RJIL/TRAI/2022-23/113
June 30, 2022

To,
Shri Asit Kadayan,
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 25th March 2022 on "Rating of Buildings or Areas for Digital Connectivity".

Dear Sir,

Please find attached comments of Reliance Jio Infocomm Ltd. on the consultation paper dated 25.03.2022 on "Rating of Buildings or Areas for Digital Connectivity".

Thanking you,

For **Reliance Jio Infocomm Ltd.**

KAPOOR SINGH GULIANI

Digitally signed by KAPOOR SINGH GULIANI
Date: 2022.06.30 16:53:28 +05'30'

Kapoor Singh Guliani
Authorized Signatory

Enclosure: as above

Reliance Jio Infocomm Limited's comments on TRAI Consultation Paper dated 25.03.2022 on 'Rating of Buildings or Areas for Digital Connectivity'

Preface

1. At the outset, we thank the Authority for inviting stakeholders' inputs on Consultation Paper on 'Rating of Buildings or Areas for Digital Connectivity' ('**CP**'). At present there are several bottlenecks to smoothen roll out of digital infrastructure owing to lack of coordination and common interests between multiple entities managing and responsible for granting administrative approvals/access for any residential or public premises.

2. At present unfair, discriminatory and revenue maximization approach taken by either Property Managers ('**PMs**') or Infrastructure Providers ('**IPs**') acts as a deterrent for TSPs to work towards creating efficient network coverage as part of IBS. We submit that there is an urgent need to address the same through a mix of regulatory and incentive mechanism. We are thankful to the Authority for aptly capturing the same in the scope of the CP, i.e. ***'to deliberate on policy interventions and explore possibility of new regulatory framework which may be required for facilitating TSPs and IPs in improving digital connectivity inside buildings, specific areas, specific transport corridors, public transport hubs etc.'***

3. We submit that it is imperative that the role and importance of Digital Connectivity Infrastructure ('**DCI**') should be thrust upon by Central Government in line with other essential infrastructure services like power and water supply for any building structure. We believe that in absence of any suitable regulatory framework, typical functions such as network designing, network implementation, network evaluation etc. for In-Building Solutions ('**IBS**') will not be undertaken for majority of new residential projects by the respective Property Managers ('**PMs**'), which will be severely detrimental for the digital transformation of the country.

4. Hence, provision for DCI should be included as part of regulation and approvals in National Building Code ('**NBC**'), Model Building Bye Laws ('**MBBL**') and other relevant regulations. The role of the National Building Code of India and Building Bye Laws should be more to give legal backing to the ecosystem required for digital connectivity including associated requirements such as developing solutions using certified products and tools, deploying solutions by certified professionals and evaluation of the network by empaneled or certified agencies.

5. We suggest that DCI adequacy should be mandated for new buildings through inclusion of the same in the approvals for the building plan. There is a need to create an ecosystem for planning, designing and installation of DCI on the similar lines as is being done in case of civil and electrical engineering works. This ecosystem may also be required to be backed by the law. For instance, RERA act does not cover DCI at present. Mandating digital connectivity inside the buildings may be incorporated in the builder-buyer agreement for covering it under the jurisdiction of this Act and its enforceability by the RERA. Further suggestions are covered in our inputs further in this draft.

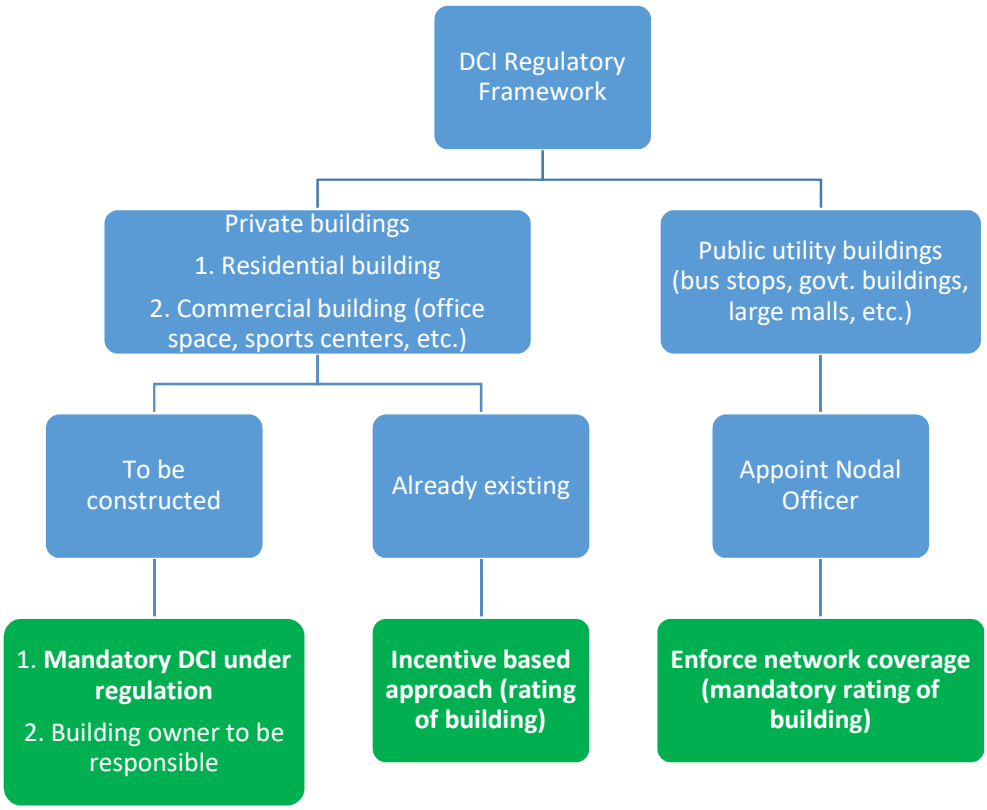
6. It is noteworthy that the TSPs are dependent upon other entities for improvement of connectivity and quality of experience as part of IBS. Multiple stakeholders are involved for providing DCI as

part of IBS, which determines the experience of the end-user residing in that building. Hence, **there is a need to demarcate the role of involved stakeholders and introduce new stakeholders who should be together responsible to develop the DCI ecosystem for the end-user.**

7. We agree with the Authority that it should be ensured that the in-building network is plugged with appropriate backhaul connectivity from TSPs present in the area. Although we would like to stress that the business interest of TSPs is aligned in providing the backhaul connectivity for the in-building network and any delay in providing the same is driven by external regulatory impediments in form of requisite approvals from multiple authorities, especially RoW. Hence there is a need to simplify the process for the TSPs to provide the same and no additional regulation related to the same should be considered, which will add to the existing compliance and cost burden for the TSPs.

8. We submit that the regulatory framework for development of DCI as part of IBS will require a multi-pronged approach depending on type of building (private, public utility), stage of construction (new, already existing) and use of the building (residential, office, commercial, etc.). We understand that the problem of poor DCI may be more for already existing buildings and hence an incentive based method needs to be evolved.

Diagram: Proposed multi-pronged regulatory approach



Issue wise response:

Q1. How can an ecosystem be created to design, deploy and evaluate DCI with good connectivity in a cohesive and timely manner? What would be the typical role and responsibilities of actors of the ecosystem? Please justify your response with rationale and suitable examples, if any.

1. The quality of availability of DCI inside the buildings is dependent on availability of unhindered access/permission to TSPs for DCI deployment. But at present such access is dependent on a discriminate, unfair, and non-transparent process determined by the PMs. Due to these unstructured current regulations, it is commercially unviable and administratively not feasible for TSPs to provide a quality DCI as part of IBS. We agree with the Authority that there is a need to create an ecosystem for planning, designing and installation of DCI on the similar lines as it is being done in case of civil and electrical engineering works.

2. The ecosystem should delineate the responsibilities of the stakeholders in a way to empower the end consumer. **The ecosystem should also consider DCI as an integral part of the building construction. Completion certification for any new building should be conditional on achieving the infrastructure required for network coverage in the building.** All this needs to have a legal backing by incorporating this in the current regulations, for the stakeholders involved in construction of the buildings to adopt the same.

3. We note that the NBC delineates the responsibility of the owner and all professionals involved in the planning, design, and construction of the building. Although at present it does not include any defined responsibility for professionals involved in development of DCI as part of IBS. The professionals referred in NBC for telecom/ICT planning and installations are electrical engineers, with the competency in LV (Low Voltage) systems, and are not experts in Radio Networks of 2G, 3G, 4G, or upcoming 5G mobile network systems.

4. Hence **there is a need to define the DCI related responsibility of the building owner and introduce new professionals, with delineated responsibilities, who should be involved during planning, design, and construction of building to deliver the requisite DCI for IBS**. We submit that the same should be incorporated in the NBC and MBBL to ensure uniform acceptance of the same and consequently should be cascaded in the related rules and regulations.

5. The primary responsibility to deliver the required output should lie with the building owner or the person-in-charge; while the **regulation should enable development of an ecosystem for the PMs to identify domain experts and professionals to develop the requisite DCI for IBS.**

6. We broadly agree with the roles and responsibilities of DCI professionals as enunciated in the CP. We believe that the DCI Designers will play a critical role in ensuring targeted network coverage for the building through development of DCI designs and ensuring the implementation of same through evaluation iterations, if required. The DCI Engineers as proposed in the CP should implement the design as suggested by the DCI Designer. **We suggest that the Authority can empanel especially trained DCI Evaluators to review and approve the DCI proposals as submitted by the DCI Designers.**

7. The above three proposed professionals should work together for the building owner to achieve the desired outcome. **DCI Designers need to ensure that the final DCI values for the building is in line with the initial design/plan prepared by them.**

Q2. How would the ecosystem proposed in response to Question no.1 ensure that created infrastructure does not get monopolized? Please justify your response with rationale and suitable examples, if any.

1. We submit that to address the DCI issues for current buildings, TSPs should have the right to access the DCI creation on first come first serve basis. **In case the DCI does not exist for the building or is fully utilized, the first approaching TSP should have the right to augment or create the DCI in compliance with the guidelines established under the ecosystem. This will ensure that the DCI for any building is not monopolized by any one TSP owing to preference of the PM of the building.**

2. For all new constructions the proposed ecosystem should ensure that the non-telecom stakeholders like the builders and Residential Welfare Association ('**RWA**') abide by the guidelines established for providing DCI as part of IBS during the architectural planning of the buildings.

3. We suggest that the DCI designers should be supported under the government initiatives of Start-ups and Digital initiatives to create a fair, healthy, and competitive market environment. One of the options for the same can be through development of comprehensive database (digital yellow pages) where the professional individuals/firms can be listed for convenience of the PMs. Such databases can be maintained either by Authority or can be developed by private players.

4. The PMs should be able to hire the professionals without much risk of monopolization as we believe that such market should be a highly fragmented market, if suitably supported under State or Central government's sponsored Startup programs. Creation of such market will also give opportunity to individual professionals and SMEs which can provide professional services to PMs.

5. There is a need to ensure that the current issue of restricted/selective access for TSPs in buildings by the PMs is adequately addressed in the new ecosystem. We suggest that **it**

should be legally binding on the PMs, through prevailing regulations, to allow non-discriminate and fair access to TSPs during the construction of the building. The cost sharing mechanism should also be transparently maintained by the PMs and the same should be verified and approved by the empaneled DCI Evaluators.

Q3. How would the ecosystem proposed in response to Question no.1 enable DCI Designers to factor in the digital connectivity requirements of the existing and/or prospective users of the network? How can such requirements be gathered at the stage of construction of a new building or at the time of upgradation or expansion in case of pre-existing DCI? Please justify your response with rationale and suitable examples, if any.

1. Digitization of building plans is the first step towards ensuring a robust Digital Connectivity Infrastructure, i.e. a structured and phased approach of converting all 2D building Plans into 3D digital drawings. Additionally, use of digital tools and platforms can play an important role in designing and predictive evaluation of network coverage for the buildings. Digital tools can help collect end-customer requirement with due consent mechanism in place. Such digital tools can be installed in the mobiles and other electronic equipment of the end users. This can form basis of doing the initial DCI design.

2. Data analysis and AI can play a significant role in ensuring that and optimum outcome is obtained for all the new buildings. Platforms can host such data and analysis along with acting as conduit for connecting the stakeholders.

3. It should be mandatory for the DCI Designers to upload the final DCI design on a government portal with their registered id. Such portal can classify the DCI design depending on the geographical location of the building (metropolitan, tier 2 city, etc.), the nature of building (residential, office space, commercial space, etc.) height of building (high rise, limited floors, villa, etc.), etc. Such portal will lead to build up of region wise categorized/labeled database which can be used by the DCI Designers in developing solutions to achieve targeted outcomes.

4. In recent past the Government of India has democratized the creation and updating of maps across the country in public domain. The Start-Ups and DCI professionals should be incentivized to fasten the 3D maps creation of the localities they serve, and Local Bodies (Urban / Rural) should undertake the same as initiative under Digital India to earn incentives as per government established policies.

5. Augmenting these building plans with Census Data will provide a robust database to all TSPs / DCI consultants for designing the standardized templates / guidelines for ensuring a seamless wireless and wireline network to serve end customers. In addition, relevant Authority can issue standards/guidelines, in consultation with ecosystem stakeholders, for different type of buildings which will ensure a minimum adherence for the PMs while ensuring DCI compliance as IBS for any project.

Q4. How would the ecosystem proposed in response to Question no.1 enable DCI Evaluators to get requisite information to evaluate and ensure that the designed or deployed network would meet the requirements of end users? Please justify your response with rationale and suitable examples, if any.

1. DCI evaluators, empowered by the digitized building plans and approximate occupancy data from Census reports, will have a grid / matrix created for the estimated Data Consumption of the Buildings. Correlating the current Data usage norms available with TRAI / DoT an average data consumption per household in the provided locality can be estimated.

2. Basis the estimated data usage and total number of approved license providers the DCI evaluators can form the guidelines for the minimum DCI requirements to serve end customers across given type of building.

3. In continuation to our input above, we suggest that the DCI designs submitted by the DCI Designers (post validation by the DCI Evaluators) should also have the connectivity values for different locations in the building structure. This will enable development of a data base for the values of the DCI metrics. This will help DCI Evaluators with the predictive evaluation of the DCI design and will further improve and optimize the new plans.

Q5. How would the ecosystem proposed in response to Question no.1 ensure that upgrades and expansion of the DCI are done from time to time and continue to meet rising demands? Please justify your response with rationale and suitable examples, if any.

1. We suggest that **to promote regular upgrades and expansion of DCI to meet rising demands, an incentive based methods should be adopted to encourage the PMs for the same. Ratings of the buildings can play a significant role in the same. We suggest that Authority should also explore possibilities of financial incentives for building in form of tax concessions incase such buildings acquire a minimum of specified rating**, ex: 5 star rated buildings can be eligible for proposed tax concession (rating scale from 1 to 5). Publicly available information of rating of the buildings can impact the quality of life in the buildings as well as resale value of the flats/houses in the buildings. Hence it is likely to act as incentive for the residents to ensure that their buildings have good rating, and they can pursue the PMs to do the same. Such ratings should be valid for a limited period beyond which there should be requirement of renewal. At time of renewal, upgradation and expansion of DCI should be mandatory for obtaining better ratings.

2. **We suggest that Authority should also publish regular updates on standards and technology for DCI requirements for IBS.** It will help the PMs to assess the readiness of their DCI to meet the end-consumer demand. Frequency at which the Authority may publish such standards/technology updates may be determined by Authority depending on pace of technology change in the market.

3. It is imperative that the DCI Designer makes the provision for upgradation of network equipment at time of design and implementation phase of the building. Hence the DCI designing should include two distinct components. First being the layout of the equipment to achieve the desired network coverage outcome. Secondly, the **DCI design should also include the possibility of modification/change of equipment/hardware for upgradation of the technology in the future.**

4. **The design and outcome of the DCI implemented for the building should be a part of approval process of the building**. Such document should be readily available to the PMs as part of building approval documents in addition to online availability of the same through the above mentioned government portal. Knowledge of built in scope for network technology upgradation will be instrumental while actual expansion or upgradation of the DCI for a building.

Q6. How would the ecosystem proposed in response to Question no.1 ensure that the TSPs' networks are planned, designed, deployed, and upgraded to serve the DCI requirements in a timely manner? Please justify your response with rationale and suitable examples, if any.

1. We submit that the TSPs will be aware of upcoming data requirements for a building owing to any changes in technology or services. Hence, they will be ready with the backhaul infrastructure and availability of required hardware/equipment for updated technology to meet the data demand of the end-consumer in the buildings, as the same is in their commercial interest.

2. With the availability of standards and guidelines to follow, the TSPs and technology partners will have a set process to follow; similar to a set of APIs to meet for any new Software rollout. With defined space and power allocation the form factors of the hardware can be optimized and further improved upon to ensure the deployment of TSPs network.

3. **TSPs, who are driven by market forces, will be willing to install the required hardware for technology upgradation till the time it is not commercially detrimental for them owing to unfair and non-transparent methods adopted by PMs.** Hence upgradation of technology and requirement of installation of updated hardware in the premises of the building by TSPs should be facilitated by the PMs on rent free basis.
4. As mentioned above, we reiterate that the ecosystem should enable the PMs to conveniently access professional service for DCI upgradation through digital platforms among others. We don't foresee any hindrance in TSPs being able to serve the DCI requirement of PMs once the latter decide to upgrade the DCI for any building based on end-consumer demand. Once the system is demand driven, we believe that the TSPs will have adequate time at their disposal to upgrade the system keeping in view upcoming data requirements.

Q7. How can an ecosystem be created to build capacity requirements of skilled professionals such as DCI Designers, DCI Engineers, DCI Evaluators? What would be the typical role and responsibilities of actors of the ecosystem? Please justify your response with rationale and suitable examples, if any.

1. We submit that **along the lines of Architect Act, 1972 a register of qualified DCI Designers should be maintained, and minimum standards should be laid down for DCI education for IBS in the country.** Experts designing DCI will require specialized knowledge and academic qualifications in both telecom domain and in-building solutions for digital connectivity. Hence the knowledge domain for a DCI professional need to be overlap of that of an architect and telecom domain.

2. Smart Cities initiatives taken by the Central Government has enabled the concept of *"Master System Integrator"* (MSI) over the last decade. On similar aspects DCI designers and evaluators can be established as a stream initially nurtured through Startup ecosystem and incentivized by various government plans of digitized maps creation as extension to providing basic infrastructure provisions for DCI.

3. DCI Designers should have a divergent knowledge of both architecture and network coverage which can be offered as additional certification or minor courses (detailed in our subsequent responses) to the architects. We believe that **it does not warrant full-fledged separate degree course structure, like that for an architect for DCI Designers. Instead, there is a need to develop narrower specialized Certification courses for deployment of DCI as part of IBS or DCI certified architects / planners.**

4. **We believe that the level of expertise DCI Engineers and DCI Evaluators also does not warrant separate full-fledged course. The TSPs can also provide services required for DCI Engineers. While the DCI Evaluators can be a certified evaluator registered with the Authority.**

5. We suggest that the A**uthority, through formation of a working group, can recommend minimum qualification requirement for the DCI professionals.** Such working group should also review the contents of the courses offered by organizations such as BICSI, iNARTE, CTNS etc. for their adequacy and suggest curriculum befitting roles of DCI Designers, Engineers and Evaluators specific to Indian environment.

Q8. How would the ecosystem proposed in response to Question no.7 ensure that relevant training courses are available in the country? Please justify your response with rationale and suitable examples, if any.

AND

Q9. Whether the training courses proposed in response to Question no. 8 are already being offered by any organization or institution that can be recognized for the purpose? If yes, please provide a list of organizations offering such courses. If not, how specialized

courses can be designed to meet the requirements? Please justify your response with rationale and suitable examples, if any.

1. We understand that the Council of Architecture ('**CoA**') approves and oversees all institutions in the country that are conducting courses in architecture. The Institutions imparting architectural education such as constituent colleges/departments of universities, deemed universities, affiliated colleges/schools, IITs, NITs and other autonomous **institutions are governed by CoA for Minimum Standards of Architectural Education. We submit that the same process and institutes should be used for imparting knowledge on specialized courses which will confirm professional certification for DCI Designers.**

2. An Architect is required to have knowledge in a vast variety of subjects to be able to grasp the requirements of any type of Client. We believe, there is no specific module related to digital connectivity infrastructure as a part of the architecture course at present. As mentioned above, the role of DCI Designer will require cross domain expertise from architecture and telecom domains.

3. We suggest that **CoA should outline the scope of course to be completed by DCI Designers**. Post definition of the scope of work, CoA should work with requisite academic institutes and working group under Authority to develop the course curriculum for the mentioned specialized course/module. Such module should be available for both the architecture students as well as telecom students as part of specialization. The mentioned academic institutes can include Telecom Certification Organization ('**TCO**'), BICSI, iNARTE, CTNS, etc.

4. The **above mentioned module can be developed on lines of 'minor course' as offered in multiple Indian Institute of Technology ('IITs')**. The number of prior conditional courses required and minimum performance requirement of the student before he/she may be allowed to apply for such a minor course may be suitably defined by CoA. This will ensure that the fresh architects or telecom professionals from such institutes will have firm foundation in DCI designing.

5. Other additional option is that the **certification institutes like TCO can offer certification courses to eligible professionals to be eligible to work as DCI Designers**. This will allow the existing professionals to also expand their scope of work and start working as DCI Designers and fill the current need gap in short term.

6. For the DCI Engineers and DCI Evaluators, as mentioned above, we reiterate that the working group under the Authority should recommend contents of the course, which should be adopted by the academic institutes offering telecom education. Working group should also ensure that training courses offered by training and certification organizations are up to date in terms of technology and relevant for role of DCI Engineers and Evaluators.

Q10. Is there a need to establish a council on the lines of "Council of Architecture" (CoA) to regulate minimum qualifications, additional specialized courses and practice of DCI profession in the country? Please justify your response with rationale and suitable examples, if any.

AND

Q11. Whether the requirements of additional specialized courses and practices of profession would vary depending upon the size of work or kind of work involved in a particular DCI project? Please justify your response with rationale and suitable examples, if any.

1. We suggest that **CoA can be given additional responsibility to regulate specialized courses for DCI Designers.** As mentioned above, we suggest that while the professional expertise for a DCI Designer will be a cross over in the architecture and telecom domain, it does not warrant a dedicated separate course structure like that for an architect. Instead, it can be a specialization education stream, which can be offered to both architect and telecom domain professionals. We suggest that **CoA can maintain the register of certified DCI professionals in the country in line with the register for the architects.**

2. **CoA should also notify a sperate 'Minimum Standards of DCI Education for IBS' along the lines of 'Minimum Standards of Architectural Education Regulations, 2020'.** As mentioned above, CoA may consider designing the course on lines of minor course offered by multiple IITs.

3. We suggest that the course structure should cover DCI designing for various kinds of buildings and of varying sizes, i.e. small or big. The course structure should be domain based allowing the certified DCI designer to serve clients with wide gamut of requirements. This will also simplify the selection process for the PMs where they can focus solely on the past experience/projects of any DCI Designer, and they need not verify the suitability of the certification due to availability of multiple certifications in the domain.

Q12. Whether creation of a digital platform to hire services of professionals would help Property Managers in creation of DCI? Should there be a feedback mechanism to assess quality of services delivered by professionals? Please justify your response with rationale and suitable examples, if any.

1. We believe that digital platforms can play a significant role in connecting the PMs and the right professionals who can provide DCI services to the PMs, depending on the type of building and nature of network coverage required. Such platform can contain the brief profile of the DCI professional, glimpse into past projects and should also have the option for client review and feedback, which should be visible for prospective clients. Although, it should be ensured that such reviews are genuine, and a mechanism should be put in place to validate the same.

2. Such digital platforms may be maintained by private players and can be governed by consumer protection rules as is applicable for other such marketplace platforms. At present there are multiple platforms which connect the professionals and the end consumer and provide rating for the professionals based on review of the end consumers to simplify the selection process for the end consumer. For instance, there are platforms in healthcare domain connecting the doctors and patients in healthcare domain.

Q13. Whether creation of a digital platform for procurement of certified products would help Property Managers in creation of DCI? How would the certified products for the purpose of DCI be identified and updated on the platform? Please justify your response with rationale and suitable examples, if any.

1. We suggest that digital platforms may be created for listing of certified products. The authorized certifying agency (e.g. TEC, etc.) can upload all certified products on the portal for knowledge of PMs. Considering the non-telecom back-ground of PMs, such platforms will ensure that suggested products installed meet minimum functional, quality and safety requirement.

2. We submit that **such certification should be voluntary for procurement by the PMs**. 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. Hence the PMs should be allowed to use non-certified products also in case the same meet DCI requirements and fulfil requirements of DCI evaluators.

3. We believe and suggest that if the certification of products is fair and diligent, it will automatically encourage PMs to adopt certified products and incentivize the manufacturers to get their products certified and listed on the platform.

4. Although it should be ensured that the identified certifying agency does the certification in a time bound, transparent, and impartial manner. It should be open to new developments and should encourage manufacturers to develop high quality, cost effective, safe, and efficient products.

Q14. What may be the possible models of DCI ownership and its upkeep? Whether co-ownership models would help in aligning incentives in realizing connectivity that would meet expectations of the end users from time to time? Should there be a need to specify terms and conditions for entities owning and responsible for upkeep of DCI to function in a fair, transparent, and non-discriminatory manner? Please justify your response with rationale and suitable examples, if any.

AND

Q19. Is there a need to introduce a special class of Infrastructure Providers to create, operate and maintain DCI for a building or cluster of buildings in ownership models suggested in response to Question No. 14? What should be the terms and conditions for such special Infrastructure Providers? Should such terms and conditions vary depending upon type, size and usage of buildings? Please justify your response with rationale and suitable examples, if any.

1. We suggest that the **ownership of the DCI for the buildings can lie with the PMs**. The ecosystem should ensure and strive to increase the awareness level of the PMs and end customers with regards to latest digital communication technologies. The upgrade/expansion of the network coverage and technology should be demand driven. But we reiterate that it should be ensured, through regulations, that the building access by TSPs for DCI augmentation should not be hindered owing to unfair practices adopted by PMs through preferential treatment and unjustified prices.

2. As suggested earlier, we submit that creation of DCI provisions for new buildings should be mandated under new regulations and PMs should be held responsible for the same; as they are held liable for deployment of essential utilities in the building, viz. maintenance shafts, Fire Hydrants, electricity passages, water lines etc,

3. We believe that existence of an ecosystem with digital platforms, which allows PMs to connect with the DCI professionals for any upgrade/expansion should be sufficient to ensure that the PMs are able to get the desired outcome as per end consumers. We feel that **any mandatory addition of any new layer for co-ownership will increase the complexity for the end consumer. Although PMs should be allowed to appoint an IP in case they want to, in which case the IPs should be working on behalf of PMs for upgradation of DCI in the building.** Hence, both the models of ownership by the PMs or co-ownership with the IPs may co-exist, depending on what is more suitable for the PM.

4. Any relationship between the PM and a third party entity responsible for upkeep of DCI is likely to be driven by a contract. Instead of adding an interaction layer, we suggest that the ecosystem should encourage PMs to directly enter into a contract with a DCI Designer and subsequently hire other DCI professionals as suggested by DCI Designer. To clarify, we are assuming that post completion the RWAs become the PM as the ownership is passed on from builder to the RWAs. We suggest that RWAs can truly represent the end consumer demand and take required steps for the same through their choice of DCI professionals. We submit that current regulations should be accordingly modified so the ownership is passed on to RWAs from builders at earliest, within a defined time-line, post completion of the building.

5. We submit that in either model it should be legally binding on the entity responsible for maintaining DCI in the building to allow fair, transparent, and non-discriminatory access to TSPs for upgradation/expansion of DCI as per the demand of the end-user.

Q15. As one solution might not be suitable for all types of buildings, whether current requirements stipulated in the National Building Code of India, 2016 would be required to be evolved and prescribed ab initio to make it more appropriate for DCI requirements? Please justify your response with rationale and suitable examples, if any.

1. We note that though the requirements for telecom and ICT have been introduced in NBC for project management and supervision, no separate concept of preparation of plan and designs for DCI and approval thereof or certification is prescribed in the NBC. Rather general practices which are applicable for civil and electrical work are followed.

2. We note that the current MBBL cover *"…provision of dedicated telecommunication ducts for all new building proposals is mandatory for conveyance of telecommunication and other data cables."*. Although we submit that this provision is not adequate for provision of DCI in the buildings. Apart from provision for ducts, there is a need to have a provision for space and power required for installing passive and active infrastructure components for fixed line or wireless DCI.

3. We submit that the above mentioned requirement needs to be included and covered under approval process for the building. **For all future buildings, MBBL approval process should include approval of plan for DCI prepared by DCI Designers and duly certified by DCI Evaluators**. In addition, we suggest that the Authority should specify specific standards and Best Current Practices ('**BCPs**') for DCI and may follow the same with detailed guidelines on the subject.

Q16. Whether NBC needs to prescribe a separate classification of buildings for the purpose of DCI? If yes, which factors should be considered to make such a classification? If not, how to accommodate DCI specific requirements in the existing classification of buildings by the NBC? Please justify your response with rationale and suitable examples, if any.

1. We submit that **DCI requires a separate classification in the NBC**. Planning and designing of DCI, apart from technical parameters, will need consideration of other parameters such as aesthetics, safety, value engineering etc. Such parameters can vary according to the types and size of the buildings, and service requirements of occupants. Design of DCI is still in evolutionary stage and will require active participation of PMs in the process of creation of suitable classification of buildings for DCI.

2. Buildings can be specifically classified for DCI based on various factors, few of which have been listed below for better understanding:

a. Purpose of use – Some buildings like stadiums, bus/railway/metro stations, museums, theaters etc. will mostly require wireless DCI only. Whereas residential buildings, office buildings, hospitals, factories etc. will require both fixed broadband connectivity as well as wireless mobile connectivity. The quality of DCI requirement will also vary as per purpose of use.

b. Area and density of occupants – This is important for design of DCI and the revenue model for the TSPs; specially for wireless part of DCI design.

c. Design and height – Planning and investment for DCI will vary significantly depending on whether the building is a detached building, multi-storied building or high-rise building, etc.

Q17. Whether there is a need to include DCI Professionals as Persons on Record as typically done in building bye laws or development regulations? Or registration with the Council proposed in Question no. 10 would suffice to practice profession across the country as followed in the case of Architects? Please justify your response with rationale and suitable examples, if any.

1. We suggest that **inclusion of DCI professionals as Person on Record ('PoR') will be beneficial for development of the proposed ecosystem.** Inclusion as PoR will ensure delineate the responsibilities of the DCI professionals and hold them accountable for accomplishment of DCI as part of IBS.

2. We note that at present architects, engineers, structural engineers, and fire protection consultant are required to be 'on record' with clearly demarcated responsibilities and accountability. We submit that same approach may be adopted for DCI professionals.

    a. Architect on Record must certify that the architectural design and specification of the proposed building comply with the regulations. It even has to submit the progress certificates, completion certificates and obtain the Building Use Permission as required under the regulations, on behalf of the owner.

    b. Engineer on Record is responsible for ensuring compliance with all procedural requirements specified in the Procedure Regulations.

    c. Structural Engineer on Record must verify the structural design and specifications of the proposed building.

    d. Fire Protection Consultant on Record must undertake all necessary measures including adequate inspection during construction to ensure that construction of the building is undertaken as per detailed design and specifications. He/she also needs to certify that the design and specification of the proposed building comply with Fire Prevention and Life Measures Regulations.

Q18. How can the clearances or approvals required for DCI at various stages of construction of building may be incorporated in building bye laws? In typical building bye laws, there are provisions for getting clearances from central government e.g., in case of civil aviation, defense and telecom being a central subject, what role can be played by the central government in giving such clearances or granting such approvals? Please justify your response with rationale and suitable examples, if any.

1. We submit that **there is a need to develop separate standards for DCI, which should be validated at various stages of construction of building through clearances/approvals**. Separate standards will also be helpful in dealing with rapid changes in digital communication and will also allow participation of relevant stakeholders in the design and implementation of DCI. NBC and Building Bye Laws may be required to be amended to recognize the DCI professionals and standardization body to provide legal backing which is entrusted with formulation of standards including specifications, guidelines, and processes.

2. We suggest that **DCI related approvals might be required at multiple stages of building construction**, for instance:

    a. At the design level, which may be sought at the time of approval of map of building project. Prediction tools may be used to confirm whether design is good, and likely to meet the requirements of end users.

    b. At the time of issuance of completion certificate for the project and it may be a combination of the proposed design and field inspections.

    c. At the time of giving possession/handover to PM, an in-building network may be live to offer the services. In this case, field measurements may also be conducted to ensure availability of a good quality network.

3. We note that for appraisal and rating for 'green' buildings under Green Rating for Integrated Habitat Assessment ('GRIHA') involves three site visits at various stages of building construction for evaluation and final awarding of rating. Similar multi-stage evaluation, as proposed above, can be adopted for DCI related approvals. The stages at which evaluation is done at site are as follows:

    a. First site visit is conducted to validate sustainable measures adopted during the construction phase. The visit is scheduled after the project has reached the plinth level and the structural work is in progress.
    b. Second site visit is conducted to validate internal finishes and electrical, plumbing and mechanical components installed in the project. The visit is scheduled after the completion of the structural work while the internal finishing work is in progress.
    c. Subsequent to it, final evaluation is done and rating is awarded.

Q20. What are the initiatives or practices being taken in other jurisdictions outside India with regard to rating of buildings from a DCI perspective? Please share details and suggest how similar processes can be created in India?

1. We suggest that a **rating model like WiredScore can be looked at closely for adoption of DCI rating system in our country**. We note that WiredScore was founded in New York with endorsement of local administrative body and support from leaders in real estate, technology, and telecommunications. The idea was born out of a response to tenants' clear need for better connectivity and hence was demand driven.

2. WiredScore certification is the industry standard for showing prospective tenants that the building will be able to meet their connectivity needs and it measures the following, among others:

    a. Connectivity
        i. Number of internet service providers
        ii. Quality of connections
        iii. Accessibility to cabling in the building
        iv. Presence of fixed wireless connectivity

    b. Readiness
        i. Presence of signed wayleave agreements with internet service providers
        ii. Capabilities of management to allow new ISPs to easily contract with tenants

    c. Infrastructure
        i. Number of entry points
        ii. Designated utility spaces
        iii. Structure and security of risers

3. We note that the **measurement metrics of WiredScore underscore the importance of fair, transparent and non-discriminatory access for TSPs by the PMs**. This is critical to eliminate any possibility of monopolization owing to preferential treatment by the PMs. It also measures the quality and resilience of the digital infrastructure of a building, mobile coverage and whether the buildings' critical digital infrastructure is safe and secure from any physical damage.

4. We observe that the success of WiredScore is owing to its acceptance by the landlords. WiredScore rating matters to landlords as it helps them to:

    a. Attract tenants
    b. Increase investment potential
    c. Enhance landlord reputation

5. We suggest that **a five-star rating system can be implemented on similar lines (as above) in our country for DCI ratings of the buildings based on the digital connectivity standards**. As has been observed in case of WiredScrore, we believe that the benefits to the building owners, upon adoption of DCI rating, will drive the success of such rating in India also.

Q21. Is there a need to introduce Rating of buildings from the perspective of DCI that may help in nudging the Property Managers to strive for collaboration with other stakeholders to meet the digital connectivity expectations of the users of the building? Please justify your response with rationale and suitable examples, if any.

1. We agree that **introduction of DCI rating system for buildings can act as nudging factor for PMs to meet the digital connectivity expectations of the end-users**. **A transparent and voluntary rating system by independent organizations will instill confidence in the people regarding the availability of promised digital connectivity services in the building** as claimed by PMs.

2. Such rating can bring value addition to the concerned building, which will draw attention of all stakeholders especially end users. We believe that rating of digital connectivity experience of the buildings would create an environment that can cause competition among PMs to achieve best quality in their buildings. This is quite likely to happen as positive externalities of rating of digital connectivity will impact the commercial decision of buyers and prospective tenants.

3. Creation of an enabling ecosystem, which allows PMs to easily identify and connect with DCI professionals for designing and implementation of DCI, coupled with a nudging DCI rating system can set the market forces in action and transfer the actual control in hands of end-consumer and empower them to demand a good quality network.

4. We believe that areas such as the subway and tunnels, railway track, highway which often suffer from lack of coverage and poor quality, are more likely to receive attention of the community and concerned authorities once the rating of digital connectivity is published. We suggest that a good awareness campaign may push property managers of existing buildings also to get their buildings rated.

5. Similar success has been seen where certification/rating system has helped to improve products and services. It has been observed that educating people regarding value offered by certified/rated products makes it possible to popularize rating system even if it is voluntary in nature. For instance:

    a. In case of ‘Swachch Bharat’ ranking of the cities across the country. Cities, which do not fare well in these rankings draw attention of citizens and consequently the

local administrative bodies get into action in an effort to improve the ranking in coming year.

b. People see value in acquiring accredited/rated products over non-accredited products as they offer higher value for their money in the long run. eg: certification by BSI for the manufactured goods, Agmark for agricultural products, BEE Star rating for Electrical Appliances, etc.

c. Popularity of 5 star rated electric appliances (such as AC, Refrigerators, washing machines, fans etc.) is forcing more and more manufacturers to develop products which are more efficient.

Q22. In case, rating is introduced as a voluntary scheme, is there a need to monitor the progress? If progress is not satisfactory, would there be a need to launch campaigns and awareness drive to encourage Property Managers to come forward for rating? Please justify your response with rationale and suitable examples, if any.

1. We suggest that monitoring of the rating system is necessary even if it is voluntary, to know effectiveness of the rating system. A positive trend of PMs adopting the DCI rating accreditation will indicate, the system is helping to improve the services to end user.

2. Although, **a negative or static trend on the other hand is indication that either the users are not aware of the benefits offered by the rating system and there is a need to launch awareness campaigns.** It will also help in identifying shortcomings in the whole process, make it more user friendly and include more value added services.

Q23. Should the voluntary scheme of rating be extended to cover cities, towns and villages and even states? Would such a scheme help in encouraging local and state authorities to facilitate TSPs in creation or in improving outdoor as well as indoor DCI? Please justify your response with rationale and suitable examples, if any.

1. We suggest that the voluntary scheme of DCI rating for buildings should be extended to cover villages, towns, cities and even states. As we mentioned earlier, today cities are competing to get the best cleanliness ratings under 'Swachch Bharat' rankings, which helps in achieving the target of cleaner cities.

2. We believe that if concept of rating of building is extended to rate cities, towns and even villages, then it may push local government authorities to mobilize local resources to create awareness about rating. The local authorities and states may also take steps to improve rating of their cities, towns, villages which may include facilitating roll out of networks in collaboration with TSPs, augmentation of outdoor digital infrastructure, overhauling approval mechanism, and helping stakeholders to upgrade digital connectivity infrastructure to match new technologies. Accordingly, Improved rating of building, blocks, cities or state will lead to enhanced collaboration between various

stakeholders of the ecosystem to provide better data connectivity and improved quality of life for the citizens.

Q24. If in response to the Question No. 23 answer is yes then what framework should be introduced to rate cities, towns, villages and states, and how weightages can be assigned to different aspects of indoor and outdoor connectivity? Please justify your response with rationale and suitable examples, if any.

1. We suggest that the framework for assigning DCI rating to cities, towns, villages, and states can include the following criteria, among others:

    a. Number of central/state owned infrastructure rated in the region and ratings awarded to such buildings. This will not only help in providing data connectivity to most neglected buildings but also set an example for the private PMs.
    b. Number of private buildings rated in the region and ratings awarded to such buildings
    c. Outdoor quality of network
    d. Easy approval mechanism for DCI
    e. Total buildings plan Digitization achieved
    f. Availability of 3D maps for all Structures across the Town / City / State.

2. We suggest that highest weightage should be given to coverage of public infrastructure followed by coverage for private infrastructure, as public infrastructure is more likely to be ignored in DCI coverage. This should be followed by ease of approval mechanism which impacts the ability of TSPs to deliver the required coverage for the region. Smallest weightage may be given for the outdoor quality of the network.

Q25. Is there a need to make rating a mandatory requirement for specific classes of buildings such as public transport hubs, government buildings or any building of public importance etc.? If yes, which type of buildings should be covered under this category? Please justify your response with rationale and suitable examples, if any.

1. We agree that for specific classes of buildings, **it may be required to make rating mandatory, especially in the cases in which end-users don't have any ownership or have not rented any space.** Examples of such buildings can be airports, ports, railway stations, public transport stations, bus stands, major rail routes and highways, large shopping complexes, industrial estates, major market areas, office or workplaces, government buildings, government residential colonies and any other building of public importance.

2. We suggest a certain threshold may be defined for such mandatorily covered buildings to get an assured level of connectivity experience of the end user. For instance, a mandatory rating above average, (eg: 3 star and above in a system of 5star rating) should go a long way in improved user experience.

3. We believe that such mandatory rating of above defined buildings will set an example for private PMs to pursue for rating. Further it will also help city/state in their DCI rating.

Q26. What should be the time plan to rate buildings falling under the mandatory category and is there a need to prioritize some buildings within the mandatory category to make it more effective? Whether existing buildings falling under such classes are required to be dealt differently? Please justify your response with rationale and suitable examples, if any.

1. We submit that for buildings, where option to get rated is mandatory and which may be large in number, a clear road map should be developed to rate such buildings. The proposed new ecosystem will require TSPs, PMs and other stakeholders to participate in co-design, co-creation and co-deployment of DCI in the buildings. In order to start rating following needs to be in place:

    a. Legislation declaring buildings of importance to mandatorily have minimum specified DCI rating.
    b. Legal framework to enforce the Rating system
    c. Eco-System for design, engineering, and evaluation of DCI, including changes required in regulations for legal backing of the same
    d. Organization and tools for establishing and assigning rating to identified buildings

2. At present the digital infrastructure, skilled manpower, and regulatory environment is not in place to complete the process simultaneously for all the identified buildings. Hence it will be advisable to develop a prioritised plan for rating of the identified mandatory set of buildings.

4. Among the buildings of public importance, we suggest that **buildings having higher flux of users may be dealt with in priority for coverage under mandatory rating**, which will also result in assurance of minimum DCI implementation for those buildings. Such priority buildings may include airports, ports, railway stations, public transport stations, bus stands, large shopping complexes, industrial estates, major market areas, and government buildings.

Q27. Is there a need to designate a nodal official for building(s) falling under the mandatory category to comply with the rating related requirements? What actions are proposed to be taken in case of non-compliance? Please justify your response with rationale and suitable examples, if any.

1. We suggest that in case of important buildings where rating is made mandatory, designating a nodal official will help other stakeholders involved in quality assessment of DCI. Such an official may play a significant role in reaching out to the concerned stakeholders, coordinating activities, and getting digital connectivity rated. Such nodal

officer should be responsible for keeping building ready with in-building telecom networks and upgrading or expanding it from time to time.

2. We suggest that the nodal official may also be authorized to initiate legal action in case of non-compliance by the stakeholders for completion of the rating process and subsequent required upgradation of the DCI of the building. He/she may also be authorized to recommend penalties to be levied, in case of non-compliance by the stakeholder. For instance, similar action is taken by State Electricity Board in case the relevant stakeholder does not use BEE certified transformers of specified star rating.

Q28. Is there a need to amend legal provisions under various laws, bye laws dealing with development of land and buildings or areas including forest areas, cantonment areas, port areas, panchayat areas, municipal areas etc. to facilitate creation of DCI and ratings of the buildings or areas? Please justify your response with rationale and suitable examples, if any.

1. We agree that legal provisions under various laws and bye laws dealing with development of land and buildings will need to be amended to enforce voluntary and mandatory requirements of ratings in any area including that of cantonment areas, port areas, panchayat areas, etc.

2. The relevant laws including the Indian Telegraph Act, the Indian Wireless Act, NBC and associated bye laws, among others need to be aligned to recognize PMs as legal stakeholders in providing DCI in the buildings. The amendments in the regulations should also lead to development of an enabling ecosystem with delineated responsibilities for new identified DCI professionals and placing the same on record. Legal backing of the proposed ecosystem and subsequent voluntary or mandatory rating is critical for any progress on the same.

Q29. In case a voluntary scheme for rating is to be introduced or rating is notified as mandatory for specific classes of buildings then what should be the role of TRAI or DoT? Please justify your response with rationale and suitable examples, if any.

1. We note that globally initiatives for building ratings have been introduced primarily in advanced countries and mostly led by industry with backing of local administration. Hence the role of relevant Authority becomes critical in providing legal backing for development of DCI for buildings and subsequent rating of the DCI.

2. We understand that in case of India, there will be requirement of amendment in multiple varied regulations, starting from Indian Telegraph Act to NBC and its associated bye laws including MBBL. Hence, we believe that the role of TRAI or DoT becomes critical in coordinating with multiple ministries/departments and ensuring that required amendments are done is associated regulations to provide legal backing to the proposed ecosystem and DCI rating.

3. If such ecosystem of rating gets introduced, it will require adoption at an accelerated rate and therefore to extend the benefits of such ecosystem of rating, the Authority will be required to play an important role of influencing and timely implementation. Establishment of an institutional mechanism backed by regulations may help in implementation as well as protecting the interests of all stakeholders including end-users.

Q30. Whether creation of "Regulatory Sandbox'' to carry out experiments or demonstrate capabilities of innovative solutions to improve digital connectivity would be helpful to make changes in existing policies, laws or regulations? What should be the terms and conditions to establish a regulatory sandbox? Please justify your response with rationale and suitable examples, if any.

1. We submit that regulatory sandbox can bring different types of stakeholders together to demonstrate their capabilities in the fields of planning, designing, procurement, deployment, and evaluation in the new ecosystem.

2. It will allow faster adoption of the newer technologies by the PMs and certification of the same by the relevant Authorities. For instance, a better way of camouflaging and aesthetic blending of digital infrastructure may be demonstrated as a part of Regulatory Sandbox. Upon successful demonstration of the pilot in the Regulator Sandbox, the commercial working solution may be adopted by the PMs in establishing in the buildings.

Q31. Is there a need to establish a Certificate Issuing Authority to award ratings to buildings from DCI perspective? If yes, what should be the structure of such an authority? If not, who can be assigned the role to perform this function? Please justify your response with rationale and suitable examples, if any.

1. We note that the Ministry of Tourism has a voluntary rating scheme, awarding one star to five star, for Hotel Projects with the aim to provide contemporary standards of facilities and services. For these classifications, Ministry of Tourism has formed Hotel & Restaurant Approval & Classification Committee ('HRACC'). The committee is of two levels, one that assesses one-to-three-stars hotels and another that assess three-to-five-stars hotels.

2. In addition, rating system for green buildings viz. Green Rating for Integrated Habitat Assessment ('GRIHA') has been developed by the Centre for Research on Sustainable Building Science ('CRSBS') and The Energy and Resources Institute ('TERI'), while it has been endorsed by the Ministry of New and Renewable Energy ('MNRE'). It has been formulated in terms of 'appraisals' which while acting as guidelines for the construction of green buildings, also have certain points allocated to them. The project team need to comply with these appraisals to achieve the desired rating and thereby construct sustainable buildings. These appraisals are classified as mandatory, optional and non-appliable.

3. MNRE (Ministry of New and Renewable Energy, Government of India) and TERI (The Energy and Resources Institute, New Delhi) jointly have also founded ADaRSH (Association for Development and Research of Sustainable Habitats), an independent platform (registered as a society). ADaRSH promotes GRIHA and all activities related to issuance of GRIHA rating are carried out by it. MNRE has constituted a National Advisory Council and Technical Advisory Committee to provide advisory services for the GRIHA team and act as interface with MNRE.

4. We observe that even for energy rating labels that provide information about an appliance's energy consumption are regularized by Bureau of Energy Efficiency, an initiative of the Ministry of Power.

5. Accordingly, we submit that **for DCI rating and certification a committee/certificate issuing authority may be formed under Department of Telecommunication ('DoT')**. Such authority should be assigned the responsibility of developing an institutional mechanism for DCI rating of the buildings by publishing well defined guidelines so that the rating evaluation remains reliable, transparent and trustworthy.

6. We suggest such committee should be a multi stakeholder body with varied representation from prominent stakeholders in the DCI ecosystem, viz. Government departments, TSPs, builder representation, DCI Designing experts, DCI Engineering and Evaluation experts, among others.

Q32. Whether the authority suggested in response to Question no. 31 may use reports from DCI evaluators to award ratings? To ensure reliability of reports from DCI Evaluators, should Certificate Issuing Authority need to conduct periodic audits of DCI evaluators? Please justify your response with rationale and suitable examples, if any.

1. We submit that DCI Evaluators will be ideally suited for providing feedback reports to the rating certificate issuing authority. However, DCI Evaluator's report alone may not be adequate and site-specific survey by the authority may be necessary especially where building developers or PMs Property Managers are able to influence the decisions of the DCI Evaluators.

2. We suggest that periodic audits of the DCI Evaluators by the Rating Authority would be necessary to verify that reports of DCI Evaluators are fair and in compliance with the specified guidelines / regulations.

Q33. What should be the terms and conditions for using ratings awarded to a building(s) from a DCI perspective? What should be the validity period of awarded ratings? Do you envisage any situations under which an awardee of ratings might be required to get the ratings renewed before the validity period? Please justify your response with rationale and suitable examples, if any.

1. We suggest the key terms while issuing of rating certificate by the authority can be as follows:

    a. Validity of the rating Certificate
    b. Maintaining consistent performance and Quality of Service after award of certificate
    c. Design of DCI deployed while obtaining rating certificate should not be altered significantly
    d. Conditions/situations where the PM may use/leverage such rating certificate

2. Such terms and conditions are important for DCI rating as the technology changes at a rapid pace in the telecom domain. User requirements will also change in tandem with technology and so will be requirement for DCI. While fiber infrastructure may not undergo much change, wireless and electronics/hardware will require change for user experience. Therefore, for example a 5 Star rated DCI today may not provide the same level of user experience after 3-5 years, thus necessitating a re-validation of the given rating.

3. We suggest that the **rating certificate given to any building can have a validity of between 5 to 10 years**. A revalidation and renewal of rating certificate should be mandated after every 5 to 10 years. In case there has not been much change in technology, the renewal can be done merely by confirmation that DCI design and DCI demand in the building has remain unchanged since last rating certificate.

4. There may be situation when the awardee may be required to renew the rating certificate before the end of the validity period. Such circumstances can include the following, among others:

    a. The DCI has been upgraded to better the previous rating
    b. There has been a change/upgradation in the technology leading to demand of enhanced service by the end consumer
    c. There are user complaints regarding poor user experience/quality of Service which may call for downgrading of the given rating. This could be due to poor maintenance of installed DCI or increase in the users of the DCI.

Q34. Whether in the initial stages of introduction of the rating system, validity should be for a shorter time period, and later it may be increased over time as evaluation system matures? Should the validity period be dependent on the type of buildings? Please justify your response with rationale and suitable examples, if any.

1. We agree that the validity period can be maintained for a shorter period in the initial years of roll out of the DCI rating certification. We suggest that such period can be 2 to 5 years. In the initial years of roll out, the standards and rating processes are likely to undergo amendments as the understanding of the diverse market increases for the certification authority.

2. We suggest that such renewal period should be increased to 5 to 10 years, as mentioned above, upon the rating ecosystem becoming mature and adept to deal with diversity of type of buildings to be rated in the country. **Frequent revalidation, due to shorter validity period, will require and imply higher resources with no significant change on the quality of service received by end user; and hence should be avoided.**

Q35. Whether the process of renewal of rating should be the same as the process defined to get rated first time or it may be incremental? Or renewal process may be dependent upon the grounds on which it is being renewed e.g. expiry of validity period, introduction of new technology, introduction of new spectrum band(s), introduction of new services(s) etc.? Please justify your response with rationale and suitable examples, if any.

1. We suggest that the renewal of rating should be incremental in nature. This will reduce the cost and compliance burden for the PMs while applying for renewal of rating and encourage them to seek the same before the end of the validity period if the need be.

2. In addition, the renewal process should be dependent on the ground on which it is being renewed. Although, while doing so the renewal authority should validate that the other parameters are also meeting the standard norms for the decided rating. For instance, a PM may consider renewal of rating because the validity period is over. Although while considering such renewal the certifying authority should validate that the DCI design, number of users, and demand of user hasn't changed from the time when earlier rating was awarded.

Q36. Whether the provisions to make an appeal should be introduced to give an opportunity to the applicant to make representation against the decisions of the Certificate Issuing Authority? What should be the time frame for preferring the appeal in case of disagreement with the rating assigned and its disposal? Please justify your response with rationale and suitable examples, if any.

1. We note that in case of any dissatisfaction with the decision of the HRACC, there is a provision of Appellate Authority, and the hotel may appeal to Secretary (Tourism), Government of India for review and reconsideration within 30 days of receiving the communication regarding classification or re-classification.

2. Similarly, any request for re-evaluation of rating awarded by GRIHA can be addressed by the GRIHA council. The rating is revised based on the fulfillment of compliance requirements and verification by GRIHA council.

3. Accordingly, we suggest that **provision for appeal against the rating awarded by the rating authority should be available with the PMs**, in case they are not satisfied with the rating. Such appeal may be made within 30 days of award of rating to the PM. We suggest that the appeal should be resolved through validation by the Appellate Authority in a defined time period, which may be 3 months.

Q37. If somebody is found to be using ratings in an unauthorized manner, what legal actions are proposed to be taken against such entities? Please justify your response with rationale and suitable examples, if any.

1. As mentioned above, we reiterate that one of the key terms while issuing of rating certificate by the authority should include conditions/situations where the PM may use/leverage such rating certificate. The authorized usage of rating should be clearly defined by the rating authority.

2. We suggest that if the rating authority finds any entity is using the rating certificate in an unauthorized manner, then it may withdraw the rating for applicable building. It may also consider imposing a suitable fine to recover the cost incurred in processing the rating application and publically publish the default list on its website and all local and major national print media newspapers.

Q38. Whether creation of a digital platform that allows stakeholders to co-design and co-create DCI would be helpful to realize better, faster, and cheaper solutions? Whether technologies and tools such as AI, ML would be helpful in achieving this objective? Please justify your response with rationale and suitable examples if any

AND

Q41. Which objective methods should be used to evaluate the DCI? How can various aspects of performance to evaluate the quality can be combined together? Please justify your response with rationale and suitable examples, if any.

AND

Q42. Which subjective methods should be used to evaluate perceived quality of DCI? Whether survey techniques can be improved considering penetration of smartphones? Whether improved techniques can help in providing insights and actionable items to improve DCI? Please justify your response with rationale and suitable examples, if any.

AND

Q43. Would combining the parametric values or results of objective and subjective methods be helpful in assessing digital connectivity that is closer to the perceived quality of experience? Please justify your response with rationale and suitable examples, if any.

AND

Q44. How advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML) etc. might be useful to make the evaluation process more nuanced and suitable for the purpose? How can AI/ML models evolve from the inputs of measurement and evaluation being carried out in other parts of the city, state or Country? Please justify your response with rationale and suitable examples, if any.

1. We understand that an efficient DCI solution requires collection of assessment of user demand, collection of data for assessment, develop a DCI design, implementation of same and evaluation for confirmation that the desired outcome has been achieved. Data collection and data analysis is a critical requirement for delivering an optimum DCI for any building.

2. Data collection and analysis is a complex process. Data collection involves both objective and subjective methods which needs to be combined. Dynamic nature of performance of wireless network makes the data collection and assessment further complicated. Variations in traffic demand also impacts quality of service.

3. For instance, objective methods of measurement include network performance monitoring app, crowd source apps, field measurements and prediction tools. While subjective methods may typically involve online surveys, face-to-face interactions, and feedbacks. Even when quality is almost same, people may rate quality differently and the experience of different users staying in the same residential society may not be the same or even close to each other. **Digital tools can help in engaging end-users to participate in the surveys and provide more precise information about the quality of experience.**

4. For overall assessment of quality, information obtained via objective methods needs to be compared with information provided via subjective methods. In fact, subjective methods may help in determining weightages applied in case of objective methods. Developing an optimum DCI solution may require more detailed understanding of the building structure, layouts and properties of material from which it is made.

5. Assessment of such complex set of data to arrive at optimum solution will required advanced digital tools. We submit that digital tools, **AI/ML may help in dealing with such large number of variants, developing optimum DCI design by deriving correlation between objective and subjective parameters data and even develop predictive models for future projects**.

6. Models of evaluation of quality would evolve over a period with better understanding of the context. In practice, there may be variants or sub-modules of the models which may be best suited for evaluation for a particular type of building. **Digital platforms created for this specific purpose may help in learning of this model from the data collected from different parts of city or state or country.**

7. We submit that local authorities can also develop a separate platform which allows DCI Designer on Record to register for specific buildings. Such platform can have the data repository for past projects in the region and requisite AI/ML tools for predictive DCI designing. Platform may allow defined number of designated login creation for a building which will allow the relevant stakeholders to view the data collected, DCI design based on data assessment and accordingly provide inputs to DCI Designer. For instance, a TSP may login, review the DCI Design to suggest enhancements on equipment/hardware for better

network coverage or modify the backhaul infrastructure based on data demand projection for a building.

8. We submit that maintaining such above mentioned platform for single purpose like digital connectivity infrastructure may be a costly proposition. But such information may be useful for variety of purposes and if digital repository of such information is maintained by local or state authority and made available to design and evaluate digital connectivity infrastructure, then it might be a feasible option. Hence, we suggest that such platform for coordination between relevant stakeholders of DCI for any building may be developed by local authority only. It will also ensure that access to such platform is fair and transparent.

Q39. What should be the typical process to rate a building? Whether terminologies and steps involved in the rating process need to be standardized? Please justify your response with rationale and suitable examples, if any.

1. We suggest that the typical process of rating a building can be as follows:

    a. PMs should submit a completed application in standardized format requesting for DCI rating for the building. Standardized procedure and guidelines should be published for collection of Quality of Service (QoS) related data from the site and end user. The rating authority should review the provided details for completeness.

    b. The details so submitted as part of application should include, among others,
        i. Details of area in which the building is located
        ii. DCI design of the building
        iii. DCI parameter values for different locations in the building, both as per DCI design as well as those confirmed by DCI Evaluators; eg: target data speed in the parking or inside room in any floor, etc.
        iv. Type of application, i.e. fresh or renewal due to any reason along with the reason

    c. The rating authority may review the details and, if necessary, will make its own assessment of the Design and parameter values in the building before issue of the rating certificate.

2. We suggest that for a fair and transparent ratings, it is necessary that terminologies, weightage and rating processes are standardized and the same should be known to all the stakeholders.

Q40. Whether the process of rating would vary based on the types of buildings? If yes, then what factors or aspects of a building would matter or impact the outcome of rating? Please justify your response with rationale and suitable examples, if any.

1. We submit that the data and services required by users occupying a building will be different depending on type of building; e.g. multistory building will have many areas, such as Lifts, Podiums, parking areas to name a few, which will not be applicable for smaller dwelling units. More often such areas are not given adequate coverage and connectivity resulting in poor user experience. Their communication and security requirements are also different. Some self-occupied single dwelling units may not even have the requirement or intent to get their building rated for DCI as it will not be giving them any advantage in terms of property value/tenancy. In such areas, RWA might be interested to have entire area covered under DCI rating rather than individual buildings.

2. Hence, for assessment of quality, context in which digital connectivity would be used is very important. Context may significantly change from one type of building to another type of building. It would be important to classify buildings from the point of view of digital connectivity experience. As discussed earlier, National Building Code of India and Development Regulations may introduce classifications of the buildings from a digital connectivity perspective. Wherever required, sub-classification may also be done to focus on specifics.

3. The information required for rating evaluation will be different for different type of buildings and so will be the weightages for various parameters. However, at the end, **it is the QoS and User experience which will be deciding factor for allocating rating.** The user experience will be with respect to user's expectation from the DCI which will differ based on Building Type. Accordingly, the building should be awarded a rating between one star to five star.

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