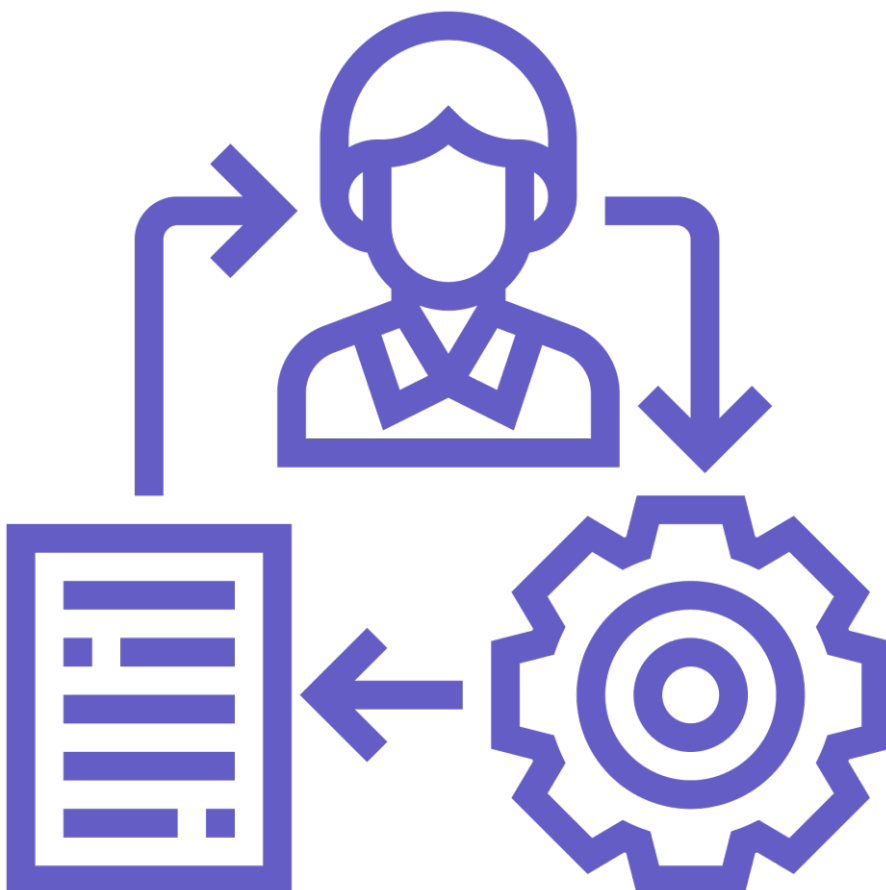# Best Practice Guide

BP505 | Act on evidence

Building a community of practice: networks, collaboration, and wider impact creation

Introduction

Local governments in Australia (and worldwide) are increasingly exploring the use of smart low-cost sensing devices to understand and respond to local air quality concerns. Projects seeking to use smart technologies to improve insights and deliver impact often involve significant complexity, and the learning curve for organisations can be steep.

By creating and developing communities of practice, local governments can increase the effectiveness and impact of their smart air quality monitoring projects. Through engagement with others, knowledge and insights can be shared, collaborations can be nurtured, new funding can be accessed, and increased value and impact for communities can be leveraged.

This chapter frames communities of practice as networks of strategic partnerships between local governments and other organisations, and suggests practical approaches to the creation and development of a community of practice.

Who is this resource for?

This OPENAIR Best Practice Guide chapter is for local government staff responsible for the design and delivery of air quality monitoring projects, who may wish to engage with a broader community of practice (or adopt a leadership role to actively develop this kind of community). The engagement approaches discussed may also be of interest to senior management and internal marketing and communications teams.

This chapter includes a more general discussion about the development of an Australian community of practice for smart low-cost environmental sensing. It may therefore also be of interest to a variety of stakeholders in this space, including various state and federal government agencies, universities, private sector product and service providers, and community groups.

How to use this resource

This resource provides guidance on a proactive strategy for local governments to support engagement with a community of practice for low-cost air quality sensing initiatives. This can help to leverage the value of local smart sensing activities to produce improved outcomes and impact.

Active engagement with a community of practice can occur at any stage in a project. A useful approach during the early development phases of a project is to connect with other organisations that are further along in their journey. This can help local governments to avoid common mistakes, and support better impact design from day one. Alternatively, some organisations may choose only to reach out to others once they have a good sense of how things work within their own unique local context (for instance, after completing a pilot project).

What does a community of practice do?

A community of practice is a group of people or organisations who share a common interest that is connected to a shared practice. Participants interact on a regular basis to explore and deepen their engagement with a topic and the shared practice associated with it. Table 1 provides an overview of **activities** that can define a community of practice, and positive **impacts** such a community can have.

Table 1. An overview of activities and impacts of a community of practice

Activities	Impacts
Collaboration A community of practice fosters collaboration by bringing together multiple organisations and interest groups with diverse perspectives, experiences, and capabilities. By exploring challenges together, this diversity supports better problem-solving and can ensure that focus is maintained on real-world concerns and impact creation. Collaboration creates new opportunities. It can enable an organisation to engage in new activities, and may support access to new funding.	**Innovation** Data from low-cost sensing devices has the potential to create impact across a range of pressing issues. However, the pathway to impact can be impeded by complex challenges relating to the application of sensing technologies, and the management, interpretation, and sharing of data. Environmental sensing practitioners can share knowledge and data to overcome these challenges, and support innovation. Innovation may include the development of new or improved technologies, methodologies, standards, design strategies, governance models, or engagement approaches.
Knowledge sharing The documentation and sharing of knowledge and insights (including technical details, project design and delivery, impact creation, and critical reflections) is often missing from smart sensing projects. A community of practice can provide incentives for better knowledge capture, and a forum for knowledge sharing.	**Dynamic best practice** The challenges that smart low-cost sensing projects might address are dynamic and ever-changing. There is no fixed approach that will ensure continued relevance. A community of practice ensures that the use of technology and data remains dynamic and responsive to changing needs.
Data sharing Data sharing is a critical aspect of smart sensing best practice that cannot be separated from data collection, management, and interpretation. Data sharing within a community of practice is a collaborative and exploratory activity that may help to define and evolve a broader data sharing strategy. By sharing data with peers – and improving collaboration methods – more effective and widespread data sharing can be achieved.	**Growth and maturation** Smart low-cost air quality monitoring depends on technologies and methodologies that are still emerging. The smart city sector is relatively immature, and most local governments have not developed approaches to smart technologies and data utilisation. A community of practice can support the growth and maturation of this emerging sector, and encourage local governments to collaborate as they scale and operationalise solutions.

Key types of partnership

A community of practice is a network built through partnerships between stakeholders. There are five common types of partnership that can be actively nurtured and sustained by a local government (as shown in Figure 1).

1. **Between local governments**

2. **Between local government and state government**

3. **Between local government and community**

4. **Between local government and businesses**

5. **Between local government and universities**

Figure 1. The five key types of partnerships that creates a community of practice

BUILDING A COMMUNITY OF PRACTICE AT DIFFERENT SCALES

Communities of practice exist at many different scales. It may be helpful to consider these scales when developing a community of practice strategy.

Scale	Examples of partnerships
Local	Community groups and organisations, local businesses, schools, and local universities
Metro/regional	Other local governments, local health authorities, state government corporations (e.g. utilities; precinct owners)
State	State air quality monitoring authorities, state departments (e.g. planning; transport; education), universities, state businesses
National	National associations, national businesses
International	International membership associations (e.g. ICLEI[*]; C40[†]), multinational businesses

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[*] The International Council for Local Environmental Initiatives (ICLEI) is a global organisation that supports cities, towns and regions become more sustainable (ICLEI, n.d.).
[†] C40 is an international network of city mayors that are committed to addressing the climate crisis (C40, n.d.).

Partnerships between local governments

Local governments working with smart low-cost sensing technologies may add value to projects by partnering with other local governments

The value of partnerships between local governments:

- **Collaboration.** Two or more local governments can come together to collaborate on the delivery of a smart sensing project. In such cases, the knowledge, expertise, staffing capacity, facilities, and baseline infrastructure (e.g. an existing local communications network) of each partner can be shared between all. This sharing of resources may make a project viable. Examples of collaborative project delivery might include a monitoring network deployed over multiple local government areas, or a citizen sensing project or school program delivered to participants from multiple local government areas.

- **Knowledge sharing.** Local governments often deliver pilot projects using smart city technologies. The lessons from such pilot projects may not always be well-captured or shared, whether they relate to the use of technology, the design and governance of a project, the approach taken to community participation, or data interpretation methodologies. Knowledge sharing between local governments can help to counter this, and active engagement during the delivery of projects creates a space where practical challenges can be explored and solved through peer support. This may create a context for better knowledge capture, which can then be shared with a broader community of practice.

- **Data sharing.** Air quality pays no heed to political boundaries, and smart sensing data collected by one local government may be directly relevant to a neighbouring local authority. If local governments run self-contained low-cost sensing networks in adjacent locations, they can harmonise[‡] data from both networks, and share it between their organisations.

  Sharing data from two geographically separated areas may also be of value in some circumstances (e.g. if two local governments are measuring the same general pollutant, such as coal dust from train lines). In this scenario, having access to more data that is directly relevant to the same problem statement can significantly assist with data interpretation. Data sharing in such cases may also form the basis of shared research and advocacy efforts.

[‡] Harmonisation refers to the process of aligning two or more data sets to have the same format and labelling, so that they can be directly compared. Refer to the OPENAIR Best Practice Guide chapter *Data interpretation: correction and harmonisation* for more detail.

CASE STUDY: Breathe London

A Node-S Clarity Sensor in the Breathe London network. Source: Clarity Movement Co.

Breathe London (2019 – present) is a 'hyperlocal' air quality monitoring project that has deployed a large network of smart low-cost sensing devices to measure air pollution across Greater London. The project is currently managed by Imperial College London (ICL).

Breathe London is notable for its broad coalition of local government partners, with 33 London boroughs hosting a total of 364 sensing devices (as of December 2022). This widespread adoption by local government may be attributed to a 'sensing as a service' business model, which removes technical and operational barriers to inclusion by outsourcing the complexity and responsibility of device operation and data interpretation to the technology vendor and ICL. A new borough can simply purchase sensing devices via the Breathe London website, deploy them following some basic guidance, and pay an annual fee for data access (Breathe London, n.d.-b).

Breathe London is an example of a highly successful partnership between a large number of adjacent local government authorities. Data from the project has improved understanding of (and engagement with) localised air quality issues in areas adjacent to pollution sources (e.g. major roads) and vulnerable receptor sites (e.g. schools and hospitals). Data has directly informed strategic planning, traffic interventions, and policy development (e.g. the development of London's Ultra Low-Emission Zone, which includes multiple boroughs as signatories). Live data has also been made available via community dashboards (Breathe London, n.d.-a; CERC, 2021).

Partnerships between local government and state government

State government comprises a large collection of agencies, and there may be diverse reasons for engaging with each of them. However, the most notable agency a local government may want to partner with in this context is the state air quality monitoring authority[§].

The value to local government:

- **Calibration and interpretation support.** A local government might receive support from a state air quality monitoring agency in calibrating low-cost sensing devices, and interpreting the data they produce (e.g. through co-location of devices at a state government reference station).

- **Data processing services.** State governments can provide automated data processing services to monitor and report on the quality of data from low-cost sensing devices.

- **General technical guidance.** A local government might receive guidance from a state air quality monitoring agency relating to the selection and use of sensing technologies, and the interpretation and sharing of data.

  Assistance in extracting more value from data. State governments have data analysis capabilities not generally found in local government. By sharing air quality data with a state government, a local government may be able to access new data insights. Currently, data sharing between local and state governments is not well-developed, making this type of value creation somewhat speculative. However, as data sharing of this type develops in the coming years, it seems likely to emerge.

The value to a state air quality monitoring authority:

- **Localised air quality data.** State government-operated ambient air quality networks provide high-quality data, but at very broad geographical scales. Air quality data collected and shared by local government allows air quality models, forecasts, reports, and other products to include data about the specific locations of interest to communities.

- **Influence and oversight.** It is in the interests of a state air quality monitoring agency that accurate air quality data (and messaging about that data) is shared by local governments. By actively engaging with local governments that share air quality data with the public, a state authority can maintain some degree of influence over the situation, by way of providing advice or oversight. Through collaborative, mutually beneficial relationships with multiple local governments, a state authority can help to guide best practice, and encourage its adoption.

Other potential state government agency partners

There are several other state government agencies that local governments may consider engaging or partnering with on air quality projects (see Table 2 for examples).

Table 2. State government agency partners.

[§] In NSW, this is the Climate and Atmospheric Science team within the Department of Planning and Environment.

Agency	Rationale
Department of Education	**Collaborative project delivery** A local government might engage with the Department of Education to develop a curriculum-aligned schools program based on citizen sensing and associated STEM skills.
Department of Planning	**Advocacy** State-level planning has implications for local air quality. Active engagement by a local government with a state planning authority may support an advocacy position (e.g. a proposal to rezone an inner-city area to reduce traffic and associated air pollution). **Collaborative project delivery** A state planning authority may have initiatives where a local government partnership can support community-level delivery. Low-cost sensing can play a role in these engagements.
Department of Transport	**Advocacy** Transport policy and planning have implications for local air quality. Active engagement by a local government with a state transport authority may support an advocacy position (e.g. road changes to reduce private car use). **Collaborative project delivery** A state transport authority and a local government might choose to collaborate in the delivery of a local transport-related project or campaign, such as the promotion of active transport. Low-cost sensing devices could support shared understandings of how behaviour change improves local air quality.
Department of Health and local health authorities	**Collaborative public health messaging** Local health authorities issue health alerts relating to poor air quality, based on data from regulatory monitoring stations. Local governments may release their own air quality data, and it is important to ensure that the data (and messaging) from local and state sources is not contradictory. A local government may wish to engage with health authorities around the interpretation and public release of their own data and the messaging that accompanies it, to avoid public confusion.
State-owned public corporations	**Collaborative project delivery** State-owned public corporations can include utility companies (e.g. Sydney Water), land development agencies (e.g. Landcom in NSW), and special precincts (e.g. Sydney Olympic Park Authority). These organisations can often be strong partners for local governments, as they tend to have a local, place-based focus.

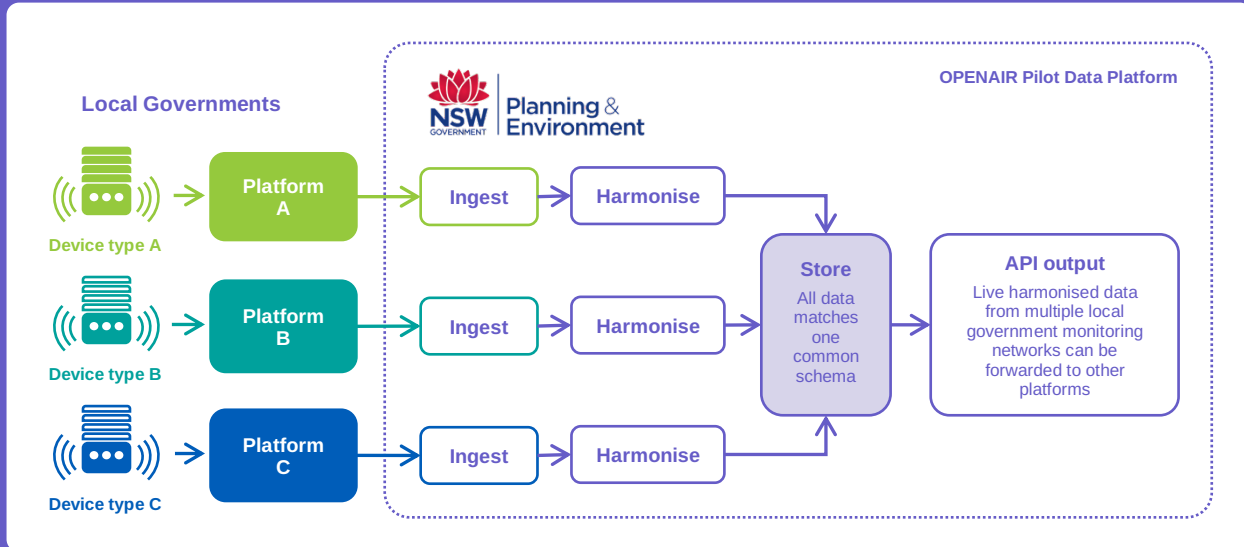**CASE STUDY: The OPENAIR Pilot Data Platform**

Figure 2. The OPENAIR pilot data platform (simple architecture)

The OPENAIR project has developed a pilot platform (see Figure 2) for sharing local government air quality data with the NSW State Government. The platform can ingest live data streams from several types of commonly used low-cost sensing devices. The data from each type of device is harmonised to match a single, standardised data schema**, allowing it to be presented in the same format, and directly compared.

The creation of the pilot data platform was made possible through collaboration between several NSW local governments and the Climate and Atmospheric Science team within the NSW Department of Planning and Environment. Each local government partner established their own network of smart low-cost sensing devices with an API†† connecting it to the pilot platform.

The pilot platform demonstrates the practical benefits of data sharing between local governments (facilitated by a state government air quality monitoring agency). Local government data that is shared in this way has the potential to supplement data from the state regulatory air quality monitoring network, and may prove to be a valuable input for improved modelling. This may support more accurate, real-time public health information relating to air quality (NSSN, n.d.).

** For more information about data harmonisation, please refer to the OPENAIR Best Practice Guide chapter *Data interpretation: correction and harmonisation*. For more information about data schemas, please refer to the OPENAIR Best Practice Guide chapter *Data labelling for smart air quality monitoring*.

†† An API (Application Programming Interface) is a set of instructions that govern how two or more computer programs communicate with each other and share data. An API structures data, defining what information is included, and in what format. In this example, a custom API is required for each type of sensing device from which the pilot platform accepts data.

Partnerships between local government and community

For projects that emphasise community participation, partnerships with trusted community groups or organisations can form a critical foundation of support that brings great value to a local government.

The degree of community engagement with a local government air quality monitoring project can vary. For more detailed guidance on this topic, refer to the OPENAIR Best Practice Guide chapters *Participative design practice*, *Citizen sensing*, and Engaging your community with air quality data.

The value to local government:

- **Access to local networks.** Community groups and community organisations (e.g. not-for-profit services and centres) provide access to pre-existing community networks, which can significantly support outreach and inclusive engagement activities.

- **Trust.** Building community trust in local government initiatives, and in the use of new digital technologies, can be challenging. By partnering with an established community group or organisation, a local government can share in the pre-existing trust placed in that community partner.

- **Knowledge, expertise, or facilities.** Local governments can fill in gaps in their knowledge or expertise through collaborating with community partner organisations. This could be technical knowledge, infrastructure, or facilities (e.g. independent maker spaces and Fab Labs), or skills in managing participatory processes or facilitating workshops.

The value to community:

- **Funding, resources, or facilities.** A local government may be a direct source of funding, or a partner that provides a community group or organisation with access to a third-party funding source. A local government may also be able to contribute existing resources (e.g. staff or equipment) and facilities (e.g. a space for hosting workshops).

- **Legitimacy and an amplified voice for advocacy.** A formal partnership with local government lends a strong sense of legitimacy to a community-led air quality campaign. This can help to grow grassroots support, boost media coverage, and amplify community voices for advocacy on an issue of concern.

Partnerships between local government and community groups or organisations are always a long-term investment from both sides. There is genuine value to both parties from this type of partnership, but it may take considerable time to build genuine trust and effective collaboration strategies.

CASE STUDY: The Bristol Approach

Frogbox sensing devices developed for the Damp Homes project (UK) using the Bristol Approach methodology.
Image source: Knowle West Media Centre

The Knowle West Media Centre (KWMC) is a not-for-profit community centre in Bristol's Knowle West neighbourhood, with a history of leading community projects with strong social impact. KWMC partnered with the City of Bristol to develop the 'Bristol Approach' methodology to enable groups to co-design solutions for everyday issues. This approach has been used to deliver several projects that incorporate the use of DIY smart technology. The Damp Homes project involved community participants developing 'Frogbox' sensing devices that measure indoor humidity. The project led to a series of community actions to tackle damp homes, including community forums, a school program, and trained community ambassadors. Another project explored local air quality using DIY sensing devices shaped like ladybirds (Knowle West Media Centre, n.d.-a; The Bristol Approach, n.d.-a, n.d.-b).

The Bristol Approach is an illustration of how deep social impact can be achieved through a partnership between local government and a community organisation. It has received widespread attention, and has since been picked up by other cities across Europe via the Replicate project (Knowle West Media Centre, n.d.-b).

TIP: Build a local community of data users

Data users are a key part of any community of practice, particularly at the local level. They make use of shared data, thus justifying its creation, and their needs should provide critical feedback on data collection, interpretation, labelling, and sharing to support iterative improvements. Local governments can actively nurture a local community of data users, connecting them with smart sensing practitioners. This ensures that air quality monitoring remains grounded in the actual needs of a local community.

Refer to the OPENAIR Best Practice Guide chapter *Engaging your community with air quality data* for more detailed guidance on this topic.

Partnerships between local government and businesses

Local governments may choose to form active partnerships with businesses as a way of strengthening air quality monitoring activities, rather than relying solely on more standard contractual relationships.

Two key types of business partnerships

It can be helpful to make a distinction between partnerships with **technical businesses** and **non-technical businesses**.

1. **Partnerships with technology vendors**

   These partnerships secure technical capabilities that are not present within a local government. They can be critical in more experimental projects where the required technology solution is not 'out-of-the-box'. An example might be a platform provider that develops a custom dashboard to support a citizen sensing project.

2. **Partnerships with local community enablers**

   These partnerships secure non-technical services, expertise, or facilities that are not present within a local government. An example might be an independent educational partner that designs and delivers a school program making use of local government sensing data.

The value to local government:

- **Access to funding.** Many grant programs require coalitions with at least one industry partner.

- **Access to local networks.** Local businesses may have existing local networks of customers who could become project participants.

- **Access to capabilities that are not present within local government.** This includes technical capabilities (e.g. hardware; platforms; communications services; integration services; and analytics) and non-technical capabilities (e.g. community engagement; education).

- **In-kind custom development.** A business partner might agree to the development of a new product or service at a discounted rate for a particular project (e.g. significant in-kind contributions from the business). This type of approach is often a critical part of pilot project design.

The value to businesses:

- **Access to funding.** By partnering with local government, a business may be able to harness funding sources (such as grants) that would not otherwise be accessible. This can support the development of new products and services.

- **New customer relationships.** Local government contracts are highly valued by businesses, and a project partnership may be the start of a longer-term commercial relationship.

- **Profile and recognition.** Inclusion in a collaborative local government pilot project may draw attention to a business, helping it to gain recognition for innovative work, and contributing to a leadership profile.

CASE STUDY: The Lake Mac Fab Lab and Core Electronics

An instructor showing an attendee how to put together a sensing device at the Lake Mac Fab Lab workshop (NSW).

The Lake Mac Fab Lab is a community makers' space and fabrication laboratory launched by Lake Macquarie City Council (NSW) in 2023. Council partnered with Core Electronics, a local vendor of hobbyist electronics, to design a DIY air quality sensing device that is sold as a kit.

Council has developed a series of workshops that are delivered through the Lake Mac Fab Lab, supporting members of the community to learn the skills they need to build the device and deploy it in their neighbourhoods. Core Electronics provides technical support to participants both during and after the workshops (Lake Mac Libraries, n.d.).

The partnership between Council and Core Electronics is mutually beneficial. Council gains access to technical expertise and support. Core Electronics gains new customers and sales through the initiative, and develops its profile as a community-focused local business.

Partnerships between local government and universities

Partnerships between local government and universities can have strong mutual benefits. Universities have expertise in a range of disciplines with direct relevance to local government air quality monitoring activities. This can include smart cities, the Internet of Things, sensing technology, data analytics, environmental sustainability, social equality, public health, policy development, or urban design.

The value to local government:

- **Access to independent and trusted expertise.** Universities can provide independent, impartial, objective, and trusted analysis and advice.

- **Access to capabilities that are not present within local government.** This might include the involvement of researchers with unique knowledge, expertise, and skills, and/or access to specialist facilities and equipment. Capabilities may be technical (e.g. collection and analysis of low-cost sensing data) or non-technical (e.g. impact creation; social research; health research).

- **Access to research funding.** Universities have access to unique research funding opportunities that can become accessible to local government through a strategic partnership.

- **In-kind support.** Universities may partner with a local government and contribute in-kind support to a particular project (e.g. discounted custom technical development; access to testing laboratories; or access to in-house services, such as publishing or media and communications).

- **Separation from the risk of innovation.** All innovation carries inherent risk. Governments are generally risk-averse because they are spending public funds. Universities are supported by different funding models, and often have a culture of innovation and a much greater risk appetite as a result. By partnering with a university, a local government can access innovative processes and research, while simultaneously maintaining a degree of separation from the associated risk.

The value to universities:

- **Access to a real-world context.** By partnering with a local government, a university gains access to a real-world context, where knowledge and expertise can be applied to create impact. Impact creation is increasingly important to universities, and can support more competitive research funding bids. A real-world context also offers the opportunity for iterative development of innovations through an ongoing partnership, ensuring that solutions are practical and positioned with the best chance of scalability.

- **Access to communities.** A partnership with a local government can give universities better access to community networks, and lend legitimacy to their own outreach efforts, aiding with recruitment and building trust.

- **Access to data.** Researchers need data to conduct their research. Partnerships that include data sharing arrangements can support high-quality academic research and comparative studies between different locations.

TIP: Engage with research associations

Research associations connect multiple universities with shared focus topics or research disciplines. They often have a remit to actively connect member universities with prospective partners and new project opportunities. When seeking new research partnerships, a local government can reach out to a research association for assistance. Examples of research associations in Australia include:

- The NSW Smart Sensing Network (NSSN)‡‡

- Australian Research Data Commons (ARDC)

- Australian Urban Research Infrastructure Network (AURIN)

- Centre for Safe Air (CSA)

TIP: Sign an MOU with your local university

Does your local university have capabilities that align with your own strategic priorities? A memorandum of understanding (MOU) can help to formalise an intent to collaborate between a local government and a university. It lays the groundwork for institutional support on both sides, should a more specific funding opportunity arise. Funding submissions often have short lead-in times, so this groundwork can allow for the rapid development of a competitive application or response.

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‡‡ The NSSN is the lead organisation for the OPENAIR project.

CASE STUDY: Breathable Sydney

The Breathable Sydney air quality monitoring network was delivered by the City of Sydney and the University of Technology Sydney (UTS) as the culmination of a five-year partnership that began in 2017. The evolution of Breathable Sydney over six years (and three funding rounds) illustrates the role of an effective, ongoing partnership between a local government and a university, grounded in a long-standing memorandum of understanding (MOU) between the two organisations (UTS-ISF, n.d.).

An air quality sensing device deployed on Sussex Street in the Sydney CBD. Image source: UTS

Year	Notable events
2017	*Urban heat monitoring trial* carried out in Chippendale, with 5 smart low-cost sensing devices deployed to test data capture and other technical practicalities.
2019	*Smart Liveable Neighbourhoods project* (funded by the Australian Government) is launched. A network of 9 air quality and 7 urban heat sensing devices is deployed. City of Sydney signs the C40 Clean Air Cities Declaration. A Mayoral Minute is issued, requesting support for an air quality monitoring network as the basis for ensuring safe and acceptable air quality for the Sydney community.
2021	The *Breathable Sydney* project begins. UTS works with transport, public spaces, and green infrastructure teams to design an expanded monitoring network. Expansion of the existing monitoring network to a total of 22 operational sensing devices deployed around key inner-city focus areas.
2022	*Breathable Sydney* report and road map is delivered by UTS.

Strategic approaches for supporting a community of practice

A community of practice should be engaged in a process of continued growth and improvement. To support an organisation's own practice (and its contribution to a wider community of practice), there are several strategic approaches local governments can take.

Develop data champions to support feedback and iterative improvement of sensing practice

To justify the expense and time associated with the use of smart sensing technologies, they must deliver value to a community of data users. These technologies are still relatively new, meaning that there is room for improvement within any organisation when it comes to the practice of collecting, managing, sharing, and activating data. This translates into opportunities to constantly increase the value delivered, helping to ensure sustainable, ongoing operation of a smart air quality sensing network.

To achieve this, there needs to be a dynamic connection between the users and the producers of the data, where user feedback informs iterative changes to sensing practice, allowing it to evolve and improve. This dynamic connection can be made by a **data champion**.

The role of a data champion may be defined as follows:

Data management

A data champion actively manages a data resource and promotes it to a community of users. They should be the first point of contact for a data resource. Depending on the governance approach taken, they may also hold direct responsibility for the sharing and management of that data, in line with an agreed data-sharing plan.

Knowledge holding

A data champion should have a complete understanding of a data resource, including how that data is produced, its quality, and the limitations it may have relative to a range of potential applications. They are commonly associated with the practical delivery of a sensing project, as this experience tends to support the detailed working knowledge required for advising data users.

Data promotion

A data champion should actively engage with current and prospective data users to promote the existence of data, and to support its discovery, interpretation, and use. This might include the development of outreach programs and initiatives (such as 'data discovery workshops'), or the convening of an informal community of data users.

External outreach

A data champion may represent their organisation at external events, positioning it as a thought leader and innovator.

Community representation

In terms of supporting a community of practice, the most important role of a data champion is to listen to and understand the needs of data users, and reflect these needs back to the team responsible for managing sensing activities. This supports iterative improvement of sensing practice, and is one of the core ways in which best practice develops and evolves in tandem with the changing needs of users.

Adapt and improve internal policy to support better engagement with a community of practice

A well-designed local government smart sensing project should be built on a foundation of supporting internal policy. This includes:

- environmental sustainability and climate change policy

- planning policy

- smart city policy

- data policy

- community engagement policy.

All these policy areas can be adapted and strengthened by local government to support improved outcomes relating to local air quality monitoring. This includes outcomes that relate to partnership development and building communities of practice. Examples include:

Climate change policy and planning policy

Climate change policy and planning policy might both be adapted to emphasise urban heat as a critical concern for the organisation, supporting efforts to improve understanding of the issue and actively mitigate it. This justifies the ongoing operation and expansion of an urban heat monitoring network. It also creates a foundation for organisational leadership on urban heat, justifying a range of activities that might include strategic partnerships, data sharing, or widespread communication of results.

Smart city policy

A **smart city policy** might guide technology procurement decisions and the strategic development of data infrastructure with an increasing emphasis on interoperability (in alignment with global best practice). This may create an environment that is more conducive to collaboration with industry and university partners.

Data policy

A **data policy** should dictate what data is shared, with whom, and under what circumstances. Improvements to the policy might enable the sharing of higher-quality data, which may form the basis of new collaborations and partnerships, or strengthen existing ones.

Community engagement policy

A **community engagement policy** might be adapted to provide a remit for more participative modes of community engagement. This may strengthen the ability of a local government to act as a trusted and well-aligned partner to community groups and organisations.

Build a leadership profile

Exploring the use of smart sensing technologies and data utilisation can position local governments at the forefront of urban innovation. Innovative project work can be leveraged by actively choosing to build a leadership profile that is recognised and celebrated by others within a broader community of practice.

Establish a leadership ambition

Before pursuing a leadership profile, an internal leadership ambition should be established and supported. This might be achieved through a combination of the following strategies:

- the creation of a new team or roles (e.g. a dedicated smart city team)

- political leadership from a mayor or councillors

- a formal local government resolution (e.g. prioritising action on air quality)

- the creation of a new strategy (e.g. local innovation)

- a formal commitment (e.g. joining the C40 Cities network and signing the C40 Clean Air Declaration).

Engage your media team and tell your stories

If you are delivering projects worth talking about, ensure that you meet with your media team and develop a communications plan that will share your stories, and expose your work to as wide an audience as possible.

Pursue high-profile platforms for showcasing your work

Innovative projects and initiatives can be showcased by speaking at high-profile conferences. Local government staff can be encouraged to pursue such speaking opportunities, and a media team can choose to seek out and secure them.

Join an association and actively contribute to collaborative initiatives

Various associations provide opportunities for active contribution by local government to collaborative initiatives within a community of practice. These initiatives can often be responsible for driving political and business agendas relating to key issues, such as smart cities, urban infrastructure, or climate resilience (e.g. through the collaborative development of new standards).

Examples of such associations in Australia include:

- The Australian Smart Communities Association (ASCA)

- Internet of Things Alliance Australia (IoTAA) (*Smart places and infrastructure* workstream)

- The Smart Cities Council of Australia and New Zealand (SCCANZ)

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Associated OPENAIR resources

Best Practice Guide chapters

Data labelling for smart air quality monitoring

This Best Practice Guide chapter provides guidance on data labelling for smart air quality monitoring. It provides advice on developing and implementing a project data schema (which defines all of the telemetry and metadata that will be used in a project).

Data interpretation: correction and harmonisation

This Best Practice Guide chapter provides guidance on correction and harmonisation of data produced by smart low-cost air quality sensors. It introduces several types of correction factor that may need to be applied to raw sensor data, and explores how data formatting and labelling should be harmonised with a project data schema to support effective data management and sharing.

Participative design practice

This Best Practice Guide chapter provides guidance for inclusion of participatory design approaches in a smart air quality monitoring project. Participatory design is where citizens can become active co-designers of a project, and may take ownership of key aspects of its delivery. The chapter explores the benefits of participatory design for local governments in this context, practical approaches to implementation, and common challenges that may arise.

Data policy for local government air quality monitoring

This Best Practice Guide chapter explores how local government data policy can support the effective, responsible, and strategic management and sharing of data associated with air quality monitoring. It addresses critical considerations, and provides practical advice relating to the design and development of appropriate data policy.

Citizen sensing

This Best Practice Guide chapter provides guidance relating to a type of citizen science known as 'citizen sensing'. This is where citizens play an active role in the collection of air quality data using low-cost sensing devices. This chapter explores the benefits of this approach, practical considerations, and common challenges.

Sharing air quality data

This Best Practice Guide chapter provides guidance on the sharing of air quality data. It explores the process by which a local government might assess data to determine its shareability, and presents a series of practical options for implementing data sharing.

Engaging your organisation with air quality data

This Best Practice Guide chapter provides guidance on designing and delivering effective activities for engagement with air quality data within a local government context, addressing the common issue of underutilisation of data assets.

Engaging your community with air quality data

This Best Practice Guide chapter provides guidance on engaging communities with air quality data. It explores the benefits of community data activation, provides tips on how to get started, and presents an extensive range of community engagement approaches that a local government might choose to adopt. It also considers how to mitigate against common risks associated with data release and community engagement with data.

Further information

For more information about this project, please contact:

Peter Runcie

Project Lead, NSW Smart Sensing Network (NSSN)
Email: peter@natirar.com.au