome in mind and running through the four steps outlined above at the design stage of your project simplifies completing the following project steps:

1. **Project design**

Effective smart city projects seek to test, learn and adapt in rapid cycles. By starting with an outcome in mind, projects can ensure this is a process of trial and improvement (each change steers closer towards the desired outcome) rather than endless trial and error.

2. **Public engagement and stakeholder engagement**

Residents, elected members, other partners and other council staff will primarily be motivated by a project's ability to deliver real-world improvements. Framing the project in terms of the outcomes it will achieve will help maximise its chances of receiving public interest and public support.

3. **Ethics and equalities assessments**

Making sound ethical judgements is inherently driven by understanding the real-world consequences of taking specific actions.

4. **Information Governance**

It's not possible to complete the Information Governance steps of a project, including conducting a Data Privacy Impact Assessment (DPIA) and creating an Data Sharing Agreement (DSA) without being able to state the real-world outcome that the use or sharing of data intends to achieve. For example, enhancing and protecting the environment is the legitimate interest that justifies the automated collection of identifiable data in an anti-fly tipping system.

5. **Evaluation**

Evaluations are only meaningful if they can assess the impact of a project against its initial stated outcomes.

Recommended Actions:

To ensure you start with the end in mind, we recommend using LOTI's **Outcomes-Based Methodology**. The methodology is intended to ensure that all projects - and especially those likely to have a strong technology or data element - focus firmly on achieving real-world outcomes.

LOTI Outcomes-Based Methodology

Start Here

	Problems		Solutions		Outcomes
Phase	**2 - Discover**	**3 - Define**	**4 - Develop**	**5 - Deliver**	**1 - Direct**
	Generate	Focus	Generate	Focus	What real-world outcomes do we want to enable?
Key Question	What problems currently prevent our desired outcomes?	What specific problem(s) will we try to solve?	What hypotheses do we want to test by prototyping?	Which prototypes perform best?	(This is not the solution, tech or data).
Tech & Data	What problems relate to technology?		What role can technology and date play in enabling the desired outcome?		
People & Process	What problems relate to people, processes and conditions?		Beyond technology and data, what's needed to achieve the desired outcome?		

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2. Be conducted openly, transparently and ethically.

Why it's important:

Using technology and data responsibly is both the right thing to do and is also key to securing the support of residents, businesses, council colleagues and other partners. As a result, public engagement and transparency should be designed into the entire lifecycle of a smart city project. In the spirit of open publishing, we must also earn and maintain public trust - producing and publishing DPIAs in an easily accessible form for public scrutiny.

Recommended Actions:

1. Use the Emerging Tech Charter to guide your project design

London's Emerging Tech Charter has been created in recognition of the fact that even the most dynamic cities need a framework to steer the emergence of new tools and applications which affect open spaces, transport systems and public services. The Charter includes principles for Working in the Open, Respecting Diversity and Trustworthiness, setting expectations for both local authorities and their suppliers. Anyone planning a smart city project should read the Charter at:

https://www.london.gov.uk/publications/emerging-technology-charter-london

2. Use and encourage suppliers to sign up to the London Data Charter

The London Data Charter commits private sector partners to work with Local Government to collaborate with data and do so ethically and transparently. Encourage your suppliers and partners to become signatories and hold them to account in meeting the commitments. Anyone planning a smart city project should read the Charter at:

https://www.londonfirst.co.uk/what-we-do/ competitiveness/london-data-charter

3. Carry out a DPIA and Equalities assessment

To ensure your project meets the legal data protection requirements, a Data Privacy Impact Assessment (DPIA) should be completed - and preferably published openly. Referring to the outcomes defined at the beginning of the process will help identify the legal basis for collecting or processing personal data in the project. Where no personal data is collected, a DPIA may not be strictly required, but completing and publishing one is still good practice to encourage public confidence and to show that the collection and use of data have been carefully assessed. LOTI recommends using Dapian to make completing DPIAs easier for those without an Information Governance background.

4. Publish your Ethical, Legal and Technical Assessments Openly

Demonstrate your commitment to transparency by publishing assessments for public scrutiny. These should include a summary to explain to the public how and why data is being collected and used. Publish to your project or council website and consider publishing to one of the registers below. Publishing openly can reduce the number of Freedom of Information (FOI) requests you receive and have to respond to.

- **Publish DPIAs to the London DataStore alongside relevant data sets.**
  Your Data Privacy Impact Assessment DPIAs and Equalities assessments can be uploaded to a data set's metadata page on the **London DataStore**.

- **Publish details of your Smart Cities Automation and Decision Making Processes to the CDEI Algorithmic Transparency Hub**
  The Centre for Data Ethics and Innovation (CDEI) have created standard for publishing information on the algorithmic tools used by the public sector including simple information for citizens and detailed technical information for researchers.

5. Select a Framework to guide your ethics assessment

Just because you can legally use data in a certain way, it doesn't mean you should do it. Using a data ethics framework can help you ask the right questions about your project to assess if it could have a detrimental or disproportionate impact on specific individuals or communities. The frameworks below have been used, tested and recommended by LOTI members. They can support project managers to design transparency and trust into the entire project lifecycle:

- **LOTI Recommendations for Data Ethics Capabilities**
  LOTI's framework sets out the actions a Local Authority can take to move towards organisational maturity in managing data ethics. This includes organisation wide governance principles and specific points (3,4,6,8 and 9) that are helpful for those designing or delivering a project now.

- **ODI Data Ethics Canvas**
  Great for initial project assessments with an intuitive interface that makes it easy to use layout for those new to assessing data ethics.

- **GDS Data Ethics Framework**
  A more detailed and process focused approach to assessing data ethics including questions and a scoring system. Good for more complicated data projects.

- **UK Statistics Authority Ethics Self Assessment Tool**
  Similar to the GDS framework with additional detailed guidance on completing the assessment questions.

6. Consider bringing in external expertise

Bringing in an external perspective on your smart city plans can be very helpful to get a more objective view and access additional expertise. An example of this is Brent Council's Data Ethics Board, which is made up of experts from the public and private sectors, as well as local residents. The board does not make formal governance decisions but offers advice and feedback on ethical considerations.

Read more about **Brent's Data Ethics Board model**.

7. Engage with residents to understand how they feel about the council's use of their data

Councils should work hard to actively engage residents in a dialogue about how they wish technology to be deployed in their local areas, and how they want their data to be used. This is likely to be an ongoing process that must be repeated to keep track of changing social norms and expectations. See Camden case study on the next page.

Communicating what a smart city system does in situ is also an important part of building trust. It can be difficult to convey the complex nature of data collection clearly in the public realm in a way that is concise, accessible and inclusive. The DTPR case study below is one example of how boroughs may choose to approach this challenge.

Case Study

Camden Council Data Charter

Camden Council has developed a **Data Charter** to provide council officers with a policy framework and set of principles to guide their approach to how they use the data they hold, both now and in the future.

They chose to take a deliberative approach and consult with local residents about the challenges and opportunities surrounding the use of data. In a set of interviews and other engagement activities, local residents were presented with different scenarios in which the council could use their data. The aim was to determine how residents feel about the use of data, identify under what circumstances and conditions they are supportive of its use, and where they have misconceptions or concerns.

The Data Charter is thought to be the first such document to be produced by any local authority and could become a model for other London boroughs.
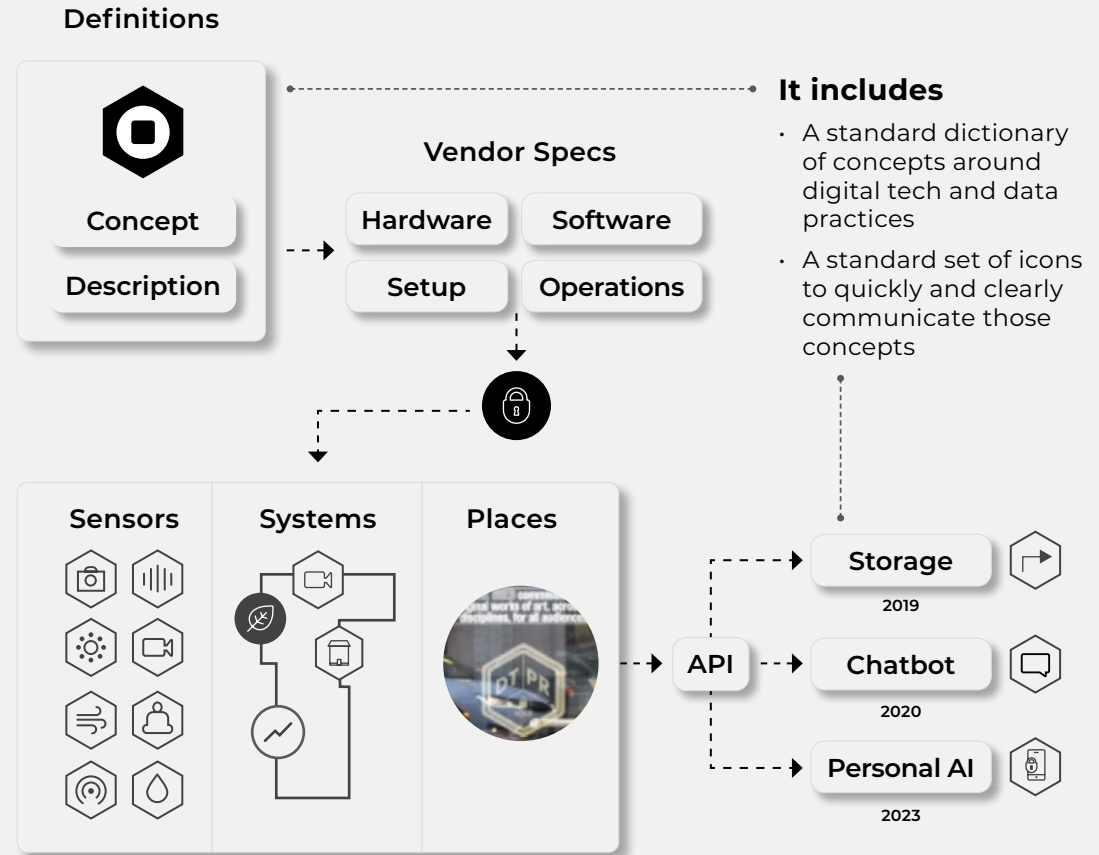
Images sourced from Camden Council, as part of the Camden Data Charter Resident Panel

Case Study

DTPR

Digital Trust for Places and Routines (**DTPR**) has been developed as an open-source standard for communicating to the public what a smart city system is doing, what data it is collecting and who operates and has access to the information. The aim is to provide transparency, accountability, and control for citizens in a uniform and simple to understand set of symbols similar to the Creative Commons licenses. The standard is free for anyone to use.

The City of Boston is currently using DTPR and like all standards will prove more valuable as other use, test and communicate using the common approach. The vision is to see the standard adopted internationally so that smart city technologies can be understood across borough or regional boundaries and when visiting connected places anywhere in the world.

It includes

- A standard dictionary of concepts around digital tech and data practices
- A standard set of icons to quickly and clearly communicate those concepts

DTPR is an open-source communication standard for transparency and accountability around digital technology in places

3. **Enable collaboration between different boroughs, systems and service providers.**

Why it's important:

The value of connected technologies grows rapidly when the data they produce can be combined and aggregated. For example, combining data on journey times collected for operational purposes with air quality readings can be used to understand the impact of road closures near schools.

To do this successfully, we need a culture of sharing openly, using technical and data standards. Enabling our peers across London to easily build on the data we collect from smart city infrastructure across the city. In the spirit of open publishing, we must also earn and maintain public trust - producing and publishing DPIAs in an easily accessible form for public scrutiny.

Recommended Actions:

1. Ensure that all non-personal data collected by smart street technology is shared with the London DataStore (and its successor, the Data for London Platform).

The London DataStore is the central data register for London. Sharing open data sets on the DataStore enables others to benefit from the data you generate. The DataStore also allows you to share data sets privately with fully configurable user access management for free. For example, the London **EV Charge Point Dashboard** brings together data from boroughs and chargepoint operators and is restricted to approved users only. **Use the LOTI guide to using the London DataStore to get started**. A new, more sophisticated, platform, the "Data for London Platform", is expected to be launched in 2024.

2. Work with technology vendors and outsourced providers to guarantee full and free access to data.

Set clear governance principles that establish full council ownership of data collected, processed or stored by smart city partners and suppliers. View sample tender questions developed by South London Partnership here and review LOTI's **Guide To Promoting Interoperability and Data Access** (part of our **Innovation in Procurement Toolkit**). The toolkit provides guidance on using contract clauses to legally establish free data access with suppliers and how to include interoperability as part of an outcomes-based tender specification.

3. Where they exist, join sensor and standards networks.

Open standards are key to making interoperability easy. You can avoid duplication and improve pan-London collaboration by working with networks such as **Breathe London**, which have established and tested standards, technology and calibration tools.

Case Study

Breathe London - Air Quality Monitoring

Breathe London is a network of Internet of Things (IoT) air quality sensors that are calibrated to the more accurate (and expensive) network of fixed air quality sensors used for regulatory monitoring of air quality.

Breathe enables London Boroughs to increase the coverage of their air quality monitoring through deploying large numbers of cheap sensors over a wide area. Joining the Breathe network has the benefit of aligning air quality data collection across London with the operators committed to sharing data with GLA to provide pan-London insights.

Other air quality networks are emerging in London and there is now a challenge to ensure that all air quality networks in London use similar standards for data collection, processing and sharing to ensure London does not end up with 33 separate pollution maps. All air quality sensor systems should be built with APIs that allow the data to be aggregated upward to provide pan-London analysis.
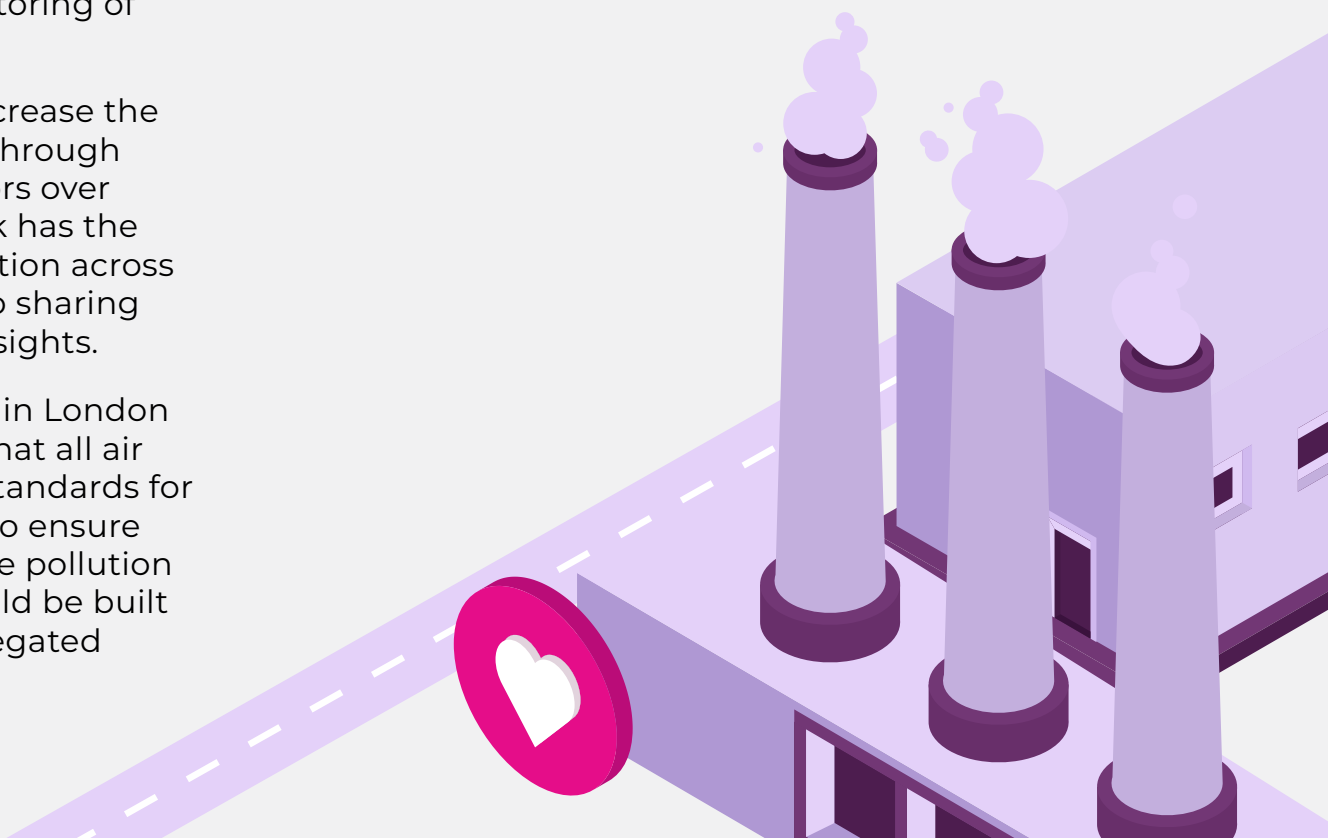
4. Be secure by design.

Why it's important:

Deploying connected technology exposes organisations to new types of risks that need to be understood and mitigated as part of the design process and monitored throughout a technology's lifecycle. Some risks will sit in a complicated supply chain and others may have national security implications.

Recommended Actions:

1. Follow LOTI's 6 Steps to Cyber Resilience

LOTI's **Cyber Resilience Guide** provides actions that borough IT, procurement and smart city leads can take when designing smart city systems. They can help ensure that risks are identified and mitigated effectively and that potential service disruption is minimised.

2. Review Sample Tender Questions for Suppliers

The South London Partnership has formulated a list of helpful **questions to ask suppliers** when procuring connected technology. The questions can help both you and the vendor to be unambiguous on cyber security requirements. Relevant terms and conditions should be applied to a final supplier contract based on answers provided by the supplier.

3. Review NCSC's Cyber Security Principles and other resources.

The **National Cyber Security Centre** (NCSC) has developed resources to support the public sector develop its cyber security capabilities. This includes:

- **Connected Places Cyber Security Principles** - principles aimed at councils implementing smart city style technologies. They set out guidance on the risks posed by using connected technology in the public sphere together with mitigation strategies.

- **The Cyber Assessment Framework (CAF)** - Provides a systematic and comprehensive approach cyber security risk management techniques that can be applied to smart city systems

- **How to develop apps, setting up secure systems** - provides specific cyber security guidance on building applications which may form part of your smart city ecosystem.

4. Review DSIT's Secure Connect Places Guidance Collection

The Department of for Science, Innovation and Technology (DSIT) have curated a set of guidance documents for organisation designing, procuring, implementing and managing smart city systems.

- **Secure connected places playbook** - Resources to help local authorities secure smart cities from cyber risks.

- **Managing your connected place's procurement and supply chain** - Relevant to those responsible for procuring connected places technology or managing a supplier.

5. Consult directly with NCSC and CPNI.

London boroughs can access world-leading cyber security support when developing their smart city projects. The NCSC can provide guidance to help local authorities better understand and manage the totality of their connected places ecosystems and technologies, including the security risks of the systems they operate and those that exist in the supply chain. The **Centre for the Protection of National Infrastructure** (CPNI) can provide help regarding the physical cyber risks your project may generate and how best to design these out and minimise risk. Any London boroughs interested in speaking to NCSC and CPNI can contact Jay Saggar at LOTI to arrange a session.

Case Study

South London Partnership InnOvate Supplier Cyber and Ethics Assurance

The South London Partnership's **InnOvate Project** is one of the largest deployments of smart city technology in London. The pilot phase is now coming to an end but many of the pilots are live as part of business as usual service delivery in areas ranging from air quality to flooding. The 5 borough partnership (Sutton, Kingston, Merton, Croydon and Richmond) were required to augment standard procurement processes to ensure the systems and suppliers involved meet high security and ethical standards.

The SLP team reviewed documentation from NCSC to support the development of questions for suppliers to mitigate security risks and included requirements in contracts as a means to enforce compliance.

When creating tenders for systems involving sensors that have the potential to capture personal information, the SLP included specific requirements for vendors to disable or not include features that could capture data on peoples faces, vehicle registrations, or track where individuals are going.

Asking the right questions requires having a good understanding of what the technology can do and then asking questions of suppliers to clarify and draw out the detail of any ethical or security risks such as, does any personal information leave the device endpoint before it is anonymised. Establishing key information such as what data is stored, where and how it is stored including information on encryption and who has access to it is essential. This process can be time-consuming and those designing smart city projects should factor into their project plans.

View sample supplier questions

5. Recognise that technology and data alone are rarely the whole solution.

Why it's important:

Technology and data alone are rarely the whole solution to any given challenge. In a smart city context, deploying new technology and collecting new data is unlikely to make much difference unless teams are empowered to grow and change the way they operate as well. For example, collecting data from social housing is unlikely to improve maintenance outcomes if surveyors are not trained and enabled to use the data effectively to shift to a more preventative, rather than reactive, service model.

Recommended Actions:

1. Use LOTI's Outcomes-Based Methodology.

The methodology builds in explicit prompts to consider not just the technology and data elements of any problem or solution, but also factors related to people, processes and conditions.

2. Use Design Thinking.

Design thinking and/or service design capabilities should be included from earliest stages of a smart city project to ensure that any new solutions are rooted in a deep understanding of the lived experience of residents, understands the current problems, and designs effective interventions to complement any new technology.

3. Ensure the involvement of a wide range of colleagues

Smart city projects should not be run just by a team of technology experts. It's vital to include service managers, frontline staff, policy colleagues and others who can bring a wide range of perspectives on the desired outcome and what it will take to achieve it.

Putting this guide into practice

We hope the guidance in this document will be helpful to any local authority that is exploring how they can use smart city tools and approaches. Any London borough councils that are part of LOTI can receive more hands-on help, guidance and support to put these measures into action. To find out more, please contact Jay Saggar.

Appendix 1

Sample Tender Questions for Suppliers

Example tender questions developed by the South London Partnership InnOvate team that can be used when engaging with suppliers to ensure data access and security are provided on unambiguous terms.

Relevant terms and conditions should be applied to a final supplier contract as appropriate.

Sample questions:

2018 Data Protection Act

"Does the solution meet data protection requirements as outlined in the 2018 Data Protection Act, including the latest legislative requirements concerning GDPR?"

Ownership of the data

"Does your solution give ownership of the data to the council?"

Selling Data

"Confirm your agreement that your organisation (or any affiliated companies) will NOT use or sell any data generated by the solution to third parties without express permission from the Council."

Open access / cost

"Does your solution provide open access to all of the Council's data at no additional cost (over and above those costs outlined in this response)?"

Compliance with Standards

"Confirm which standards your solution and/or organisation is verified with, e.g. ISO27001, ISO9001, Cyber Essentials Plus, or similar."

Anti-malware defences and boundary firewalls

"Outline what effective anti-malware defences and boundary firewalls are in place to protect your solution from external attack, including the use of role based security models secured using HSM (Hardware Security Modules), if any."

Disaster recovery

"Describe your approach to disaster recovery, including details regarding full recovery that is up to date with both the data and the latest configuration of the products from the primary data centre, and that such recovery has backups that are air-gapped, and that the supply chain that may support any recovery has been tested and can demonstrate its ability to deliver if called upon"

Secure encryption

"Describe how your solution meets the following requirements (where applicable):

- Secure encryption of any data on desktops, laptops or other mobile devices
- Secure encryption of any data exported to other electronic portable devices

- Secure encryption of any data archives (including on any mobile/portable devices)
- Secure encryption of backups
- Secure encryption of data transfer by all electronic means i.e. integration with other systems
- Demonstrate how and in what circumstances algorithms for pseudonymisation / anonymising data will be applied
- Data movement to and from the bidder's data centres is encrypted at all times as well as data movement within the bidder's data centres."

Compliance with Legislative requirements

"Outline how the system's information management will comply with the latest legislative requirements, including GDPR. The system will be upgraded by the provider should legislative requirements change."

BSI standard PAS 185:2017

"Explain how your solution aligns or conforms to BSI standard PAS 185:2017, 'Smart cities – Specification for establishing and implementing a security-minded approach'. Applicants must provide any details of where it does not conform to the standard."

Data API

"Describe the extent of the data available through the API, i.e. how the data is accessed by the Council and which datasets are not available via API, what API documentation is available, etc."

Data Subcontract the provision of data processing services

"Do you ever subcontract the provision of data processing services to a third party? If so, please outline under what circumstances this is done and provide evidence of the subcontractor's suitability in terms of data security, including if subcontractors are required to meet any minimum security requirements (and what those are)."

Data Storage

"Explain how your organisation makes use of data collected and stored by your solution, including specifically which data sets are stored, why they are stored, how these are stored and if any of the data collected is used by third parties. You must provide a fully documented data flow to support this."

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About LOTI

The London Office of Technology and Innovation (LOTI) was established in July 2019 to help its members (currently 27 London boroughs, the Greater London Authority (GLA), and London Councils) to collaborate on projects that bring the best of digital and data innovation to improve public services and outcomes for Londoners.

Read more at: loti.london