



RJIL/TRAI/2022-23/316

4th November 2022

To,

Advisor (QoS)

Telecom Regulatory Authority of India

Mahanagar Doorsanchar Bhawan

Jawaharlal Nehru Marg, New Delhi - 110002

Subject: RJIL's Comments on TRAI's Consultation Paper dated 05.08.2022 on "Leveraging Artificial Intelligence and Big Data in Telecommunication Sector"

Dear Sir,

Please find enclosed the comments of Reliance Jio Infocomm Limited on the consultation paper dated 05.08.2022 on "Leveraging Artificial Intelligence and Big Data in Telecommunication Sector".

Thanking you,

Yours Sincerely,

For **Reliance Jio Infocomm Limited**

Kapoor Singh Guliani

Authorized Signatory

Enclosure: As above

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Reliance Jio Infocomm Limited's Comments on 'Leveraging Artificial Intelligence and Big Data in Telecommunication Sector'

At the outset, we thank TRAI for coming out with timely Consultation Paper on 'Leveraging Artificial Intelligence and Big Data in Telecommunication Sector' ('CP'). We note that in last few years, multiple departments, viz. MeitY, NITI Aayog and DoT have come out with papers on various facets related to AI and BD and we have submitted our inputs on most of them.

We note the Personal Data Protection Bill ('PDP Bill') has been withdrawn by the Government and a new comprehensive bill is likely to be introduced in due course of time. We believe that PDP Bill will form the bedrock of development of an effective data economy for our country by ensuring security of personal data by the data fiduciary and instilling confidence in the data principal.

Without an effective PDP Bill, it will be difficult to formulate any Non-Personal Data ('NPD') Governance Framework. NPD is critical for unlocking the potential of AI for upliftment of quality of life of citizens in the country.

Hence, we submit and stress that before we frame any regulation related to AI and BD in the country, it is imperative that a comprehensive PDP Bill and NPD Governance Framework is put in place to strike balance between harnessing potential of AI & BD and protecting interest of a data principal. Accordingly, we request and suggest the Authority should also allow for formulation of PDP Bill and NPD framework before assessing the need and scope of possible recommendations on leveraging AI and Big Data in Telecommunication sector.

Please find below our inputs on questions posed in CP after the Overview section.

Overview

1. While on a sectoral level, it is worthwhile to note that Telecom sector has inbuilt Data Privacy mechanism as part of Unified License terms and conditions, we are supportive of operationalizing an evolvable regulatory, institutional, and technology design/framework for secure data sharing that will empower individuals with control over their personal data. We believe that there is a need to adopt a nuanced approach which unlocks the immense potential of data for social/public/economic betterment of individuals but ensures that the agreed data sharing framework does not dilute or compromise the security of such shared data; it should uphold the protections afforded by PDP Bill. **Only such a balanced data sharing framework can lead to development of a responsible AI and BD ecosystem.**
2. AI is expected to have a positive impact across sectors of social and economic life, including employment, transportation, education, finance, healthcare, personal security and manufacturing. But at the same time, AI applications could pose concerns related to privacy, individual rights, autonomy, and civil liberties that must be carefully assessed and appropriately addressed. Its continued adoption and acceptance will depend significantly on public trust and validation. Hence it is important that reliable, robust, and responsible AI applications should be promoted, which will contribute to public trust in AI.
3. **Given the early stage of AI technology maturity and deployment into products and services for consumers, our view is that it is premature to prescribe or enact legislation, which could stifle innovation.** Although it is important that AI policy and regulatory framework should promote

reliable, robust, and responsible AI applications, which will contribute to public trust in AI. Hence, we submit that Authorities should consider a light touch risk-based regulatory approach for AI / BD applications, once **a comprehensive PDP Bill and NPD Governance Framework is put in place.**

4. **The character, intensity and timing of regulatory intervention should be a function of the type of risk created by an AI system.** We submit that the risk across use cases and contexts vary and evolve over time; and one-size-fits-all approach is not sustainable. A risk-based approach will avoid unnecessarily precautionary approaches to regulation that could unjustifiably inhibit innovation.
5. Developers and deployers of AI, more specifically under the telecom sector, are already subject to relevant licensing conditions and regulations, viz. consumer protection rules, data protection rules, cyber-security rules and competition rules along with provisions providing for protection of fundamental rights, viz. non-discrimination and privacy. **We therefore believe that most of the possible concerns or risk areas would be effectively addressed particularly for telecom sector.**
6. **We therefore submit that there is no need for creation of a specific AI regulator** and recommend that all existing regulators should consider and respond to the regulatory requirements and impact of the growing use of AI in the fields, for which they have responsibility. Although an advisory body should be formed which can advise the sector regulators in ensuring adoption of Principles of Responsible AI by high-risk AI developers. **We suggest only upon formation of such advisory body and development of mentioned Principles, should the Authority consider releasing any recommendation on leveraging AI and Big Data in telecommunication sector.** Details have been provided in our inputs in subsequent sections.

Q1. What may be the most appropriate definition of Artificial Intelligence (AI)? What are the broad requirements to develop and deploy AI models in a telecom sector? Whether any major challenges are faced by the telecom service providers in adopting AI? Please justify your response with rationale and global practices, if any.

1. We observe the rapid growth of AI and its increasing application by industry to replicate the cognitive and decision-making process of humans. Hence, we are aligned with the definition of AI as provided by NITI Aayog which defines AI as a constellation of technologies that enables machines to act with higher levels of intelligence and emulate the human capabilities of sense, comprehend and act.
2. But at the same time, we believe that all the prevailing definitions of AI, whether of entities like ETSI, ISO/IEC or scientist such as John McCarthy, Alan Turing, and Marvin Minsky cover key aspects of AI and are hence acknowledge and accept the same.
3. **We believe that the challenges with adoption of AI for any sector remains the same, viz. privacy violations, discrimination and biased results among others and there is nothing significantly specific to telecom sector.** Rather, with current regulatory and licensing oversight, the risks are minimal for telecom sector. In fact, **in absence of any comprehensive PDP Bill in the country and bound by obligations under Unified License, TSPs cannot share the personal data of data principal for AI and BD purposes with third party, unless they have the consent for the same in place.** Also, they are bound by purpose limitation for the usage of the personal data collected

from the users, which we believe is the `biggest roadblock for roll out of AI/BD in the country in absence of suitable PDP Bill.

4. In addition, some of the common challenges that most companies face when trying to implement AI, include limited AI expertise and knowledge, access to quality data, and AI specific infrastructure. Besides that, we agree with other sector agnostic risks/challenges mentioned in the CP related to use of data for AI/BD, i.e. data biases, data poisoning, among others and that related to models i.e. model biases, model extraction, among others. **However, we submit that all these issues can be addressed by PDP Bill and associated regulatory framework.**

Q2. Whether the big data in the telecom sector may be utilised for developing AI models? For efficient and effective handling of big data, whether there is a need for adoption of special programming models or software frameworks? Please justify your response with suitable examples and global practices, if any.

1. Telecom sector has access to large amounts of data sources including customer profiles, device data, call detail records, network data, customer usage patterns, location data, among others. These data when combined can become the Big Data. There is no doubt that these data can be utilized for developing AI models. Select case studies given in the CP establish the same, viz. Big Signalling Data, Big Location Data and Network Management.
2. We submit that development of suitable programming models or software frameworks for handling of big data can be accomplished by the industry with requisite regulatory support from Authority in form of regulatory sandbox, etc. but before that it is critical that the telecom sector is allowed under the prevalent regulations to create and use such BD for development of AI models without any additional restrictions, as long as such light tough regulatory requirements are duly complied with.

Q3. Whether deployment of 5G and beyond technologies will help to accelerate adoption of AI in all the sectors and vice versa? Please justify your response with suitable illustrations including global practices, if any.

1. The high bandwidth, massive connectivity, and low latency capabilities of 5G will drive the development of IoT services by connecting massive devices. These interconnected devices will generate large amount of data to be used for training and modelling AI. 5G will also allow AI processing to be distributed among the device, edge cloud, and central cloud, enabling flexible system solutions for a variety of new and enhanced experiences
2. We agree that AI and 5G will work synergistically. This means AI advancement will work towards improving 5G systems performance and efficiency while expansion of 5G will drive distributed intelligence through connected devices.

Q4. Do you think that a number of terminologies such as Trustworthy AI, Responsible AI, Explainable AI etc. have evolved to describe various aspects of AI but they overlap and do not have any

standardised meanings? If yes, whether there is a need to define or harmonise these terms? Please justify your response with rationale and global practices, if any.

1. We agree that there should be a uniform and standardised meaning for terms being used for AI and they should be capable of instilling trust in users. We have submitted our inputs on NITI Aayog's 'Working Document Towards Responsible #AIforAll' ('**Working Document**') released in July 2020. This Working Document invited comments from stakeholders on principles which should drive the regulatory approach for development of Responsible AI environment in the country.
2. We submit that there is a need to balance ethical considerations of AI with need for innovation. This can be achieved through evolution of a 'Responsible AI', as defined in the Working Document, which can contribute to achieving a fair society, by helping to increase citizens' well-being in ways that foster equality in the distribution of economic, social and political opportunity.
3. We submit that the regulatory approach for development of a Responsible AI environment in India should be driven by following Principles ('**Principles**'), details of which are available in our submission to NITI Aayog on Working Document. Such Principles should be developed by a non-statutory expert Multi-Stakeholder Body ('**MSB**'), having varied representation, after due consultation with the industry stakeholders.
 - a. Principle of Safety, Reliability and Robustness
 - b. Principle of Non-Discrimination, Equality and Inclusivity
 - c. Principle of Privacy and Security
 - d. Principle of Transparency, Explainability, Accountability and Communication
 - e. Principle of Protection of Human Values, Human Centricity and Human Oversight

Q5. Which are the applications of AI and BD already being used by the TSPs in their networks to improve Quality of Service, Traffic Management, Spectrum Management and for Security purposes? Please list out all such applications along with the level of maturity of such applications. Please specify whether they are at trial stage or pilot stage or have reached the deployment stage? Details should include type of AI models, methods to access data, and procedures to ensure quality of data.

1. AI has utility for companies, across sectors, for better analysis and gaining new insights to improve sales of new products, operational efficiency, customer satisfaction. Telecom sector has been no exception, which has been using AI for improvement of network performance while ensuring optimum utilization of resources to improve customer experience. There are vast opportunities of AI in improving QoS, spectrum management, security, customer services, broadcasting among other in the telecom sector.
2. AI with advanced analytics already plays significant role globally in reducing network Capex, MTTR and poor QoE for VoLTE subscribers. It also plays significant role in predicting hardware failures prior to customer impact. The adoption of AI has improved network reliability and customer experience, optimized cost of operations, and much more.
3. Domain wise few applications of AI in telecom sector, among others, are as follows:
 - a. In the Network domain, AI is being used in self-driving network with self-configuration, self-monitoring and self-diagnosis function. AI is also being used for expansion of fibre optic network. It is also being used for network fault prediction and self-healing.

- b. AI is used in network design in which it focuses on identifying ideal site locations and defining the parameters for the cells of the site and cells in its neighbours for network deployment. AI supports network design process which result into better predictions in prioritising sites for network upgrades.
 - c. In the Services domain, it can be used for rolling our smart home solutions, which includes home automation systems. While the ecosystem can be made ready for the same, there is a need for establishing customer demand. Such services are well established and expected in developed countries, but we need to establish a value for money for users in our country for the customer to realise the tangible benefit from such smart home solution.
 - d. In the Industries domain, while few solutions like smart city have been successfully rolled out and is in early stage of adoption for pilot towns in the country, other solutions like smart agriculture solutions, smart transportation service and smart medical image processing is still in testing stage and may take some more time before effective mass rollout.
4. We submit that AI is being used by companies across multiple sectors at present, and use non-personal or aggregate data, without any concerns or potential risks.

Q6. What are the major challenges faced by the telecom industry, including policy and regulatory, in developing, deploying, and scaling applications of AI listed in the response to Q.5? How can such challenges be overcome? Please justify your response with rationale and suitable examples, if any.

- 1. We submit that AI is still at the nascent development stage and is expected to have a positive impact across sectors of social and economic life, including employment, transportation, education, finance, healthcare, personal security and manufacturing. Its continued adoption and acceptance will depend significantly on public trust and validation. Hence it is important that AI policy and regulatory framework should promote reliable, robust, and responsible AI applications, which will contribute to public trust in AI.
- 2. **Such regulatory oversight involving a comprehensive PDP Bill, NPD governance framework, and the proposed AI Oversight Advisory Body will lay guidelines for a Responsible AI in the country. This can be supplemented with, if required based on assessment at that point of time, sectoral regulations to address the newer challenges posed by adoption of AI in the sector, among others.**
- 3. As aptly mentioned in the CP, AI has the potential to bring together behavioural and conventional system-sourced data, location tracking, social media monitoring and other sources, to contextualise and personalise customer experience in the real and online domains. These technologies can assist deployers to develop empathetic marketing and target customers more precisely with personalised offers and services, creating new sales opportunities, while ensuring privacy and confidentiality of customer data.

Q7. In which areas of other sectors including broadcasting, existing and future capabilities of the telecom networks can be used to leverage AI and BD? Please justify your response with rationale and suitable examples if any.

1. The telecommunications industry generates and stores tremendous amount of data in terms of call data records, network data, customer profile, customer usage pattern and location data. We understand that the data which is available or might be available with the TSPs may be quite useful to provide insights to other sectors to carry out their forecasts, planning, designs, operations and maintenance.
2. Pandemic has been the most noble case in which telecom network has been used for containing the spread of the disease. For covid control, user call history data through CDR and geo-tagging data (GIS) were used to identify potential carriers, hotspots with high mobility helped identify the reverse migration of people. Additionally active locations from Applications and Bluetooth based proximity data from handset was also used to identify covid-19 infected persons and perform contact tracing.
3. Data from IoT devices, duly connected with service and application providers can be analysed to predict and implement the necessary operations. The IoT devices so connected, will provide the necessary data to the telecom network at the edge where the model can be trained and executed. Based on the outcomes of the models, IoT devices may be managed intelligently to achieve the desired results. Telecom network deployed for connecting various IoT devices/sensors may use a combination of edge computing and federated learning to train models. In such cases telecom networks may provide an execution environment in leveraging AI/ML in various other sectors, which can be one of the most important contributions of telecom for leveraging AI/BD.

Q8. Whether risks and concerns such as privacy, security, bias, unethical use of AI etc. are restricting or likely to restrict the adoption of AI? List out all such risks and concerns associated with the adoption of AI. Please justify your response with rationale and suitable examples, if any.

1. AI system can suffer from bias due to multiple factors, viz. bias in the way in which AI systems are developed including cognitive bias (e.g. the way in which the programming code of an algorithm is written) and bias in data sets used by AI systems (both for training and operation). Such biases can lead to direct and indirect discrimination for the users and resultant harm. Incorrect decisions can lead to exclusion of service/ benefits for the users.
2. As AI systems are increasingly relied upon for decision making that has significant consequences for a large section of population, calls for explaining the decision-making process will gain momentum; absence of which can lead to erosion of trust among consumers. Situation is likely to become more complicated with advancement of Deep Learning systems and consequent Black Box phenomenon, where only the input data and results are the known factors in whole decision making by AI; although they are likely to help increase accuracy and hence trade off should be considered between explainability and accuracy, depending on potential harm that can be caused by the select AI system.
3. An idea that every human being possesses an 'intrinsic worth', which should never be diminished, compromised or repressed by any individual or any technology needs to be recognized. AI systems

should be human-centric, resting on a commitment of their use for common good, with the goal of improving the living standards for people; hence ensuring ethical use of AI.

- 4. If there is a lack of overarching regulation it enforces data fiduciaries to enforce privacy by design while processing or sharing the personal data of data fiduciaries for AI/BD purposes. Data fiduciaries employing AI systems need to be bound to take necessary precaution for data security of the data collected after due consent from the consumer. AI systems need to ensure privacy and data protection throughout a system's entire lifecycle and the integrity of the data needs to be maintained through all stages of AI system, viz. planning, training, testing and deployment.**

Q9. What measures are suggested to be taken to address the risks and concerns listed in response to Q.8? Which are the areas where regulatory interventions may help to address these risks and concerns? Please justify your response with rationale and suitable examples, if any.

1. It would not be prudent to deliberate upon the need of regulatory interventions required at present, when the AI solutions are at nascent stage and data protection framework including the PDP Bill and associated framework is yet to be developed.
2. On principle level, the data used to train AI systems should be as inclusive as possible, representing different population groups. Ensuring equality in AI system's output will also require adequate respect for potentially vulnerable persons and groups in the society.
3. Data quality should be maintained to minimize any resultant bias. Input data should be evaluated on following parameters to ensure that the AI output is non-discriminatory:
 - a. accuracy of the dataset
 - b. completeness of the dataset
 - c. veracity of the dataset, which refers to how credible the data is
 - d. relevance of the dataset and the context for data collection
 - e. integrity of the dataset that has been joined from multiple datasets
4. The machine learning algorithms of tomorrow should have the built-in capability to explain their logic, enumerate their strengths and weaknesses and specify an understanding of their future behaviour. 'Explainability' is achieved by explaining how deployed AI model's algorithms function and/or how the decision-making process incorporates model predictions. It concerns both the technical processes of an AI system and the related human decisions. However, explainability should not aim towards opening of code or technical disclosure by the organization; this is critical for Black Box in AI systems.
5. The data sets and the processes that yield the AI system's decision, including those of data gathering and data labelling as well as the algorithms used, should be documented to the best possible standard to allow for traceability and an increase in transparency. This also applies to the decisions made by the AI system. This enables identification of the reasons why an AI-decision was erroneous which, in turn, could help prevent future mistakes. Traceability facilitates auditability as well as explainability.

6. AI systems must be designed to facilitate end-to-end accountability and auditability. This requires both responsible humans-in-the-loop across the entire design and implementation chain as well as activity monitoring protocols that enable end-to-end oversight and review. Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes, both before and after their implementation.
7. The objective of a Responsible AI can only be achieved by ensuring an appropriate involvement by human and human controlled systems and processes beings in relation to high-risk AI applications. Human oversight helps ensuring that an AI system does not undermine human autonomy or causes other adverse effect. Depending on the specific AI-based system and its application area, the appropriate degrees of human oversight and control measures, including the adaptability, accuracy and explainability of AI-based systems, should be ensured.
8. Data is important for AI applications, and the variety of enriched data will aid applications of AI. However, privacy is one of the concerns. To make data more secure, various encryption and anonymisation techniques may be adopted by the experts. However, this may limit the data usage for the AI modelling. Therefore, it is a difficult task to ensure efficient utilisation of data in AI modelling and ensure security of the data at the same time. Thus, further research may be required to address such concerns.
9. PDP Bill should act as an overarching data protection regulation for all sectors implementing AI systems, which may be supplemented by additional sectoral regulations on need and assessment basis. Data fiduciaries employing AI systems will be bound to take necessary precaution for data security of the data collected after due consent from the consumer. Organizations should also integrate safety and security-by-design mechanisms for the AI systems deployed by them.
10. AI systems should be secure and protected against vulnerabilities that can allow them to be exploited by adversaries, e.g. hacking. Attacks may target the data (data poisoning), the model (model leakage) or the underlying infrastructure, both software and hardware. Steps should be taken to mitigate the same. AI systems should integrate safety and security-by-design mechanisms to ensure that they are verifiably safe at every step. AI systems should have safeguards that enable a fallback plan in case of problems. This can mean that AI systems switch from a statistical to rule-based procedure, or that they ask for a human operator before continuing their action.

Q10. What measures do you suggest to instil trust and confidence regarding a robust and safe AI system among customers, TSPs and other related entities/stakeholders? Whether adopting general principles such as Responsible AI and ethical principles at the time of designing and operationalising the AI models will help in developing ethical solutions and instilling trust and confidence in the users? What may be such principles and who should formulate these and how compliance can be ensured? Please justify your response with rationale and suitable examples, if any.

1. As mentioned above, we reiterate that the regulatory approach for development of a Responsible AI environment in India should be driven by following Principles ('Principles'), details of which are available in our submission to NITI Aayog on Working Document. A brief of each principle has been reproduced in subsequent points for benefit of the Authority. Such Principles should be developed by a non-statutory expert Multi-Stakeholder Body ('MSB'), having varied representation, after due consultation with the industry stakeholders.

- a. Principle of Safety, Reliability and Robustness
 - b. Principle of Non-Discrimination, Equality and Inclusivity
 - c. Principle of Privacy and Security
 - d. Principle of Transparency, Explainability, Accountability and Communication
 - e. Principle of Protection of Human Values, Human Centricity and Human Oversight
2. AI systems should be secure and protected against vulnerabilities that can allow them to be exploited by adversaries. Reliability is required to ensure that the AI system works properly with a range of inputs and in a range of situations. Robustness refers to the ability of an AI system to cope with errors during execution and erroneous input and is assessed by the degree to which a system or component can function correctly in the presence of invalid input or stressful environmental conditions.
 3. The data used to train AI systems should be as inclusive as possible, representing different population groups. Data quality should be maintained to minimize any resultant bias.
 4. AI systems must ensure privacy and data protection throughout a system's entire lifecycle. The integrity of the data must be maintained through all stages of AI system, viz. planning, training, testing and deployment. The access to data must be adequately governed and controlled.
 5. 'Explainability' is achieved by explaining how deployed AI model's algorithms function and/or how the decision-making process incorporates model predictions. It concerns both the technical processes of an AI system and the related human decisions. Traceability facilitates auditability as well as explainability. Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes, both before and after their implementation.
 6. AI systems should have respect for human dignity; an idea that every human being possesses an 'intrinsic worth', which should never be diminished, compromised or repressed by any individual or any technology.

Q11. Whether there is a need of telecom/ICT sector specific or a common authority or a body or an institution to check and ensure compliance of national level and sector specific requirements for AI? If yes, what should be the composition, roles and responsibilities of such authority or body or institution? Please justify your response with rationale and suitable examples or best practices, if any.

AND

Q12. In response to Q.11, if yes, under which present legal framework or law such authority or body or institution can be constituted and what kind of amendments will be required in the said law? Or whether a new law to handle AI and related technologies is a better option? Please justify your response with rationale and suitable examples or best practices, if any.

AND

Q37. Whether there is a need to prepare and publish a compendium of guidance, toolkits and use cases related to AI and BD, to foster adoption in the telecom sector? If yes, what should be the

process to prepare such a compendium and who should be assigned this task? Please justify your response with rationale and global best practices, if any.

1. Considering the dynamic nature of AI systems characterized by rapid technological change, we submit that it will be preferable to adopt a principle and outcome-based policy approach. Although some sectors have unique considerations that may require sector specific laws for AI; ex: use of AI in administrative decisions by the State would be required to explain the decision-making process.
2. We submit that **a systematic mapping and evaluation of all existing laws should be done that are particularly relevant to AI systems. Such evaluation should consider the extent to which existing laws have the capacity to safeguard against unfair and exploitative practices made possible by AI applications and assign accountability in the AI systems.** We submit that the regulations related to protection of consumer interest and Principles for governance of AI systems should be updated at regular intervals based on emergence of new use cases. The governance structure related to AI should leave the powers and responsibilities of relevant competent authorities in specific sectors unaffected.
3. For AI, at appropriate time as detailed earlier, Authorities should adopt light touch regulatory mechanism and adopt a risk-based approach towards regulation. The character, intensity and timing of regulatory intervention should be a function of the type of risk created by an AI system. Risk for this purpose can broadly be defined to encompass adverse impacts of all kinds, both individual and societal. A risk-based approach will, where appropriate, avoid hazard-based and unnecessarily precautionary approaches to regulation that could unjustifiably inhibit innovation.
4. We submit that the Principles should be framed and maintained by earlier proposed MSB which has varied representation from diverse stakeholders in the AI domain space. It should include representation from industry space, technology experts, legal experts, academia and Authorities.
5. **The MSB should be a non-statutory expert committee of independent members set up to provide advice to government and high-level leadership in the AI ecosystem. It can carry out following activities:**
 - a. Providing an open dialogue and exchange of ideas between industry, academia and government.
 - b. Sharing research and development expertise.
 - c. Horizon-scanning for new AI technologies, applications and their impact.
 - d. **Advising the Authorities and government on its priorities, opportunities and challenges for the responsible adoption of AI for the betterment of society.**
 - e. Advise and assist the sector Authority in designing the mechanism to translate the Principles for Responsible AI into practice
 - f. Assist sector regulators in identifying risks with respect to AI use cases and design policies, benchmarks or ratify standards as applicable.

Q13. Whether telecom/ICT industry is facing constraints such as access to data, lack of computing infrastructure, lack of standards, and R&D in the adoption of AI and BD technologies? Please list out all such constraints with adequate details.

1. We believe that the biggest constraints in adoption of AI and BD include data accessibility, privacy and regulatory obligations. A telecom operator or solution provider or a researcher is likely to have limited or suboptimal solutions due to incomplete or no access of telecom data and a platform for demonstration and experimentation. **In absence of any comprehensive regulation allowing the data fiduciaries to share such data for AI and BD within group, sector as well as across sector in a secure environment, accessibility to telecom data will continue to remain a challenge for all the stakeholders.**
2. An entity, whether private or Government, is bound by obligations to maintain the privacy and security of the data it has in its control and in absence of any clear regulatory framework, it may be reluctant to share the same. In addition, there are strategic business decisions which also act as deterrent for the data fiduciaries in sharing the data.
3. Simultaneously, owing to increasing incidents of security breach, users themselves may be reluctant to share their data owing to concern of privacy which may be compromised while sharing data or insights for AI operations. These concerns may include identification, tracking and profiling of the individuals.
4. To work with data i.e., to perform analysis, computation and mathematical operations, one requires the fundamental relationship and correlations which was removed by encrypting the data. Hence, while encryption is being seen as possible solution for use of data for AI, there is a need to find a solution to this tussle between data protection and loss of data utility.
5. **Upon enactment of PDP Bill, the development of standards for data handling (collection, storage, and integrations etc), data sharing, protection of data, privacy and ethical standards for adoption AI will be facilitated for mass adoption of AI.**

Q14. What measures are required to make data and computing infrastructure available and accessible to developers and also to make data/AI models interoperable and compatible? Please respond along with examples, best practices and explanatory notes.

1. Data is important for AI applications, and the variety of enriched data will aid applications of AI. However, privacy continues to be the primary concern. To make data more secure, various encryption and anonymisation techniques is being discussed and proposed globally by the experts. However, this may limit the data usage for the AI modelling. Therefore, it is a difficult task to ensure efficient utilisation of data in AI modelling and ensure security of the data at the same time.
2. **We submit that the proposed MSB should work towards development of standards for data handling (collection, storage, and integrations etc), standards for interoperability between AI based systems, standards for design, development and deployment of AI systems and a generalised meta-data standard to enable integration of variety of resources, among others.** It should also participate in AI based international standards setting discussions so that India moves along with other countries in development of AI standards. Such standards will help build public trust and confidence use of AI technologies.

Q15. Whether there is a gap between requirement and availability of skilled AI workforce? If so, what measures are required to be taken to ensure availability of adequate skilled workforce in AI domain? Please respond along with suggestions with supporting details and best practices.

1. While there is abundance of data with the entities now with increase in digital literacy in the country, there is a gap between demand and availability of skilled professionals who can leverage the data for AI projects. Still not many higher education institutes are offering specialized courses for AI. The same needs to be developed and provided for by the best technical institutes in the country.
2. There is also a need to address the immediate requirement of professional expertise which need to be sufficed through training of existing workforce through specialized courses. We submit that Government should push the institutes to develop bridge academic courses that teach technical AI skills as a top-up to the existing engineers.

Q16. What initiatives do you suggest to democratise data required to develop AI models in the telecom sector? Please justify your response with rationale and suitable examples, if any.

1. We reiterate that Data Privacy requirements in telecom sector are already in place in the Unified License terms and conditions, will possibly require more clarity and flexibility to democratise the data.
2. We note that globally efforts are being made to develop public open access data bases for AI use. Few prominent ones are listed below. Similar initiatives can be taken by Government in our country.
 - a. In US, The National AI Initiative directs Federal agencies to provide and facilitate the availability of curated, standardised, secure, representative, aggregate, and privacy-protected data sets for AI research and development.
 - b. In UK the policy initiatives focus on exploring and defining a framework for safe, secure and equitable data transfer, developing a data infrastructure to make available high-quality public data in an open, reusable and accessible format for machine learning.
 - c. In Singapore, IMDA has set up free and open-source AI libraries. These libraries contain collections of APIs, source codes, databases and more.
3. While in our country there have been multiple proposals through committee recommendations or otherwise by Government, any concrete step towards building any public open database of Government data for AI purposes is yet to take place. We suggest that any such pioneering step by Government with suitable security protocols and access controls in place will instil confidence in users and allow growth of AI in the country.
4. **Initially sectors which are strategic and economic in nature and are driven by public interest should be selected to create data space for AI by Government at national levels, viz. health, geospatial/transport data space followed by sectors like agriculture, education, skills development and MSMEs support.** Focus on mentioned sectors in first phase will lead to availability of large pools of data in these sectors, combined with development/evolution of technical tools (anonymization, encryption, etc.) and infrastructure necessary to use and exchange data, as well as appropriate governance mechanism. This will instil confidence in stakeholders and help iron out the challenges faced in setting up such data spaces.

Q17. Whether the authority or body or institution as suggested in response to Q.11 may also be entrusted with the task to manage and oversee collection, cataloguing and storage of data? Whether such authority or body or institution need to be entrusted to generate and make available synthetic data? Please justify your response with rationale and suitable examples, if any.

1. We submit that while the above suggested MSB should have the role and responsibility to drafting the guidelines/principles for growth of Responsible AI in the country, the role of gatekeeper for the proposed data spaces should be assigned to an executive body which should govern its role as per standards and guidelines published by the MSB in addition to adherence to the provisions of PDP Bill. Such executive body can be formed under the MSB or under the Data Protection Authority ('DPA') as envisaged in the erstwhile PDP Bill.
2. Such an executive body should be authorised to assess the purpose of such data request and only meeting the criteria, viz. for sovereign, social and economic welfare purposes, may allow the data requester to assess such data space.
3. In addition, such an executive body should be empowered to verify if the data requester has the required means and infrastructure to maintain the security of the shared data; smaller firms may not be well equipped to prevent data breach. Successive stakeholders who use such shared data should be bound by prevalent regulations and be held responsible to maintain the security of shared data. In case the proposed executive body is not confident of the data security mechanism/process of the data requester, it can mandate the data requester to use the data & cloud innovation labs and research centres, established by the suitable Authority, to develop, test and implement new digital solutions.
4. Synthetic data can be an effective supplement or alternative to real data and can be used to train, test, validate new AI system where live data doesn't exist or it is biased. We suggest that the proposed executive body may also be entrusted with the responsibility to generate and make available synthetic data.

Q18. Whether the legal framework as envisaged in para 3.5.3 and Q.12 should also enable and provide for digitalisation, sharing and monetisation for effective use of the data in AI without affecting privacy and security of the data? Please justify your response with rationale and suitable examples, if any.

1. We reiterate that there is a need for enactment of comprehensive PDP Bill before development of any regulation/framework for sharing of the data for AI purposes. This will facilitate **development of a secure environment for processing of data while aggressively pushing for data digitization, sharing and monetization at all fronts.**

Q19.(a). Which are the currently used privacy enhancing and privacy preserving technologies facilitating adoption of AI and BD? Are there any challenges in using these technologies? How these challenges can be addressed?

AND

Q19.(b). Which are the potential technologies likely to be available in near future to further strengthen privacy? Please justify your response with rationale and suitable examples, if any.

AND

Q20. Whether the list of technologies provided in response to Q.19 are adequate to handle all the perceived risks and concerns in the AI domain? Or is there a need to develop new privacy preserving architecture? Please justify your response with rationale and suitable examples, if any.

1. Encryption techniques and algorithms, often used for means to ensure privacy of the personal data, have their limitations as the adoption of these techniques increases processing overheads, delay in output and above all loss of data utility.
2. Data anonymization is being explored globally as a tool for sharing the data for AI purposes. **But anonymization standards need to be established which should specify proportional anonymization efforts depending on the harm potential/risk posed by the underlying personal data. We submit that such anonymization standards should be developed by suitable Department in consultation with the industry.**
3. Enactment of PDP Bill will also allow legal framework under which there will be an option to protect the privacy of data while allowing the players to use data through a defined process and after taking consent of the users prior to using data for such models.
4. We note and agree the other privacy enhancing techniques mentioned in the CP, viz. Differential Privacy, Secure Multi-Party Computation and Homomorphic Encryption, have their defined use cases and limitations and can be used in combination in future as tools for data sharing while maintaining privacy.

Q21. Whether the next generation telecom network architectures such as AI at edge, federated learning, TinyML or their combination can offer solutions to meet both privacy as well as intelligence requirements? Please justify your response with rationale and suitable examples, if any.

1. Yes, we believe that the next generation telecom network architectures will be able to deliver solutions that meet both privacy as well as intelligence requirements. The current telecom laws and license conditions provide sufficient safeguards for data security and we are confident that upcoming PDP Bill will help facilitate data Privacy preserving architectures which enable AI models to continually learn from data without requirement to share the data and thereby significantly allaying the fear of de-anonymisation at any stage gain importance as the world grapples with risk of privacy breach. Learning mechanism which enables AI to learn without gathering data at the central level may serve both purposes, privacy as well as intelligence.
2. Edge AI allows faster computing and insights, better data security, and efficient control over continuous operation. As a result, it can enhance performance of AI enabled applications and keep operating costs down. Similarly, Federated Learning ('FL') holds remarkable promise for future as it is capable of handling privacy issues as data is not transferred or shared to the central server, rather model updates are shared with the central server. Hence learning for AI models can happen over entire telecom data. Edge Computing in combination with FL may resolve the issue of data privacy and security and building trust among users to significant extent.

3. **While we believe that these are next generation architectures have significant potential, a lot more needs to be done in terms of research for mass adoption of these architectures owing to challenges in terms of requirement of efficient communication across the federated network, heterogeneity in the computation and communication capability of devices which are part of the federated network, requirement of standardization of data across distributed devices and low levels of user involvement with just limited fraction of devices operating at any given time among others.** Hence while we are hopeful that these next generation network architectures make significant contribution in future, we understand that a lot of research still needs to be done to make the same happen.

Q22. What type of technological advancements are happening for running the AI models on the end user devices to overcome constraints in respect of processor, memory, battery etc.? Whether special tools, programming languages, and skills are required to be developed to build such AI models? Please justify your response with rationale and suitable examples, if any.

1. We note that the key technological advancements for running the AI models on end user devices have been well covered in the CP. While these are promising and hold potential for future, we believe that a lot needs to be done in terms of research to make these ready for mass adoption by the AI players. We are aligned with the following:
 - a. The key components of the network include data ingestion components, Data Relay Gateway (DRG) which transfers data between the TSP and the domain of the developing organization, achievement of a clear separation of responsibilities, Data Operations (DataOps) environment for feature engineering, environment of Machine Learning Operations (MLOps), Intent Managers (IM) and Network Functions (NF).
 - b. Ownership of the model trained in a federated manner is controlled by the DRG, as it's functionality enforces data transfer according to agreements covering legal and privacy aspects.
 - c. The advancement in AI chips may further support adoption of AI at edge and FL in telecom sectors for handling privacy. AI chips are physically smaller, relatively inexpensive, and use much less power and generate much less heat.
 - d. TinyML is also being envisaged of being capable of performing on-device sensor data analytics at extremely low power, typically in the mW range and below, and hence enabling a variety of always-on use-cases and targeting battery operated devices.

Q23. Considering availability of new privacy preserving architectures as suggested in response to Q.19 and Q.20, what is the likelihood of emergence of new business and operational models? Whether such models will raise issues related to ownership and responsibilities? What do you suggest to address these issues? Please justify your response with rationale and suitable examples, if any.

AND

Q24. Whether the concept of “Operator Platform” would help in providing AI based solutions in a unified and more equitable manner? Apart from popular federated use cases of edge cloud federation, Cloud XR, Cloud Gaming, whether this concept may also be applied for public service delivery and in making public policies that are data-driven? Whether there is a need to take initiatives for developing and demonstrating advantages of concept of “Operator Platform”? If so, what steps and measures are suggested to launch such initiatives? Please justify your response with rationale and suitable examples, if any.

1. While such new privacy preserving techniques are in process of being developed and adopted globally, they are still far from any standardization to allow free transfer and interoperability of the data.
2. We submit that enactment of a comprehensive PDP will delineate the accountability for data fiduciaries and data processors. It will also ensure establishment of primal requirements such a privacy by design process by data fiduciaries, purpose limitation and consent as basis for any data processing.
3. **Once we have a comprehensive PDP Bill in place in the country, subsequent regulations should include NPD framework and anonymization standards among others to set the stage for availability of data spaces for AI model development in the country. Any attempt to aggressively promote new privacy preserving architectures without having a comprehensive PDP regulation in place is likely to lead to significant harm to data principals and we strongly suggest that the same should be avoided.**
4. Our submission remains the same for suggested Operator Platform in the CP. While the proposed concept has significant potential for the future, we believe that the same should be preceded by enactment of a comprehensive PDP Bill in the country.

Q25. Whether there is a need to create AI-specific infrastructure for the purpose of start-ups and enterprises in the telecom sector to develop and run AI models in an optimised manner? Whether such an infrastructure should cover various real-world scenarios such as cloud AI, edge AI and on-device AI? Please justify your response with rationale and suitable examples, if any.

1. We agree that there is a need to create AI specific infrastructure for the purpose of start-ups and enterprises in the telecom sector to develop and run AI models in an optimised manner. While AI players constitute entities in various phase of maturity, many of such AI players at present include the start-ups and smaller firms. These entities may not have the resources to develop the AI models as per the global standards while maintaining the privacy and security of the data.
2. For instance, we suggest that when a framework is developed for data sharing using new privacy preserving techniques, **the relevant Authority should ensure that the data requester should either have the required infrastructure to maintain the security and privacy of shared data or it should be mandated to use the digital infrastructure of the Authority while using such shared data.** The mentioned digital infrastructure may include cloud innovation labs and research centres, established by the Authority, to develop, test and implement new digital solutions. These innovation labs can provide practical physical environments or field validation centres in which AI

developers can develop, test and implement effective digital solutions. This will be especially important for data request in which the underlying data is sensitive personal data in nature.

3. We agree with NITI Aayog's proposal for establishment of India's own AI compute infrastructure, which should be aimed to facilitate and speed up research and solution development for solving India's societal challenges using high performance and high throughput AI-specific supercomputing technologies. Such architecture, with composite compute and storage infrastructure, can allow maintaining large data sets (thus eliminating the need for separate data centres and addressing data integrity concerns), and proximity of computing facilities for efficient processing of data-intensive tasks viz. training of algorithms on large (both number and size) datasets.

Q.26. Whether the emerging trends of development of foundational AI models such as GPT-3, Gopher etc. are leading to democratisation of AI space by offering finetuned or derived AI models? Whether such a trend will also help in reducing costs for the AI developers? Whether similar approach will help in development of large-scale AI model for the telecom sector? Please justify your response with rationale and suitable examples, if any.

1. We believe that availability and development of foundational models reduces the initial groundwork for development of AI models and allow the developers to focus on solving enhanced problem-solving using AI. We agree that the coalescence of foundational models such as BERT, CLIP, the GPTs, Gopher, etc. has democratized access to high-quality, generic architectures. Also, the fine-tuning of foundational models can lead to high performance for downstream tasks. Hence, the same should be encouraged as it is advantageous to train other models on existing powerful models. This will reduce the effort to build models from scratch and thereby reduce cost and time.
2. It also brings some degree of standardisation in AI modelling. Thus, to accelerate adoption of AI in telecom sector, the industry may use the benefits of such models to train their AI models by fine-tuning or deriving from foundational models.

Q27. Whether there is a need to establish experimental campuses where startups, innovators, and researchers can develop or demonstrate technological capabilities, innovative business and operational models? Whether participation of users at the time of design and development is also required for enhancing the chances of success of products or solutions? Whether such a setup will reduce the burden on developers and enable them to focus on their core competence areas? Please justify your response with rationale and suitable examples, if any.

AND

Q28. Whether experiments are required to be backed by regulatory provisions such as regulatory sandbox to protect experimenters from any violation of existing regulations? Whether participation of government entities or authorities during experimentation will help them to learn and identify changes required in the existing regulations or introducing new regulations? Please justify your response with rationale and suitable examples, if any.

1. AI solutions pose their own complexities are consequently development of an optimal solution requires to consider all the aspects of the network before deploying it live, which requires an environment which can provide similar conditions as available in a live network to test and design an optimal solution.
2. We submit that such campuses can play an important role in ramping up AI growth in the country. Experimental campuses with all requisite infrastructure in place, can allow the stakeholders to use such facilities and test their models. This will ensure that AI developers can focus on their core competencies while experimental campuses provide with the required infrastructure. Focus of the campus should be to provide test infrastructure and offer opportunities for relevant stakeholders and start-ups to develop new business and operational models.
3. We believe that the regulatory sandbox can play a critical role and help to achieve the goal of AI through experimentation. AI Regulatory Sandbox can provide a controlled environment that facilitates the development, testing and validation of innovative AI systems for a limited time before their live deployment. It will also reduce regulatory burden and facilitates experimentation to improvise and boost confidence of AI developers while deploying in live networks.
4. Regulatory Sandboxes can also assist Authorities in understanding the emerging AI opportunities. It will help them to modify the regulations suitably and seek wider consultation before implementing the same. Hence proposed experimental campuses and Regulatory Sandboxes will help remove entry barriers for SMEs and start-up.

Q29. In response to Q.27 and Q.28, whether establishing such a campus under government patronage will enable easy accessibility of public resources such as spectrum, numbering and other resources to the researchers? Whether it would be in mutual interest of established private players as well as start-ups, innovators and enterprises to participate in such experiments? Please justify your response with rationale and suitable examples, if any.

1. We suggest that it will be optimal that initially such campuses should be set up by Government as it requires multitude of regulated infrastructure elements to be assembled at one place. Also, it will instil confidence in the stakeholders that they are not in violation of any regulation and may focus solely on development of targeted AI solutions.
2. At later stage when procedure and standards for setting up such campuses is established, the same may also be established by private players to aid growth of AI in the country. As aptly mentioned in the CP, we agree that the concept of lighthouse may also be adopted with suitable modifications to accelerate adoption of AI related use cases in the telecom sector. The adoption may incorporate design thinking concepts while building a shared infrastructure available to experimenters to develop AI solutions by involving all relevant stakeholders.

Q30. Whether active participation in the international challenge programs such as ITU AI/ML 5G challenge will help India's telecom industry in adopting AI? Whether similar programs are also required to be launched at the national level? Whether such programs will help to curate problem statements or help in enabling, creating, training and deploying AI/ML models for Indian telecom networks? What steps or measures do you suggest to encourage active participation at international

level and setting up of such programs at national level? Please justify your response with rationale and suitable examples, if any.

1. We understand that MeitY has already organized few AI challenges for start-ups with an intention to promote the growth of AI in the country. We suggest that such challenges should be encouraged and organized in coordinated manner by the Government departments to attract best talents in the country to solve prevalent AI problems. Hence, we believe that Government should focus on strengthening a national ecosystem for conducting such challenges on priority.
2. While reward programs help attract stakeholders to participate in such challenges, an opportunity to develop their solutions for national launch using the above proposed experimental campus infrastructure and monetary support from the Government will allow the AI developers to strive for excellence and make such challenges achieve their true purpose.
3. The risks and constraints with technologies can be addressed by such challenge-based programs. These programs can help in improvising the solutions or products by allowing different stakeholders to participate and to demonstrate their products or provide ideas on the solutions. More importantly it will help in building trust on the AI solutions.

Q31. Whether AI/ML developers should launch bounty programs to establish trust in the public about robustness of measures taken by them to protect privacy in their products or solutions? Whether conduction of such programs will help companies or firms to improve their products or solutions? Whether such programs should be conducted under the supervision of the government or an institution established/assigned for this purpose? Please justify your response with rationale and suitable examples, if any.

1. Such bounty programs are already being deployed by few organizations for improving/refining their solutions before mass launch. We believe that based on their strategy, companies will adopt such methods for perfecting their products and there may not be requirement of any regulatory intervention for the same.
2. We suggest that it should be left to the discretion of the entities to conduct such bounty programs without any intervention from the Government. Needless to say, that such bounty programs should ensure that the data security and privacy is maintained as per prevalent regulations and the AI solutions in the challenge are not in violation of any regulation leading to potential harm to interest of citizens.

Q32. Whether the telecom industry is required to adopt a Machine Learning Operations (MLOps) environment to develop, train, validate and store ML models? Whether there is also a need to establish a DataOps feature store to help MLOps for training purposes? What standardisation is required in terms of interoperability and compatibility for MLOps to function in a federated manner? Please justify your response with rationale and suitable examples, if any.

1. Our submission remains the same for suggested MLOps in the CP. While the proposed concept has significant potential for the future, we believe that the same should be preceded by enactment of a comprehensive PDP Bill in the country. Hence, hence we have no additional comments on it at present.

Q33. Whether active participation in the international bootcamp programs such as MIT Bootcamps, Design Thinking Bootcamp by Stanford University etc. will help India's telecom industry workforce to find international developers community, navigate challenges and learn from experiences of others? Whether similar programs are also required to be launched at the national level? What steps or measures do you suggest to encourage active participation at the international level and setting up of such programs at the national level? Please justify your response with rationale and suitable examples, if any.

AND

Q.34. Whether the courses or programs related to AI/ML currently being offered by various institutions and universities in India are adequate to meet the capacity and competence required to develop and deploy AI solutions or products in the telecom networks? If not, what additional steps or measures are suggested to fill the gap? Please justify your response with rationale and suitable examples, if any.

1. We submit that there is an urgent need to bolster AI skill development ecosystem in our country to ensure availability of skilled manpower for required growth of AI. While various graduation/post-graduation courses are provided in many universities, sector-specific knowledge and skills should also be incorporated as part of the training to bring new use cases in any sector.
2. In the case of telecom, network engineers typically do not have background of AI that includes mathematical training and experience that is essential in AI; for example data modelling and evaluation, software engineering and system design, ML algorithms and libraries. Also, AI experts may not have technical knowledge of the network. Thus, recruiting people with the right skills is a challenge.
3. Proliferation of such graduation/post-graduation courses should be ensured by development of guiding curriculum for adoption by the institutes. Top institutes in the country should be mandated to offer such courses and contribute towards development of AI curriculum for adoption by other institutions. We submit that a clear roadmap on capacity building and skilling may be required to be formulated.
4. Most of the countries have made AI as a part of their educational curriculum. Some countries like the UK, Finland, and Norway have introduced higher education and post graduate courses in this field. Some countries have introduced apprentice programs and vocational training for teachers to learn and understand AI. Countries like UK, Australia and Denmark have committed towards strengthening their capability in AI and ML through funding. Other global initiatives include federal R&D agencies supporting multiple fellowship and scholarship programs for graduate and postdoctoral studies in AI. We submit that the similar initiate and programs need to be adopted for our country and we request Government to ensure the same.
5. Some organisations and companies have been organising bootcamps to impart better skills to their employees, to improve the overall performance of the organisations and build workforce for new technologies. Although availability of guiding curriculums and availability of such programs by top institutes in the country will help private sector to work in collaboration with academic institutes and develop the required skillset for their company.

Q35. Whether establishing a system for accreditation of AI products and solutions will help buyers to purchase such solutions or products? If yes, what should be the process of accreditation and who should be authorised or assigned with the task of accrediting such products or solutions? Please justify your response with rationale and suitable examples, if any.

1. We suggest that an optional system for accreditation of AI products and solutions may be created for listing of certified products and solutions. We submit that such certification should be voluntary for procurement by the purchasing entity. It should be like 'ISI mark' of Bureau of Indian Standards which is not mandatory but is more a mark of confidence for the consumer that the ISI marked products will meet the functional, quality, and safety requirement expected from such a product.
2. We believe and suggest that if the certification of products is fair and diligent, it will automatically encourage AI developers to get their products/solutions certified and instil confidence in consumers in adoption such certified solution. Although it should be ensured that the identified certifying agency does the certification in a time bound, transparent, and impartial manner. We believe that the process of accreditation can play a significant role in increasing public trust in AI solutions.
3. The earlier mentioned MSB can issue guidelines and standards for certification of AI solutions based on the Principles. Such certification can be undertaken by an executive body under MS itself.

Q36. Whether creating a framework to prepare a list of prequalified suppliers of AI products or solutions will help industry including government agencies to procure AI products or solutions? Whether there is a need to formulate a standard Code of Conduct or guidelines for AI related procurements? What should be the typical elements of such a Code of Conduct or guidelines including guidelines on trusted source and who should be tasked to formulate such a Code of Conduct or guidelines? Please justify your response with rationale and suitable examples, if any.

1. We submit that preparing a list of prequalified suppliers of AI products or solutions can be considered a possible key requirement for procurement of AI systems during public procurement. Use of AI solutions by public sector is likely to have a direct bearing on the citizens and it is critical that such AI solutions should have any inherent bias in them leading to discrimination among citizens.
2. Hence such public AI solution procurement, if procured from prequalified suppliers who abide by the before mentioned Principles, will instil confidence in the citizens for such Government programs. We suggest that such public procurement may also be done based on certain guidelines, based on the above-mentioned Principles. The before mentioned MSB can issue such guidelines. Although the same should not be made mandatory in any manner for the private sector.
3. The assistance in the form of a collection of pragmatic approaches for adoption of AI, or in the form of toolkits to measure readiness and assess alignment with ethical principles, are the approaches to build readiness in industry and bolster adoption of AI.

Q38. Whether there is a need to establish telecom industry academia linkages specifically for AI and BD to accelerate the development and deployment of AI products and solutions? Whether there is a need to establish Centres of Excellence (CoEs) for this purpose or it can be achieved by enhancing the role of existing TCoE? Please justify your response with rationale and global best practices, if any.

AND

Q39. Whether there is a need to establish telecom industry academia linkages specifically for AI and BD for AI related skill development? Please give the suggestions for strengthening the industry-academia linkages for identification of the skill development courses. Please justify your response with rationale and global best practices, if any.

1. As mentioned earlier, we believe that experimental campuses, with all requisite infrastructure in place, can allow the stakeholders to use such facilities and test their models and it can play an important role in ramping up AI growth in the country.
2. On similar lines we believe the CoE, which may focus on various aspects such as researching methods to mitigate risks from AI, finding ways to preserve user privacy, reducing skill gap and bolster adoption, can play a significant role in leveraging AI and BD for telecom sector. Further, the academia and start-ups working in the field of AI and BD may be made part of such CoE.
3. As mentioned earlier we submit that there is an urgent need to bolster AI skill development ecosystem in our country to ensure availability of skilled manpower for required growth of AI. Such Industry-academia partnership may help in advancing research and creating a skilled workforce (please refer our response to Q33 and Q34).