UCL IIPP Institute for Innovation and Public Purpose

India's National Urban Governance Platform

Leveraging digital infrastructure thinking to build smart city capabilities at scale.

Case Study — January 2025

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1. Case Summary

Location and time period

2015-2019
India

The policy problem

Many Indian cities are faced with the challenge of rising populations amidst a lack of physical infrastructure elements such as water and electricity supply, sanitation, and urban transport. This is further exacerbated by missing IT infrastructure which could be leveraged at the state- and city-level to improve service delivery to residents. In 2019, Kunal Kumar, Joint Secretary and Mission Director of the Smart Cities Mission, supported a new digital infrastructure-oriented solution to this capacity challenge by leveraging India Stack[1] and the biometric ID system Aadhaar. But for a country with a federated government system, how to provision a highly scalable platform from the national level to states and cities became a big question for the Indian Ministry of Housing and Urban Affairs (MoHUA) and National Institute for Urban Affairs-Centre for Digital Governance (NIUA-CDG) to grapple with.

Main topics/themes in this case

- **Digital Public Infrastructure**
- **State Capacity**
- **Service Delivery**
- **Smart Cities**

Read this case if you…

- **Are seeking lessons on overcoming the hurdles of implementing large-scale digital initiatives, including tackling ownership issues, infrastructure gaps, and resourcing.**
- **Want to understand the dynamics of public-private collaboration in creating and sustaining digital infrastructure, with insights on how such partnerships can accelerate innovation and reach.**
- **Want to explore how a digital public infrastructure approach may transform service delivery.**

1 "India Stack." Accessed March 17, 2024. https://indiastack.org/.

2. Overview

When the eGovernments Foundation was founded in 2003 by Nandan Nilekani and Srikanth Nadhamuni, it focused on addressing the lack of digital capabilities in Indian local governments. The founders, later involved in creating India Stack and the biometric ID system Aadhaar, recognized that while India was building cutting-edge digital for essential functions at the national level, most cities remained dependent on pen and paper for core functions.[2]

Simultaneously, these cities were faced with the challenge of accommodating an increase of 20 million people in urban areas annually as of 2022 despite widespread "demand-supply gaps in housing, infrastructure, and services."[3] Across India, this rapid urbanisation was further exacerbating challenges presented by a lack of access to basic infrastructure elements like water and electricity supply, sanitation, urban transport, IT connectivity, and education.[4] And, as the largest democracy in the world at 1.4B + people, India faced policy and governance questions around transparency, accountability, and privacy and security which are key to building trust with citizens.[5]

Recognizing these gaps, eGov initially built bespoke digital solutions for states and cities to support the development and maintenance of basic infrastructure—like creating an enterprise resource management (ERP) suite for Chennai in 2009 and a state-wide solution for Andhra in 2014-15—before launching an open source platform called DIGIT (Digital Infrastructure for Governance, Impact & Transformation) in 2019, first used in Punjab, for states and cities across India to build their e-governance capabilities. DIGIT serves as a platform upon which services such as "water connections, trade licences, obtaining certificates, building plan approvals, payment of municipal taxes, resolution of civic complaints, etc." can be built.[6]

This effort would come to complement and support municipal capacity-building efforts at the Ministry of Housing and Urban Affairs (MoHUA) and drive an infrastructure approach to enabling decentralised urban transformation at scale forward.

2.1 Crafting the National Urban Innovation Stack

While eGov was evolving their approach to supporting cities in their e-governance efforts, the central Government of India was addressing similar challenges through a 'National Mission'—flagship ministry-led programmes—called the Smart Cities Mission, founded in

2 "eGov Foundation Follow-Up Questions." May 2023.

3 United Nations India. "Poverty and Urbanisation | United Nations in India." Accessed January 10, 2024. https://india.un.org/en/171267-poverty-and-urbanisation,

4 "Mission Statement & Guidelines." Ministry of Urban Development, June 2015. https://smartcities.gov.in/themes/habikon/files/SmartCityGuidelines.pdf.

5 Hans, Anjali. "eGov Foundation: Transforming Urban Governance -." Societal Thinking (blog), May 19, 2022. https://societalthinking.org/egov-foundation-impact/.

6 "eGov Impact Report," October 2020. https://egov-website-content.s3.ap-south-1.amazonaws.com/wp-content/uploads/2023/07/31133716/eGov-Impact-Report-2020.pdf.

2015.[7] It sought to develop 100 smart cities through more than 7800 projects with an investment of more than USD 22 billion,[8] but was cited as being "hamstrung by multiple challenges such as long-term funding, lack of private participation and capacity building" in a 2019 India Times article.[9]

When Kunal Kumar accepted the role of leading the Smart Cities Mission in 2019, he faced an imposing question: How might the Government of India (GoI) get past these challenges and scale their operations and impact quickly?

Having been the commissioner for Pune, a leading smart city, Kumar was well-positioned for being the mission's first director as it was designed to power further development in cities across the country.[10] Despite his background, leading a national mission presented a new challenge for Kumar since it existed within but operated outside GoI's conventional scope.

As he knew from his time as a career bureaucrat in India's civil service, a government's ability to accomplish policy goals is hindered by constraints such as poor governance, low staffing, insufficient tools and technology which prevent them from overcoming gaps in infrastructure and services. This, paired with growing demand by citizens for improved public infrastructure and services, placed additional pressures on cities to consistently contribute to a higher quality of life.

Kumar began exploring the idea of an urban tech stack that would serve as the foundation for cities to build their IT infrastructure with applications and tooling for financial management, payments, property tax management, and public grievance redressal. According to Kumar, "Smart Cities was a program that did not have the capacity to do what it was meant to do, but there was demand."[11]

MoHUA saw e-Governance—the use of information technology to improve the delivery of services—as a way for cities to support their current and growing populations while also improving accountability and transparency, reducing cost, and improving feedback mechanisms and monitoring of programs.

Despite this promise, simply outlining the components of a smart city along with example solutions—ranging from citizen engagement, telemedicine and tele-education, intelligent traffic management, and grievance redressal—wasn't enough to drive adoption. **For Kumar, taking an digital infrastructure approach would mean forgoing one-off solutions and instead developing a digital platform with associated standards, specifications, and certifications to unlock urban data, build capacity, drive collaboration between stakeholders, and strengthen governance.** Creating a comprehensive solution by combining software components and involving layers or tiers would be more scalable while enabling states and cities to learn from an existing approach throughout implementation and management.

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7 "About The Mission | Smartcities." Accessed February 4, 2024. https://smartcities.gov.in/about-the-mission.

8 Smart Cities Mission: Localizing Sustainable Development Goals," 2023.

9 Khan, Sobia. "Smart Cities Mission Hit by Funding Blocks." The Economic Times, September 26, 2019. https://economictimes.indiatimes.com/news/economy/infrastructure/smart-cities-mission-hit-by-funding-blocks/articleshow/71306563.cms?from=mdr.

10 "Mission Statement & Guidelines." Ministry of Urban Development, June 2015. https://smartcities.gov.in/themes/habikon/files/SmartCityGuidelines.pdf.

11 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

To determine a path forward, Kumar hosted a 3-day workshop in Bangalore in 2019 with diverse participants from the government, private sector, and NGOs, including the eGov Foundation, Smart Cities Mission, and National Institute of Urban Affairs (NIUA).[12] The workshop led to the creation of a draft a National Urban Innovation Stack (NUIS) strategy and approach which was refined in follow-on working sessions, and resulted in the creation of the National Urban Digital Mission[13] (NUDM)[14] and the National Urban Governance Platform (NUGP).

In actions that followed, Kumar and MoHUA weighed a variety of options and considerations for bringing the infrastructure thinking approach to life—including gaining buy-in from prime minister the infrastructure approach, laying the governance foundation and deciding on the right balance between centralisation and decentralisation of the platform—which will be covered in this case.

2.2 Smart Cities, IT, and Decentralisation

Smart cities and Information and Communications Technology (ICT) go hand-in-hand. In cities, IT systems and applications are designed, developed, deployed, and scaled through various models, which have their own pros and cons. One debate between two common approaches—monolithic and decentralised architectures—are weighed in accordance with intended outcomes and ideal governance.

Monolithic Architecture is a traditional model in which "one code base couples all the business concerns together,"[15] resulting in greater efficiency, but decreased flexibility and scaling potential. Due to dependencies between elements such as payment and invoicing, inventory, and notification, it's also time-consuming to make updates to the stack. This approach can be beneficial when building a new software product for a smaller user base, but becomes challenging to manage when serving a larger group with spikes in usage.

Decentralised Architecture, on the other hand, is an approach to software development where an application is built as a collection of small, loosely coupled, independently deployable services that communicate through APIs. Unlike the monolithic approach, in which all functionalities are bundled together, decentralised architecture allows teams of developers to choose their own programming languages and tech stacks to develop, deploy, and scale microservices independently from one another.

The NUIS is delivered through the NUGP, using eGov's DIGIT platform, which leverages a decentralised architecture and provides a replicable, yet flexible, model for digital solutions across India's 28 states and approximately 5000 local government bodies.[16] DIGIT services are illustrated in Figure 2.

12 "eGov Foundation Follow-Up Questions." May 2023.

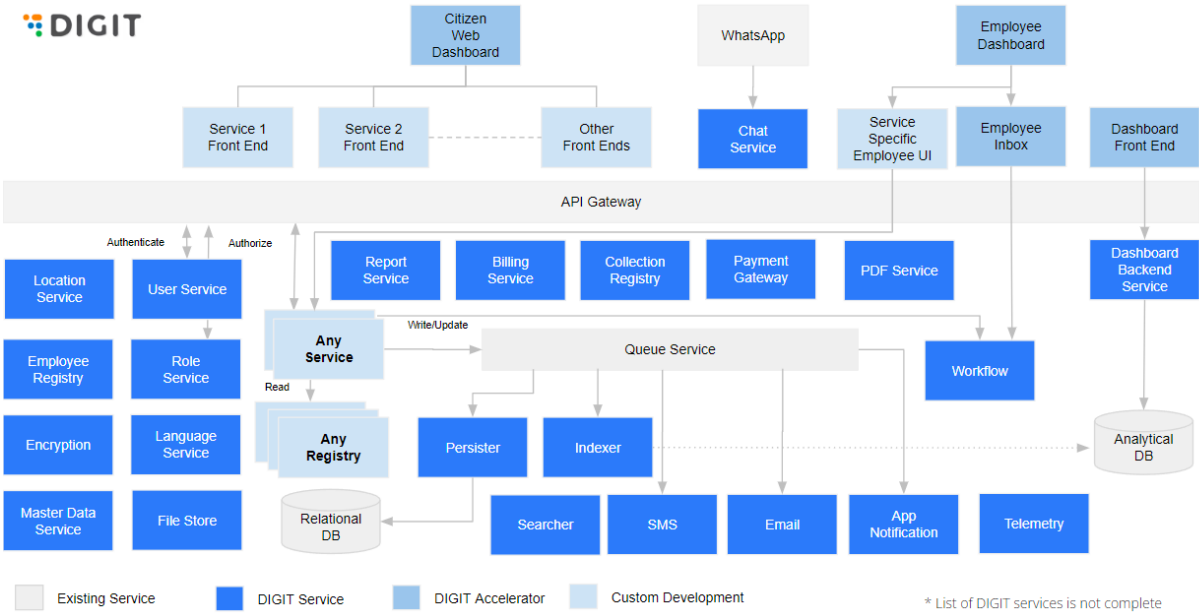
13 "What Is NUDM? | National Urban Digital Mission." Accessed January 10, 2024. https://nudm.mohua.gov.in/about/what-is-nudm/.

14 "eGov Foundation Follow-Up Questions." May 2023.

15 Harris, Chandler. "Microservices vs. Monolithic Architecture." Atlassian. Accessed February 4, 2024. https://www.atlassian.com/microservices/microservices-architecture/microservices-vs-monolith.

16 "LGD - Local Government Directory, Government of India." Accessed February 4, 2024. https://lgdirectory.gov.in/.

Figure 1. List of DIGIT Microservices.



Source: authors

Note: "Service Architecture." Accessed February 4, 2024. https://core.digit.org/platform/overview/architecture/service-architecture.

It's comparable to a "LEGO brick" car which can be purchased fully assembled, just with the chassis and engine, or taken with some modules and merged with your own systems.[17] In practice, this looks like governments using it as-is, forking and modifying source code,[18] or using specifications to build from scratch. All code is open-source and hosted in Github, a software developer platform for managing and sharing code, and accessible to the public.

17 "eGov Foundation Follow-Up Questions." May 2023.

18 Forking code occurs when developers create a copy of a publicly-available code repository from a project, often on platforms such as Github, and further develop it independently of the original project. Steig, Cory. "A Beginner's Guide To Open-Source Lingo — & How To Start Contributing," June 29, 2022. https://www.codecademy.com/resources/blog/open-source-terms-to-know-beginners/.

3. Challenges and decision points

According to Kumar, the key challenges stemmed from 1) gaining buy-in for the infrastructure approach from the appropriate stakeholders, 2) building the governance foundation for intended outcomes, and 3) finding the balance between centralisation vs. decentralisation of the platform.[19]

3.1 Gaining Buy-In for a Digital Infrastructure Thinking Approach

Despite Kumar having strong connections at the mayoral level of city government, that alone wouldn't provide the political support to make the NUIS vision a reality. As eGov knew and Kumar would quickly see, a digital infrastructure approach requires a fundamental shift in thinking around how to govern and deliver services to a population. Simultaneously, he was thinking about who would be strong advocates, advisors, and standards developers before deciding on the owner and providers of the platform (See Table 2).

Having seen the infrastructure thinking approach leveraged in India before—with the digital ID Aadhar and the India Urban Data Exchange (IUDX), among others—Kumar sensed a real opportunity. But despite this groundwork being laid by previous digital infrastructure solutions, the concept was still difficult for national, state, and local leadership to wrap their heads around.

Former Director of NIUA Jagan Shah said, "If we wrote to these government organisations, they wouldn't budge. We were offering an open source solution, which many saw as a problem and counter to the business-as-usual model of giving a contract for municipal services. This was more than websites, but that's how the states saw it."

Key concerns raised by various stakeholders around this time are illustrated in Table 1.

19 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

Table 1. Areas of Concern Raised by MoHUA and NUIA.

AREA OF CONCERN	RISKS AND CONCERNS RAISED…
Governance	Many existing players—both in the private and public sector—would want ownership over components of NUIS, but incentives were often misaligned. For example, a state-owned corporation like the National Informatics Centre (NIC) would want full ownership, but their business model would incentivise scaling the stack itself rather than the e-governance outcomes MoHUA was aiming to achieve in a decentralised manner. Additionally, due to the federated structure of the Indian government, no mandates could be given for adoption or implementation at the state and city level.
Vendor Lock-in	Software providers and consultancies with vested interests and long-term contracts could prevent platform adoption.
Adoption	A national-level solution would only be adopted if states and cities saw the value and obtained the resources to implement and maintain it.
Funding	States and cities would require resourcing to implement and sustain their instances of the platform.

Source: authors

Due to many concerns raised, Kumar and NIUA sought stronger political will before seeking to implement the approach.

Rather than focusing solely on convincing mayors of its potential for their cities, Kumar engaged the Prime Minister and positioned the solution as a political win which would directly deliver improved services to citizens as well as create new markets. Ultimately, it would provide a quick, scalable, win-win solution for stakeholders throughout the ecosystem.

He turned the NUIS concept, which was regarded as a purely technological stack, into a political dialogue—"Imagine the prime minister being able to give easy-to-access services to every citizen in all of India," he said.[20] It'd be a significant win for the central government. This framing positioned the infrastructure approach as a mechanism for the PM to directly impact the daily lives of citizens as well as MoHUA to deliver DIGIT nationally while providing support to Mayors for actual service delivery.

In parallel, NIUA was on a mission to get buy-in at the state level. They positioned the infrastructure approach as in sync with the Smart Cities Mission and asked MoHUA to draft and send a letter which then paved the way for meetings with state government representatives.[21]

19 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

20 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

21 Interview with Jagan Shah on 7 July 2023.

This provided the foundation for the 2019 workshop and additional engagements which would lead to the creation of new institutions and governance mechanisms for the platform.

3.2 Laying the Governance Foundation

One of MoHUA's biggest concerns was how to place the NUGP under the right governance structure for intended outcomes. Initially, they identified a need for 1) an entity to manage and deliver the platform and 2) a platform partner with technical expertise for ongoing support. Despite the existence of certain government departments and IT providers, they weighed sticking with existing institutions and arrangements or creating new ones.

While some state-owned corporations were responsible for managing solutions similar to the NUIS, relying on them would perpetuate the traditional and counterproductive view of industry as the state's competitor. Similarly, should a for-profit company be the primary technical partner, they would be viewed as a traditional vendor given their financial motive rather than an active collaborator in lock-step with MoHUA and other government organisations.

MoHUA decided to do a combination—First, they established the Centre for Digital Governance (CDG) under NIUA to manage the NUGP implementation so they'd be ring-fenced from doing anything else, and then they sought a formal arrangement with a technical partner that would provide ongoing guidance and development of the NUGP.

In 2019, a Technical Advisory Committee (TAC) was also created with senior experts to address the question of decentralisation. Kumar said that a "dialogue with states and cities really helped to drive forward the usability of the stack in a customised way."[22]

21 Interview with Jagan Shah on 7 July 2023.

22 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

Table 2 - Stakeholders for NUGP Governance

ORGANISATION	ROLE	TYPE	REMIT	RESOURCING
MoHUA	Oversight	Central Government	MoHUA is responsible for policy creation and monitoring for housing and urban affairs programmes. While much of this responsibility is delegated downwards to states and cities themselves, the ministry plays a coordinating and monitoring role, and sponsors some schemes like the Smart Cities Mission.[23] This made MoHUA an ideal sponsor for the NUIS and support for an infrastructure approach.	Funded NIUA and local support teams which could provide bespoke support later on.
NIUA-CDG	Platform Implementation	Non-Statutory Body / Think Tank	The NIUA was founded in 1976 as an autonomous non-statutory body to carry out urban research, including the collection, processing, and dissemination of information related to urban local bodies.[24] The CDG was founded beneath the NIUA as the home of the NUIS in order to transform urban governance.[25]	Funded by MoHUA.
eGov	Technical Partner	Nonprofit	eGov designed DIGIT and became a national technical partner through a non-funded MOU to support NIUA in the implementation of the NUIS.	Non-funded MOU with NIUA.
States & Cities	Adoption	State & Local Government	Responsible for engaging with NIUA-CDG to build and/or use the platform.	Short-term funding through NUDM with expectation of city revenue growth upon implementation.
Special Purpose Vehicles	Local Implementation	Limited Liability Company	SPV's "plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects."[26]	Funded by GoI through grants.

Source: authors

23 "MoHUA Annual Report 2020-21." Ministry of Housing and Urban Affairs, 2021. https://mohua.gov.in/upload/uploadfiles/files/Annual_Report_2020_21_MoHUA_EnglishVersion%20(Final).pdf.

24 "MoHUA Annual Report 2020-21." Ministry of Housing and Urban Affairs, 2021. https://mohua.gov.in/upload/uploadfiles/files/Annual_Report_2020_21_MoHUA_EnglishVersion%20(Final).pdf.

25 "MoHUA Annual Report 2020-21." Ministry of Housing and Urban Affairs, 2021. https://mohua.gov.in/upload/uploadfiles/files/Annual_Report_2020_21_MoHUA_EnglishVersion%20(Final).pdf.

26 "SPVs :: SMART CITIES MISSION, Government of India." Accessed March 12, 2024. http://164.100.161.224/content/innerpage/spvs.php.

In January 2021, the CDG released a Request for Expression of Interest (REoI) on 'Selection of Partner for Providing Software Implementation and Consulting Services for Development of National Urban Governance platform (NUGP).[27] eGov was well-positioned to become the provider as they aligned with GoI's 2014 'Policy on Adoption of Open Source Software'[28] and their model as an NGO was complementary to the goals of the NUGP agreement.

The DIGIT platform was ultimately selected as a National Platform Partner in July 2021 and operates under a no-cost Memorandum of Understanding (MOU) with MoHUA.

Following this selection, MoHUA, NIUA and eGov also signed a tripartite agreement which spelled out what each entity was responsible for. Additionally, three committees—Apex, Program Management, and Technical Review—were established and two core documents—Program Implementation[29] and Technical Standards—were created to govern the provisioning of the platform.[30] According to Kakul Misra, former National Program Head, National Urban Digital Mission at the National Institute of Urban Affairs (NIUA), "We institutionalised a governance structure and mechanism to ensure adherence to the charter."

In addition to the platform, MoHUA and NIUA identified a need for local technical support for the platform implementation. Some states had existing support systems—like Kerala and the state-owned Information Kerala Mission (IKM) company that is funded through a cut of the transactions—but the existing incentive structures were often misaligned. As an alternative, the national NUDM program provided funding for and helped design local support teams which could provide bespoke support later on.

NIUA was then responsible for the NUGP roadmap as well as centrally hosting an NUGP instance which could be adopted by states as-is or through various customisation options. Yet, as Kumar pointed out, "software looks like a product you can buy off the shelf,"[31] but these solutions don't implement and adopt themselves. Effectively leveraging digital solutions requires internal capacity and is often aided by services throughout the period of usage. This would present a new host of adoption challenges as states and cities lacked the capacity to implement and sustain their instance of the platform given a lack of talent and funding.

MoHUA also weighed factors such as complexity and cost in managing a system which many Indian cities couldn't afford and also risked vendor lock-in due to proprietary technology. Misra said, "One of the key pain points in this mission [NIUA] faced is we didn't have funds to give. We gave everything else. We gave technical know-how. We gave platform support. But we did not give budgetary support."

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27 "Request for Expression of Interest (REoI) for Selection of Partner for Providing Software Implementation and Consulting Services for Development of National Urban Governance Platform (NUGP) at NIUA-CDG (on No-Cost Basis)." National Institute of Urban Affairs, January 30, 2021. https://smartnet.niua.org/content/17e13518-7fa3-4731-8a77-f80a4f3c49ab.

28 "Policy on Adoption of Open Source Software for Government of India." Ministry of Communication & Information Technology, 2014. https://www.meity.gov.in/writereaddata/files/policy_on_adoption_of_oss.pdf.

29 "Implementation Guidelines for NUIS." NIUA-CDG, November 2020. https://niua.in/cdg/sites/default/files/2021-07/Implementation-Guidelines-for-NUIS-CCSG-v3.pdf.

30 Interview with Kakul Misra on 27 October 2023.

31 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

By leveraging eGov's platform and services approach, MoHUA ensured that they weren't limiting themselves to a purely technical solution. eGov dedicates roughly 30-35% of their focus and resources to capacity building in states and local communities where DIGIT is to be implemented.[32] The NUIS Strategy and Approach emphasises this need for learning opportunities to be available when and where required, in the form of training, open documentation, and reference implementation.[33]

3.3 Centralization vs. Decentralisation of the Platform

After the NUIS Strategy and Approach was published and DIGIT became the NUGP platform partner through NIUA to be managed and delivered by NIUA-CDG, the question arose of where and how to provision instances of the platform—In other words, who would be responsible for providing authorised users access to DIGIT's services and the applications built on top of them, and would this be done on one version of the platform at the national level or multiple times with copies of the platform at the state-level?

Providing multiple options for states allowed for last mile governance, but would risk creating siloed architectures and data sets among states and cities should they build and customise their own versions of the platform. Long-term, this could restrict interoperability between systems at various levels of government.

Yet, according to Kumar, "situational awareness is really high"[34] in cities and providing a higher degree of autonomy would allow for more localised and tailored solutions for unique needs.

32 Interview with Viraj Tyagi and Gautham Ravichander on 17 May 2023.

33 Interview with Viraj Tyagi and Gautham Ravichander on 17 May 2023.

34 Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

4. What happened and what would you do next?

In the end, the NIUA decided to support both centrally provisioned services and decentralised ones. In the latter, the issuing state delegates authority downwards using open and evolving standards, systems, and tools for improved planning, decision-making, and execution.[35]

DIGIT was designed to work in a federated government system with the adoption models of modularity, extensibility, and customizability.

1. Adopt a centrally-hosted NUGP instance which states and cities could access but not directly customise (i.e. NIUA-CDG hosts the code in a single data centre and government employees and residents access that main version);
2. Create state- or city-level instances of the national platform;
3. Integrate existing platforms and solutions.[36]

In practice, these options were supported through the development of standards, reporting mechanisms, and indexes (i.e. Municipal Performance Index[37]) as management tools to further incentivise alignment with the national instance of DIGIT.[38] The MoHUA team also works heavily with industry, urging them to engage with the stack and contribute to it to ensure collaboration and open lines of communication occur over time.

"We convinced [cities] to have customisations, but adhere to certain common denominators to be able to report in a standardised way at the state level," Kumar said.[39] This way the common denominator incentive prevented too much bifurcation and ensured a higher degree of alignment between the national and local levels.

The benefits of this approach included pushing cities towards a higher denominator, providing evidence for policy, and offering data to determine what's working and what's not.

Since building and implementing the NUGP, MoHUA and NUIA's question has now become how each state will choose to adopt and provision DIGIT, whether it will lead to the strengthened governance and capacity at the city level, and what the implications of this approach will be.

Misra said, "There is the thought process [behind the NUGP], and then there is what really happens on the ground. And they could be two distinct things. And largely, it is reliant on the existing capacities to attract and retain talent in the government setting. It was one of the biggest challenges we faced at NIUA. There was always this constant tension."

35 "National Urban Innovation Stack - Strategy and Approach," n.d.

36 "Implementation Guidelines for NUIS." NIUA-CDG, November 2020. https://niua.in/cdg/sites/default/files/2021-07/Implementation-Guidelines-for-NUIS-CCSG-v3.pdf.

37 Kapoor, Amit. "Municipal Performance Index," 2020. https://smartnet.niua.org/sites/default/files/resources/final_web_mpi_report_2021.pdf.

38 Interview with Kunal Kumar on 5 December 2023.

39 Interview with Kunal Kumar on 5 December 2023.

5 Lessons learned

100 ULBs adopted the platform within 90 days of launching DIGIT in 2019, which quickly rose to 2400+ ULBs by 2020. In the state of Punjab alone, 63 services were digitised and 77 thousand complaints were resolved within the 90 days of implementation.[40] This was a win for eGov, having championed and delivered the platform to states and cities nation-wide. Now, with MoHUA and NIUA supporting the NUGP to drive nation-wide adoption, this approach may fundamentally change how a state delegates authority downwards.

While DIGIT already had significant adoption prior to being used for the NUGP, the ramifications of making it nationally-sponsored are yet to be determined. Given the degree of flexibility states have when choosing how centralised or decentralised their instance of DIGIT will be, there's an ongoing risk of digital siloes arising. This could restrict the ability of the national government to implement changes to DIGIT in the long-term.

Additionally, while GoI provided grants to some states for greenfield operations where they faced difficulty carving out funds for digitization efforts, the cloud compute and talent costs are a major barrier for sustaining the platforms' use over time.

MoHUA and NIUA are continuing to explore what a long-term, sustainable approach for the NUGP could look like. While challenges such siloed instances of the platform and varying degrees of resourcing may restrict interoperability and adoption, the investment into tools like reference architecture, training, and new revenue sharing models are being used to expand the impact of an infrastructure approach to driving municipal capacity-building at scale.

40 "eGov Impact Report," October 2020. https://egov-website-content.s3.ap-south-1.amazonaws.com/wp-content/uploads/2023/07/31133716/eGov-Impact-Report-2020.pdf.

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Kumar, Kunal. Interview with Kunal Kumar. In-Person, December 5, 2023.

"View: Triple-Engine Sarkar Is the Key to India's $5 Trillion Target." The Economic Times, February 20, 2023. https://economictimes.indiatimes.com/opinion/et-commentary/view-triple-engine-sarkar-is-the-key-to-indias-5-trillion-target/articleshow/98103251.cms?from=mdr.

Misra, Kakul. Interview with Kakul Misra. Zoom, October 27, 2023.

"Mission Statement & Guidelines." Ministry of Urban Development, June 2015. https://smartcities.gov.in/themes/habikon/files/SmartCityGuidelines.pdf.

"National Urban Innovation Stack - Strategy and Approach," n.d.

"National Urban Innovation Stack (NUIS) - Digital Blueprint," n.d.

"NIUA's Role in MoHUA's Ongoing Digital Governance Initiatives." 2020.

"Policy on Adoption of Open Source Software for Government of India." Ministry of Communication & Information Technology, 2014. https://www.meity.gov.in/writereaddata/files/policy_on_adoption_of_oss.pdf.

"Pre-Standardization Study Report: Unified, Secure & Resilient." Bureau of Indian Standards, INDIA, November 2017.

"Reference Implementation - Glossary | CSRC." Accessed March 17, 2024. https://csrc.nist.gov/glossary/term/Reference_Implementation.

"Request for Expression of Interest (REoI) for Selection of Partner for Providing Software Implementation and Consulting Services for Development of National Urban Governance Platform (NUGP) at NIUA-CDG (on No-Cost Basis)." National Institute of Urban Affairs, January 30, 2021. https://smartnet.niua.org/content/17e13518-7fa3-4731-8a77-f80a4f3c49ab.

Shah, Jagan. Interview with Jagan Shah. Zoom, July 7, 2023.

Smart Cities. "Home Page | Smartcities." Accessed January 10, 2024. https://smartcities.gov.in/.

"Smart Cities Mission: Localizing Sustainable Development Goals," 2023.

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Appendix

List of Acronyms / Abbreviations

- BIS - Bureau of Indian Standards
- CDG - Centre for Digital Governance
- GoI - Government of India
- ICT - Information and Communications Technology
- ISO - International Organization for Standardization
- MoHUA - Ministry of Housing and Urban Affairs
- NIUA - National Institute for Urban Affairs
- NUIS - National Urban Infrastructure Stack
- NUDM - National Urban Digital Mission
- NUGP - National Urban Governance Platform
- NUS - National Urban Stack
- SPVs - Special Purpose Vehicles
- ULBs - Urban Local Bodies

Key Terms

REMIT	RESOURCING
Application Programming Interface (APIs)	"...a set of definitions and protocols for building and integrating application software."[41]
Microservices	"Microservices refer to a style of application architecture where a collection of independent services communicate through lightweight APIs."
Open Source Software	"...software developed and maintained through open collaboration. It is made available for anyone to use, examine, alter and redistribute however they like, typically at no cost."
Reference Architecture	"...a document or set of documents that provides recommended structures and integrations of IT products and services to form a solution."[42]
Reference Implementation	"...the implementation of a standard to be used as a definitive interpretation for the requirements in that standard."[43]
Software Deployment	"...includes all of the steps, processes, and activities that are required to make a software system or update available to its intended users. Today, most IT organizations and software developers deploy software updates, patches and new applications with a combination of manual and automated processes. Some of the most common activities of software deployment include software release, installation, testing, deployment and performance monitoring."[44]
Technology Stack	"A set of technologies that are stacked together to build any application."[45]
Urbanisation	"...the increase in the proportion of people living in towns and cities."[46]

41 "What Is an API?" Accessed March 17, 2024. https://www.redhat.com/en/topics/api/what-are-application-programming-interfaces.

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Stakeholder Map

STAKEHOLDER	ROLE IN NUGP ROLLOUT	INTERESTS
Prime Minister	Leadership buy-in	Political win for GoI solution to state and city capacity-building.
Mayors	NUGP users	Want access to better tooling for digital services.
MoHUA	NUGP oversight	Expand reach and impact of Smart Cities Mission.
National Institute for Urban Affairs (NIUA)	Advisors to MoHUA	Advisors and advocates for the NUIS and NUGP.
NIUA Centre for Digital Governance (CDG)	NUGP implementation	Newly-created office which owns the broader NUGP roadmap and provisions to states and cities.
Bureau of Indian Standards (BIS)	Platform standards	Provide technical guidance for NUGP.
eGov Foundation	Platform provider	Deliver a platform which is widely used by cities across the country.
National Informatics Centre (NIC)	State-owned company which builds custom solutions for cities.	Would want ownership, but the incentive structure was misaligned.

"Triple-Engine Sarkar": Federalist System 101

In a federalist government system, there's an inevitable tension between national priorities and local implementation. India's 'Triple-engine sarkar' of local, state, and central levels of government with associated constitutional powers can, at times, favour the central government and leave a gap between national priorities and local implementation.

Kumar referenced this issue as a barrier to decentralisation—largely addressed through efforts like the NUGP—in a February 2023 op-ed in India Times titled 'Triple-engine sarkar is the key to India's $5 trillion target' which critiqued the central government's 'missionary' approach which restricts ownership and localisation by states and cities.[47]

> "While GoI's current approach has helped build targeted infrastructure, it leaves some fundamental questions unanswered. Does it truly strengthen democracy and governance at the local level? Does it help decision-making become community-centric? Won't it be more helpful to think of current and future problems through the lens of adaptive institutional systems - strong local governments, instead of merely provision of logistics like water supply or sewage treatment?"[48]

This op-ed reflected Kumar's continued advocacy for GoI to take an infrastructure approach to municipal capacity building while leveraging active partnerships and open dialogue with local government bodies to foster policy innovation and performance-driven local action.

47 Kumar, Kunal. "View: Triple-Engine Sarkar Is the Key to India's $5 Trillion Target." The Economic Times, February 20, 2023. https://economictimes.indiatimes.com/opinion/et-commentary/view-triple-engine-sarkar-is-the-key-to-indias-5-trillion-target/articleshow/98103251.cms?from=mdr.

48 Kumar, Kunal. "View: Triple-Engine Sarkar Is the Key to India's $5 Trillion Target." The Economic Times, February 20, 2023. https://economictimes.indiatimes.com/opinion/et-commentary/view-triple-engine-sarkar-is-the-key-to-indias-5-trillion-target/articleshow/98103251.cms?from=mdr.

About the Institute for Innovation and Public Purpose

The Institute for Innovation and Public Purpose (IIPP) at University College London (UCL) brings together cutting-edge academic theory with teaching and policy practice, to rethink the role of the state in tackling some of the biggest challenges facing society.

IIPP works with partners to develop a framework which challenges traditional economic thinking, with the goal of creating, nurturing and evaluating public value in order to achieve growth that is more innovation-led, inclusive and sustainable. This requires rethinking the underlying economics that have informed the education of global public servants and the design of government policies.

IIPP's work feeds into innovation and industrial policy, financial reform, institutional change and sustainable development. A key pillar of IIPP's research is its understanding of markets as outcomes of the interactions between different actors. In this context, public policy should not be seen as simply fixing market failures, but also as actively shaping and co-creating markets. Re-focusing and designing public organisations around mission-led, public purpose aims will help tackle the grand challenges facing the 21st century.

IIPP is uniquely structured to ensure that this groundbreaking academic research is harnessed to tackle real world policy challenges. IIPP does this through its high-quality teaching programme, along with its growing global network of partners, and the ambitious policy practice programme.

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