Ministry of Electronics and Information Technology
Government of India

Strategy for
National Open Digital Ecosystems (NODE)

CONSULTATION
WHITEPAPER

Contents

1 Introduction

India took centre stage in the 'Digital Governance' or 'GovTech' movement, with the creation and successful implementation of Aadhaar, the world's largest digital identity platform. Aadhaar, together with the Digital India Mission, fuelled the development of the India Stack, which has laid the foundation for integrated online public service delivery for the country. Such shared digital infrastructure has the potential to make governance truly citizen-centric, by simplifying and easing citizens' interactions with the government. At the same time, this can also spur innovation driven by entrepreneurs who build solutions on top of such 'digital rails'.

The Ministry of Electronics and Information Technology (MeitY), with other departments of the Government of India (GoI), is working on building an enabling ecosystem to leverage digital platforms for transformative social, economic and governance impact, through a citizen-centric approach. Sector-specific blueprints have been published, including National Digital Health Blueprint (NDHB), National Urban Innovation Stack (NUIS), and National Platform for Teachers (DIKSHA); and work is underway on several other priority sectors, including agriculture, land & real estate, open data analytics, etc. Several state governments such as Andhra Pradesh and Haryana are adopting a platform-based approach in order to enable seamless service delivery to citizens. MeitY has also conceptualized the India Enterprise Architecture (IndEA) to reimagine the delivery of government services via a "Whole of Government (WofG)" approach.

While efforts to study these innovations have focused considerably on understanding technology best practices, the non-technology aspects of these initiatives such as governance, operational management and user-engagement are equally, if not more, critical. In addition to getting the technology right, it is particularly important to ensure that future platforms are designed sustainably and "responsibly". This means ensuring robust governance for the platforms including their institutional accountability, regulatory frameworks, personal data privacy, security and risk management, talent management and sustainable financing.

MeitY has already undertaken significant initiatives in this direction. Some of these include- a policy on Open APIs for Government of India, an Electronic Consent framework, a Personal Data Protection (PDP) Bill, and a Committee of Experts on governance of non-personal data. The next step towards improving the lives of Indian citizens in a transformative way, is to build robust 'National Open Digital Ecosystems' (NODE), i.e. open and secure digital delivery platforms, anchored by transparent governance mechanisms, which enable a community of partners to unlock innovative solutions, to transform societal outcomes. These will truly transform service delivery and create shared value for all stakeholders in the ecosystem.

Looking ahead at the 2020s, the time is opportune for India to pioneer a holistic national strategy around such open digital ecosystems, in service of its people, and as lighthouse for other countries who are seeking to learn from India's long strides in 'GovTech'.

2   Objectives of this Document

The purpose of this whitepaper is to solicit public comments towards a comprehensive national strategy on NODE. We would like to adopt a participatory process to prepare this strategy and seek perspectives from a broad spectrum of stakeholders including government officials in the Centre and the States, policy researchers, entrepreneurs, technology developers, and civil society, more broadly.

This whitepaper highlights key elements of NODE and describes the paradigm shift from earlier approaches to digital governance or 'GovTech'. It establishes design principles that can help realize the full potential of open digital ecosystems to create transformative impact across sectors. The final chapter of the whitepaper lists a set of key questions on which public consultation is sought.

With your collaboration, we hope to develop a national strategy that is actionable, that inspires and guides innovators within the government and in the private sector, to come together to radically improve the lives of citizens, and that positions India as a trailblazer in 'GovTech' thinking on the global stage.

3 National Open Digital Ecosystems: The New Paradigm of 'GovTech'

3.1 Evolving Paradigms of 'GovTech'

In the 1990s, the idea of using Information and Communications Technology (ICT) to reform governance gained considerable traction. Digitization efforts were initiated to automate simple processes such as issuance of domicile/ income certificates and to provide access to information on Government schemes. By 2000, a 12-point e-governance agenda was launched that made the use of technology for electronic delivery of public services a priority. Since then, numerous steps have been taken to further the 'GovTech' agenda, such as the National e-Governance Plan (NeGP) and the Digital India initiative. However, only in the last decade, with the build of the India Stack and recent thinking on IndEA, has there been discussion around fundamentally rethinking how public services can be delivered using shared, open and modular digital platform technologies that can seamlessly cut across departmental silos.

This shift in vision and approach can be represented through three phases or paradigms of 'GovTech'. 'GovTech' 1.0 represents "Automation"; 'GovTech' 2.0 represents "Building Systems", and going forward, 'GovTech' 3.0 will be about "Enabling Ecosystems" (Refer Figure 1).
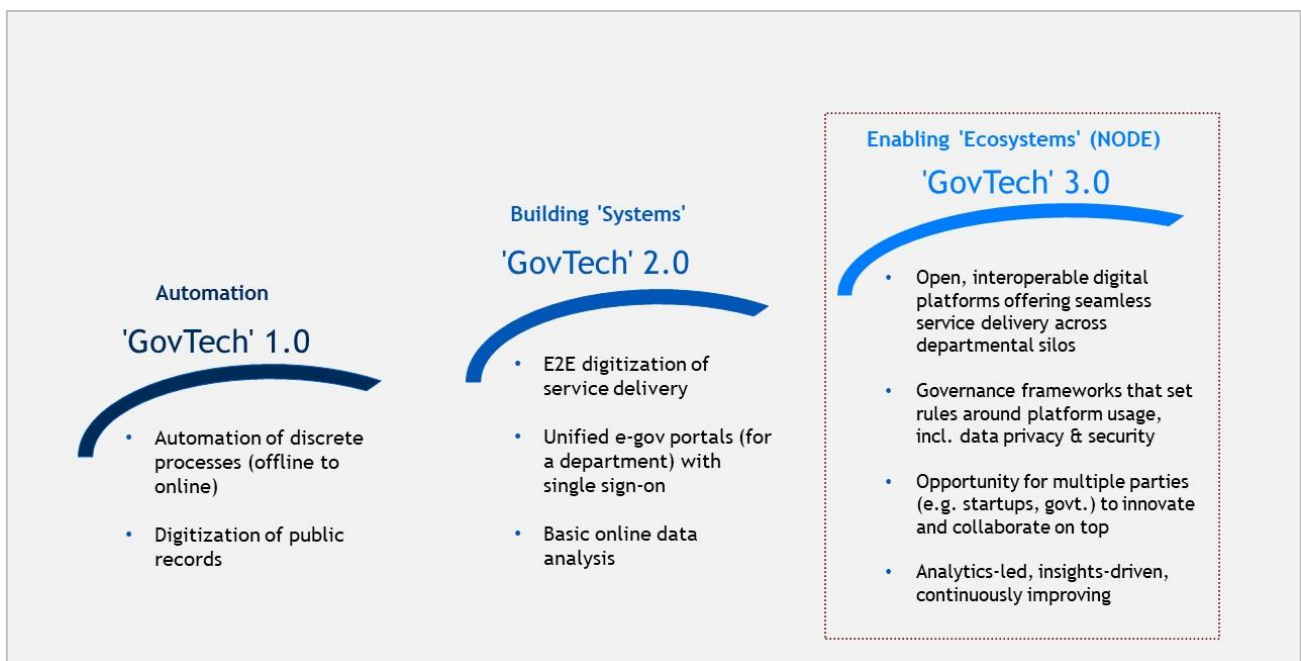

Figure 1: Evolving paradigms of digital governance or 'GovTech'

'GovTech' 1.0 represents the earliest approach to digitization, in which traditionally offline models of service delivery (G2B/G2C/G2G) were automated in a piecemeal manner. In this phase, service delivery continued to be largely offline, however some parts of the user experience, such as service requests and information provision, were taken online to offer enhanced experience.

'GovTech' 2.0 is a step up from piecemeal automation. In this phase systems are designed to enable end-to-end digitization of public service delivery, i.e. from raising the request to processing the application, and in some cases, delivery of the service. For example integrated service delivery portals enable citizens to access all information and services provided by a department or sector through a Single Sign-on (SSO) functionality. This is a 'tell us once' approach, in which the user shares her personal information only once and this is automatically available to other systems within a department. However, there is limited sharing across departments, resulting in multiple citizen touchpoints or interfaces with government. The Indian Railways Catering and Tourism Corporation (IRCTC) portal is a good example of the 'GovTech' 2.0 paradigm. The portal provides a one-stop shop for information on rail transport availability and for making and editing reservations. The portal has launched APIs to allow inter-connectivity with private sector travel aggregators applications e.g. ClearTrip. This is an important shift towards building a truly open ecosystem.

'GovTech' 3.0 or NODE is a paradigm shift to an ecosystem-based approach. These ecosystems are made possible by shared, interoperable digital delivery platforms, anchored by strong governance frameworks and accountable institution(s). These platforms enable different parts of the government system (across ministries and departments) to collaborate for service delivery and allow private players to build new services and solutions on top. The full potential of technology and community is realized by using open APIs, open standards, open data and modular architecture, thus facilitating inter-operability and unlocking shared value. A distinguishing feature of 'GovTech' 3.0 is integration of data and services across Departments (and potentially across Centre and States). IndEA lays out standards and principles for both Central and State Governments to achieve inter-operability across departments by facilitating seamless flow of data. This is especially significant for three reasons. First, service delivery is made seamless by eliminating multiple touchpoints between Government and the citizen, unlike in 'GovTech' 2.0. Second, the working of government is also more efficient as silos across departments are broken down, eliminating duplication of efforts and realizing economies of scale. Finally, data sharing can lead to improved analytics and policymaking. In 'GovTech' 3.0, two significant shifts are the engagement of government with a broader community of players, and the resultant need for strong governance frameworks around data access and sharing, roles and responsibilities of different institutional stakeholders, operational management and financing of these platforms, etc. Each Ministry and State can use the 'GovTech' 3.0 approach to build NODEs, e.g. Health NODE, Agriculture NODE, and State Service Delivery NODE.

A few classic examples of 'GovTech' 3.0 include NUIS, UPI, and Goods and Services Tax Network (GSTN).

The NUIS, conceptualized by the Ministry of Housing and Urban Affairs (MoHUA), is envisioned as a set of shared, modular digital building blocks (data, APIs, etc.) that can enable all cities and states to build applications and services to unlock myriad urban solutions, e.g. traffic management, public grievances redressal, public safety, etc. It aims to harness the power of urban data to solve challenges at scale and speed and to enable data-driven governance.

The UPI platform, anchored by National Payments Corporation of India (NPCI), has led to a transformation in how financial services transactions take place, enabling cost-effective and speedy real-time digital payments. UPI has given birth to a vibrant community of both public and private actors in financial services, such as the mobile wallet Payment Service Providers (PSP), who are building solutions in m-commerce, bill payments, P2P real-time payments, etc.

The GSTN platform was established to provide a single, unified interface for indirect taxation across the country, and has led to a considerable efficiencies in tax management for both government and citizens. It has since grown both in terms of the services it offers as well as its potential to unlock new use cases. For example, GSTN allows for online generation of transportation document called e-way bill that has reduced the need for physical check-posts and has led to an increase in transparency for the logistics sector. Moreover, the data collected on the platform has the potential to unlock multiple solutions in transportation and logistics, such as capacity management and sharing, investment planning etc.
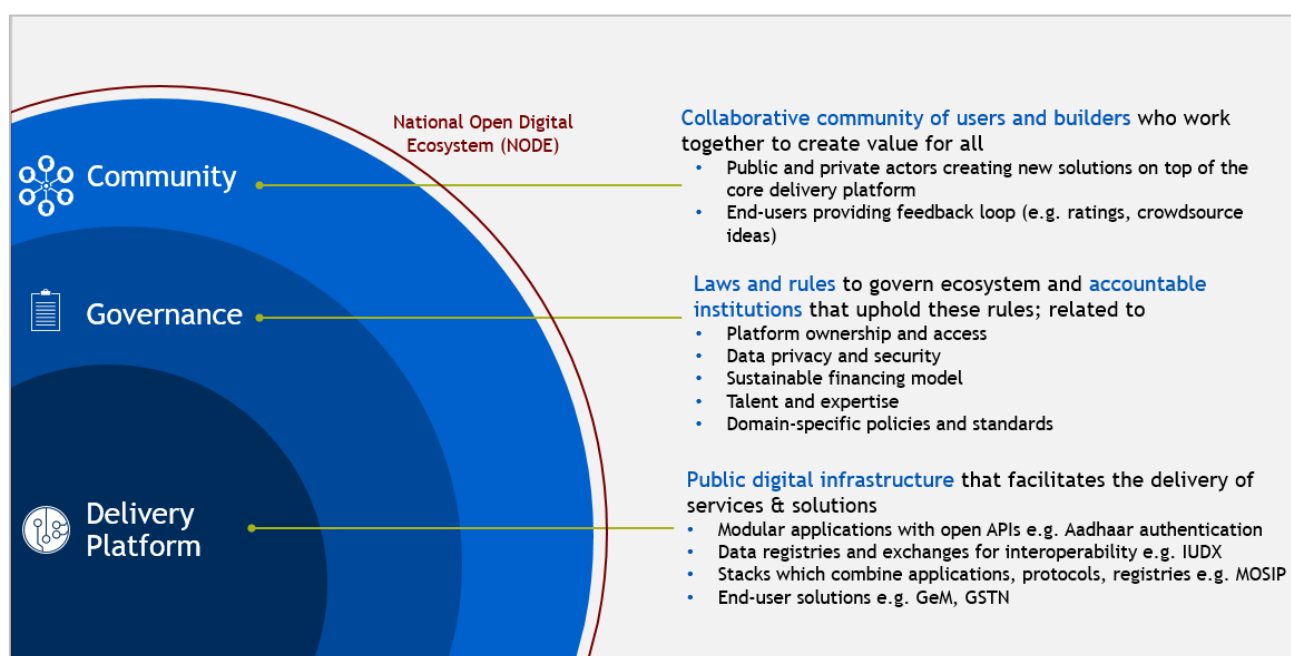
3.2 Defining National Open Digital Ecosystems (NODE)

NODE can be defined as "Open and secure delivery platforms, anchored by transparent governance mechanisms, which enable a community of partners to unlock innovative solutions, to transform societal outcomes"[1]

There are three key components of the NODE:

- At the core are Delivery Platforms (the technology), anchored by
- A robust Governance Framework, and
- A vibrant Community of actors using the platform, working together and building on top of the platform to deliver shared value

The Delivery Platforms represent the "tech" and the Governance Frameworks and Community collectively refer to the "non tech" (Refer Figure 2).

Figure 2: Key components of a National Open Digital Ecosystem (NODE)

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[1] The term "open" in NODE refers to principles of openness, including but not limited to transparency, accessibility, interoperability, open APIs and standards and open source code, where appropriate. However, it must be noted that each NODE will have its own configuration and degree of "openness", which may introduce certain limitations in order to adhere to specific objectives, context or to mitigate potential risks.

3.2.1 Delivery Platform

Delivery platforms comprise the "tech" component of the NODE that facilitate the delivery of services and solutions to the end-users. Builders (entrepreneurs, business, public agencies, etc.) build new solutions on top of Delivery Platforms, to create a wider range of services.

To make this transformative service delivery model possible, it is critical that these platforms are built to be 'open' to allow for collaboration across multiple stakeholders. Additionally, as described in the principles in section 4, delivery platforms need to be modular / reusable, scalable and interoperable to unlock maximum benefits.

The various types of delivery platforms are described below.

- **Modular applications using modern architecture such as micro-services** that can flexibly integrate with other applications through open APIs, e.g. Aadhaar authentication, eKYC
- **Data registries and exchanges:** Registries include both personal and community information/ records, that provide a 'single source of truth' e.g. financial data, identification data, civil registries, land registries, and Exchanges which facilitate flow of data being generated by governments, businesses and individuals, e.g. IUDX, Account Aggregators
- **Stacks:** A combination of applications, protocols, and/or data registries, e.g. Modular Open Source Identity Platform (MOSIP), India Stack, Health Stack, NUIS
- **End-user solutions** such as marketplaces, information access portals, or open co-creation platforms; these typically have a services/ application layer and an user interface build on top of a stack, e.g. Government e-Marketplace (GeM), GSTN

3.2.2 Governance

An ecosystem typically comprises multiple stakeholders; institutions that own the delivery platform, builders who develop solutions on it, and end-users who consume services and/ or participate in designing solutions. Additionally, openness of data and technology architecture increases the risk of misuse. Therefore, a NODE must have a strong governance framework to ensure fair value sharing while keeping stakeholder behaviours in check, with both preventive and corrective measures laid out.

For any NODE, accountability is ensured by both the laws and rules that govern the ecosystem as well as the institutions that uphold them. The following are the key elements of NODE governance framework.

- **Platform ownership and access:** Frameworks defining the institutional home of platforms, rules of engagement for various stakeholders, and responsibilities and liabilities of ecosystem actors with respect to the delivery of services through these platforms
- **Data privacy and security:** Laws, regulations and codes of conduct around protecting both personal and non-personal data, guiding how data is accessed, shared and used. Additionally, transparent policies around the type of data the platform aims to collect and store and how it will be used for the various use cases.
- **Sustainable financing model:** Mechanisms and models for financing and revenue generation that the platform can adopt to ensure sustainability of operations. The choice of financial model influences other governance choices e.g. institutional home and platform ownership, and vice-versa.
- **Talent and expertise:** Identifying capabilities to be developed in-house vs outsourced to expert partners. Policies on human capital management, including guidelines for attracting and retaining talent who can successfully build and operate these platforms, and partnership management frameworks and rules.
- **Domain-specific policies and standards:** Regulatory frameworks that govern the activities in specific sectors and thus inform the design of the delivery platforms.

3.2.3 Community

A vibrant community of partners is the driving force of any NODE, enabling value unlock. This community comprising Government, foundations, think tanks, businesses and entrepreneurs will transact and collaborate via the platform to create new user-centric solutions. The community primarily includes two types of actors.

- **Builders:** Public and private players, e.g. start-ups, entrepreneurs, businesses, public agencies who leverage the existing shared digital infrastructure (delivery platforms) to develop new solutions on top of it. These can be for public service delivery or private enterprise, and each NODE will state the feasibility of this and rules around value generation and sharing in its governance framework.
- **End-users:** Consumers of the services or solutions delivered by the platforms. They participate in the design/ co-creation of solutions (e.g. through crowdsourcing models) and continuous improvement of solutions by providing feedback (e.g. ratings, surveys, etc.)

3.3   Benefits of the NODE Approach

Both Central and State Governments in India offer a myriad of public services across a variety of sectors such as education, health, social justice, law and order, employment, etc. Given the increasing scale and complexity of India's development agenda as well as the ambitious vision of becoming a $5 trillion economy by 2024, there is a need to continuously improve the access, quality, efficiency and effectiveness of the delivery of public services. NODEs can enable service delivery in ways that were previously not possible; by reinventing market models to create greater access for underserved populations, offering better pricing or cost-effectiveness in the delivery of public services, and lowering transaction costs and inefficiencies.

Key benefits that can be derived from adopting the NODE approach

- **Benefits for citizens:**
    - Seamless and consistent end-user experience (e.g. Single Sign-on)
    - Increased efficiency and reliability of service delivery: convenient, fast and affordable
    - Enhanced transparency and accountability and reduction in leakages

- **Benefits for government bodies:**
    - Improved ease of operations: removal of redundancies and faster processing
    - Increased delivery capacity (scale and speed)
    - Enhanced transparency and integrity
    - Savings due to lower leakages, transaction costs
    - Realization of savings from economies of scale via shared digital infrastructure
    - Data-driven decision-making: increased robustness of government policies and schemes by leveraging insights from analytics

- **Benefits for entrepreneurs and businesses:**
    - New business opportunities
    - Reduced cost of new builds
    - Enhanced ease of doing business

## 3.4   Transitioning from 'GovTech' 1.0/ 2.0 to NODE
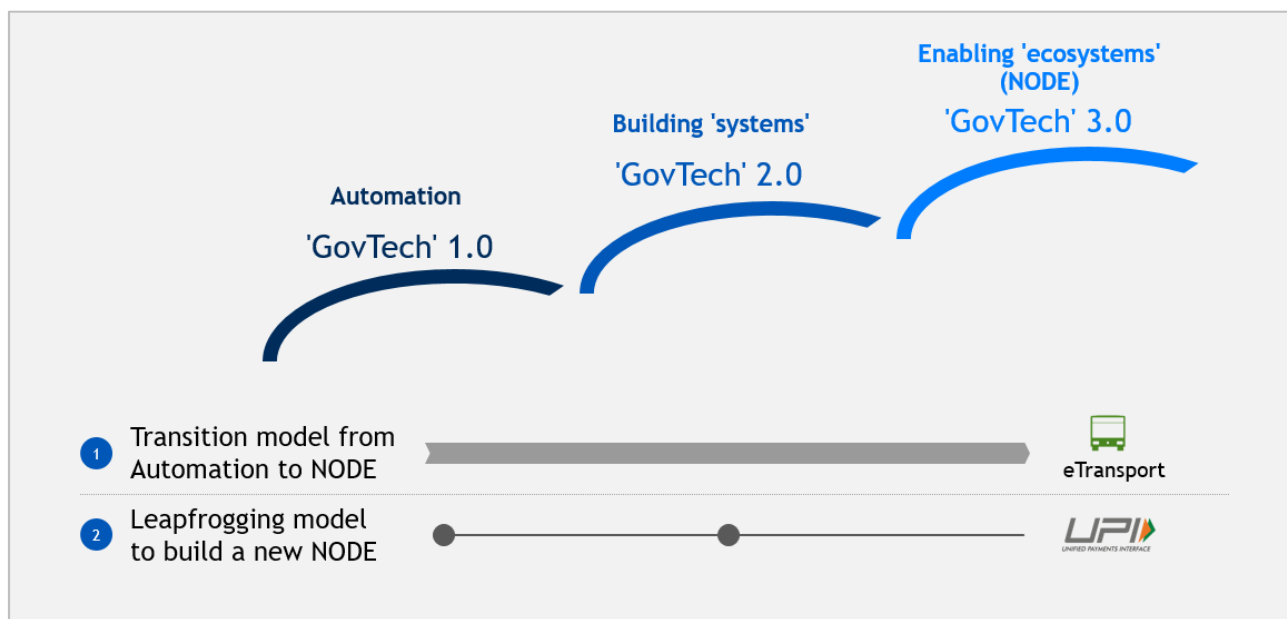
Figure 3: Two approaches (transition and leapfrogging) to enable NODE in various sectors

It is important to note that while UPI is an example of a "digitally born" 'GovTech' 3.0 NODE – it was built from scratch using the open digital ecosystem principles and technology – such a 'build-from-scratch' approach is unlikely to be feasible for every system or platform. The good news is that sectors for which digital solutions already exist, albeit in the form of disparate portals and applications, can undertake a transition/ migratory approach to enable the creation of the NODE, adding building blocks and re-architecting elements of existing solutions.

There are a few available solutions to aid this transition, and thinking is underway on building a robust toolkit to support States and Departments. Specifically, the IndEA framework provides standards, principles, and reference models to guide both the development of new/greenfield solutions as well as the transition of legacy/brownfield solutions to the citizen-centric WofG approach.

Transition is possible – as demonstrated by the vehicular transport sector. The eTransport Mission Mode Project that is driven by the Ministry of Road Transport and Highways (MoRTH) and is executed in partnership with NIC envisions a new transportation NODE built on available digital solutions (Refer Figure 4).
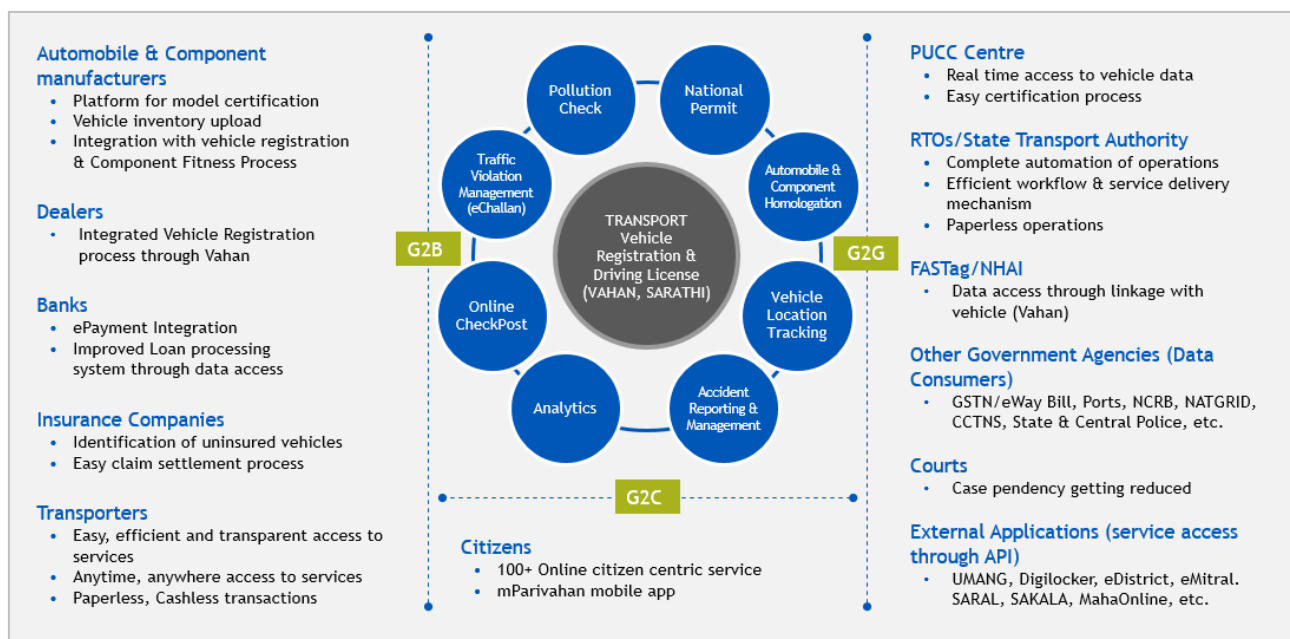
Figure 4: Illustration of the current state of the eTransport NODE (Source: NIC)

It is important to elaborate eTransport's transition journey since the learnings will be applicable to many government departments on the path to 'GovTech' 3.0. The eTransport initiative in its nascent stage comprised two flagship applications: Vahan and Sarathi that automated the vehicle registration (VR) and driver licensing (DL) operations respectively at Regional Transport Offices (RTOs). It was also an attempt to digitize the vehicle and driver records. However, these applications were unable to achieve the efficiency levels that they aspired to, owing to the use of dated technology, localization of digitization at RTO level, lack of user-centricity leading to high footfalls in RTOs, and insufficient analytics/ reporting options.

With the availability of digitized data and increased focus on centralization, the eTransport applications are now evolving into an eTransport NODE. The platform is designed to offer seamless G2C/G2B/G2G services to users across the country, benefiting not only citizens, transporters and automobile dealers, but also banks, insurance companies, police, automobile and component manufacturers and Government. It includes a centralized portal (Parivahan) that offers seamless integration across the web-enabled versions of the Vahan, Sarathi and the e-Challan (for traffic compliance and enforcement) applications. These applications offer complete functionalities of RTOs, i.e. VR, DL/LL licensing, taxation, etc. It also comprises a National Transport Register that consolidates real-time data from all states and can be accessed by both public and private bodies (e.g. National Crime Records Bureau (NCRB), police, banks, insurers). Additionally, to drive increased efficiency, transparency, accountability and reliability across the entire transport ecosystem, the platform ensures inter-operability with external applications (payment gateways, DigiLocker, etc.), along with data integration with NCRB (for stolen vehicle data), Insurance Regulatory and Development Authority (IRDA) /

Insurance Information Bureau of India (IIB) (for insurance data), FASTag, GSTN, courts, etc. The platform is also powered with analytics that enables configurable dashboards and fast search options.

Models for public service delivery across Central and State are currently at different points in the 'GovTech' spectrum. However, irrespective of the maturity levels of the existing digital solutions, a path for transition from 'GovTech' 1.0 or 2.0 to 'GovTech' 3.0 can be charted.

4 Guiding Principles for NODE

NODEs hold immense potential to unlock significant economic, social and governance benefits for a country such as India, with the second-largest internet user base in the world, foundational digital infrastructure like digital identity and payment in place, and a vibrant start-up ecosystem. However, to maximize their impact, and do so in a responsible manner without causing any significant harm to society, requires the adoption of certain guiding principles and best practices for robust design and operationalization of the ecosystem.

This section highlights key guiding principles (Refer Figure 5) for the design and build of the NODE.

Figure 5: Guiding principles for building NODE

The aforementioned principles address both the technology (delivery platforms) and non-technology (governance and community engagement) aspects of building NODEs. Equal emphasis on both tech and non-tech elements is essential as they collectively ensure robust and responsible solutions and service delivery. In this section, we describe the 15 principles further, along with examples of where these have been put into practice.

4.1 Principles for the Design of Delivery Platforms

Principle 1

Be open and inter-operable: Use and/ or build open standards, licenses, databases, APIs, etc. and promote inter-operability. It helps realize inter-platform efficiencies, promotes competitive behaviour and guards against potential monopolies of unfair value capture.

Example 1

The NUIS is being developed to provide foundational building blocks for a host of digital urban initiatives across India. The stack is envisioned as a collection of cloud-based services such as location, payments, authentication and authorization, etc. that can be accessed using open APIs (compatible with global standards across multiple urban applications and services). The stack also provides open standards and specifications to enable ecosystem players (e.g. entrepreneurs) to innovate on top of it and unlock diverse solutions in the urban sector. Several use cases have been identified, including citizen safety, application for services like small business licenses, procurement etc.

Principle 2

Make reusable and shareable: Incorporate modular architecture to repurpose elements in diverse contexts. It helps in saving valuable time that would otherwise be wasted in reinventing the wheel for every separate build.

Example 2

Sunbird is an open source repository of learning management micro-services that serve as building blocks for the creation of diverse teaching and learning solutions. MHRD, Government of India has leveraged these modules to build a teacher content creation and sharing platform called 'DIKSHA'. Various other organizations in India, e.g. Educational Initiatives, ShikshaLokam, Akshara Foundation, have also leveraged Sunbird to deliver education content, training and assessment solutions. This has saved considerable time and cost vs each organisation building from scratch, and can also lead to interoperability across these solutions.

Principle 3

Be scalable: Use elastic design, cloud computing, etc. to enable the platform to adapt to an increase in the number of data, transactions, users and other players and to operate at population scale.

Example 3

The GSTN platform is likely to see a steady increase in the number of tax payers. As reported by GSTN, the scale of users has already gone up from ~65 lakh to 1.2 crore from July 2017 to Feb 2019. In order accommodate an increase in the number of users, the platform incorporates a scalable architecture for all software components. This implies that additional user capacity can be added by augmenting hardware, without any application changes. Further, this is done in a way where resources are instantly deployed based on load.

Principle 4

Ensure security and privacy: Apply 'Secure/ Privacy by design' principles, for e.g. E2E encryption, data purpose specifications, collection limitations and user consent frameworks, etc. to ensure individual choice & privacy. Along with the choice to revoke access at any point in time, users should have control over how their data is used by the platform.

Example 4

The Estonian Government has incorporated 'privacy by design' principles into its e-Estonia ecosystem to safeguard citizens from unauthorised access and misuse of their data. For example, Estonia's e-health system is underpinned by Electronic Health Records (e-Health Record) which is a nationwide database consolidated across different healthcare providers. Citizens can access their data by using their digital ID which is secured using multi-factor authentication (digital certificates and PIN). Other players such as health care providers, pharmacists and insurance providers, etc. can only access the data with the citizen's knowledge and consent. The citizen has full ownership over his/her data and can allow as well as restrict access to whoever they desire.

Principle 5

Adopt an agile, data-driven development method: Instead of spending upfront time to build a solution incorporating all value-added features, parts of which may be obsolete by roll-out, build incrementally by developing MVPs to which additional features are added as our understanding of user behaviour improves and/ or new use cases emerge. Regularly review data about the performance of the system and leverage analytics to identify new features and capabilities that can improve its user-centricity and effectiveness.

Example 5

GovTech (Singapore) adopts an 'agile, bold and collaborative' approach for all its applications and services development to be able to iterate and test solutions. For example, MyCareersFuture.sg, Singapore's job marketplace, was initially launched as a Minimum Viable Product (MVP) version, which was then beta-tested at career service centres before developing and launching the complete product. The agile methodology requires a complete change in the way of working, including sprint (short bursts) planning, continuous engagement between the 'business' and 'technology' functions of the organization and a "fail fast" culture.

4.2 Principles for Transparent Governance

Principle 6

<u>Define accountable institution(s):</u> Ensure a single-point of accountability, the right legal & organization structure, operating processes, etc. that are aligned with platform objectives. This involves identifying an accountable institution for each delivery platform, whether a public or a private body or a coalition set up as a Special Purpose Vehicle (SPV) or Public-Private Partnership (PPP), which is responsible for the overall administration of the platform and setting the standards or rules of engagement that drive accountability. Finally, organization structures, platform resourcing and performance management all need to align with these frameworks.

Example 6

To handle the operations and governance of the GeM platform, a separate accountable institution has been set up under the Department of Commerce as a Special Purpose Vehicle (SPV) - a 100% government-owned, Section 8 Company. The SPV has defined key processes, organization structure, people model and a revenue model in line with the overall objectives e.g. flexible HR policy to attract industry talent for running marketplaces. GeM has also defined a policy for online marketplaces to align government buyers around a common set of rules. It has created specific platform features to serve some the key objectives e.g. boosting MSME business. Significant effort has been put in to drive end-user adoption.

Principle 7

<u>Establish rules of engagement:</u> In a multi-stakeholder system, have clear delegation of responsibilities, decision rights & liabilities to avoid mismanagement and instances of conflict of interests. Also, introduce regulations to ensure fair value sharing within the ecosystem and check for undesired behaviours.

Example 7

The UPI ecosystem is comprised of multiple stakeholders including banks and PSPs. The roles and responsibilities, including liabilities of all stakeholders, for e.g. liability clause for user data protection, have been clearly laid out by NPCI under Procedural Guidelines for UPI. These guidelines have been framed under the provisions of the Payment and Settlement System Act, 2007 and are binding on all members of the UPI ecosystem. They define (1) the entities in the UPI system, membership rules and requirements (including on-boarding and termination processes), (2) customer on-boarding and handling of registrations and complaints, (3) PSP management, (4) roles and responsibilities of key stakeholder groups including PSPs, technology service providers etc. (5) compliance and regulations, and so on.

Principle 8

Create transparent data governance: Outline data policies & standards on ownership, contribution & consumption of data. Ensure that they are easily understood & readily available to all users. Put in place a set of mechanisms to enable enforcement of these and monitor adherence.

Example 8

The World Bank states that "The Estonian Data Protection Inspectorate, founded in 1999, is a supervisory authority, empowered by the Data Protection Act, Public Information Act and Electronic Communication. The Inspectorate's mandate is to protect the rights to obtain information about public authorities and the right to inviolability of private and family life in the use of personal data." These legal and institutional mechanisms are designed to create transparency around data governance. Additionally, the Estonian government has defined clear rules and frameworks around data collection, usage and sharing to safeguard citizens' data and privacy, in line with its adherence to 'privacy by design' principles. For example, only minimum data collection and sharing for the purpose of delivering a service is allowed, either between platforms or from the citizen themselves. Additionally, data sharing is allowed between only authenticated and authorised systems. Citizens are also provided access to a Personal Data Usage Monitor, an AI-enabled software that allows them to view logs of all instances of their personal data being used by the Government. They can use these logs to identify any unauthorized usage or data breaches.

Principle 9

Ensure the right capabilities: Nurture partnerships or ensure human resource policies and practices to attract and retain relevant talent from the private sector to supply skills such as analytics, customer support, technology development and maintenance, etc., required to build & operate the platform

Example 9

The GSTN platform has an organization comprising ~60 people which is lean in contrast to most public or private organizations dealing with a comparable user base or revenue base. GSTN leverages a network of partners that provide expert capabilities and services in order to be able to maintain its agility, and ensure service delivery in a specialised manner. Some partnerships include Infosys for building the platform in an agile manner (vs. the waterfall methodology adopted earlier), Wipro which manages the TINXSYS, a centralised exchange of all interstate dealers, supporting verification and reporting. Tech Mahindra supports the GSTN help desk which is responsible for handling issues related to registrations, returns, payments etc. NIC has built the e-way bill mechanism which enables logistics integration.

Principle 10

Adopt a suitable financing model: Create a sustainable financing model, which is aligned with the overall goals of the platform, to aid the right governance choices and ensure uninterrupted operations.

Example 10

OpenLMIS, an open source logistics management platform used extensively in the health care space, was initially developed with the support of donor funding from various international foundations. Since then, this open source platform in the digital health space has been implemented across multiple countries globally. However, it currently faces a challenge with securing long-term funding from Governments or Foundations. OpenLMIS is now exploring several initiatives in its attempt to become self-sustainable, including (1) commercializing usage of the platform by private entities (pharmacies, clinics, etc.) on a subscription-based model, (2) payment structures for public health entities to fund on-going deployments (potentially on a cost-recovery basis), (3), exploring partnerships with private sector entities to develop a paid commercial version, which can cross-subsidise the open-source software. Additionally, OpenLMIS underwent a set of key changes in order to lower the long-term running costs of the software, including (1) re-architecting to a microservices, modular structure to enable a single version for all implementations and easy software/ functionality extensions, (2) building capacity of the developer community closer to end-user markets (e.g. in Africa) to avoid the high cost of US-based project support, (3) business model planning for long-term diversification into new services and sectors.

4.3 Principles for a Vibrant Community

Principle 11

Ensure inclusiveness: Incorporate user-friendly UI/UX design, omni-channel (e.g. web, mobile), universal, and affordable access. For example, ensure availability of content on the platform in all vernaculars spoken in the country (except only Hindi and English), create multiple formats of access to the services offered by the platform, such as IVRS services for users without smartphones. Support on-boarding and platform adoption.

Example 11

The GeM platform enables users to overcome socio-cultural and technological barriers to usage. For example, the platform UI/UX design is intuitive to ensure easy navigation by end-users. To overcome the language barrier, the platform is available to the user in multiple Indian languages. Further, GeM undertook a number of offline initiatives to drive inclusion and participation, including regional workshops to on-board local government buyers, structured on-boarding kits to ease the process for vendors (including MSMEs) and buyers, regular program monitoring (with KPIs around user mix and engagement) and course-correction for user feedback.

Principle 12

Facilitate participatory design & co-creation: Proactively engage with innovators and end-users by crowdsourcing ideas, launching competitions, sharing learnings and best practices, enabling peer review mechanisms, encouraging collective problem-solving and facilitating new solutions to be built on top of the platform.

Example 12

Open Data DK is an online platform that aims to make data from a number of government regional and municipal agencies across Denmark accessible for a wide community of users and builders. The purpose is two-fold, (1) to create transparency in public administration and (2) to enable a range of innovative solutions to be built by a network of individuals and businesses e.g. traffic management, healthcare, recreation. In order to facilitate this, Open Data DK undertakes a range of activities to promote co-creation; (1) information meetings/ workshops for capacity building of local and regional governments to facilitate on-boarding onto the platform, (2) formal engagement/ dialogue meetings with the business community, (3) hackathon challenges, (4) informal meetups/ connection sessions where coders, public employees, academic, entrepreneurs, and students get together to discuss open data case studies, (5) collaboration with educational institutes to leverage the data for research, (6) making the platform more demand-driven by soliciting feedback about the type of data

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Ministry of Electronics and Information Technology
Government of India

required by the network and facilitating direct engagement between business and public authorities for access.

Principle 13

Drive end-user engagement: Spread awareness via offline and online channels; take proactive steps (e.g. workshops, incentives, etc.) to on-board and retain users from diverse backgrounds.

Example 13

Consul is an open source platform leveraged by the Madrid city council to improve citizen participation for a more transparent and democratic government. The localised version, "Decide Madrid" has 400,000 users as of 2018 (3 years after it was first launched). The platform is open to any individual citizen of Madrid over the age of 16, as well as NGOs and local organizations (although what they can participate in differs). In order to drive user engagement, Decide Madrid undertook several activities including (1) significant PR and communication campaigns, including outdoor advertising in prominent locations, especially at the time of launch, which saw spikes in participation, (2) engagement with 'associations' which have traditionally been the hubs of participation in Madrid and enabling them to access the platform (for limited use cases), (3) analytics on the user lifecycle to derive insights about when and how to drive up engagement The platform has now been adopted across 30+ countries, and learnings from the on-boarding experience have facilitated faster uptake in several cities.

Principle 14

Be analytics-driven and learn continuously: Build analytics as central pillar to generate insights that enable improvements in platform performance, support robust policy-making and lead to the design of new solutions and services for users.

Example 14

Saudi Arabia's National Labour Gateway (TAQAT) leverages big data and analytics to enable informed decision-making by all stakeholders, thereby improving citizen-centricity. The platform provides the Government access to real-time up-to-date information on the national labour market (job seeker profiles, employment history, skills, etc.), which is then analysed to compute valuable indicators such as job seeker distance to the labour market and their activity and flexibility (i.e. number of preferred sectors, locations, etc.). These indicators enable the Government to segment and prioritize job seeker groups and launch targeted labour policies, thus maximizing the impact of their investment. Additionally, the platform also incorporates analytics into key functionality to improve the user experience. For example, the 'smart matching' algorithm was launched to match job-seekers to opportunities. Profiles, preferences and constraints of both job-seekers and employers are

taken into account and analysed to produce optimal results via a 3-dimensional scoring model.

Principle 15

Enable grievance redressal: Define accessible and transparent mechanisms for grievance redressal, i.e. defined interfaces, processes and responsible entities, with a strong focus on actions for resolution.

Example 15

Buenos Aires, Argentina, revamped its grievance redressal mechanism within its smart city initiative, to make it more effective and responsive to citizens. The earlier process of allowing citizens to log complaints via call centres was estimated to have a turnaround time of approximately two years. This was replaced by a digital solution allowing citizens to post grievances via a mobile application as well as social media. The mobile app, being equipped with location tagging technology, allows the Environment and Public Spaces Ministry, within the City Government of Buenos Aires to redirect the complaint to the nearest vendor, thereby facilitating faster resolution. Additionally, a city street inspector verifies that the issue has been resolved and posts the status update via the app as well. The Ministry also uses real-time dashboards to monitor the status of complaints and citizen ratings on the same

5 Illustrative NODEs of the Future

In this section we lay out concept briefs for a few illustrative high momentum sectors such as skilling and jobs, agriculture, MSMEs and state service delivery. The aim is to provide an illustrative sense of how NODEs could be designed and the range of transformational outcomes they could enable. There are several other potential NODEs and through this whitepaper, we aim to encourage further thinking and collaboration to conceptualise these.

5.1 Talent (Skilling and Jobs)

While we have made large strides in developing the skilling ecosystem in the country, two fundamental challenges continue to persist. (1) Information asymmetry across stakeholders in the ecosystem, including job seekers, skilling providers and employers. (2) A lack of trust in the information that is available e.g. quality of skilling providers, veracity of employee skill history. There are currently multiple digital solutions and programs in place to try and address these challenges; however, these are fragmented and do not offer a holistic view. For example, on the job search front alone, there are multiple portals that exist or are being set up. The National Career Services portal collates job openings, State Employment Exchanges are also responsible for maintaining a repository of available employment opportunities. Further, a number of private initiatives exist, such as BetterPlace's SkillConnect platform, Naukri.com, Quikr, LinkedIn etc.

Going through the user journey of the job/ skill-seeker, we can see that accessing career services i.e. job search, identifying training opportunities, career counselling, skills assessment/ verification etc. is currently a cumbersome process.

- A skill seeker cannot log onto one platform to identify all the possible job opportunities in his or her geography, with the skill requirements listed for that job.
- If they are able to identify the needed skills, they need to log-in to a different portal to see which training institutes offer the necessary courses. If the information isn't up-to-date, they may have to go door to door to a number of training institutes to find their appropriate skill course.
- As they compare training centres, it is difficult to understand which one offers the best training as a verifiable rating system does not yet exist. The skill seeker also may have to navigate a number of other complexities such as government funding, personal financing, or loan applications and understanding job placements. All of this happens even before the training course begins.

- Then, the skill seeker takes the course and the assessment, and if he passes, he receives a credential/ certificate. At this point, they would expect to be able to gain employment. However they lack counselling on navigating the application process, if the training institute has not successfully placed them.
- And once they find a job, if the employer is unable to validate the promised capabilities of the skill seeker, they may not trust the quality of training or reliability of the credential/ certificate.

While many of the technological building blocks are either in place or being developed by the Ministry of Skill Development and Entrepreneurship (MSDE) and the National Skill Development Corporation (NSDC) as well as private players, there is room for more collaboration across the ecosystem. There is a need for integration of these services and holistic governance to manage the accountabilities and operations of the ecosystem and to encourage collaboration across the community of actors. There is, thus, significant opportunity for the development of a Talent-NODE (Refer Figure 6), capturing all sources of supply and demand, connecting skill seekers with training institutes, facilitating interactions between job seekers and employers, and linking to available counselling and funding providers. It is important to note that the delivery platform in this NODE will be built as a set of 'bridges' to enable exchange and sharing of data across existing systems and create some of the missing building blocks e.g. a digital resume locker or an aggregation engine with de-duplication, rather than building a new, monolithic end-to-end solution.

As an example, using the NODE approach, the Skill India portal can link with the National Career Service and the SkillConnect portal as well as the private job market portals. This can provide employers a view of available skilled labour that match their requirements and job seekers with potential job opportunities, the necessary skills and institutes that offer the highest quality instruction for that skill course. Upon completion, the job seeker can receive counselling and job search advice and employers can trust their skill levels. Ultimately, this matching of supply and demand can reduce frictions in the talent market, lower unemployment, increase the skill levels of the workforce and enable an analytics-driven assessment of the true labour requirements of the country.
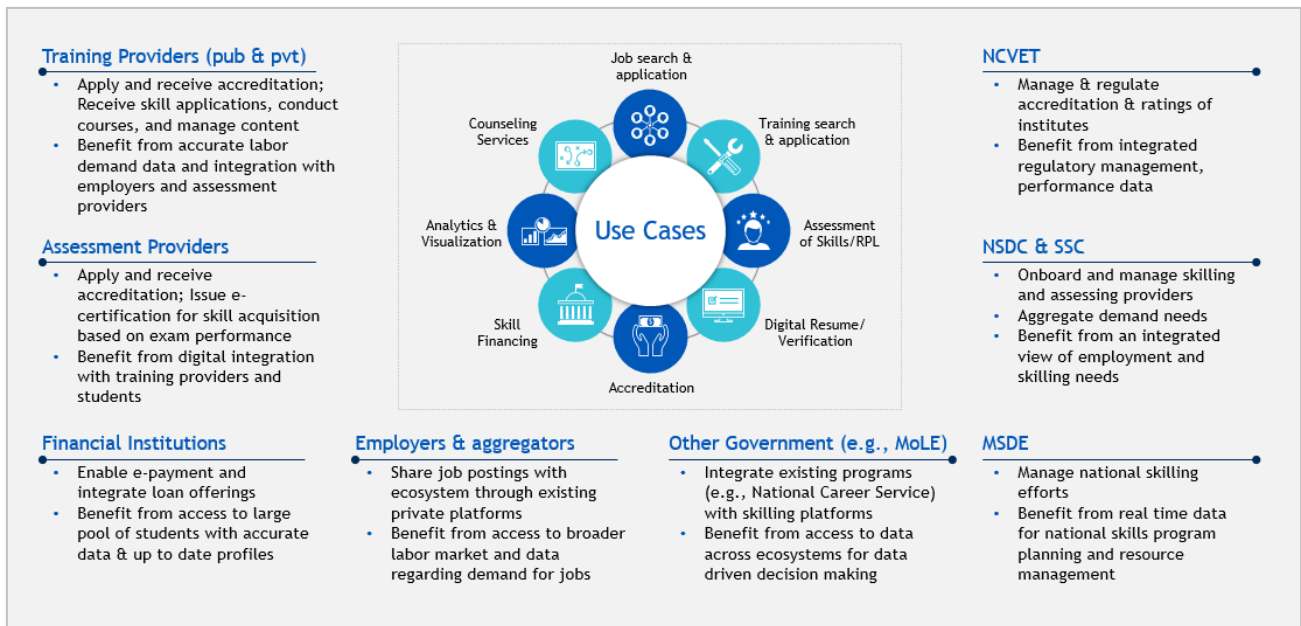
Figure 6: Illustration of Talent (Skilling & Jobs) NODE

5.2 Agriculture

The agriculture sector is in the early stages of digital transformation, with significant recent momentum. There are approximately 80+ initiatives on digitization of data or building of digital applications or services portals, including National Agriculture Market (eNAM), Farmer Portal, mKisan, Soil Health Card digitization, PMFBY platform, Meghdoot, etc. States have also taken the lead here, with Telangana Odisha and Andhra Pradesh, for example, making considerable progress in bringing together different farmer, farming, and weather related databased to provide better agri extension and advisory services, better planning to tackle regional peculiarities, improved provision of inputs, targeted and timely procurement, and direct farmer payments, through schemes like PM-KISAN, Rythu Bandhu (Telangana) and KALIA (Odisha). In the spirit of the NODE approach. States are also engaging with start-ups and businesses, to build solutions on top of their platforms specifically suited for small farmers.

Despite these efforts, a typical small/ marginal farmer still faces key challenges as follows:

- At the beginning of farming season, a farmer tries to arrange financing for inputs (seeds, fertiliser, labour etc.). The formal lending application process involves travel to the local bank where he has to furnish documents like land records, crop history data etc. To gather these documents, he needs to visit different local government offices, resulting in both time spent and cost. Despite this, the farmer may or may not be able to receive a loan, and if not, will have to arrange funding from informal sources.
- While insurance is now integrated under the PMFBY scheme for loanee farmers, non-loanee farmers need to go through a separate but similar process for application, requiring paperwork and high transaction costs.
- Applying for benefits/ entitlements is also arduous for a farmer as it involves multiple departments, forms and processes.
- Pre-harvest, the farmer needs to access advisory on managing his crop e.g. disease detection and control, which require customised information and advice. However, largely generic advisory is available due to the lack of farmer-specific information mapped to a unique ID (although several start-ups are trying to enhance advisory services).
- In the event of crop damage/ loss, while farmers who are enrolled for insurance services are covered against income losses, they face considerable delays due a cumbersome manual offline mechanism of crop cutting experiments and coordination between multiple stakeholders.
- Even for farmers wanting to sell their produce, challenges exists. Accessing markets continues to be a significant challenges, driven by a lack of scale. Even with market access, getting the right price is another challenge which can occur due to lack of information and bargaining power. While intermediaries exist to bridge this gap, this results in higher commissions and pay-outs for the farmer.

Currently, there are a number of public and private sector actors trying to solve these challenges through technology, however, they struggle to reach the necessary scale and desired service levels, in part due to lack of access to data that is spread across multiple institutions. An Agri-NODE that allows for interoperability across systems and stakeholders can help deliver seamless services by addressing core challenges like lack of data via a digital delivery platform. The Agri-NODE (Refer Figure 7) can be envisioned as an integrated repository of data and services built around a data exchange, helping service providers (either Government or private players) build end-to-end, customized services. The data exchange can help integrate farmer details, land records, tenant records, soil health records, crop survey data, weather, satellite imagery and irrigation data, amongst others. With open API access to these registries, digital solutions in services like lending, insurance, benefits/ subsidy transfer, crop advisory can be customized and delivered at scale and at effective cost. This can result in improved transparency and access to lending and insurance, increased agricultural productivity and better value for their crop.

With the Agri-NODE, it will be possible for a farmer to visit his nearest Common Service Centre (CSC) or use his mobile to apply directly for an agricultural loan by providing only his Unique ID/ Aadhaar and loan requirements. Required data about the farmer can be sourced from the Agri-NODE via a privacy protected, informed consent-based data exchange, eliminating the need for the farmer to visit multiple offices. Insurance enrolment can be seamless, due to real-time connectivity between banks and insurance providers within the Agri-NODE. The farmer can access a range of other services at his fingertips, including bespoke crop advisory services, automated insurance processing, shared equipment rentals etc. due to the integration of data in the Agri-NODE, linkage to a unique farmer ID, and secure access to a community of stakeholders. Finally, post-harvest the farmer can access marketplace services like connecting to remote buyers for better pricing and pooled logistics services. The farmer could also opt to store his produce in the nearest warehouse and avail an e-receipt that is integrated with the banking system to immediately access lending. For the government, enhanced application of data and analytics holds the potential to significantly improve efficiency of service delivery and to provide insights for policy formulation.
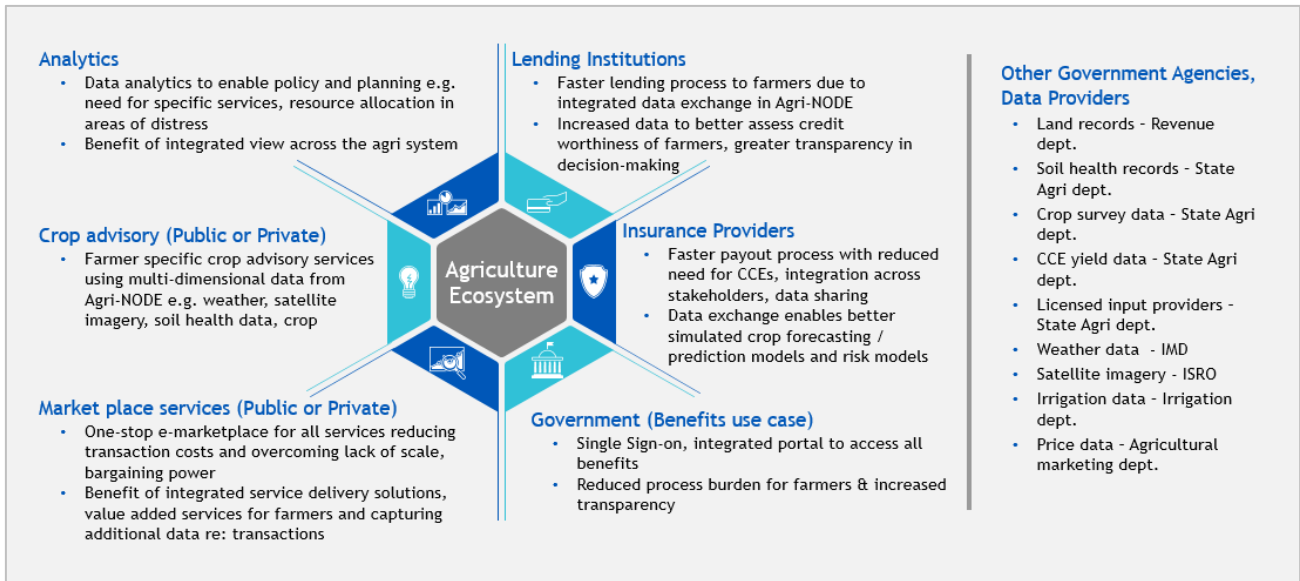
Figure 7: Illustration of Agri-NODE

5.3 MSMEs

MSMEs currently contribute ~30% of Indian GDP with a target to increase their share to 50% of GDP. As a share of non-farm employment, MSMEs represent ~20% in India vs 50-80% in benchmark countries. These statistics indicate that the potential for them to scale is immense, with significant multiplier effects on growth and jobs. However, a few critical challenges exist including access to credit, access to markets and access to services (e.g. logistics and warehousing, accounting and tax management) on a just-in-time, affordable basis. While a number of disparate (public and private) solutions exist to address some of these challenges, they lack the scale to serve 60 million MSMEs and can result in exclusion bias for the smallest enterprises which tend to be outside the ambit of the formal system.

Take the credit challenge as an example; one of the key issues underpinning this is the lack of a unique digital identity for MSMEs, which further restricts the creation of a transparent data-driven mechanism to assess their creditworthiness. Today, an MSME potentially has an Udyog Aadhaar Memorandum (UAM) number, a PAN number, a GSTIN number, all with different information. MSME data, while captured by a number of players such as utilities companies, statutory authorities, banks and fin-tech companies, is not integrated across registries. Beyond the credit challenge, an MSME currently has fragmented touchpoints with government for public service delivery and must access a number of different portals for services (although efforts are being made towards a single interface). For example, the MyMSME portal for information on government schemes, procurement, and grievance monitoring, MSME Sampark for job matching, MSME Samadhaan for delayed payments monitoring portal, public marketplaces like GeM where MSMEs transact etc. These separate portals have the possibility to deliver an integrated service experience via a platform approach but are not unifiable without a set of common building blocks, including identity.

To achieve the ambitious growth goals for MSMEs, there is an opportunity to scale up and integrate these services solutions into a single MSME-NODE (Refer Figure 8). A universal digital ID can be established, similar to the UAM, with proper indexing of all data repositories like banks, utilities companies, statutory authorities and fin-techs across a shared digital platform. By enabling sharing of data from multiple statutory and non-statutory sources to prove creditworthiness, MSMEs can get access to formal lending and help bridge the existing credit gap. Further, the unique ID can be used as a building block in the MSME-NODE and open API standards can be developed for key institutions to integrate services such as the marketplace. Another use case for this platform can be just-in-time services for MSMEs e.g. logistics and warehousing, tax and accounting, talent management etc. which are currently difficult to access. This unique ID, with data exchange, can help MSMEs reach scale and achieve the nation's growth goals as well as create jobs and facilitate the inclusion of MSMEs in the formal financial system.
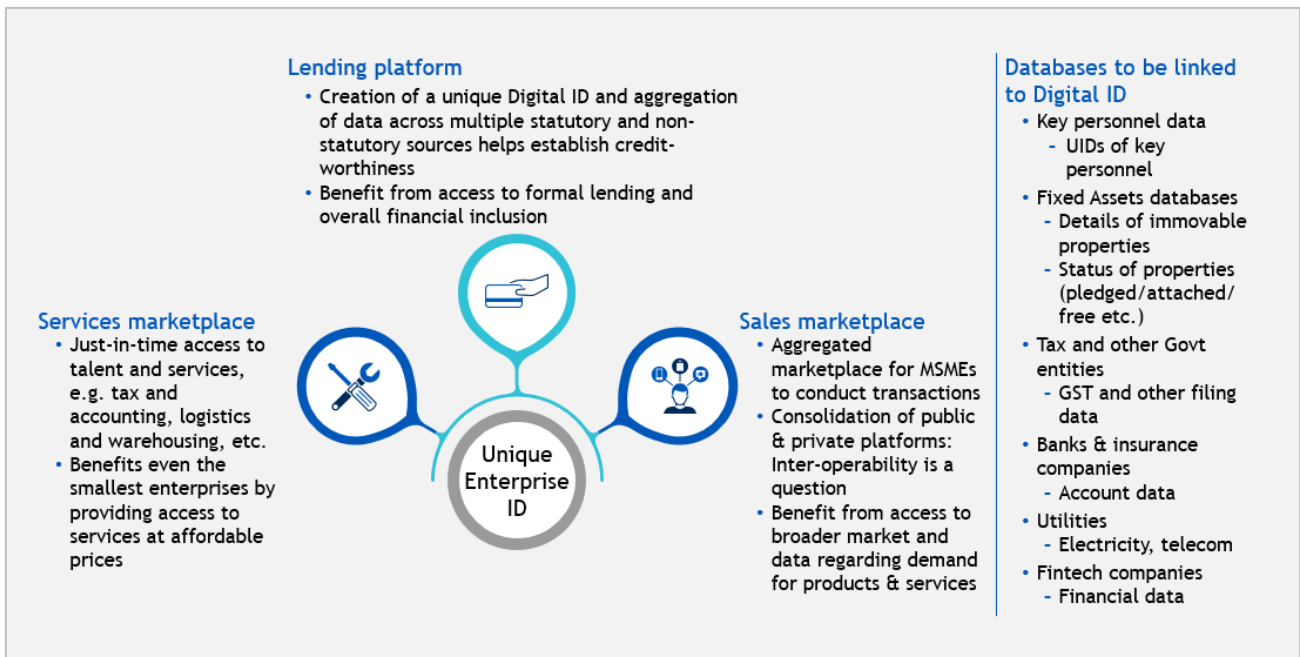
Figure 8: Illustration of MSME-NODE

5.4 State Service Delivery

In India, there are over 500 schemes offering benefits to citizens based on a range of socio-economic criteria. Additionally, a number of government services are available to citizens on a universal access basis. Currently, various departments within most State Governments are running fragmented online (or offline) systems to deliver these benefits and other schemes for citizens.

Hence, to avail benefits (cash or kind) or services offered by the state, a citizen may go through a complex process of discovery, application and disbursal, resulting in significant time and monetary cost. Due to the absence of a single repository wherein the citizen can view all state benefits that he/ she is eligible for, they have to either rely on the word of the local government official or on disparate offline and online government communication. Further, for every benefit that they are eligible for, the citizen must undergo a separate registration and verification procedure to get enrolled in the scheme/ program. Sometimes, the citizen might even face exclusion from availing a certain benefit due to inconsistencies in databases across departments, arising due to the absence of a 'single source of truth'. In addition to this, the disbursal process also tends to be non-uniform across departments, along with high involvement of manual interventions. This leads to loss of valuable time and wages, as well as lack of transparency leading to benefits leakage.

This uncoordinated digitization poses a challenge for the government as well. For example, multiple data collection programs lead to wastage of resources, absence of reliable data about citizens and their entitlements can lead to leakage in government revenues. Being cognizant of these challenges, a few states have taken the leap to create inter-departmental systems and uniform data registries. Some of these initiatives include Rajasthan's Bhamashah Yojana, Madhya Pradesh's Samagra, Harayana's SARAL, Telangana's Samagrah Vedika and Andhra Pradesh's e-Pragati. However they are still at a nascent stage and some continue to face operational challenges such as data management and updates.

Development of a State Service Delivery NODE (Refer Figure 9) can help in overcoming the challenges stated above in three ways

1. Greater citizen empowerment and agency in accessing services and benefits that they are eligible for
2. Better targeting and reduced leakages, resulting in better fiscal outcomes for States
3. Better planning and forecasting capabilities, improving the overall level of citizen experience over time.

The State Service Delivery NODE would comprise an interoperable platform that enables integrated benefit disbursements and service delivery across multiple departments within the State. This platform would serve as the one-stop destination for a citizen to access, apply for

and receive all his/ her entitlements and public services. This would be made possible by:

- Enabling the Single Sign-on functionality and ensuring that any citizen provides all his/ her information only once. A citizen can log into the platform and see all his or her details, along with a comprehensive list of schemes and programs offered by the state. A provision for citizens to update their information, with the necessary proofs can be made available.
- The citizen can then directly apply for the service (that require registration) online itself, based on the eligibility criteria for each.
- In case of discrepancies between available and registered schemes, the citizen can raise queries directly through the platform.
- With respect to availing the benefits, citizen would receive the cash payments directly into his/her bank account, made possible by integration of the platform with e-payments services. This would eliminate middlemen from the process, thereby increasing transparency and reducing benefits leakage.

A key enabling requirement for this system is the creation of an integrated data registry of citizen information. Data standards need to be defined to enable aggregation/ exchange of information across multiple departments and sources (e.g. personal data, household data, asset ownership) to provide a consolidated view, as required for the particular service. However, there is a significant data privacy and security risk that needs to be managed through strong governance and accountability frameworks. 'Privacy by design' principles need to be adopted. For example, purpose specification to clearly communicate the purpose for which personal information is being collected or used, collection limitation to ensure only the minimum required information is being collected, data minimization to define transactions with non-identifiable data as a default. Additionally, consent management frameworks need to be built to provide users full agency over how their data is accessed and shared.

The State Service delivery NODE can be developed as an open platform solution that can be customised and implemented by any state, thus leading to a standardized experience across states. Steps are already underway with the NIC Service Plus platform, and a comprehensive study of this, together with the state platforms, can be made. In addition to this, the platform and data could be opened to the wider community (e.g. business, research institutions, start-ups, etc.) to build solutions and generate insights for policy making, with the necessary safeguards in place.
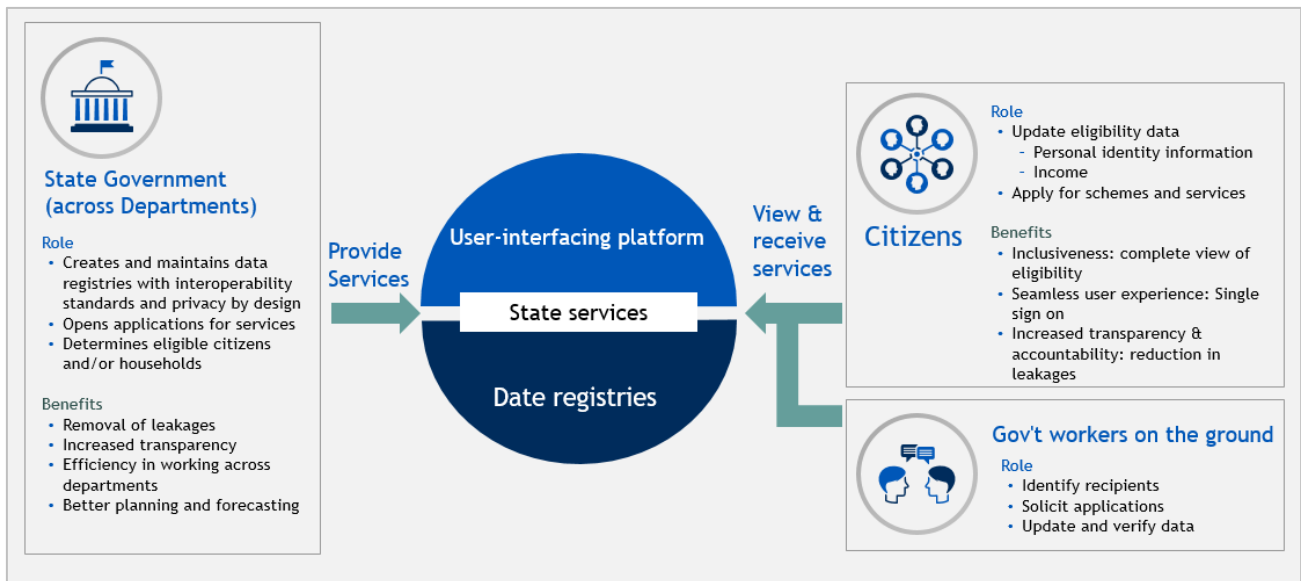
Figure 9: Illustration of State Service Delivery NODE

The above are a few illustrative examples. Other sectors such as education, health care, real estate, law and order, rural development, smart cities, logistics, disaster management and many more, also hold immense potential to transition to NODEs.

6 Conclusion

This document describes a new paradigm of 'GovTech' that can truly transform service delivery and create shared value for all stakeholders in the ecosystem. Preliminary estimates suggest that by 2030 NODEs have the potential to unlock over US$ 500 billion in economic value together with tremendous societal and governance benefits. The time is truly ripe for India to take the lead and chart a course to unlock this potential.

This whitepaper highlights key elements of NODEs and suggests design principles that can help realize their full potential to create transformative impact across sectors. However, in order to develop a truly actionable national strategy, there are a few critical questions that need to be answered with respect to the governance, financing and risk management of NODEs.

First, NODEs will require an overarching governance framework that establishes common rules around the technology and data architecture for delivery platforms, identifies approaches to ensure that risks & ethical considerations are taken into account when designing NODEs, provides for multi-pronged mechanisms for end-user protection and grievance redressal, and establishes guidelines for community involvement in governance e.g. peer review of code, social audits of platform performance. This is by no means an exhaustive list, and a comprehensive framework will need to be developed.

Second, financing NODEs will be costly; both with respect to the upfront investment as well as sustained operations and maintenance cost. While catalytic capital from the public sector will undoubtedly need to be earmarked for NODEs, there is significant potential for innovative financing and use of both philanthropic and private sector capital. We need a robust financing strategy for financial sustainability of NODEs, while continuing to ensure the principles of inclusive public sector delivery are met.

Finally, a number of risks may emerge, e.g. potential exclusion of certain user and builder groups, data security & privacy-related risks, weaponisation of the delivery platform or data. These need to be identified and preventive and corrective mitigation measures need to be put in place.

Your inputs on these themes, and others presented in this whitepaper, are sought in Chapter 8. Collectively, we hope to develop a national strategy that is actionable, that inspires and guides innovators within the government and in the private sector, to come together to radically improve the lives of citizens, and that positions India as a trailblazer in 'GovTech' thinking on the global stage.

7   Key Questions for Consultation

Through this whitepaper, we would like to invite your inputs and perspectives on the following questions around the 'GovTech' 3.0 or NODE approach.

On the guiding principles for NODEs	1. Please comment on the guiding principles defined in Section 4 and indicate whether there are any principles you would add/ amend/ drop. Please provide reasons for the same. 2. For these principles (either individually or collectively), are there platforms (in India or globally) that you consider as benchmarks (from a best practice standpoint)?
On delivery platforms	3. What are the biggest challenges that may be faced in migrating from a 'GovTech' 1.0 or 2.0 approach to a NODE approach (e.g. inter-departmental systems integration, legacy systems modernization, poor usability, and poor data quality)? How might these be overcome? 4. In your opinion, should all delivery platforms be 'open source' or are 'open APIs' and 'open standards', sufficient? Please elaborate with examples.
On governance	5. Do NODEs across sectors require common governance frameworks and regulatory/ advisory institutions to uphold these? Or is it sufficient for each node to have an individual governance construct? If a common framework is required, please elaborate the relevant themes/ topics e.g. financing, procurement, data sharing. 6. Are you aware of any innovative financing models that could be deployed to build NODEs? If yes, please describe along with examples e.g. PPP models or community crowdfunding models 7. What are some potential risks that open digital ecosystems can leave citizens vulnerable to, for example, risks related to data privacy, exclusion, having agency over the use of their data etc.? What types of overarching guidelines and/or regulatory frameworks are required to help mitigate them?

On community	8. What are effective means to mobilize the wider community and build a vibrant network of co-creators who can develop innovative solutions on top of open platforms? What can we learn from other platforms or sectors? 9. Are you aware of any end-user adoption and engagement models that platforms have successfully adopted e.g. feedback loops, crowdsourcing use cases, offline awareness and on-boarding campaigns? 10. Are you aware of any innovative grievance redressal mechanisms/models that go beyond customer support helplines to augment accountability to citizens? If yes, please describe along with examples.
On designing and implementing NODEs in your sector	11. Imagine designing a NODE in the context of the state or sector that you work in (please refer to Figure 4 and the Figures in Section 5), and describe - 11.1. The key challenge/ problem your NODE is seeking to address? What benefits will it offer? 11.2. The key building blocks for this node or key components of the delivery platform? Please list any challenges / barriers you may face in building this platform e.g., poor data quality, data is in silos, lack of common open standards and APIs, transition from legacy systems, etc. and how you may overcome these 11.3. With reference to the 5 design principles on "Governance", please indicate what the governance model could look like for your NODE. What are some challenges/ barriers you may face in establishing a successful model e.g. inter-departmental coordination and strategies to overcome these? 11.4. The "Community" for your NODE – key stakeholders, how would they engage with the platform and build on top of it? What benefits would having a vibrant community offer and what additional use cases can be unlocked? Please list any challenges (e.g. incentivising adoption, value sharing) and how you may overcome these?

On support required	12. Are there any useful resources that you have come across that would help the broader community, as we build out this NODE approach? 13. What kind of tools (e.g., case studies, workshops, online knowledge banks, access to experts, etc.) would be most useful for your organization/ department to enable you to take this approach forward? 14. How would you like to engage further (e.g. individual consultations, workshops, etc.) as we build the strategy for NODE?

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The Centre for Internet & Society	MindTree Foundation
CivicDataLab	Ministry of Agriculture and Farmers' Welfare
Data Governance Network	Ministry of Environment, Forest & Climate Change
Department of Agriculture, Rajasthan	Ministry of Housing and Urban Affairs
Digital Impact and Governance Initiative, New America	Ministry of Human Resource Development
DigiSahamati Foundation	Ministry of Labor and Employment
Farmguide	Ministry of Rural Development
eGovernments Foundation	Ministry of Skill Development and Entrepreneurship
EkStep Foundation	Ministry of Micro, Small and Medium Enterprises
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Goods and Services Tax Network (GSTN)	NITI Aayog
Government of Andhra Pradesh	National Skill Development Corporation
Government of Gujarat	RICH Telangana
Government of Haryana	Samagra Governance
Government of Maharashtra	Sattva Consulting
Government of Odisha	Setu
Government of Punjab	Societal Platform
Government of Rajasthan	Trilegal
Government of Telangana	UChicago Trust
HasGeek	Vidhi Legal Policy
IDFC Institute	World Bank

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