S&T CLUSTER ACTIVITIES

A cluster denotes several things of the same kind or a group, growing or held close together. This was the ethos of developing S&T city clusters consisting of people having similar ideas and passion otherwise unlikely to be coming together for a similar purpose. The cities were therefore selected based on dynamic institutions and expert people, each being a leader and achieving institutional or own goals.

Keeping this ethos in mind, the following three types of activities may be undertaken by each Cluster institution:

1. Creating a shared ecosystem
2. Becoming a regional solution provider
3. Becoming nationally and globally competitive

A draft set of suggested activities under each category, has been elaborated in this document and may be treated as a standard operating procedure for the S&T Clusters and also be referred to when creating MoUs with members and partner institutions.

1. Creating a shared S&T Ecosystem

1.1. Governance

- The cluster needs to set up/re-purpose a legal entity (SPV, Section-8, society, trust, etc.) to receive funds from public & private sources (independent of lead institute), on behalf of the cluster. A timeline driven approach may be adopted for the **creation of the legal entity** for the cluster.
- The cluster needs to hire an experienced and dynamic CEO/COO to build a stakeholder network including industry, start-ups, incubators, PSUs, MSMEs, local bodies, state Govt., line ministries, foundations and raise resources from public & private sector.
- The cluster may create its own vision and mission statement on how it plans to build a vibrant and dynamic S&T eco-system in its region and in the nation overall and be supported by an advisory board.
- The cluster may hire a dynamic team consisting of both scientists and science & technology managers to manage its various functions such as project management, technology development and management, legal, social media/out-reach, business development etc.
- The cluster can develop a dynamic outreach strategy including its website with engaging content about its activities and services. It may also create its accounts on social media channels to run engaging out-reach campaigns about its activities and S&T in general.

1.2. Process

- The cluster may create awareness about science and technology in the general public through outreach programs, roundtable dialogues, workshops, citizen science projects and through its own social media channels, in partnership with industry.
- The cluster may enable cross mobility of researchers, technical staff and faculty of member institutes through efforts such as (but not limited to): -
    - providing open access to common facilities such as libraries, laboratories, etc., the cluster should ensure all public academic institutions in its network are using the I-STEM portal
    - enabling cross-institutional credit courses for students
    - mobility of faculty, staff and students between academia and industries and vice versa
    - setting up common shuttle services between institutions
- The cluster may design and conduct high quality HR development programs and academic programs, with support from the industry and incubators. These can include inter-institutional fellowships to allow faculty intra-mobility among cluster members, allowing students to take up cross-institutional research supervisors, etc.
- The cluster may set up common facilities such as science museums, centers of excellence for technology validation, etc. open to all.
- The cluster may create short - term exchange programs between industry and academia, where experienced industry personnel can take a hiatus and come to teach while scientists can go to industry to work for short one to two year periods.

2. **Becoming a regional solution provider**

2.1. Industry engagement

- The cluster may aim to solve R&D problems of industry in India and globally, through consultancy projects.
- The cluster may create member consortia to apply for national and international grants for collaborative cutting edge research and development projects.
- The cluster may design and deploy a fair and open policy for sharing intellectual property among members and with partner industry in collaborative projects.

2.2. Startup and incubator engagement

- The cluster may involve a local incubator as a 'partner institution' and leverage their existing strengths of industry partnerships and technology development and innovation. This will create a network effect at a regional level. The O/o PSA will also be connecting the cluster to identified 'Mentors', for regular support.
- The cluster may open up member R&D infrastructure and testing facilities to start-ups for technology and product development.

- The cluster may collaborate with start-ups, MSMEs for piloting technologies suitable for commercialization and product development.
- The cluster may provide support and infrastructure for incubation of early-stage ideas of researchers of member institutes all the way to their conversion to commercial products/technologies.

2.3.Government engagement

- The cluster may build connections with the 'State S&T Council' and 'State Innovation Council/Society', both of which are embedded in the state machinery, and will help to address regional problems through S&T.
- The cluster may create inter-institutional research teams to undertake R&D projects, targeting alleviation of local issues using latest science and technology solutions.
- The cluster may work with the local government (state/municipal) to identify regional issues which can be solved using cutting edge S&T solutions for such problems.

3. Becoming nationally and globally competitive

- The cluster may undertake collaborative R&D global challenge projects aligned with the national missions and aspire to become national and global leaders in selected domains.
- The cluster may build formal partnership with international universities, research organization, foundations, etc.
- The cluster may target global industries for R&D consultancy.

The cluster needs to bring together its member institutes to solve national goals / local needs with available resources and lead such a mission in a manner that the results can be more than the sum of the whole. A broad overlay of how this may happen along with an illustration is suggested at Annexure – I.

Stakeholder Value Proposition from S&T Clusters

Academic Institutions and R&D organizations will benefit from cluster membership by getting increased access to facilities, manpower, funding opportunities, industry insight, potential student placement opportunities, etc. both at a national and international level.

Industry, through the cluster, will be able to out-source R&D and get access to the cutting-edge science and technology in their domain by interacting with a single entity.

Start-ups/MSMEs, through the cluster will get access to physical and human resources for product development and process improvement.

Local bodies, state govts. and line ministries will be able use the cluster to find technological solutions for critical local issues as well as bring India's S&T resources to bear on national goals, security and defense.

A Cluster Methodology for Collaborative Projects

1. An idea on how a cluster can try to arrive at a solution for a problem using all local resources is described below. The idea itself may not be a true depiction but has been penned down to help the clusters. Clusters may follow the below suggested broad principles:
   a. Define/identify a theme, for which the cluster has inherent expertise.
   b. Identify cluster institutes with expertise/strengths in the theme.
   c. Identify core researchers in the institutes who would be part of the thematic proposal.
   d. Define roles and responsibilities of each institute towards the theme.

2. Lead Institutions and PIs therefore may consider the following tasks outlined:

   a. Identify areas requiring people to work together to solve common goals. One among them whose idea is accepted by multiple institutions can take on the project as a project coordinator.
   b. Create a mechanism to involve maximum groups/institutions with a separate PI for each subproject under the project coordinator, from among the member institutions for the desired project or mission so identified.
   c. For each big project identified, find ways, and means to involve community participation, school/college students undertaking projects and volunteers/MSMEs etc. who can help implement the same. Stakeholders such as industry partners, multiple educational institutions, policy makers, entrepreneurs', philanthropists etc. Thus, the projects can be envisaged by a lead institution among the cluster members, brainstormed amongst themselves to make them equal stakeholders and then the cluster framework looks at methods of getting the resources aligned. Each big project is a theme under which small projects form as many member institutions piggyback to produce big results that count.
   d. The PIs presently identified for developing the cluster need to involve all partners to select or identify themes what the city cluster needs besides those provided as top down. Even for the top-down themes, all member institutions may be encouraged to submit a subproject instead of only partnering to provide data. A mechanism for each partner institution to submit an idea and all members to brainstorm each idea may be a way forward. Thus, the vision of the project to be undertaken also needs to have all stakeholders and partner institutions on board and ready to develop a common vision as equal partners.
   e. New ideas need to be encouraged and facilitated instead of continuing projects which one or a couple of institutions can undertake or are undertaking on their own.
   f. Member institution/industry/laboratory resources be opened, and a sharing mechanism be developed for the same making borders porous.

g. Multidisciplinary solutions from younger students and faculty should be encouraged under the umbrella of the cluster and the same should be available on an open forum among them.

h. All these aspects will need experienced project coordinators and a CEO to build the bridges under dynamic guidance of the PIs and Co-PIs of Cluster.

3. A rather simplistic depiction, JUST TO TRY TO ILLUSTRATE THE CONCEPT as example of a big project for a cluster, is as follows: -

Problem- Traffic woes, etc. of the city and how to turn it into a "Know Smart" City (Know for knowledge) in a time bound manner.

a) Step I - Brainstorm with a focused group discussion (FGD) within the city by inviting participation by member institutions as well as others who may contribute under the Cluster Umbrella and arrive at a consensus - <u>one month</u>.

b) Step II - Generate data and try to develop resources or products as POC through school colleges and other partner institutions - <u>six months to one year</u>.

Subprojects under this time frame

i. Surveys in the city as student projects - L1.

ii. Social aspects studied by volunteers/crowd sourcing such as problems of Police and how to increase discipline among society members, etc. - L2.

iii. Students and start-ups encouraged to develop IEC material apps as community products - L3.

iv. Colleges with IT specializations may develop IT solutions - L4.

v. Research Labs can share and involve internship projects to find solutions - L5.

vi. Integrated teaching module/course can be developed by one institution for members from different streams to work and learn together and produce environmentalists or smart citizens with holistic experience and ready to have their own start-up/consultancies' - L6.

vii. Develop smart solutions and innovative methods to reduce vehicles on the road – L7.

- Funds can be generated through proposals by each institution PI from various funding agencies. Cluster may only provide support first three months.

- Cluster can provide support and ensure student/partner interaction between all institutions depicted as L1-7.

- Cluster may find innovative ways to crowd fund or attract industry CSR.

- Involve city policy and decision makers and liaise with authorities to partner the initiative by the cluster.

c) Step III - MSME working in this field or keen to jump in can partner for implementation of projects as POCs and be invited to join in with any prototype solutions. Cluster academia can help select the appropriate solutions under the Cluster umbrella – one to two years.

d) Step IV - City policy makers can partner for trials implementation and funding the same – one to two years.

e) Step V - Prepare a report and scalability of the model - After 3rd year.