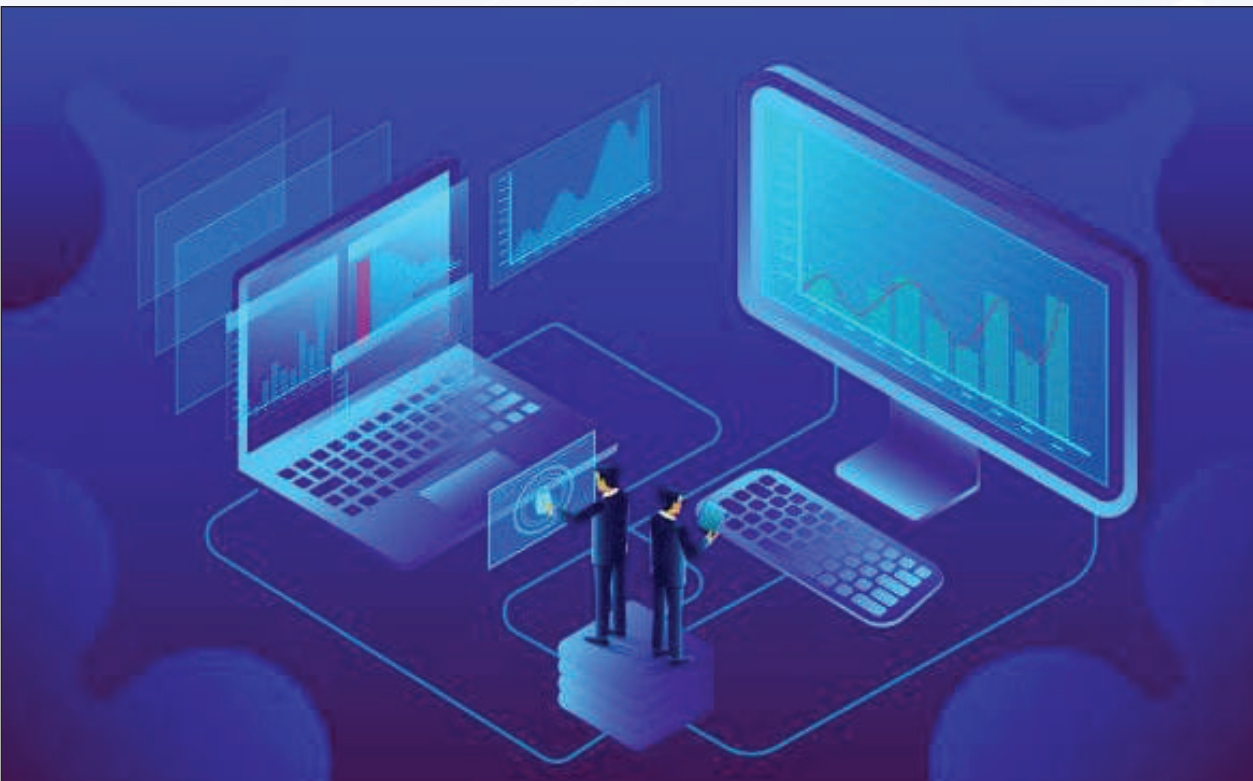


BUILDING DATA ALLIANCES



A CITY REFERENCE GUIDE

Ministry of Housing and Urban Affairs
Government of India

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I. Executive Summary

With the ever-growing urbanization and its challenges for municipal authorities, cities need to navigate issues across various areas such as public health, water supply, traffic congestion, waste management, climate change, air quality, and others. Though data is being viewed as a new tool for trying to solve such problems, even that is lying in silos with multiple stakeholders. However, many of today's urban problems are much complex which often may not be easily solved by any single authority in the public sector or by any other societal actors on their own.

Thus, partnerships aiming to leverage data kept in silos to address such problems are often required to address a shared goal. A data-driven collaborative approach can help navigate these challenges, as highlighted in the DataSmart Cities Strategy released by the Ministry of Housing and Urban Affairs in 2019. With cities trying to become more smart, productive and efficient, it is necessary for diverse urban stakeholders to come together for mutual benefit. There is a need to understand that power of data lies in the combinatorial possibilities that are unlocked when data from multiple sources comes together.

The ability of innovators to share and combine key datasets is the foundation from which new approaches to problem solving can be developed. Combining health, environmental, population and other data to address asthma risk in large urban areas requires infrastructure that supports the access, use, reuse, management, coordination, and stewardship of relevant data sets. Data alliances are all about utilising data to help solve every day urban problems having large citizen impact by having shared goals, shared priorities and being mutually beneficial.

Data Alliances are a new form of collaboration, beyond the classic public-private partnership model, in which participants from across the ecosystem exchange their data and technical expertise to achieve a shared goal and create

public value by solving a common problem. Effectively leveraging the strength of the quadruple helix in such areas, can help cities navigate the complex urban challenges and become smarter and sustainable.

Usage of this guide

This document has been designed as a reference to facilitate cities in initiating and sustaining data alliances with various stakeholders. It lays out the basic principles which can help cities structure strong data alliances and strengthen their ability to tackle urban problems. It outlines the advantages of forming data alliances, the stakeholders with whom cities are encouraged to form alliances, how the cities may form these alliances and framework within which the alliances might be formed. This document also presents certain global and national use cases that cities can study and emulate. Additionally, it includes a model Memorandum of Understanding (MoU) that cities can use as a template to create their own MoUs for data alliances.

However, this document has been designed as a guide and not as a prescriptive document that cities must follow. Cities are expected to study this document, work with city departments and contextualise their approach based on the city's vision, its goals and its strengths. For example, a city might choose to build alliances with stakeholders not covered in this document; not only is this expected, but it is encouraged. This document can be used to set up the necessary processes, ensure a strong foundation as well as spark new ideas that cities can take forward.

This document should be read in conjunction with the DataSmart Cities Strategy. While the latter focuses more on how data can be harnessed and leveraged, this document outlines the fundamentals of building a city data alliance. The two frameworks strengthen one another and can help cities tackle urban problems more effectively.



Kunal Kumar

Joint Secretary & Mission Director (SCM)
Ministry of Housing & Urban Affairs

“ Indian cities are vibrant ecosystems built on a network of social connections. Leveraging such connections for solving local problems can help bring about end-to-end improvement in design, implementation, and adoption of programs. Data alliances have the potential to transform the way cities are implementing data-driven approaches for problem-solving by aggregating the strengths of different stakeholders – both public and private and fostering an environment of innovation and collaboration amongst them. Furthering a “whole-of-society” approach, these alliances can help cities unlock the full potential of data to tackle everyday urban challenges and benefit citizens at large. ”



Rahul Kapoor

Director & Mission Data Officer (SCM)
Ministry of Housing & Urban Affairs

“ The capacity to discover and realise benefits coming from the vast amount of data requires significant capacity, both technical and organisational, which cities can source from all stakeholders in the urban ecosystem. Data alliances can help cities tackle complex urban challenges in many areas such as climate change, future of mobility, child-friendly neighbourhoods, water and waste management. City leaders need to take an active leadership role in forming data alliances and transform data-driven governance in cities. ”

II. Understanding Data Alliances

The volume of data collected by multiple devices, such as mobile phones, sensors, satellites, is growing at an exponential rate. These data may be held by citizens, or by public or private organizations. To benefit from the explosion of this data, it cannot be kept in silos and needs to be made available and accessible to the relevant stakeholders to allow for data-driven decision making. Accessing and aggregating different sources of data, including data outside the public domain, has the potential to provide insights for many urban challenges. This gives way to new forms of partnerships between public, private, and non-governmental actors aimed at leveraging different sources of data for positive societal impact.

The DataSmart Cities Strategy recognises the strength of the quadruple helix model and the need to include various stakeholders if urban policies and programmes are to be sustainable and successful. Through data alliances, the stakeholders come together to collaborate, learn from one another and leverage each other's expertise and resources to meet their own and collective ends. Through these alliances, the urban local bodies can extend their data, platforms and services to members (inside-out innovation) and receive solutions and data products from members (outside-in innovation),

and in the process improve the user-centricity and efficiency of goods and services to citizens.

Data Alliances attempt to address specific problems through a coordinated, inclusive and data-driven approach, build on partners' strengths and provide benefits to the city at large as well as to the stakeholders involved. Data alliances are dynamic – in composition, purpose and duration – and could deepen over time. The alliances formed between city government and one or more stakeholders are intended to be beneficial for all those involved, as well as for the larger urban citizenry. Data alliances can ensure that much needed resource augmentation, innovation channels, global exposure for cities is achieved. While individual/private stakeholders have the opportunity to innovate or test innovations, be included in the policy process and contribute to India's urban growth and development.

Surat Smart City in India was looking to improve its public bus occupancy, but its transit data, fare collection data, etc. was lying in silos with multiple agencies. Using the India Urban Data Exchange, the city has been able to integrate data from various sources such as ITMS, Surat Money Open Loop Smart Card, QR code-based ticketing, and



Google's bus-related real-time data. Analysis of these datasets is helping the city identify real-time bus occupancy, resulting in minimising waiting times for passengers, effective scheduling of buses, helping the citizens better plan their travel, among other benefits.

While forming a data alliance, city leaders need to think of an inclusive approach covering various aspects of the data lifecycle, engaging data producers, users and stewards, addressing data sharing and exchange, processing, storage, data interoperability, as well as technological aspects.

Strategic datasets crucial for addressing complex urban problems are not only held by governments, but also rest in private hands. Companies around the world, as part of their corporate social responsibility, have also begun to explore opportunities to contribute to addressing societal problems by sharing some of their data and resources.

Alliances work at different levels- within the cities and across various cities - nationally and internationally. While departments within city governments need to coordinate their own efforts when solving urban problems for increasing the efficacy of a solution, they may also collaborate with other cities, or private stakeholders to solve similar problems. Data alliances, data exchanges, and data consortiums all offer a growing alternative to traditional do-it-alone data development and service delivery models.

In the aftermath of the 2015 earthquake NCell, a telecom operator in Nepal, shared mobile call records with data scientists from the non-profit Flowminder in Sweden to help direct disaster response efforts in the area.

The Research Data Alliance (RDA), founded in 2013, is a collaboration of government entities and the global scientific community emphasizing open sharing of data across technologies, disciplines, and countries to address the challenges of society. Presently, the RDA boasts more than 11,100 members from 145 countries.

Data alliances are key to shaping the public good in new ways.

Thus, in a bid to solve urban challenges, it is in the city government's interest to form data-based alliances for specific use cases with external agencies, Subject Matter Experts, professional bodies, technical experts, think tanks, academia etc. In this document we will look more closely at some of the alliances' cities can form and how they can go about approaching stakeholders and building partnerships.

Advantages of Forming Alliances

Some of the advantages of forming ecosystem alliances are listed here:

The objective for a city to enter into an alliance must be informed by the city's developmental context.

City may form data alliances that:

- Enable bringing together data from various disaggregated sources
- Grant access to analytical and technical know-how
- Enable innovation and co-creation of data-driven solutions to urban problems
- Create an architecture that allows for data enrichment
- Uncover scalable and replicable solutions
- Enable prototyping, testing and validation of data-driven solutions
- Provide academia and institutes new avenues for research



The eventual goal of the city to enter into a partnership / alliance is to unlock societal benefits that can help:

- Bring in capacities and capabilities the city might not have
- Shared resources, risk management and finances
- Situational awareness and response
- Public service design and delivery
- Knowledge creation and transfer
- Prediction and forecasting
- Impact assessment and evaluation

Role of city leaders

Cities need to spearhead the efforts to formulate such alliances by bringing the partners together on a common platform. They need to work out the modalities and convene all such efforts in order to make these alliances successful and result in public good. This would be possible only if all stakeholders in the city including the Municipal Commissioners, the Smart City CEOs, the City Data Officers and others are agreeable to a common goal.

The key functions of the city for formation of data alliances may be spread across strategic, operational and administrative activities and could include:

- a. Identifying potential use cases/problems for data alliances
- b. Designing the best course of action for initiating these alliances and ensuring that these alliances are optimised and sustained
- c. Identifying potential partners/collaborators
- d. Acting as the point of contact for organisations if they have their own alliance proposals
- e. Identifying and bringing together the relevant government departments for various projects and coordinating between these departments
- f. Maintaining continuity across alliances and with alliance partners
- g. Communicating with existing alliance partners and engaging with potential partners
- h. Ensuring that data alliance projects are well-documented for further use
- i. Coordinating projects between city government and external stakeholders, before and during the projects

In due time, the city may look to publicise information on the data alliances on existing websites for wider reach. This includes an archive of past projects, a forum through which potential partners can reach out to the city government and a bulletin showcasing on-going collaborations and plans for the future.

III. Toolkit for Alliance Building

While we have discussed how data alliances can be formed, it is also necessary to delve into some of the terms of these alliances. Following steps may

help cities form meaningful and sustainable data alliances:



1. DEFINING THE PROBLEM/USE CASE

Gaining a clear sense of the problem city is seeking to solve is an essential first step in establishing a successful data alliance. The idea is to find a problem that can be solved via useful inputs arising from data alliance. Defining the objective will help the alliance partners to commit to a clear cause with measurable outcomes.

The problem statement should articulate the problem with precision and explicitly state all assumptions. It should ask and answer why the problem has not been solved yet. It might also address who is affected by the existence of the problem and why and what are the root causes of the problem.

Cities can work with relevant stakeholders to conceive the specific urban problems and to co-design and develop use cases that address the relevant urban development challenges such as improving learning outcomes in city schools, prediction of specific infectious diseases like malaria, predicting occurrence of crime in the neighbourhood, and so on.

The alliances that are initiated should be issue-based and outcome-based. One of the rationales of forming data alliances is to find data-driven solutions to address local urban challenges. These alliances should be able to outline what urban issue they are attempting to tackle, what outcomes they expect to deliver within a certain timeframe and perhaps most importantly, why this issue is a priority and who benefits if it is addressed.

Questions & Considerations

- Describe issue to be addressed
- Identify the beneficiaries
- Explain why now?
- Articulate why it matters
- Note any assumptions
- Examine any counterarguments
- Explore current work done to address the problem (internally and externally)

2. IDENTIFYING POTENTIAL ALLIANCE PARTNERS

An alliance partner is someone who is part of the process of building or implementing a solution and thus, working together towards a common goal. Each vertex of the quadruple helix is important, and the city can build a more nurturing environment for each stakeholder.

A. GOVERNMENTS

Urban problems can be effectively tackled when cities work as cohesive units. There is an urgent need for different departments to come together to make projects successful and sustainable. Some aspects of forming in-city alliances include sharing data, sharing ideas and apprising other departments of the progress being made.

	Government	Academia	Industry	Start-ups	Community
Identify	City Departments; Indian and Global Cities	Colleges & Other Institutions	Global & Local Businesses	Local and International Start-ups	NGOs, Think Tanks, Citizens
Engage	Existing Networks, National Forums	Internships, Innovation Labs	PPPs, CSR Projects	Incubators, Hackathons, Events	Surveys, Open Consultations
Collaborate	Shared Resources and Solutions	Research, Impact Assessment, City Labs	Data Sharing, Technology, Investment	Data Analysis, Solution Testbeds	Inclusion, Participatory Governance



City governments understand one another and the complex challenges of urban governance. There is a shared language between cities; the advantages of sharing experiences can be captured and built upon to the benefit of the cities involved. Cities are encouraged to learn from each other, share experiences and collaborate on certain data projects and share relevant resources. Cities can work with other Indian cities or even collaborate with cities around the world.



experimentation and offer a wide range of expertise at a single place. Cities can form long-term associations with academic institutions to take advantage of their comprehensiveness of research that other stakeholders are not equipped to offer.

B. ACADEMIC INSTITUTIONS

Academic institutions keep pace with global trends in research and innovation, are open to

Cities might also invite applications from academic institutions for certain specific data collaborations. While students form the most dynamic resource of academic institutions, cities might also work with faculty who are likely to be experts in their fields. Partnering with academia offers cities the opportunity to access high quality research and analysis for specific issues as well as for broad inter-disciplinary deliberations.

USE CASE: FIRE SAFETY PROGRAM, IN COLLABORATION WITH UNIVERSITY STUDENTS AT LOUISVILLE, US

- In Louisville US, the Data Officer partnered with students at the Master of Urban Spatial Analytics (MUSA) program at the University of Pennsylvania to work on a city data project with the Louisville Fire Department (LFD).
- The students were given datasets around fire incidents, inspection schedules, outreach programs and vacant property fires and by using machine learning and analysis, they were able to determine high fire risk factors from three different categories.
- The result was a data project that created a geospatial Fire Risk Index that used the calculated risk factors to help inform the fire department to optimize its smoke detector outreach.

USE CASE: TUMAKURU SMART CITY LTD. (TSCL) HAS PARTNERS WITH ACADEMIC INSTITUTIONS TO TACKLE URBAN ISSUES

- TSCL has recently partnered with several local academic institutions including Sri Siddhartha Institute of Technology, Siddaganga Institute of Technology, Sridevi Institute of Engineering and Technology and HMS Institute of Technology to foster innovation and co-creation of solutions for urban problems.
- TSCL has provided specific problem statements and related datasets to the students of these institutions to come up with innovative solutions to identified urban challenges.

C. INDUSTRY AND BUSINESSES

Cities can work with established industries and businesses, including local businesses to leverage their rich experience in utilizing data for problem solving. They might be able to offer the city implementable solutions, infrastructure and services. Cities can collaborate with businesses on

CSR projects and on public-private partnerships (PPPs) for data projects, and also partner with industry for specific technological solutions and data sharing. Local businesses that may have emerged from or are close to urban communities might be especially well positioned to offer solutions.

USE CASE: UBER 'MOVEMENT' DATA FOR URBAN PLANNING

- For improving urban mobility, global ride-hailing service Uber has launched "Movement", a platform that provides anonymous, aggregated data on traffic patterns to support cities with urban planning and data-driven policy making. The Movement tool shows travel conditions across different times, days or months and how commuting times are impacted by big events and road closures.
- All data is anonymized and aggregated to ensure no personally identifiable information or user behaviour can be surfaced through the tool. The data is available in a machine readable, csv format and can be combined with the geo-boundaries for use in GIS applications.
- Currently this is available in 50+ cities globally, and 5 cities in India namely, Delhi, Bengaluru, Hyderabad, Kolkata and Mumbai.

D. START-UPS

While established businesses offer great experience, in today's times start-ups can offer more innovation opportunities. They are dynamic, innovative and willing to try newer approaches to solving persistent challenges using data. Cities may form alliances with start-up incubators and can offer certain start-ups in these incubators the opportunity to work at the community, neighbourhood or city-level. Cities should make a concerted effort to

make themselves attractive to start-ups by easing compliances, offering subsidies, making available more co-working or affordable workspaces and offering the opportunity to test their ideas in the city. Start-ups focused on data (collection, use and analysis), urban infrastructure and urban sustainability will be of particular interest to city governments. City governments can share data and offer opportunity and a supportive environment for start-ups to experiment with innovative solutions.

USE CASE: CITY INNOVATE'S START-UP IN RESIDENCE (STIR) PROGRAMME, US

- Under the STIR programme (run by the non-profit City Innovate) one of the start-ups, LotaData, worked with the San Leandro city's Recreation and Human Services Department, for improving community engagement and better utilising funds.
- LotaData created a data analytics platform, called "People Intelligence" platform, to collect relevant data from various sources – public, private, community surveys, geolocation data, census data, etc. – and present trends and patterns.
- These patterns are presented in maps and other formats, using which, the city got deeper insights into the activities of its residents and their movements, which facilities residents visited, or which programmes were most popular. The city was also able to easily send text messages or emails to those residents enrolled in various programmes.
- Since the STIR programme, LotaData has expanded its CityDash dashboard (based on the People Intelligence platform) to more than 1,000 cities across the world. The map-based visual dashboard provides accurate and anonymized people intelligence for city departments and agencies.

E. COMMUNITY AND CIVIL SOCIETY ORGANISATIONS

Cities may also identify civil society organisations, non-governmental organisations, non-profits and

think tanks, they could work with. Cities may partner with such agencies around their focus areas as well as leverage the wide networks they may have.

USE CASE: SOLVING TRAFFIC CHALLENGE IN US CITIES WITH HELP OF NGO AND DATA ANALYTICS

- Several US cities including, Seattle, New York and New Orleans, have entered into an alliance with Microsoft and DataKind, a non-profit dedicated to utilising data science for humanity, to identify and deploy innovative solutions by expanding analytical capabilities to identify complex relationships within civic challenges.
- As part of the alliance, each municipality shared a traffic challenge specific to them and DataKind built machine learning models to assess the potential sites and impacts of local interventions.

Questions & Considerations

- Which entities (whether private, governmental or non-governmental) possess and could provide the needed data?
- Which entities could provide additional competencies (data science or otherwise)?
- What entities are best suited for filling identified data gaps and/or expertise?
- Why would different actors be motivated to collaborate?

3. IDENTIFYING AREAS OF COLLABORATION

In partnerships aiming at data sharing and use, it is important to articulate and agree on common goals. Assuring communication and exchange between the partners is a key factor for success. Each partner should be able to determine what resources they bring to the table. Once these are assessed and decided upon, the additional steps required to tackle the problem may be identified. The alliances may be formed for different purposes:

A. DATA SHARING

This relates to data acquisition from original data sources/providers and may include:

- Government organisations collecting data as part of operations and service delivery
- Private organisations collecting data as part of their core business
- Academic institutions collecting data for their research activities



- Data from crowdsourcing

Such organizations may be collecting huge volume of data which may be helpful for city governments in urban planning, vis. mobile phone movement data, data from scanners, smart meter data, user mobility data, data from impact assessment studies, survey data, etc. Data sharing may occur using any form including open publication of data, open APIs, data sharing through a third party, or using specific data exchange platforms such as the India Urban Data Exchange (IUDX).

The main challenges while accessing such data are managing privacy and confidentiality. Another challenge is possible conflict between the intention of the city to acquire data with minimum cost and business model of data providers. Commercial interest could be in conflict with free access to

data. Further, issues like continuity (availability of data) and data quality are also a problem with regard to data sharing. Cities should collaborate and work together with data providers to address these challenges. City may look to offer incentives to encourage the data providers, including goodwill, social good, enhanced brand reputation, opportunities for co-creation, testing of pilot solutions, creation of bespoke research and others.

B. DATA ANALYSIS AND SOLUTIONS

Cities produce high volumes of data. However, since there is often limited or no control of the data source and its quality, the utilisation of such data requires novel approaches. In the absence of have such capacities or capabilities, cities may require adoption of newer methods of data analysis and solutions. Towards this end, cities may consider engaging with engineers, data scientists, researchers or such organisations and collaborate with them on specific use cases.

Ideally, cities can provide the standards and methodology, while the partner organizations can provide analytical capacity and modelling expertise. This would be especially relevant to



start-ups and other business organisations that are constantly experimenting with innovative solutions for urban challenges. Through these efforts, the city may be able to make more accurate predictions of severity or

spread of existing problems or find insightful ways to tackle them.

C. SHARING TECHNOLOGY, I.E. TOOLS, DATA INFRASTRUCTURES

Access to the best tools for data processing, data mining, real-time analytics, storage, computing, and data visualization is essential to successfully understand and analyse urban problems. Analytics software can be used to sift through vast quantities of data to tell its hidden story, look for emerging trends, etc.

Technology partners may have different service offerings such as stand-alone software, full platforms, or hardware which may be needed for storage, computation or analysis. Cities may decide whom to collaborate with based on their requirements.

Questions & Considerations

- What is the intended societal benefit of the data alliance?
 - ~ Situational awareness and response
 - ~ Public service design and delivery
 - ~ Knowledge creation and transfer
 - ~ Prediction and forecasting
 - ~ Impact assessment and evaluation

4. ESTABLISHING DATA GOVERNANCE FRAMEWORK

Current experiences of partnerships have highlighted how several types of issues may arise within a data alliance, such as responsibilities and ownership, privacy and confidentiality matters, etc. At this stage, it is critical to establish a reliable data governance mechanism. Establishing a set of principles, processes and tools that holds stakeholders accountable to support the legal, fair and just use of data is a must.

Privacy is a paramount concern for government organizations which are bound both by legislation and codes of conduct in the safeguarding of personal information. Local, State and National data protections laws should be followed to ensure protection for an individual's data. Key ways to access and utilise personal data for analysis are to either acquire anonymous individual level data or data in aggregated form so that only trends can be observed.

Mobile phone movement patterns are a prime example of privacy concerns around using individual level data. Similar issue was encountered in Netherlands during research into the potential for mobile phone geo-location data to estimate population densities. They dealt with the issue of privacy in a transparent manner. The mobile phone provider set up a separate company to process the data and provided only the aggregated information.

Confidentiality issues may also arise while dealing with data sharing, especially with commercial companies. For this, non-disclosure agreements (NDAs) may be entered into to facilitate the acquisition of commercially sensitive information. Such agreements can cover quality assurance and other processes which may also be proprietary.



Another issue that may arise is the ownership or intellectual property of the solution developed via the data alliance. In cases where advanced programmes/algorithms are developed by the alliance partner, the issue of ownership may be complicated, and should be agreed upfront. There could be situations where cities may need to have ownership in order to ensure sustainability of the solution. In other cases, the the Intellectual Property Rights (IPR) may be kept with the solution provider itself.

Another risk to manage is the potential for lock-in to a particular platform in a rapidly changing technology environment. The alliance partners may have chosen a specific “stack” of technologies, with or without offering any degree of flexibility.

City administration will need to understand what parts of their offerings are truly open and what imply a greater degree of lock-in to their proprietary model for any web or a mobile app or platform being developed as a solution. Cities should also ensure linkages

to the existing infrastructure and may even explore cloud-based resources such as the IUDX for data exchange.

Cities will need to find an optimal balance between innovative use of new data sources, adherence to ethical principles and legal conditions as well as quality of data sources and derived urban solutions and products. This will require trust among the members of the data alliance, along with an open attitude and transparency.

Data partnerships can vary with the level of complexity but having a responsible governance structure in important to ensure effective outcomes. A proper governance framework would also require clarification of decision-making structures, roles and responsibilities and an accountability mechanism.

Questions & Considerations

- What could be the risk factors across the data lifecycle (with particular focus on the sharing and use stages)?
- What are the relevant legal, political and cultural concerns?
- What techniques may be useful for mitigating risks (e.g., through anonymization, data security techniques)?
- What will the data alliance’s decision-making process and hierarchy be?
- How can stakeholders create feedback loops to ensure that progress isn’t made in isolation?
- What will the process/next steps in case the data alliance proves to be ineffective?



5. ESTABLISHING COLLABORATION ARRANGEMENTS

Establishing a collaboration arrangement would entail putting in place a framework for operationalising the alliance. A city can enter into a formal partnership through the agreed upon various channels or even collaborate informally, as the case may be.

Where data sharing does not involve any financial implications in terms of payments for use of data, a formal arrangement document such as a Memorandum of Understanding (MoU) or a Letter of Intent is suggested, duly covering the conditions of use of data and technology. These documents should outline the overview of the project, detailed roles and responsibilities, expected timeline and outputs, ownership and privacy aspects, IPR and grievance redressal mechanism, if needed. These partnerships may include incentives for the data

provider that can be laid down in the document vis. the benefits of association with the city or simply involve an element of goodwill on the side of the data provider. Where sharing of data involves financial implications for the data user, such exchange of data can be made through formal contractual arrangements and the agreement for the same can be standardised. This makes the process transparent and easy to use for all stakeholders (a model MoU template is given in Annexure III).

Technology partners may be engaged for providing data analysis service or software. Data analysis software can be either open source or licensed, in which case a license will have to be purchased either annually or with one-time fee. In such cases, generally an umbrella agreement may be negotiated that can be used for the resources shared.

Informal arrangements could also be made, or already existing coordination or consultation mechanisms could be used for establishing partnerships relating to data sharing among the stakeholders. However, due care must be taken to ensure addressing of issues related to data usage, such as privacy, confidentiality, ethical issues, coordination and harmonization.

Collaboration structures in any alliance would vary depending on the nature of collaboration being formal or informal, security and privacy concerns, the end objective and desired operating procedures of individual partners, and any other factors as relevant.

Questions & Considerations

- Liability of various parties
- Intellectual property provisions
- Data ownership and handling
- Cost considerations
- Data privacy concerns
- Ethical considerations

6. ENSURING SUSTAINABILITY OF THE ALLIANCES

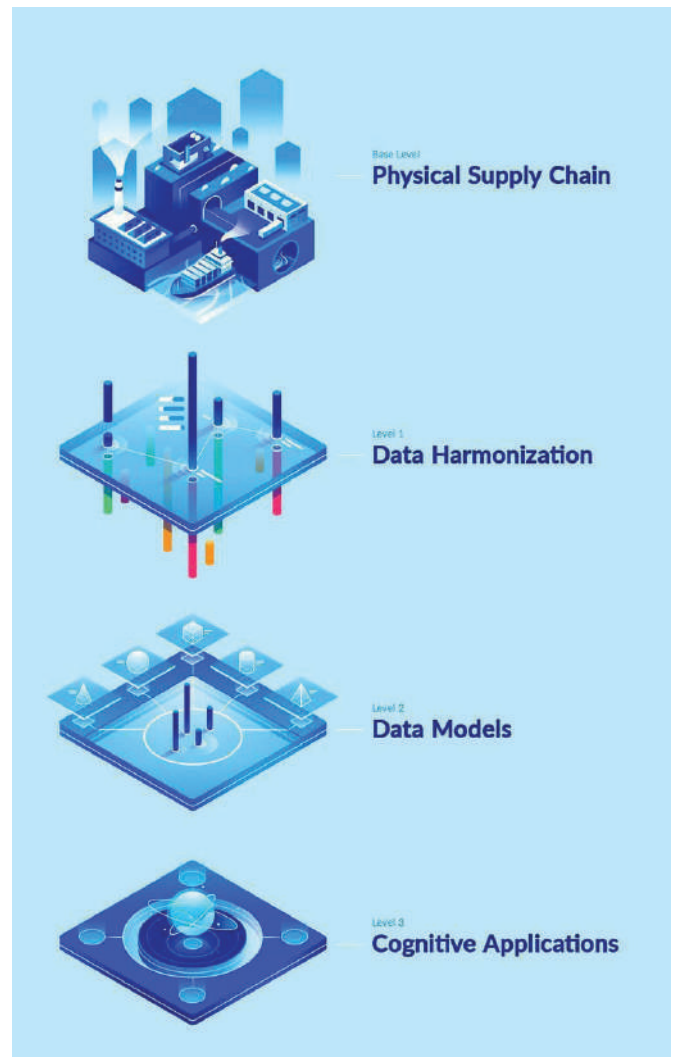
Once the data alliance has been initiated and the partners are working on their identified areas, they may identify mechanisms to ensure that the agreed goals are delivered. The partners should be able to provide the products/services/solutions necessary for achieving the Key Performance Indicators (KPIs) as mutually decided and perhaps specified in the collaboration agreement, if needed.

Once the immediate purpose of the data alliance is successfully attained, potential for scaling up the identified solutions may be evaluated. The aim should be to create scalable and sustainable solutions for everyday urban challenges using data. Any data alliance should ensure continual focus on long-term benefits for citizens.

Moreover, data alliances may even be part of a broader decision to make data more freely available with no immediate expectation of reciprocation. Even though less measurable, the benefits here may be longer term. This would entail a greater collaboration that eventually supports a healthier data environment, such as for open data publication.

Thus, building data alliances is a smart proposition for cities trying to discover sustainable solutions for urban challenges. In addition to realizing the efficiencies in an instance of strategic alignment of

each stakeholder's assets and capabilities, data alliances across the quadruple helix have value even beyond a single use case. Strong relationships across diverse stakeholders supports an ecosystem of data collaboration, co-creation and innovation – a key ingredient for a smart city.



Questions & Considerations

- What indicators are most representative of the issues the data collaborative is meant to assess?
- Does the data alliance appear to be having an impact in intended areas?
- Are the KPIs intended at the start being met?
- Do the metrics uncover any unanticipated impacts to date?

Case Studies

CASE STUDY 1: BENGALURU'S FIGHT AGAINST COVID-19

Context

Covid-19 outbreak has adversely affected the functioning of cities worldwide and in India. Cities have been trying to mitigate this problem by leveraging all possible resources/tools available, including the Integrated Command and Control Centre (ICCC).

To manage this crisis in Bengaluru city, the Bruhat Bengaluru Mahanagara Palike (BBMP), with support from Bengaluru Smart City Limited (BSCL) had undertaken an innovative initiative by setting up a Covid-19 War Room. The ICCC War Room was established on 22nd March 2020 as first in the country for crisis management during Covid-19.

Details

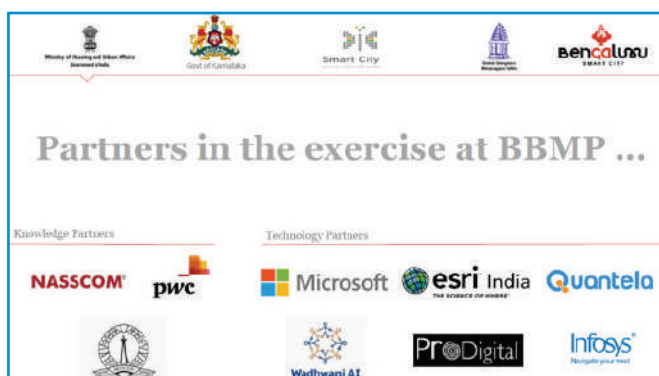
The city put immense effort in bringing together various partners across the quadruple helix- Government, Industry, Academia and Community, under a single consortium. The stakeholders ranged from start-ups to many MNCs and firms including, Prodigital, PwC India, Infosys, Quantela, NASSCOM, IISc, Wadhvani AI, ESRI India, Microsoft, AWS, Chipsy Solutions, Mediahanger, Sprinkler, and others.

The partners came together on pro-bono effects

and were identified after considering several aspects such as prior association with the city itself, past experience of successful solution delivery, engagement with the central Ministry, expertise in their field of work, etc.

The partners were engaged through various modes such as signing of MoUs. Systematic governance structures were set up so that all entities are well managed and coordinated, and each partner had specific role to play to help manage the pandemic. They provided technical assistance as well as manpower support to the city including that for software platforms, data analytics capabilities, development of mobile and web applications, etc. The team was instrumental in helping tackle the pandemic through:

- Implementing the overall war-room, through Quantela
- Developing a mobile application to act as a single platform for volunteers, NGOs, citizens, BBMP officers' workflow, with the help of NASSCOM and Infosys
- Developing an Index Application built on Microsoft Power Apps platform for Covid-19 pandemic management in the city, developed and supported by PwC India
- Developing Covid-19 pandemic predictive modelling software along with Indian Institute of Science (IISc)



Outcomes

There were several notable outcomes including:

- Response-time has become quicker and delay has decreased uniformly across all categories
- There was a reduction in the number of deaths due to the robust technology enablement
- Real-time data dissemination and data analysis along with issuing of SOPs, Advisories, Containment Zone Orders, proved to be effective in containing the spread of the virus
- Ready-to-use handbook “Model War Room Operational Framework Document” prepared and shared with 100 Smart Cities helped in easier adoption and replication

The Bengaluru model is an excellent example of a successful Public Private Partnership: different types of contributors coming together to tackle the on-ground issues.

CASE STUDY 2: ENABLING SEAMLESS DATA SHARING THROUGH THE INDIA URBAN DATA EXCHANGE (IUDX)

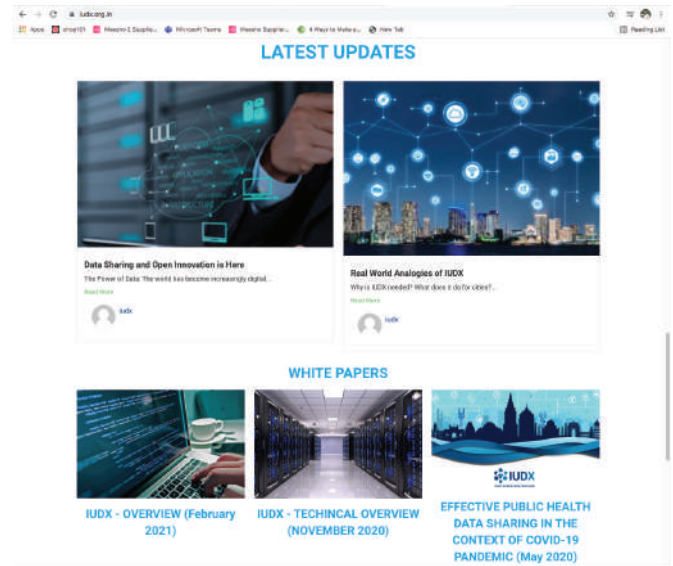
Context:

IUDX was born out of the need to enable data exchange between various city departments, government agencies, citizens and private sector. IUDX aims to help cities in using the data intelligently to address complex urban challenges through innovation and co-creation.

The IUDX Program is a collaborative initiative of the Smart Cities Mission through the Ministry of Housing and Urban Affairs (MoHUA), the Ministry of Electronics and Information Technology (MeitY) and the Indian Institute of Science (IISc), Bengaluru that facilitates the use of data to achieve the full potential of technology and innovation within Indian cities.

Details:

IUDX is completely open source, based on an underlying framework of open standard APIs, data models, and the security, privacy and accounting mechanisms that will facilitate its easy adoption across the digital ecosystem. It provides the



accessibility, interoperability, and reusability of data, helping industry partners and academic researchers tap into and amplify its full value.

IUDX platform is a software system, which needs to be deployed and operated as part of the overall Smart City IT infrastructure. Since IUDX is a data exchange and not a data repository, it provides considerable deployment flexibility and not a rip-and-replace deployment. It is designed to add value in the existing deployments (brownfield) with no disruption to existing platforms and for the new deployments (greenfield) without any challenge. The IUDX components (Catalogue, Consent, Resource) along with the API adapters, will allow the existing data in their data platforms to be searched, requested, permitted and exchanged.

The platform can help in:

- **Data Aggregation & Standardization:** Breaking data silos to enable sharing of public and privately owned data. Converting collected data into understandable format and usable information.
- **Data Analysis:** Generating insights from large set of data for creating new applications/ services
- **Secure Collaboration:** Mitigating security risk and data fraud, and enhancing transparency and accountability
- **Data Marketplace:** Enabling data economy by monetizing data. Using data innovatively to foster entrepreneurial ecosystem in smart cities

Cities can essentially engage with the IUDX via MoUs and utilise it for data sharing with relevant stakeholders.

Outcomes:

The pilot projects in the cities of Pune, Varanasi and Surat have been a success and will shortly be deployed in 7 more Indian cities. Further, there are plans to take the number to 50+ cities under the IUDX umbrella by 2023.

Varanasi: To solve waste management problem, the city created a mobile-based app solution using datasets catalogued, managed and shared on IUDX. The App helps ICCC to identify anomalies and generate real-time alerts. Further, the city is working on improving tourist experience by integrating datasets from diverse and discreet sources and plans to create a safety index for popular destinations in the city through a mobile app for tourists.

Pune: The city has collaborated with multiple stakeholders to onboard a variety of relevant datasets on IUDX to allow solution providers to develop applications. This has resulted in development of Pune Personal Safety Mobile App which enables citizens to choose a safer route based on safety index thus improving public safety.

Surat: IUDX has been used to tackle the challenge of public transit in the city. A mobile app-based solution has been developed that offers a ticket booking functionality and indication of the ETA of buses, showcasing a real-time map view of the buses to various bus stops. It utilizes IUDX to smartly process data from different systems of ITMS and AFCS, helping in harnessing and standardising the datasets for effective functioning of the App.

CASE STUDY 3: MICRO-MOBILITY DATA TO DRIVE TRANSPORTATION POLICY AND INVESTMENTS IN GREATER BOSTON, US

Context:

With Boston ranking among the worst cities for traffic in the country, the Metropolitan Area Planning Council (MAPC), the regional planning agency supporting the 101 municipalities in Metro Boston (US), was looking to drive its transportation policy and infrastructure investments, with specific goals of: 1) improving public safety, 2) improving public health and sustainability, and 3) advancing equitable service delivery and access. With a goal to use data for this, MAPC worked in partnership with the micro-mobility company Lime to roll out dock less bikes in 16 cities in Boston's outer area and used the data for informed policy making.

Details:

In late 2017, MAPC offered municipalities in the region an opportunity, at no cost to them, to participate in an inter-municipal dock less bike share program where the planning agency would facilitate the procurement and roll-out of dock less bikes on behalf of each participating city. In exchange for MAPC facilitating the proposal, procurement, and contracting on behalf of participating municipalities, Lime agreed to share trip data from each bike's GPS unit with MAPC.

At the start itself, MAPC clearly identified what data to collect, how to analyse it, and how to use it to drive policy. The agency wanted to better understand system usage and how people were moving around the region. The data was shared in Mobility Data Specification format, a nationally recognized data standard established by the Open Mobility Foundation that emphasizes the use of trip-level data, anonymized at the user level. MAPC clearly defined its goals and values from the beginning of this partnership.

After 18 months of the program, MAPC conducted an analysis of the 300,000 trips taken by area bikers and the 380,000 miles they rode. They used data visualization tools and mapping to conduct the analysis to better understand the inter-municipal use of dock less bikes.

Outcomes:

Several insights were identified; vis. dock less bikes constitute a very small percentage of all trips that Boston-area commuters take, almost 1 in 5 miles travelled by riders were on “very high stress roadways”, dock less bikes constitute a very small percentage of all trips, etc.

This analysis, possible only due to sharing of data, helped MAPC better understand what role micro-mobility options like dock less bikes play in the region; and what infrastructure investments should be prioritized to create safer travel routes for users of dock less bikes.

CASE STUDY 4: LONDON DATASTORE’S ‘PURPOSE-LED’ APPROACH FOR DATA PARTNERSHIPS

Context:

London took a global lead when the Greater London Authority (GLA) launched the London DataStore in 2010, making large amounts of data about the city freely available. Currently London’s data architecture shares more than 6,000 datasets and metadata supporting urban planning and policy development. As part of the Smarter London

Together Roadmap, it is planning for city data to support data collaborations and increase data sharing for the benefit of citizens.

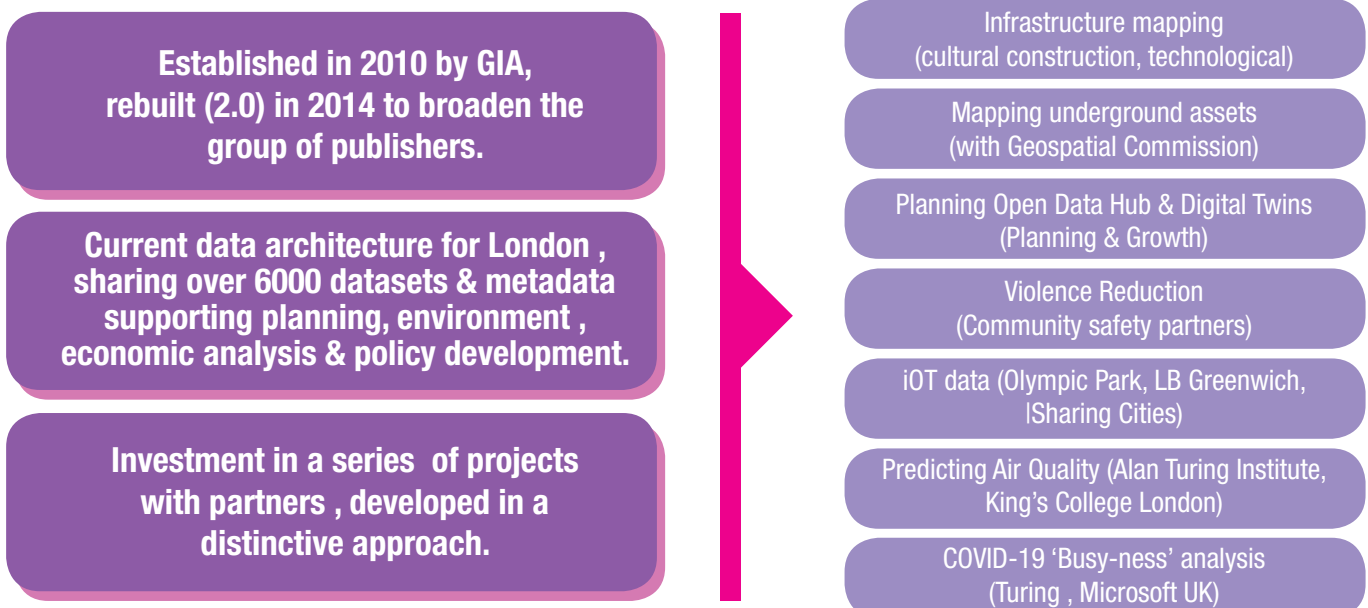
Details:

The city has been steadily working on several projects and initiatives to achieve these aims since 2018, including the City Data Analytics programme, which provides additional resources to accelerate the process of data-sharing and collaboration, in external as well as internal data projects and exercises.

The London DataStore is now evolving into its 3.0 version as a central register of data and APIs for everyone to use. The city is adopting a “purpose-led approach” that emphasises a series of high-value projects with external partners to meet clear objectives. It recognises that city authority alone would not have either the datasets or all of the capabilities to use data to help solve the most pressing city problems.

The idea is for the London DataStore to fulfil a slightly different function, i.e., to share secure and private data as well as open data. In addition to working with organisations from the Alan Turing

London Datastore towards a purpose lead approach :





Institute to the Geospatial Commission, the new ecosystem will extend to the boroughs and the London Office of Technology & Innovation (LOTI); as well as organisations such as Transport for London (TfL), NHS One London, London Data Commission, research bodies, civil society and central government.

Covid-19 highlighted the need to partner with the private sector and use different sources of data to gain better insights into the impact on London's economy. A wide range of Covid-19 related datasets have been emerging, but differing standards sometimes make it difficult to use of them efficiently. GLA thus created an API to help ensure coherency and consistency of the data. It also developed an interactive dashboard of cases and hospital treatments. Data also underpinned London's Covid-19 "busy-ness" project, in which the GLA worked with the Turing Institute and Microsoft UK, where, in addition to contributing datasets, Microsoft provided the Azure AI and cloud infrastructure services to support the project.

While the above examples show that a focus on data collaboration can start to make a real difference, all these projects were not without difficulty. Key considerations were given to various aspects such as negotiating data-sharing arrangements, managing for technology barriers, securing available time from very limited data resources, and identifying the right officers responsible for data in some organisations.

Outcomes

The Covid-related work was recognised by the UK government's Centre for Data Ethics and Innovation and featured in its Covid-19 Repository & Public Attitudes review, which described one of the successes of the project as bringing together data from different sources to tell a clearer picture of what was happening across London. Further, the analysis from the "busy-ness" project was used by the GLA and the boroughs to understand how spending and movement patterns have been impacted by the pandemic and lockdown using data from Mastercard and O2.

Annexure I: Checklist for Cities

1. Identify the urban challenges that city may like to solve via the use of data
2. Identify partners who may help provide suitable ways of tackling these challenges through data
3. Choose the set of people who will be responsible for working with and managing these alliances, especially the City Data Officer (CDO)
4. Create awareness, through different media, on the city's objective to build various alliances with different stakeholders. Moreover, use targeted mechanisms for specific stakeholders like expert groups, academia, industries and NGOs
5. Once the partners have been identified, define the aim of the alliance/the project, the stakeholders it would like to align with and why? There should be clear justification for the project itself, including how it will be mutually beneficial
6. Identify the datasets required and the relevant sources to gather them to make the alliance reach a fruitful outcome
7. Define the terms of the alliance, the roles and responsibilities of each alliance partner, the expected outputs and predicted timelines. This should be a collaborative process between the stakeholders and well-thought through
8. Ensure proper guidelines are in place for the alliance partners to contribute most effectively, including data sharing agreements, data privacy & security guidelines, open data frameworks, etc.
9. Evaluate outcomes to analyse whether the envisaged outputs have been achieved within the predicted timeline and budget.
10. Engage and sustain long-term partnerships

Annexure II: Alliance FAQs

What is a data alliance?

A data alliance is a partnership between the government and other stakeholders that aims to solve a specific urban problem by sharing of data and technology to enhance urban liveability. Data alliances attempt to address multi-faceted urban problems through an inclusive data-driven approach, build on partners' strengths, and provide benefits to the city at large; as well as to the stakeholders involved.

What is the quadruple helix model?

The quadruple helix model recognises that government is not the only stakeholder when it comes to policy and planning and can benefit from having multiple partners involved in the problem-solving process. In the quadruple helix model there are four broad stakeholders, viz. Government, Industry, Academia and Communities/Civil Society (GIAC). When these stakeholders work together for a common cause, policymaking and governance can be more inclusive and sustainable.

Which are potential data alliance partners for cities?

Cities can choose to form data alliances with any entity that falls under one of the quadruple helix model categories. While this document has discussed some potential partners, cities are encouraged to choose other partners as well, especially those suitable and relevant for specific alliance projects. What is important is having a mutual agreement for each of these alliances and a common purpose in order to maximise the benefits.

Why should cities form data alliances?

There are many advantages for a city when it forms data alliances with other stakeholders. These advantages range from gaining access to data and technology to uncovering actionable outcomes for the benefit of citizens at large. Data alliances can help cities find innovative solutions to specific urban challenges being faced by them, such as air quality, traffic congestion, drinking water, waste management and so on.

What is the first thing that a city should do to begin its alliance building process?

First and foremost, a city should concentrate on identifying the problem to solve that it is unable to do by itself. City can then move to understand what kind of support is required from external stakeholders which will then help identify the stakeholders to reach out to.

How can stakeholders benefit from entering into alliances with cities?

Like cities, external stakeholders also have much to gain from entering into data alliances. For example, start-ups and industries can design urban solutions or test their innovations; civil society and think tanks can help bring together their expertise in such solutions implemented elsewhere; academia can contribute to research while students can gain hands-on experience in working with data.

How can cities attract alliance partners? How should a city initiate the alliance building process?

The city should use news media and social media to attract partners and advertise alliance-building

Annexure III: Draft Memorandum of Understanding

City
Logo

Organization
Logo

MEMORANDUM OF UNDERSTANDING
ON DATA COLLABORATION BETWEEN
[CITY NAME] and **[ORGANIZATION NAME]**

DD MMM YYYY

MEMORANDUM OF UNDERSTANDING BETWEEN [CITY NAME] AND [ORGANIZATION NAME]

This Memorandum of Understanding (MoU) is made in [City name], India on XX day of Month, Year by and between [City name] acting through Municipal Commissioner, [City name] office at [City Office Address], hereinafter referred to as “[City name]” which expression shall, unless repugnant to the context or meaning thereof, include its successors and assigns) of the first part.

And

[Organisation name], having its headquarter/ principal place of work at [Organization address] [(hereinafter referred to as “[Alias Organization name]”), which expression will include its successors and permitted assigns, unless repugnant to the context or meaning), acting through its [authorized representative], of the second part

The above entities are referred to as the “PARTY” individually or “PARTIES” collectively, as the context may demand. A reference to a Party includes a reference to that Party’s executor, administrator, heirs, successors, permitted assigns, guardian, and trustee in bankruptcy; all of whom, respectively, are bound by the provisions of this MoU.

II. Whereas,

1. Smart cities are looking to leverage data generated by systems and processes deployed in cities for generating business intelligence and improving their operational efficiency. Smart cities are trying to create a culture of data through various means and engaging with various stakeholders in this regard. The city government/ non-government organizations/ individuals are custodians of different types of data sets/feeds. While many of these stakeholders work as vertically integrated structures, a lot of the data so produced remains in silos within them. In order to solve the myriad complex issues faced by cities, it is vital that data locked in such silos be unlocked and shared amongst these entities.
2. Smart Cities Mission, MoHUA has released the DataSmart Cities Strategy to leverage the potential of data to address complex urban challenges in 100 Smart Cities. DataSmart Cities focuses on evolution of culture of data-driven governance in Smart Cities. DataSmart Cities encourages cities to setup building blocks of data culture at the city level through multiple initiatives as outlined in the strategy.
3. As part of the DataSmart Cities Strategy, cities are encouraged to form alliances with various urban stakeholders to better equip themselves for solving complex urban challenges and making use of partner resources.
4. As a step further, [City name] is working on several data initiatives to enable the use of data and move towards data-driven decision making. [City current data initiatives]
5. [About the Organization] [*For example, is a leading ridesharing company offering services that include vehicle for hire and food delivery. *]

-
6. **[Organization's current data initiatives]** [*For example, is engaged in the business of providing an online platform for facilitating transportation services, creating technology, designing and developing solutions for the purpose of creating a market place for facilitating such services through its website and mobile application duly published on the Android, iOS, Windows or any other web/mobile based platforms. *]
 7. **[Organization name]** is keen on working with **[City name]** under MoHUA's DataSmart Cities initiative and **[other city initiatives]** to support strengthening of data culture in **[City name]** to promote innovation, co-creation and research in finding solutions for complex urban problems.

Now, therefore, in consideration of the mutual promises and covenants contained herein, the Parties agree as follows:

III. PURPOSE

The Parties are entering into this MoU to record the terms and conditions on which [Organization name] will provide the Scope of Services for implementing the activities under this MoU.

IV. AREAS OF COLLABORATION

[Organization name] hereby agrees that it will undertake reasonable endeavours to provide services in accordance with and to the extent requested by **[City name]** with the objective of implementing DataSmart Cities Strategy. This will include assistance in the following areas of collaboration:

[*Scope may include manpower assistance / creation of visualizations or dashboards / detailed analytics / data gathering / data sharing / creation of strategy or roadmap etc. An illustrative list of such areas of collaboration that may be included in the MoU is listed in Appendix A. Authority may include points that are relevant to them in addition to any other point that may be specific and context relevant to the Authority.*]

The Parties acknowledge and agree that the Areas of Collaboration are not exhaustive in nature and the Parties shall in good faith, negotiate to elaborate upon the Areas of Collaboration, including additional areas of collaboration as may be mutually agreed along with the rights, responsibilities and obligations of each Party in relation to each of the Areas of Collaboration. The Parties may, from time to time, execute addenda or modifications to this MoU to incorporate such additional scope of collaboration.

V. DURATION

This MoU shall be valid for a period of **[Time Period]** from Effective Date. The Parties may further extend the MoU, with mutual written consent, in order to ensure continued collaboration in the light of changing trends and environment.

VI. COSTS AND EXPENSES

Both Parties shall be responsible for meeting their own expenses in connection with all matters related to MoU. In case of programs that are newly co-designed by both Parties, resource deployment and mobilization will be planned respectively by each of the Parties at their own cost.

[*The Authority may amend this paragraph if there are any financial implications to the MoU. *]

VII. ASSIGNMENT

Neither of the Parties shall assign any of their activities defined under this MoU to any other person or institution without prior approval of other Party.

VIII. AMENDMENTS

Both the parties may, if the need so arise in the interest of the collaboration, suitably modify the MoU through mutual agreement in writing. No alterations, additions, extension or modification hereto shall be valid and binding unless the same are agreed in writing and signed by both the Parties.

IX. NON-EXCLUSIVE DISCUSSIONS

The Parties acknowledge and agree that the Areas of Collaboration under this MoU are being undertaken on a non-exclusive basis and either Party shall be free to enter into or consummate transactions similar to the Areas of Collaboration with other parties in India or elsewhere maintaining the confidentiality of both parties.

X. SHARING OF INFORMATION

As may be appropriate from time to time, each Party may share information with the other on a regular basis regarding the arrangement under this MoU. Both the parties will be solely and entirely responsible for any third-party information or materials, that they will share with each other, with regards to its requisite rights, authorizations or agreements, in place, enabling accessibility and usage of such information.

XI. CONFIDENTIALITY

The Parties agree and acknowledge that sensitive information and confidential data will be exchanged between the Parties pursuant to this MoU. Such data will be marked confidential ("Confidential Information"). Each Party agrees that it will maintain confidentiality of the Confidential Information disclosed to it by the other Party under this MoU and will ensure that this clause is strictly adhered to by its officers, employees, agents, consultants and representatives.

"Confidential Information" means the confidential, proprietary, the electronic data of either parties without specific mention about confidentiality and trade secret information of the disclosing Party to be disclosed by the disclosing Party under this MoU, and comprises (a) information in tangible form that: (1) bears a Confidentiality Legend, or (2) does not bear any Confidentiality Legend, if the receiving Party knew, or reasonably should have known under the circumstances, that the information was confidential and had been communicated to it in confidence; and (b) discussions about that information that may occur before, at the same time, or after disclosure of the information. This MoU and all confidential information exchanged between the Parties pursuant to this MoU shall be held in confidence.

'Confidential Information' shall not, however, include any information which:

- a) is, or becomes, publicly available otherwise than through a breach of this Clause or any other duty of confidence by the Receiving Party;
- b) was lawfully made known to the Receiving Party by a third party without any obligation to keep it confidential; or
- c) is independently developed by the Receiving Party without breach of this Clause or any other duty of confidence.

The Receiving Party agrees that immediately upon termination of this MoU or within five (5) days from the written request of the Disclosing Party, whichever is earlier, to promptly deliver to the Disclosing Party, all Confidential Information in whatsoever form, in the possession of the Receiving Party.

Neither Party nor any of the affiliates shall make any public announcement about the MoU and /or the scope of proposed engagement, without the prior written consent of the other Party. Any public announcement so made, shall be as per activities outlined in this MoU excluding the information being asked under RTI Act.

XII. CONFLICT OF INTEREST

Neither of the Parties believes that the Collaboration contemplated by this MoU raises any actual or potential conflicts of interest. The Parties agree that this MoU and the negotiation of the same (and any other agreements entered into in connection herewith) are independent of any past, present or potential future arrangements, and are not connected to an existing business relationship between either of the Parties.

All commercial opportunities are considered separate and distinct from this collaboration. Both Parties acknowledge that consumption of services by **[City name]** extended by **[Organization name]** will not create a preference for a future contract award, and no promise or commitment has been made by **[City name]** for any future award of contract in return for these services or support being offered by **[Organization name]**.

The parties are mutually agreed to resolve any possible conflict of interest if any arising during the term of this MoU.

XIII. LICENSE AND INTELLECTUAL PROPERTY RIGHTS

- i. For the purposes of this MoU, “Intellectual Property” means, including but not limited to, any patent, registered design, copyright, design right, trademark, application to register any of the aforementioned rights, and any other intellectual property right of any nature whatsoever in any part of the world.
- ii. No license is granted under this MoU to either Party under any of the other Party’s intellectual property rights, either expressly, by implication, inducement, estoppels or otherwise. Both Parties understand and acknowledge that grant of any such license shall always be express and in writing.
- iii. The Parties agree:
 - a) The Parties are not jointly developing IP, but if they were to decide to, they would only do so under terms to be mutually agreed in writing; and
 - b) Both Parties will take all necessary steps to protect the knowledge documents shared by the Parties.

XIV. DISPUTE SETTLEMENT

In case of any dispute on any matter, related to the project during the course of its implementation, the decision of Municipal Commissioner, **[City name]** shall be final and binding on **[Organization name]**. [*Authority may include a suitable mediation/conciliation/dispute resolution mechanism depending on the nature, scope and degree of foreseeable litigation in the collaboration.*]

XV. TERMINATION

Both the Parties may terminate this MoU at any time by notice of one month if it reasonably believes that its performance, or any aspect of it, results, or might breach any legal, regulatory, ethical or audit independence requirement in the jurisdiction, or any other reason. [*Termination settlement/payment provision can also be considered for inclusion in case of significant financial implications for the Parties in the event of default. *]

XVI. ENTIRE MoU

This MoU contains the entire understanding between the Parties hereto and supersedes all prior arrangements, understandings and agreements, written or oral, on the subject hereof. Any part of this MoU which is not enforceable due to any reason whatsoever will be deemed to be inoperative and the rest of the MoU will continue to be valid and binding on the Parties hereto.

IN WITNESS WHEREOF, the parties have executed this MoU by their duly authorized representatives.

For and on behalf of	For and on behalf of
For and on behalf of	For and on behalf of
[City name]	[Organization name]
Signature:	Signature:
Title:	Title:
Date:	Date:
Witness	Witness

APPENDIX A

[*An illustrative list of such areas of collaboration that may be included in the MoU is given below. Authority may include points that are relevant to them in addition to any other point that may be specific and context relevant to the Authority. *]

1. Strategy and Advocacy

- a. Formulation of vision, goals and strategy for implementing DataSmart Cities Strategy in the city.
- b. Support with creation of City Data Policy, and other such strategies to better manage data in the city.

2. Outreach and Capacity Building

- a. Conducting capacity building exercise at various levels including City Data Officers, various departments and other stakeholders through online and offline mediums.
- b. Preparing training content in various domains to enable data officers and other stakeholders to use and provide data in an efficient manner.
- c. Supporting with organizing Data Challenges/Hackathons to promote co-creation.
- d. Support with capacity building and data collection for participating in various National City Performance Assessment Frameworks.
- e. Support with publication of datasets and data stories on the Smart Cities Open Data Portal for promoting data-driven analysis.

3. Dashboards and Analysis

-
- a. Preparation of city dashboards across various parameters to assess city performance.
 - b. Preparation of visualizations to better understand city data and take informed decisions.
 - c. Providing a unified visualization tool for displaying live, historical and predicted data alongside interactive GIS maps and other contextual information on the dashboard.
 - d. Creating spatial insights to monitor the performance indicators of various cities and present as City score cards.

4. Analytical Support

- a. Chalking out strategy and roadmap for leveraging emerging technologies, data science techniques and advanced analytical tools to create insights and aid decision-making.
- b. Use of advanced data visualization and analytics to provide insights for promoting innovation and co-creation at the city level.
- c. Providing a layered architecture where data assimilated through various sources, is processed on AI models and provides meaningful outcomes.

5. Data Sharing

- a. Sharing of identified data in appropriate formats in compliance with the organization's policies and prevalent laws during the MoU period as agreed between both parties.
- b. Updating of shared datasets periodically as per the defined frequency.
- c. Analysis using city data and the shared data to draw insights for better governance and policy making.

6. Manpower Assistance

- a. Onboarding of experts for driving and supporting various tracks under the DataSmart Cities Strategy in the city.
- b. Providing technical experts for performing activities like data sourcing, analytics, UI/UX etc.
- c. Providing functional experts in areas such as policy formation, advocacy, etc.

7. Domain/Sectoral Support

- a. Identification of synergies for creation of robust sector-wise datasets.
- b. Sensitization of city authorities to collect, maintain and share the domain/sectoral data through open data and data exchange platforms.
- c. Engagement and setting up of sectoral communities to provide inputs for policy formation and governance from sector perspective.
- d. Conducting in-depth research and analysis for specific urban problems based on city data.
- e. Collaboration with research institutes and start-ups.

8. Technical Assistance

- a. Designing and developing prototypes/solutions for civic problems.
- b. Designing, development and promotion of software, mobile apps and algorithms using advanced technologies.
- c. Testing innovative solutions and algorithms using available data.
- d. Providing proprietary services/products to support city in carrying out various data-related tasks such as data storage, data visualization, GIS mapping, sensor-based data collection, etc.



Ministry of Housing and Urban Affairs
Government of India