NOTE
National Data Strategy for India

India's Digital Economy

India is accelerating towards an online population with an estimated 59% of its population expected to be connected to the internet in 2021[1] and with each smartphone user averaging 15.7 GB data annually in 2020.[2] Its IT and telecom infrastructure provides a robust backbone-- the country is expected to touch 1.5 telecom connections per capita by 2021 wherein citizens are increasingly relying on digital services for citizen-state services. As of 2020, India's IT workforce accounts for 4.47 million in FY 2020-21[3] with its relative skill penetration in technology areas like artificial intelligence (AI) being among the highest globally[4]. Further, emerging technologies are expected to generate $1 trillion in economic value for India -- spearheading the $5 trillion economy ambition by contributing 20 percent to the country's nominal GDP and sustaining 60-65 million jobs by 2025.[5] The potential five-fold increase in economic value from India's digital transformation by 2025 would create a rapidly growing market for a host of digital services, platforms, applications, content, and solutions.[6] Against the backdrop of an opportune digital ecosystem, data occupies the position of a fundamental building block. In light of data leaks, biased algorithms and cyber-attacks, the imperative for the responsible production, access and governance of data is central to the discourse on the 'India data and digital opportunity'.

Global Precedent

Across the globe, in addition to deriving value in the public sector through digital adoption and development initiatives, governments have played a fundamental role in constructing the data-driven economy through the creation of designated data strategies (*detailed strategy in Annexure 1*). While the UK and USA have designated data policies to inculcate a strong data sharing culture other data-led/data-rich economies like Singapore, China and Brazil have dedicated data protection legislation where guidance for data practices is embedded as part of other strategies. Most countries have successfully strategized for economic development and cyber security while upholding human rights and freedom of choice for the data principle as a central tenet. Notably, these strategies seek to maintain the status quo of the existing socio-political regimes wherein countries like China that value protectionism through information censorship place a higher degree of restriction on cross border flows of data than the UK or Europe, where the open data movement has enabled cross border collaboration and innovation.

- Estonia's 'once only' model has created a data exchange with virtually zero inefficiencies arising from duplication which has complete uptake by both public and private sector data fiduciaries.
- Despite its eminence in Big Data/AI innovation and stringent data protection, public- sector data in China remains siloed with poor data culture at the local government level.[7]
- USA is tackling similar siloes through its Federal Data Strategy supplying tangible steps and measures to enable the creation/curation/sustenance of data/data systems within governments through partnership-led state-of-the-art technical systems.

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[1] Cisco Visual Networking Index (VNI) Complete Forecast

[2] Ericsson Mobility Report 2020

[3] NASSCOM Strategic Review 2021: New World 'The Future is VIrtual'

[4] Stanford AI Index Report 2021

[5] https://government.economictimes.indiatimes.com/news/technology/emerging-technologies-to-create-1-trillion-economic-value-by-2025-ey/71589838#:~:text=Emerging%20technologies%20are%20expected%20to,report%20from%20consulting%20firm%20EY.

[6] https://community.nasscom.in/communities/digital-transformation/smartcities/role-of-technology-in-the-government-public-sector-undertakings.html

[7] https://blogs.worldbank.org/eastasiapacific/taking-pulse-digital-government-china

- The National Data Strategy in the UK is an elaborate roadmap aiming to catalyze better data use across businesses, government, civil society and individuals.

Indian Precedent

India, like other countries in the G20 have prioritized the digital agenda through the National eGovernance Plan (2006)[8] and e-Kranti framework (2015)[9] for eGovernance. This strategy specifically emphasizes digital governance services that are integrated and interoperable, encourages 'cloud by default', mandates common standards and protocols for information storage and exchange, among other features. Further, frameworks like the IndiaStack, IndEA architecture, DEPA architecture along with data and metadata standards provide the boundary conditions to transform India from being data-rich to data-intelligent.

India's Report by the Committee of Experts on Non-Personal Data Governance Framework[10] has created a blueprint for a system of data and has been subject to healthy scrutiny by the community with repeated calls to free it of any modicum of obscurity. The framework is anticipated to continually evolve to interact with other legislation like the PDP Bill, intellectual property laws like Copyright and Trade Secrets, and the Competition Law, to keep pace with the data-led innovation/application that is rapidly becoming ubiquitous.

Given this maturity in legislation and the projected economic development that is to ensue, there is an urgent requirement to create enabling strategies for the data ecosystem. As the pandemic has normalized digital mediums for knowledge dissemination and providing citizen services, governments with leverage in data volumes, systems and governance are likely to lead a critical geo-political agenda. In this regard, a coordinated and iterative strategy for data at the national level is the imperative for India.

Vision for India's National Data Strategy

- **Unlock high-value data across the economy**: While India's private sector remain early adopters of technology and digital products, the thrust towards e-governance has meant that data is increasingly becoming central to fundamental citizen services. Likewise, the private sector relies on high-value public data repositories in sectors such as health, geo-spatial mapping, indirect taxes, logistics, and energy to successfully inject innovation and propel a data-driven economy. A future-forward data strategy should accordingly engage with data from multiple sources (public and private) to make accessible through G2G, G2B, B2G and B2B channels. A newly unlocked data repository will not only enable more informed policymaking and efficient public services, but will also *allow a new generation of start-ups to bolster digital innovation* for high-priority use cases and enter new markets, driving growth in the Indian economy.

- **Facilitate a congruent and robust governance strategy:** Data governance policies are increasingly viewed as a tradeoff between privacy and innovation. Open data accordingly, is perceived with a degree of suspicion, not only because of the propensity it creates for accountability but also for the lack of understanding around misuse of data and safeguards against it. Principles of *data privacy*, *security* and its implications on the *safety* of the data principal are tantamount to responsible technology and innovation, instilling *trust* in governmental data fiduciaries to adopt a rights-based approach to data sharing. A responsive data governance strategy focuses on devising safeguards to optimize principles of value to governance (like privacy and safety of the

[8] https://www.meity.gov.in/divisions/national-e-governance-plan

[9] https://negd.gov.in/e-kranti

[10] https://ourgovdotin.files.wordpress.com/2020/07/kris-gopalakrishnan-committee-report-on-non-personal-data-governance-framework.pdf

data principal) through iterative consultations with relevant stakeholders like data principals, custodians, users and intermediaries.

- **Realize an interoperable digital infrastructure:** Federated and interoperable architectures allow data sets and platforms to engage with each other's functions and insights such that the value of the architecture expands with the input of more data, without compromising the ability to update and improve its layers of functionality. A data architecture that is interoperable not only mandates adherence to strict data and metadata standards, but also creates robust enforcement structures for standards across the data ecosystem. The flow of data within this architecture is further governed by comprehensive consent frameworks, technical safeguards for anonymization and streamlined sharing. This will be a crucial step in *breaking data silos*, especially in the *intra-government data sharing* context.

- **Data skills and data-driven culture:** Skill investments for capacity in data science, analytics, emerging technologies and ethics in data need to be closely coordinated with goals for the burgeoning digital economy. Building human resources for the global data economy will allow the incoming workforce to not only understand the technical aspects of the data lifecycle, but also encourage practical and ethical innovation for data applications. Further, as data-based insights, innovations and products become commonplace to the citizen and the state, a data strategy will allow for an incremental degree of sensitization to be built towards absorbing this potential, thereby *inculcating an enabling data culture*.

- **Security and resilience of the infrastructure on which data relies:** Data's underlying infrastructure is a vital national asset/resource, and hence needs to be protected appropriately from security risks and other potential service disruption. Its safety, security and resilience are of paramount importance– whether data is in transit or when stored in data centers. Robust data security measures would cover areas including, but not limited to, system security, network security, data protection, citizen privacy, application security, and database monitoring. Outlining protocols in case of a data breach or the failure to protect data privacy/restrictions is critical.

Key Opportunities in India's Data Strategy

Digital and data-based innovation holds immense value for all digital economies, but especially for developing countries like India that are navigating a gamut of domestic priorities that value development and innovation, without subscribing to first world principles or absolute restrictions. In the proposed national data strategies, it would be imperative to address the following:

- **Superior quality of data:** Public data collected through government programs and services is currently compromised by outdated data management systems and protocols[11], when evaluated against metrics like *volume, usage, accessibility and complexity*[12]. While these metrics are being acknowledged and written into *data quality assessments*[13], the quality of retrospectively published data still remains compromised. Further, poor enforceability of data and meta-data standards[14] due to a lack of network effects (federated data systems don't yet interoperate), dictates that the quality of public data in terms of its utility cannot be reliably established at the moment. In order to maximize the utility of data and subsequent data-driven applications, updating existing systems and standards to *bolster data accuracy, relevance, reliability and timeliness* is crucial. Addressing the opportunity to overlap public with private data to accrue additional value will require

[11] Public data as accessible through the OGD (Open Government Data, data.gov.in) Portal https://cis-india.org/openness/publications/ogd-report
[12] https://hbr.org/2019/01/which-countries-are-leading-the-data-economy
[13] DGQI (NITI Aayog, March 2021): https://dmeo.gov.in/sites/default/files/2021-03/DGQI_Toolkit.pdf
[14] http://egovstandards.gov.in/metadata-and-data-standard

upholding quality standards to allow data sets from multiple sources to engage mutually through common formats and quality metrics.

Suggested Key Action

- Enforcement of data and meta-data standards across all ministries/departments/ agencies of the government.
- Development of 'Government Data Quality Framework' and identify areas of convergence with the Data Governance Quality Index(DGQI) of NITI Aayog as appropriate
- Facilitate mechanism of safely sharing open data with data.gov.in by government entities through necessary checks for regularity and interoperability
- Creating incentive mechanisms to improve contribution to the open data ecosystem

- **Towards a federated, interoperable data infrastructure**: Initiatives like the Open Government Data Platform (data.gov.in) and its affiliated chapters (smartcities.data.gov.in, and other State-based chapters), emerging initiatives like IUDX (India Urban Data Exchange) by MoHUA and NDAP (National Data Analytics Platform) represent critical first-steps in the direction of opening up public data for insight, innovation and research. However, a fragmented approach to designing specific platforms or channels of access for specific stakeholders undermines the role of the data custodian as the single source of truth for the data and burdens their capacity to build robust pathways to supply data. Addressing this opportunity by creating holistic data stores with diverse functionalities (and collaborative computing platforms that further enable convenience and innovation) will allow us to optimize processes and systems more comprehensively.

Suggested Key Action

- ➔ Bestow sector-specific ownership to data custodians to determine enabling frameworks and standards that can determine cross-sectoral collaboration.
- ➔ Sector-specific data exchanges should culminate in a unified national data exchange, enabling collaboration and innovation while ensuring data custodians are responsible for their individual data governance.

- **Building the capacity of data custodians** to share high-value public data for innovation and research is significantly compromised by lack of consensus on data management and sharing practices. Cultivating *dedicated capacity within the government to create and manage long-term solution frameworks around data quality will allow for more comprehensive and efficient uses of data.* Further, creating data value chains for the purposes of different technologies (for instance, AI) requires specific skills and human resources that need to be harnessed to actualize that technology's value add, its potential use cases atop given data, and the scope of processing data for the same.

Suggested Key Action

- ➔ Creation of a National Data Office under MeitY, similar to the digital mission to determine data collection, access and transformations across government.

- ➔ Ensure availability and training of Chief Data Officers in each ministry/department/agency/ MMP and inject necessary personnel for data transformation to fast-track the release of High Value Data
- ➔ Implement a standardized data request mechanism and automate channels of response with associated TATs to center requirements of the data consumers

- **Proactive governance:** Existing policies like the NDSAP (DST, 2012), Health Data Management Policy (NDHM, 2020) and legislative proposals like the PDP (MeitY, 2018) and the Report of the Committee on Non- Personal Data (MeitY, 2020) provide useful precedent for data governance but not for safety, privacy, and security as they fail to establish fundamental goals for the treatment of data (for example, privacy maximization vs. economic value maximization) beyond a commodity. Addressing the design of a data regime through consultation is necessary to bridge disparate pieces of public and private data governance. Such an overarching strategy, especially when contextualized to data-based application through the deployment of emerging technologies will be crucial in priming protections against myriad use cases. This can also proactively *mitigate the avoidable disparity between digital haves and have-nots*.

Suggested Key Action

- ➔ Assimilation of multiple policies under a National Data Office to eliminate overlapping jurisdiction and avoid creation/delineate jurisdiction of multiple authorities.
- ➔ Adoption of robust consultation process with diverse stakeholders (including policymakers, public officials, technical experts, industry leaders, R&D community and start-up ecosystem)
- ➔ Fair treatment of data (viz. privacy maximization vs. economic value maximization) keeping in view the goal of national development (enabling innovation and creation of unicorns).

- **Increasing access to high value data:** Democratic access to data is challenged when data is accessible through reserved access channels, crippling the potential for innovation.[15] Data sharing through license agreements and platform-based sharing of open data remain heterogeneously-organized activities that are undertaken at the discretion of various public data custodians. Multiple points of access and opaque data request features result in research, innovation and public service actors resorting to independent and ad-hoc access channels for their data needs. This is further constrained by the lack of sensitization to quality metrics of data, its potential uses, and lack of investments in improving its quality through technical and operational means. Creating streamlined access channels around data will allow greater engagement and innovation with the same. The government data could be categorized in three groups:
  - Data to which unhindered access could be provided
  - Data which could be shared with streamlined approval process
  - Data, which can't be provided on account of privacy and security concerns.

  Every ministry/department/agency should declare and publish a list of data falling in above mentioned categories through necessary legislation.

[15] https://the-ken.com/story/answers-to-indias-covid-questions-are-hiding-in-governments-reluctant-servers/&sa=D&source=editors&ust=1623153173179000&usg=AOvVaw0kQDrQUC55lb3IXa_NwEzX

Suggested Key Action

- ➔ Creation of frameworks for sharing data with private sector (G2B) and research community (G2C)
- ➔ Create standardized data request handling mechanism for G2G (intragovernmental) purposes to reduce ad-hoc measures and administrative burden
- ➔ Creation of a framework for the identification of what constitutes High Value Data
- ➔ Identification of datasets of various ministries/departments/agencies by the National Data Office whose sharing can be fast-tracked along with required controls.
- ➔ Map high value data sets (HVDs) and applications of emerging technologies with relevant use cases as inspired by the UK model (Annexure-2).

- **Legislative Framework rather than Guidelines:** To ensure data strategy gets implemented, the same needs to be made part of legislation rather than guidelines. In the absence of legally binding frameworks (especially those catering to data and the associated emerging technologies), government policies and guidelines have proven to be ineffective in incentivizing responsible or efficient data sharing and governance. An Open Data law should constitute extensive procedural norms for data identification and selection, as well as a framework that creates incentives for performance and accountability for non-compliance. A robust Data Protection Authority (DPA) will support the implementation of the national data strategy by not only sensitizing citizens to their digital rights, but will also force non-compliant or hesitant public and private organizations to break the data silos and build necessary internal capacity.

Suggested Key Action

- ➔ Create needs assessment to understand the current challenges in the innovation ecosystem with the provisions of NDSAP
- ➔ Propose NDSAP 2.0 that moves the narrative from purely accountability and extends it to data based innovation to ensure better data quality and incentives for sharing for spurring the economy.

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Annexure I

UK - National Data Strategy (NDS)

Target Groups	Public Sector, Private Sector and Third Sector
Overall strategy	5 mission areas: 1) Unlocking value across economy 2) Maintaining a pro-growth and trusted data regime 3) Transforming gov's use of data 4) Ensuring security and resilience of data infra 5) Championing the international flow of data 4 pillars: 1) Foundation (format, technical infra) 2) Skills (leveraging data for innovation) 3) Availability (accessible, mobile, re-usable) 4) Responsibility
Values and Principles	- Pro-growth and encourages cross border flow of data - Focusing on government capacity for unlocking data value and building capacity for 'data skills' therein - Special focus on environmental sustainability
Open Government Data	'Open Data: unleashing the potential' paper launched the philosophy of 'Open by Default' for public sector data opendata.gov.uk
Governance and Policy	- *Data Protection Act 2018* and GDPR - *Digital Economy Act 2017* - *Data Ethics Framework*
Office set up	The NDS was developed under the Ministry of Culture, part of Cabinet Access. Aims to recruit senior cross-government data leadership, including a Chief Data Officer for government. This is built on findings of a GDS survey on technology innovation in government survey to identify challenges and bottlenecks
Emerging Tech Focus	Published a government innovation and emerging technology network databases of projects that leverage data for innovative public
International Efforts	- The NDS aims to support the global effort on data interoperability and will advocate to remove unnecessary barriers to cross border data flows via WTO, G7, G20 and OECD. - Data Governance Working Group under the GPAI to explore approaches to international data access and sharing

USA - Federal Data Strategy (FDS)

Target Groups	Public Sector (Intended for Federal Government Agencies)
Overall strategy	10 Principles across 40 Practices with yearly Action Plans Building a Culture that Values Data and Promotes Public Use - open data, interoperability, sensitization, accountability Governing, Managing, and Protecting Data - capacity, HVD, inventory, standards, intra-gov sharing

	Promoting Efficient and Appropriate Data Use - upskill, DSA, access and liabilities, infra-hosting and sharing
Values and Principles	- Ethical Governance - Conscious Design - Learning Culture
Open Government Data	OPEN (Open, Public, Electronic, and Necessary) Government Data Act makes a requirement in statute, rather than a policy. This has also led to a collection of code, tools and case studies for the creation of data consolidation platforms data.gov
Governance and Policy	- *Digital Accountability and Transparency (DATA) Act of 2014* - *Grant Reporting Efficiency and Agreements Transparency (GREAT) Act* - *Evidence-Based Policymaking Act of 2018 (Evidence Act)* - *The US doesn't (yet) have a federal-level general consumer data privacy law, but the **U.S. Privacy Act** and the **California Consumer Privacy Act (CCPA)** act as the model*
Office set up	- Chief Data Officer Council in the Office of Management and Budget (OMB) - Government Accountability Office (GAO) - Each agency designates a senior employee as Chief Data Officer, Evaluation Officer, Statistical Official
Emerging Tech Focus	Pilot demonstration of how access to data useful for AI should be enhanced. Implementation of the Executive Order on Maintaining American Leadership in Artificial Intelligence (AI)

Estonia - Digital Agenda 2020

Target Groups	Public Sector and Private Sector
Overall strategy	Promotes the use of ICT in the context of information society-- eGovernment 5 measures 1) ICT for economic growth, dev, well being 2) Skilling for ICT 3) Smarter governance and public administration 4) Greater awareness about initiatives externally Specific initiatives: - Data embassies – servers outside the country are digital copies of key databases that can be accessed in the event of a major data incident in the country thereby protecting its digital lifeblood - Leveraging data analytics for better governance
Values and Principles	Individual ownership of personal data Collect 'Only Once' Philosophy
Technical Infrastructure	- X-Road, the data management backbone for a decentralized linked government data infrastructure, where private sector can access public data as well - Promoting the use and opening up of information gateways (i.e., state portal eesti.ee, open data portal, etc.) for third parties, including internationally, for easy and secure access to data and information
Governance and Policy	*GDPR* ● *Digital Signatures Act*

	• *Archives Act* • *Population Register Act* • *Identity Documents Act* • *Personal Data Protection Act* • *Information Society Services Act* • *Electronic Communications Act* • *Databases Act*
Office set up	- Chief Data Officer - Data Protection Inspectorate
Emerging Tech Focus	- Estonian Catalogue of Public Sector Information Systems - Open-Source Ai Components - National Artificial Intelligence Strategy

Singapore - eGovernance strategy (Singapore Smart Nation)

Overall strategy	Integrated Data Management Framework (IDMF) 4 key thrusts 1) Architecture 2) Infrastructure 3) Education 4) Use Cases Wherein SSOTs (designated official sources of certain data points) and TCs (trusted centers who aggregate data across sources-- like all geospatial data, or all census data etc.) have been designated.
Technical Architecture	- data.gov.sg - Whole of government analytics platform - APEX - a self-service API platform that acts as a centralized and secure API gateway for the Government. On APEX, users can easily publish, secure, monitor, and discover APIs.
Governance and Policy	PDPA (Data Protection Law) Trusted Data Sharing Framework - IMDA has released this Framework to guide organizations through the data sharing journey and outline key considerations for organizations to take into account when planning data partnerships. Public Sector Governance Framework (2018) - helped regulate intra-governmental data sharing and preventing misuse
Office set up	GDO (Government Data Office) set up to implement the data strategy by 2023 - Chief Data Officers (CDOs) Government Technology Agency - GovTech - Smart Nation and Digital Governance Office (SNDGO) - Data Science & Artificial Intelligence Division (DSAID) - Along with SNDGO, it's building a centralized digital systems and infrastructure to offer scaled data capabilities among CDOs.[16]
Emerging Tech	National AI Strategy (2019) - The strategy identifies five national AI projects including

[16] https://www.csc.gov.sg/articles/bring-data-in-the-heart-of-digital-government

Focus	transport and logistics, smart cities and estates, healthcare, education, and safety and security Build capacity of Data Science & Artificial Intelligence Division (DSAID) - Under GovTech AI Singapore (AISG) - a national AI program supported by the National Research foundation (NRF) to build AI capabilities, ecosystems and grow local talent. SGInnovate - a govt owned company which invests and develops Deep Tech start ups National AI Office - to facilitate commercialization of AI research and strengthen PPPs.

China -

Target Groups	Public and Private Sector
Overall strategy	China aims to promote technology, service, and data convergence ('three-convergence') to enable cross-layer, cross-region, cross-system, cross-department, and cross-service ('five-cross') collaboration management and service.[17] The PIPL does not establish an independent data protection authority (DPA) and Cyberspace Administration of China (CAC) is the enforcer while also being a policymaker. No dedicated data integration policies
Technical Architecture	https://data.sh.gov.cn/ - Open Data Portals of Shanghai and Beijing
Values and Principles	Data Security and Localization Restricted Flow of Data across Borders Strong regulatory hold on private firms (data minimization and security)
Governance and Policy	PRC Cybersecurity Law 2017 *Personal Information Protection Law (PIPL)* *China Open Science and Open Data Mandate* *Data Security Law (DSL)*[18]
Office Set up	Cyberspace Administration of China (CAC) - Policymaker and enforcer of PIPL- *A relatively new agency seeking to assert its authority over cybersecurity and informatization (i.e. digital economy and the ICT industry), CAC draws its authority from its status as the office of a Xi-led Leading Small Group.* National Bureau of Statistics China Ministry of Industry and Information Technology - *major developer and manager of digital strategies and plans, MIIT has significant mandates to regulate ICT sector industrial policy.*
PPPs	China Artificial Intelligence Industry Development Alliance
Emerging Tech Focus	Law of the People's Republic of China on Promoting the Transformation of Scientific and Technological Achievements (2015 amended) New Generation Artificial Intelligence Development Plan

Australia -

[17] https://e.huawei.com/in/publications/global/ict_insights/201806041630/ecosystem/201808170840

[18] Among other provisions, DSL and PIPL impose a new requirement that, if a judicial or enforcement agency outside of China requests data stored in China — either personal data or non-personal data — companies must first obtain the approval of the Chinese government before transferring the data, or face potential penalties. Source

Target Groups	Public Sector, Private Sector
Overall strategy	Data Sharing and Release Legislative Reforms: acts as a quasi-data access and protection initiative, to promote better sharing of public sector data and build trust in public data use. Australian Data Strategy[19]: The Data Strategy will explore the contribution of data to the digital economy, identify the Government's use of data in delivering its functions and set out how the Government will manage data as a critical asset. It will also strengthen consumer's rights and collate a Digital Atlas to segment Australian demographic indicators by geography.
Values and Principles	- Strengthen consumers' data rights - Improve government accountability, policy, research and public service delivery - Foundational Four Guide[20] - Five Safes Framework (forms the basis of Australia's give data-sharing "Principles": Projects, People, Settings, Data, Output)[21]
Technical Architecture	data.gov.au - beta product (open government and private data repository)
Governance and Policy	Digital Economy Strategy Data Integration Partnership for Australia Data Strategy (2021-2026)
Office set up	- Office of the National Data Commissioner (ONDC) (established to improve data sharing across Australia's public sector) - National Data Commissioner - National Data Advisory Council - Standards Australia (an independent, non-government standards organization of Australia) - Department of Prime Minister and Cabinet: Directly lead initiatives (policy, implementation and technical tool development) to enable sharing and use of Public Data.
Emerging Tech Focus	Human Rights and Technology Discussion Paper

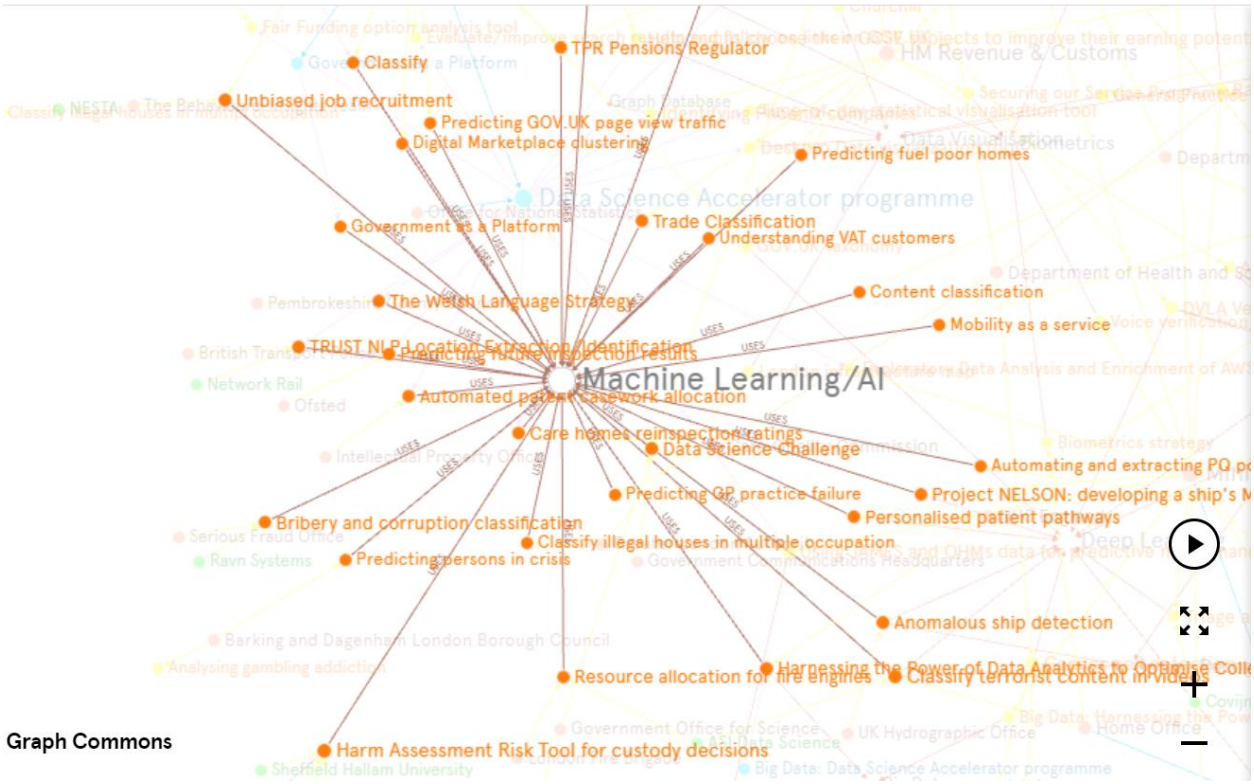
Annexure-2

[19] The Australian government will propose this strategy by the end of 2021

[20] https://www.datacommissioner.gov.au/sites/default/files/2020-06/foundational-four.pdf

[21] https://pmc.gov.au/sites/default/files/publications/data-sharing-principles-best-practice-guide-15-mar-2019.pdf

[Innovation Map – Graph Commons]



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