Building India's Digital Highways

The Potential of Open Digital Ecosystems (ODEs)

Executive Summary

OMIDYAR NETWORK INDIA | BCG BOSTON CONSULTING GROUP
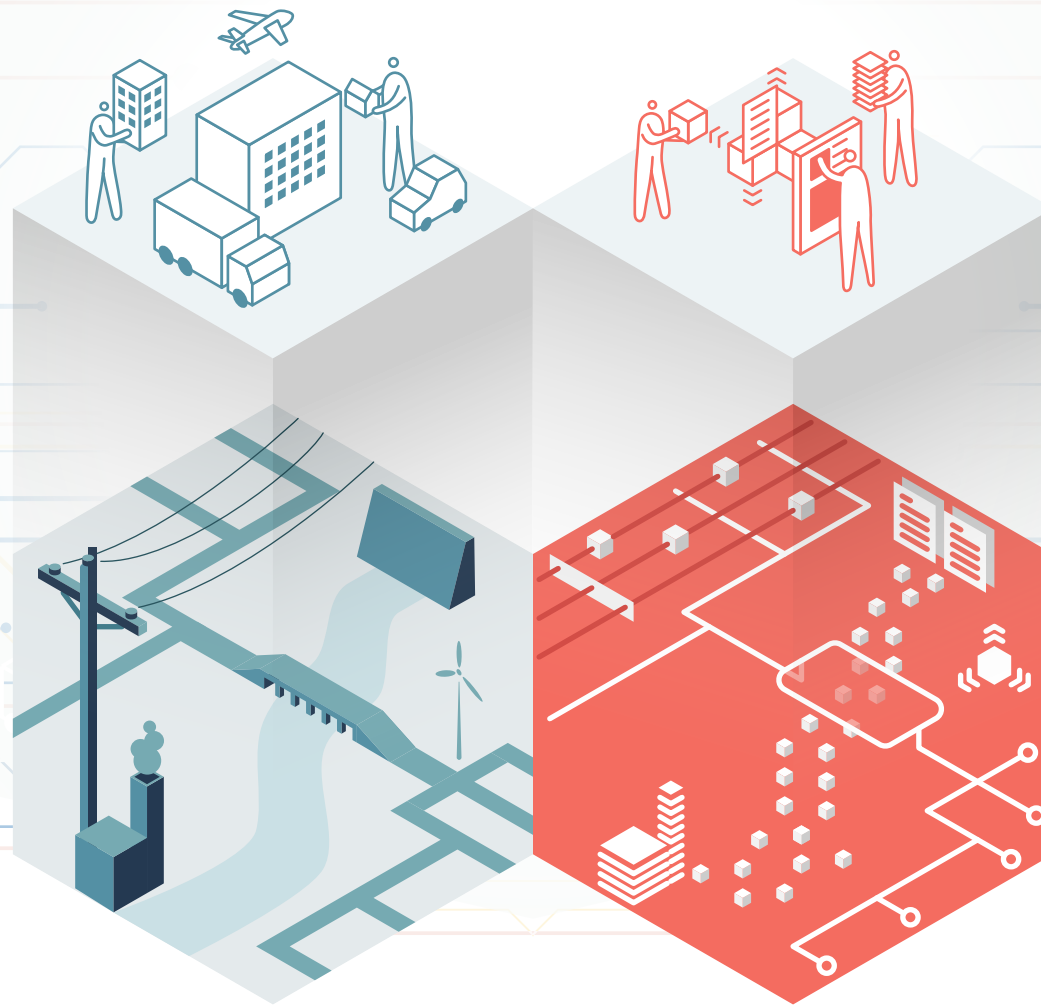
India, and the world, are at the cusp of a paradigm shift in the way digital solutions are being deployed for large-scale societal impact. Technology interventions for public service delivery have made significant strides since the **"1.0" era of computerization and automation** of processes, such as raising service requests or viewing your application status online. This was followed by the **"2.0" era of digitization** that offered End-to-End (E2E) processes for numerous services, such as tax payment, welfare delivery, issuance of government certificates, etc., albeit through disparate online portals.

We are now witnessing a shift to the **"3.0" era of platformization** – a service delivery construct where shared technology infrastructure is leveraged by both government and private sector entities to unlock new solutions and enhance end-user experience (as shown in Exhibit 1).

We call this paradigm shift to the "3.0" era the 'Open Digital Ecosystem' (ODE) approach.

ODEs are: "open and secure Digital Platforms that enable a Community of actors to unlock transformative solutions for society, based on a robust Governance framework".

Collectively, we estimate that 10 high potential National ODEs[1] in sectors like health, jobs and skilling, agriculture, logistics, etc., can unlock over USD 700 billion (INR 50+ lakh crore) in economic value by 2030 (about eight percent of GDP in 2030), and create substantial societal and governance impact.

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[1] The concept of NODEs was first introduced in: Ministry of Electronics and Information Technology, Government of India. (2020). Strategy for National Open Digital Ecosystems. Retrieved from https://static.mygov.in/rest/s3fs-public/mygov_158219311451553221.pdf.

Exhibit 1

Evolving Paradigms of Digital Solutions for Public Service Delivery

3.0 Enabling Ecosystems (ODEs)

Tech

○ **Platformization:** Open, modular and interoperable digital platforms, enabling seamless access to data and services

Non-tech

○ Holistic **Ecosystem** that includes

• Community (e.g. start-ups, civil society organizations) to innovate and collaborate on top of the digital platform

• Governance frameworks that set rules around platform usage, including data privacy and security

2.0 Building Systems

○ End-to-end digitization of processes, from raising service requests to delivery of services

○ Integration of discrete data and back-end services for delivery via a single online portal

1.0 Automation

○ Automation of discrete processes (offline to online)

○ Digitization of public records

India's Unified Payments Interface (UPI): An Example of an Open Digital Ecosystem

The UPI platform in India is an example of the "3.0" era. It has enabled a seamless payment experience for individuals, businesses, and the government by allowing payment service providers to innovate on top of the existing technology infrastructure to build user-centric applications (apps). As a result of this shared infrastructure, many of these apps (for example, mobile payment apps) can integrate into other systems (like banking systems, payment gateways, etc.), thereby creating a powerful, interoperable payments ecosystem. Similar efforts are being made in service delivery across education (DIKSHA), healthcare (National Digital Health Blueprint), urban governance (National Urban Innovation Stack), and agriculture.

This report discusses both the 'tech' and 'non-tech' dimensions of the ODE approach, establishes the key building blocks of ODEs, estimates the potential benefits and identifies critical risks, and charts a roadmap for the successful adoption and implementation of 'responsible' ODEs.
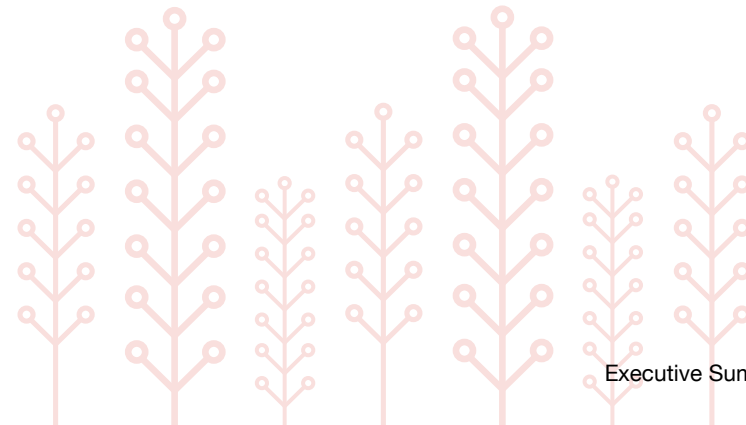
I. How is the ODE Approach Different?

The ODE approach is characterized by the creation of 'open' technology infrastructure, and the associated policy frameworks and safeguards, as a public good. Such an approach enables a large number of actors – both public and private – to leverage this infrastructure to bridge disparate systems and build new solutions for service delivery, at population scale and lower cost.

The ODE approach reflects three major paradigm shifts in the way digital solutions are deployed for service delivery.

1) **First, a focus on creating shared digital infrastructure on which public and private sector entities can build a wide range of innovative services for individuals, businesses, and government bodies.** This reflects a shift from monolithic, E2E solutions to open and shared digital platforms that enable multi-stakeholder collaboration towards the delivery of user-centric solutions. For example, the India Stack,[2] a set of open Application Programming Interfaces (APIs) connecting Aadhaar Authentication, eKYC, Unified Payments Interface (UPI), eSign, and DigiLocker, can be utilized by public agencies, private enterprises, start-ups, and developers to offer a truly digital service delivery experience to users (i.e., presenceless, paperless, and cashless) in areas such as accessing financial products and services, disbursing welfare benefits, and health coverage.

2) **Second, a focus on enabling interoperability among disparate systems and datasets.** Creating interoperability and allowing data that is fragmented across systems to be exchanged safely can lead to new insights and a better understanding of users' requirements. This will allow for the creation of new solutions that provide improved access and service quality. For example, India Urban Data Exchange (IUDX)[3] is an open source platform that will enable real-time coordination and exchange of diverse streams of public data to create solutions for smart cities. Anonymized data from government speed sensors and cameras,

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[2] About – IndiaStack. IndiaStack – Technology for 1.2 billion Indians. Retrieved April 25, 2020, from https://www.indiastack.org/about/.
[3] Learn more at https://www.iudx.org.in/.

combined with crowdsourced data from navigation apps and private platforms like delivery and cab-hailing apps, can lead to a number of useful solutions, from emergency response and safety in public spaces to parking optimization.

3) **Third, a strong emphasis on building in safeguards and incorporating 'Privacy by Design' (PbD) principles within digital platforms to protect the rights of individuals and prevent misuse.** Depending on the type of data flowing in an ODE, significant risks can stem from either inadvertent data breaches or ill-intentioned actors within the system. For example, a registry of digital health records for every individual can be a powerful tool for accessing the right healthcare. However, without stringent measures to protect individual agency over use of these records, they can also be exploited causing harm to the individual. To minimize potential harms, the ODE approach advocates for building responsible ODEs, through design and technical features, as well as through governance and community mechanisms. These imperatives may not have been addressed in the "1.0" or "2.0" eras.

Collectively, these shifts can unlock new public value (through innovation), more efficient service delivery (better access and targeting, cost and time savings for all stakeholders, and greater transparency), and a more user-centric experience (consistent, customized, inclusive, seamless, and safe).
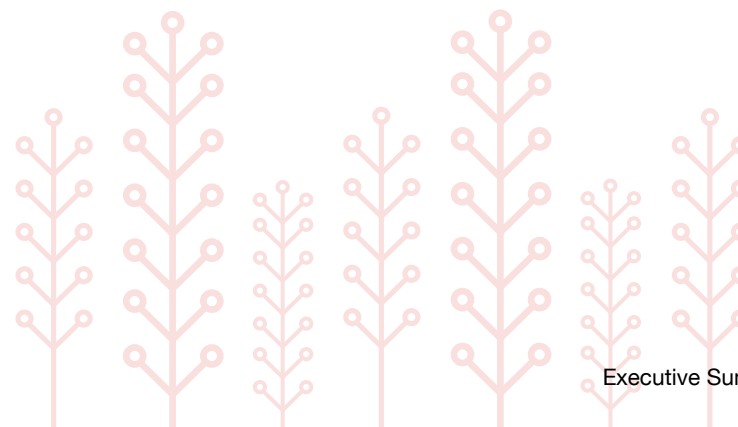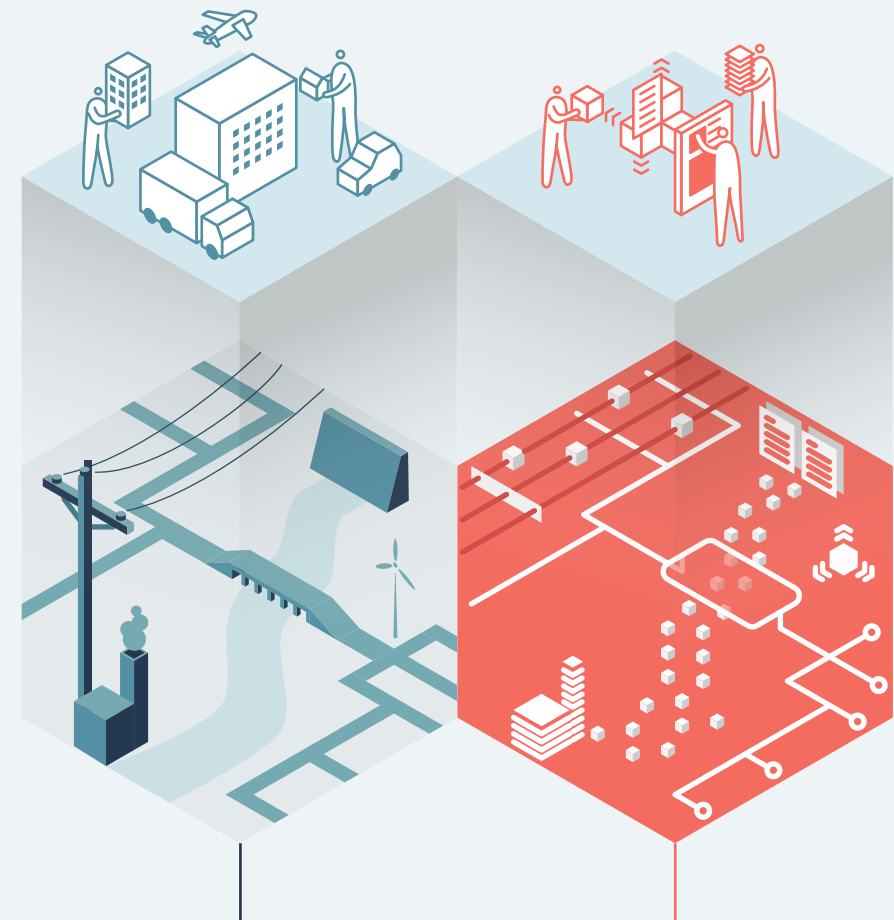
Exhibit 2

ODEs: Public Infrastructure for a Digital World

A good analogy to understand the new ODE paradigm is the physical infrastructure of cities. Building roads, drainage systems, parks, mass transit, i.e., the 'commons', is typically done by the government, through public funding and ideally with robust public engagement. If built and governed well, this is the 'platform' over which businesses and individuals can create a vibrant ecosystem of activities and contribute significantly to improved quality of life.

Similarly, the ODE approach suggests that the government should focus on creating the 'digital commons'; enable interoperability between siloed systems, so that innovators can build solutions on top, by leveraging open source software, open data, open standards, open licenses, and open APIs.

Physical Infrastructure   **Technology Infrastructure**

II. Unpacking ODEs: The 'Tech' and 'Non-Tech' Layers

ODEs comprise three fundamental layers (as shown in Exhibit 3).

1) The first layer, **Digital Platforms**, comprises the technology infrastructure (data exchanges, registries, stacks, etc.), designed to be open, modular, and extensible to facilitate interoperability and co-creation, on which end-user solutions can be built.

2) The second layer, **Community**, comprises builders who co-create digital platforms and / or new solutions on top (for example, businesses, start-ups, developers, government etc.), end-users who access services and enable feedback loops (for example, individuals, public or private sector entities), and facilitators who play important roles like financing, research, providing on-ground user feedback, and holding the government accountable (for example, Civil Society Organizations [CSOs], think tanks, foundations, etc.)

These actors transact and collaborate via the platform to create shared value, drive greater adoption, and ensure accountability.

3) The third layer is a robust **Governance** framework which comprises the laws and rules that govern the ecosystem as well as the institutions, both government and non-government, that uphold them. This framework is necessary given the collaborative, open, and multi-stakeholder nature of ODEs. It should address stakeholder roles, accountabilities, and liabilities, the mitigation of ODE-specific risks related to privacy, security, and exclusion, and the design of sustainable funding models for ODEs that align with their objective of maximizing societal impact.

So far, much of the discourse on open platforms has been on the 'tech' layer. We believe that the 'non-tech' layers, i.e., Governance and Community, are equally critical, given the 'public good' character of ODEs.

Exhibit 3

Three Layers of an Open Digital Ecosystem (ODE)

Governance

Laws and rules that govern the ecosystem and accountable institutions that uphold these rules; related to:

Fair and equitable platform access and outcomes

Robust data privacy and security

Sustainable funding model

Digital-ready talent and expertise

Domain-specific policies and standards

Governance

Community

Digital Platforms

Community

Collaborative community who transact via the digital platform to create value for all

1. Builders

Public or private enterprises, and developers, co-creating digital platforms and / or leveraging them to create new solutions

2. End-users

Individuals and entities accessing services and enabling feedback loops

3. Facilitators

Ecosystem participants (e.g. CSOs, academia, philanthropies) involved in governance, financing, research, etc.

Digital Platforms

Technology infrastructure that facilitates co-creation for the delivery of services to end-users

Technology infrastructure includes data exchanges and registries, ID, open stacks, etc.

End-user solutions may be public goods or proprietary services

Open APIs, standards, and protocols enable interoperability

Governance and Community are both, enablers of adoption and bulwarks against potential harms. They enable innovators to build solutions, facilitate end-user collectives to drive adoption, and empower communities and civil society to ensure accountability. It is these 'non-tech' layers that will help ODEs succeed by encouraging broad-based participation, creating a level playing field for the building and use of technology infrastructure, and ensuring that an individual's rights and agency are protected in these multi-stakeholder ecosystems.

> While the ODE approach enables new models of service delivery and collaboration between the private sector and government, it is important to note that it does not absolve the government of its responsibility to provide public services.

On the contrary, it can equip the government with new tools to enhance service delivery and can empower individuals by enabling better access to their entitlements without discrimination or discretion at the point of delivery. For example, by leveraging shared digital infrastructure such as digital identity (ID) (i.e., Aadhaar) and payment platforms (for example, Aadhaar-enabled Payment System (AePS), the Government of India (GoI) has transferred subsidies worth approximately USD 144 billion (INR 11 lakh crore) to people between 2013 and 2019. The improved targeting and reduced leakages, via the Direct Benefit Transfer (DBT) mechanism, have resulted in savings worth USD 15 billion (INR one lakh crore).[4]

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[4] As accessed on June 30, 2020, from https://dbtbharat.gov.in/. This is a cumulative figure between March 2013 and December 2019.

Unpacking the Term 'Open' in Open Digital Ecosystems*

Our thinking on ODEs embraces the word 'open' in the broadest sense possible. At its core is the 'philosophical' idea that ODEs are foundational public goods, in service of society. We unpack this idea at the operational level in the following ways:

- 'Technical' openness refers to making ODEs easily accessible by adhering to a set of open APIs, open standards, and open source code.[5]

- 'Legal' openness refers to various types of open licenses that allow software, data and other content to be freely used, and shared.

- 'Financial' openness refers to universal access by making ODEs accessible for free or at minimal cost.

Above all, 'open' is a deep cultural attribute which involves engaging with end-users, builders, and facilitators, at all the stages of the ODE lifecycle to enable the creation of a truly multi-stakeholder, participatory ecosystem.

*We acknowledge the valuable contribution of Societal Platform in advancing the thinking on 'open' in the context of ODEs.

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[5] Ministry of Electronics and Information Technology (MeitY) has released two policies on the use of open APIs and Open Source Software (OSS) to encourage interoperability. Learn more at https://www.meity.gov.in/writereaddata/files/Open_APIs_19May2015.pdf and https://www.meity.gov.in/writereaddata/files/policy_on_adoption_of_oss.pdf.
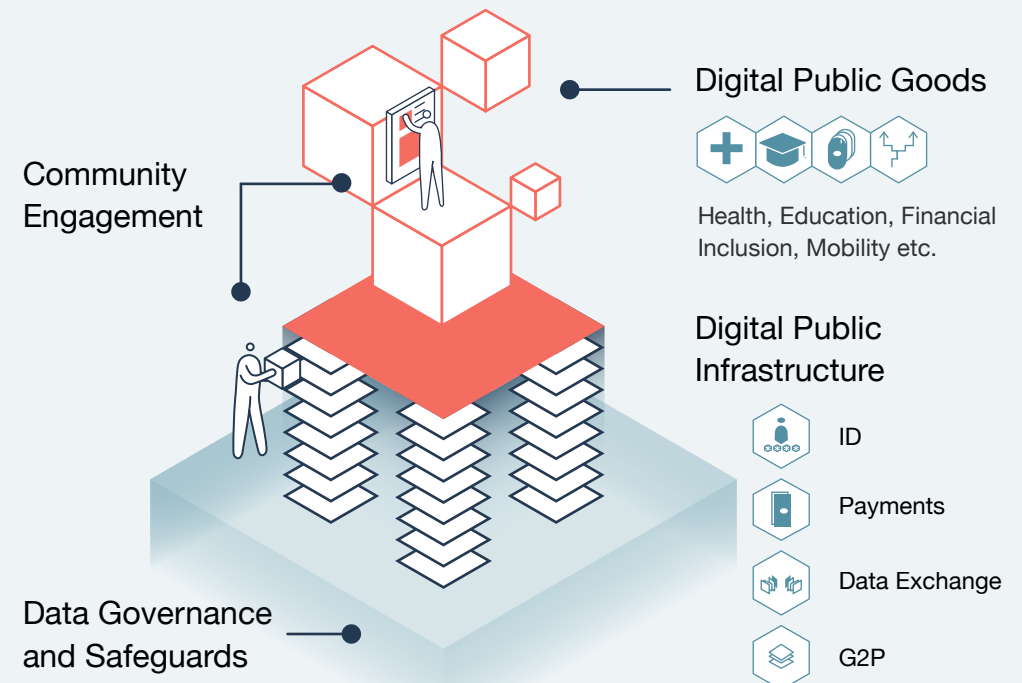
Exhibit 4

How Open Digital Ecosystems relate to the concepts of 'Digital Public Infrastructure' and 'Digital Public Goods'

There are two terms used to describe the 'tech' layer or the digital platforms layer of Open Digital Ecosystems (ODEs), which have recently become part of the global discourse.

The first is **'Digital Public Infrastructure' (DPI)**. DPIs are the open source foundational technology infrastructure for nations, like Identity, Payments, Secure Data Exchange, and Data Registries that contain information on individuals, households and businesses in the economy. Examples of DPIs are India Stack, MOSIP, Mojaloop, and X-Road.

The second is **'Digital Public Goods' (DPGs)**. Open source solutions in sectors that are critical for public welfare such as health, education, mobility, and financial inclusion need regulations that allow them to be 'public goods' i.e. non-excludable (no individual can be excluded from using it) and non-rivalrous (use by one individual does not reduce its availability to others). DPGs may be complete end-user solutions or may refer to open standards and protocols that can be used to build end-user solutions. Examples of DPGs include the FHIR standard for health data exchange, the Beckn protocol for mobility and local commerce, Open Street Maps, Open Data Kit, and Wikipedia.

ODEs are an evolution of the DPI and DPG concepts with regard to the comprehensive thinking that needs to go into building public infrastructure. ODEs go beyond the 'tech' and give equal prominence to the 'non-tech' layers i.e. governance and community, which are critical if these platforms are to work for the ordinary citizen.

Digital Public Goods

Health, Education, Financial Inclusion, Mobility etc.

Community Engagement

Digital Public Infrastructure

ID
Payments
Data Exchange
G2P

Data Governance and Safeguards

III. ODEs: A USD 700+ billion (INR 50+ lakh crore) Opportunity for India

The ODE approach has applications across a wide variety of sectors, including skilling and jobs, health, education, agriculture, and urban governance.

> We estimate that over USD 700 billion (INR 50+ lakh crore)[6] worth of additional value and savings can be generated by 2030 in India, if 10 high potential National ODEs are implemented.

National ODEs can both create new economic value by unlocking new opportunities, and lead to savings by increasing efficiencies in service delivery. By 2030, 10 high potential NODEs in sectors like health, jobs & skilling, agriculture, justice, logistics, etc., can collectively create new value of USD 500+ billion (INR 35+ lakh crore) – equivalent to 5.5% of India's GDP, and in addition, generate USD 200+ billion (INR 15+ lakh crore) in savings to the country. Exhibit 5 outlines the total economic benefit across all 10 NODEs as well as the societal and governance impact potential for each NODE.

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[6] USD 700+ billion is the one-time impact achieved based on benchmark adoption rates in the year 2030. Since adoption is assumed to be modelled on a curve between 2020 and 2030, the benefits will start accruing sooner than 2030. Further, there will also be recurring benefits post adoption which have not been considered in this estimation. Therefore, the impact is likely to be greater than what is estimated above. India's GDP in 2030 is projected to be USD 8.6 trillion, assuming a business as usual scenario, i.e. without accounting for incremental GDP from ODEs. The estimated USD 500+ billion in new value creation is, therefore, equivalent to about 5.5 percent of GDP in 2030. For a detailed understanding of the methodology please look at the Appendix and the Microsite. Source for GDP projection https://www.oxfordeconomics.com/.

Exhibit 5

Economic, Societal and Governance Impact Potential of NODEs

Health

1-3+ years increase expected in life expectancy

Talent

50-80M+ people expected to be matched into better-fit jobs

Urban Governance

100+ hours of time per person per year expected to be saved due to smart mobility solutions

Agriculture

1.5X increase expected in farmers' incomes

Law and Justice

2-6M court cases that have been pending 3+ years to be resolved

Logistics

5-15% efficiency savings expected in national logistics expenditure

Education

15-25M+ student drop outs expected to stay in school

State Service Delivery

20% more eligible citizens expected to be included in the social safety net

E-Land Records

1M people and 250,000 hectares of land expected to be impacted via resolved land conflicts

MSME

10-20M+ MSMEs expected to be included in the formal financial system

Economic Impact

USD 700+ billion
(INR 50+ lakh cr)

Note: USD 700+ billion is the total economic impact potential of these 10 NODEs. Additionally, each NODE will generate a number of societal and governance impacts, a few of which have been showcased in this exhibit.

Source: ONI and BCG analysis

IV. Mitigating the Risks Associated with ODEs

Although ODEs offer considerable potential for impact, they can also give rise to several risks. These risks, if not addressed proactively, can hinder the ability of ODEs to deliver their true economic, societal and governance impact. We have identified four key risks associated with ODEs, and suggested key mitigation measures for each risk.

The first two risks are specifically related to the construct and functioning of ODEs.

- **Data Centralization risk may arise if there is aggregation of personal data into a single database.** Consolidation of data into a centralized registry can increase its vulnerability to cyber-attacks by creating a single point of failure. Further, enabling interoperability across multiple data registries, without appropriate safeguards, can allow entities to access information in a manner that can potentially be misused, for example for unauthorized profiling or surveillance.

- **Builder Adoption risk may arise if the builder community does not, or is unable to, adequately leverage the technology infrastructure to create innovative solutions on top.** This could arise due to poor quality of the infrastructure, lack of awareness about the digital platform, or misaligned incentives.

Two additional risks, while not unique to ODEs, also need to be highlighted, as their mitigation is critical to the successful implementation of ODEs.

- **Exclusion risk may prevent certain segments of the population from accessing services due to technological or socio-economic barriers, such as limited digital access or inadequate digital literacy.** It could also stem from the disintermediation of the public sector by private entities in service delivery, leading to the exclusion of segments that might be unprofitable to serve.

- **Operational Management risk may arise for several reasons, including a lack of expertise in shaping and managing vendor contracts for technology builds, inability to identify the right talent with the necessary digital skills or insufficient funds for operational sustainability.**

Several of these risks can be addressed through well planned and executed mitigation strategies. This report suggests mitigation measures for each risk.

- To **mitigate the risk of data centralization,** we recommend incorporating PbD principles, in the form of both technological and policy choices. For example, adopting a federated or decentralized architecture for data registries, such that the data is held in multiple independent databases from where relevant data can be accessed when needed. This will help mitigate the risk of potential misuse of large centralized data pools and prevent a single point of failure. Further, instituting key measures such as purpose limitation, tokenization, encryption, and ensuring transparency through adequate notifications at the time of data collection and exchange, can protect users and build trust in the ecosystem. While most of these privacy protection mechanisms are neither complex nor expensive, their successful implementation does require a broad consensus on the key principles, as demonstrated by countries like Estonia.[7]

- For **mitigating builder adoption risk**, it is crucial to establish mechanisms that enable and incentivize builders to participate in the ecosystem. For example, providing structured trainings and hosting workshops to drive engagement and digital platform adoption, launching incentive-based competitions and hackathons to spur the build of new solutions on top, and promoting the use of common standards to facilitate wider adoption. Developing reference applications to demonstrate the utility and impact potential of the ODE can also be considered, as in the case of the Bharat Interface for Money (BHIM) app[8] developed on top of the UPI platform by National Payments Corporation of India (NPCI).

- To **ensure inclusiveness and last-mile access**, multi-channel (online and offline) access to services should be provided. This will ensure universal accessibility across socioeconomic, gender, and demographic groups. Regular multi-stakeholder consultations and social audits can be undertaken to check for exclusionary biases and collect corrective feedback. Existing offline infrastructure can be leveraged or strengthened to provide offline touchpoints for accessing services.

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[7] World Bank. (2018). Privacy by Design: Current Practices in Estonia, India, and Austria. Retrieved from https://id4d.worldbank.org/sites/id4d.worldbank.org/files/PrivacyByDesign_112918web.pdf.

[8] Bharat Interface for Money (BHIM) is an app that uses UPI to facilitate payments. Learn more at https://www.bhimupi.org.in/.

- Finally, **operational management risks** can be addressed by ensuring that digital-ready policy frameworks are in place for financing the ODE, hiring and retaining top talent, and building partnerships. These can include, for example, shaping multi-vendor technology contracts to on-board the best talent, creating flexibility in procurement rules to facilitate agile sprints, or enabling open market recruitment processes for specialist functions.

V. Our Vision: Unlock Transformative Societal Impact through 'Responsible' ODEs

We believe that the immediate need is to focus on building responsible ODEs that maximize societal impact while minimizing potential harms.

To this end, we have laid out **15 guiding principles**, five for each of the three ODE layers (as shown in Exhibit 6), to ensure robustness of both the tech and non-tech layers. These principles aim to achieve the following outcomes.

- **For Digital Platforms:** Develop reusable, scalable and interoperable technology infrastructure to enable efficient, collaborative, and innovative solutions.

- **For Community:** Foster a vibrant group of builders, end-users, and facilitators who co-create platforms and new solutions, drive accountability, and ensure continuous feedback loops.

- **For Governance:** Enable robust mechanisms – rules and institutions – to ensure transparency, sustainable operations, and fair value sharing for all stakeholders.

Exhibit 6

15 Guiding Principles for the Tech and Non-Tech Layers

Open and secure **DIGITAL PLATFORMS** that enable a **COMMUNITY** of actors to unlock transformative solutions for society based on a robust **GOVERNANCE** framework

DIGITAL PLATFORMS

1. Be open and interoperable
2. Make unbundled, extensible and federated
3. Be scalable
4. Ensure privacy and security
5. Develop minimally and iteratively

COMMUNITY

6. Ensure universal access
7. Drive participatory design and end-user engagement
8. Cultivate a network of innovators
9. Be analytics-driven for continuous user focus
10. Enable responsive grievance redressal

GOVERNANCE

11. Define accountable institutions
12. Establish and align with robust rules of engagement
13. Create transparent data governance
14. Ensure the right capabilities
15. Adopt a sustainable funding model

VI. Financing ODEs: Public Funding for the Public Good

Given that ODEs are meant to be 'public goods', the initial financing for the build should be done using public sector or philanthropic capital.

This is important for creating a level-playing field without giving undue advantage to any market player, and for keeping vested interests of different actors at bay. The maintenance and scale-up of ODEs requires recurring operational investments for which cost-recovery models can be considered, such as charging user fees within an appropriate range that ensures inclusive access (similar to how a public park might charge a small entry fee to offset its maintenance costs).

Once the core digital infrastructure is in place, products and services with a variety of different business models, including proprietary solutions, can be built on top. For example, while various market players may compete to create a better solution for small business owners to access credit, the core technology infrastructure which provides small businesses a digital ID to transact online should be publicly funded. A robust governance framework for the ODE would play a critical role in ensuring access and fair value distribution across the ecosystem.

VII. Three Recommendations for a National Governance Strategy for ODEs

To ensure that the true value of ODEs can be realized, India needs a robust national governance strategy for ODEs. For this, we have outlined three key recommendations.

01 **Develop common national standards and frameworks in a few critical areas like data governance, ethics, and risk management to bridge existing gaps.** This will ensure a consistent approach across all ODEs and can serve as a guide for ODEs to develop and implement their own associated policies.

02 **Develop participatory governance mechanisms to enable greater collective accountability and transparency, ensure inclusion and last-mile access, and bring to bear the right expertise.** These can include public consultations at all stages of design and deployment, releasing performance data and facilitating social audits, constituting expert groups to provide guidance on topics like data governance and risk mitigation, etc.

03 **Establish a national-level NODE Council to devise strategies for the adoption of the ODE approach,** including developing common standards and frameworks, participatory governance mechanisms, and advising government bodies on their design and delivery.

VIII. ODEs: Laying the Foundation for Transformative Solutions

India has already taken significant steps towards the ODE approach with the implementation of Aadhaar and the India Stack – shared technology infrastructure that has enabled financial inclusion, reduction in leakage, and smoother transfer of government benefits. Further, the Ministry of Electronics and Information Technology (MeitY) has released a whitepaper on 'Strategy for National Open Digital Ecosystems (NODEs)' which establishes a conceptual framework for NODEs and puts forth key questions on the way forward for this approach.

Many of the frameworks and tools laid out in this report are intended to address these questions and build on the vast body of work and thinking around digital platforms, with a special emphasis on the two non-tech layers of ODEs. With this report, we aim to highlight the transformative impact of the ODE approach and guide practitioners on how they can build responsible ODEs. To that end, an online, interactive, and freely accessible toolkit has been created and is available at the Microsite.

> Looking ahead at the 2020s, we believe that the time is opportune for the nation to adopt ODEs at scale, to not only further harness their impact potential but to also serve as a lighthouse for other countries who are beginning to embark on this journey and are seeking to learn from India's long strides.

Epilogue: ODEs can be a Game-Changer in the Fight Against COVID-19

The ODE approach has become even more relevant now, with the rampant spread of the novel corona virus disease (COVID-19) across the globe. The pandemic has widespread economic and societal ramifications, not just in the healthcare sector but also in areas like employment, education, and economic growth. This underscores the need to establish digitally enabled, interconnected ecosystems that can be built using the ODE approach. Various types of ODEs can be used not only to predict the onset of crises (such as pandemics or natural disasters) and effectively manage response, but also to restore normalcy. Two National ODEs in particular can create immediate impact in the context of the COVID-19 crisis.

- First, a Healthcare NODE, which provides an interoperable platform for all health and related services can prove to be invaluable in the current environment. This requires the creation of a federated database of the health records of all individuals in the country, backed by the necessary governance frameworks and safeguards. The Healthcare NODE can allow a community of actors – public and private – to build applications on top that can serve multiple use cases, including supporting remote clinical triaging and patient monitoring, assessing the extent of disease spread, integration with pharmacies for easy access to medicines, regular alerts and reminders for testing, etc.

- Second, a Social Protection NODE can provide the critical technology infrastructure required to ensure seamless access to government benefits for those who need them the most. India's existing digital infrastructure comprising Aadhaar, AePS and other elements of India Stack, enabled the GoI to transfer about USD five billion (INR 37 thousand crore), directly to the bank accounts of 160 million (16 crore) beneficiaries to provide critical financial support and relief in the wake of COVID-19.[9] Adopting the ODE approach facilitates interoperability across disparate state and central systems and can, therefore, strengthen social protection services by enabling portability of entitlements for vulnerable groups (like migrant workers).

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[9] Ministry of Finance, Government of India. (2020, April 19). DBT ensures cash benefit directly credited into the account of the beneficiary, eliminates leakage and improves efficiency. Press Information Bureau. Retrieved June 19, 2020, from https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1616022#:~:text=More%20than%20Rs36%2C659%20 crore,of%20Expenditure%2CMinistry%20of%20Finance.