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Policy Watch - Interdisciplinary Cyber-Physical Systems

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National Mission on Interdisciplinary Cyber-Physical Systems is a comprehensive mission which would address technology development, application development, human resource development and entrepreneurship and start-up development in **Cyber-Physical Systems** and associated technologies.

Fifteen **Technology Innovation Hubs (TIH)**, six **Application Innovation Hubs (AIH)** and four **Technology Translation Research Parks (TTRP)** would be set up under the mission. It is being implemented by the **Department of Science & Technology** at a total outlay of 3,660 crore rupees for a period of five years.

Cyber-Physical Systems

- Government normally likes to implement physical entities such as energy grids, transport sector, agriculture, health etc on the ground i.e. making such services accessible to the whole population. For this, there is a need of technology/ cyberspace.
- Cyberspace includes technologies such as Information and Communication Technology (ICT), Artificial Intelligence, the sensors, the activators, the data science, the quantum technologies.
- **Interacting with physical systems in the cyberspace is referred to as Cyber-Physical Systems.**
- CPS and its associated technologies, today, are playing a **transformative role** in almost every field of human sphere. Therefore, **government and industries** in India are **preparing themselves** for adoption of these emerging and disruptive technologies **in order to remain competitive, drive societal progress**, generate employment, foster economic growth and to improve the **overall quality of life and sustainability of the environment.**

Drishti Input

- Cyber-physical systems **integrate** sensing, computation, control and networking into **physical objects and infrastructure**, connecting them to the Internet and to each other.
- Few Potential applications: **Driverless cars** that communicate securely with each other **on smart roads**, Sensors in the home to **detect changing health conditions**, improving **agricultural practices** and enabling scientists to address issues arising out of climate change, etc.

Highlights

- A strategic approach involving a suitable **mix of Academic, Industry and Government** is proposed to be adopted under the mission.
TTRPs will connect to Academics, Industry, Central Ministries and State Government for developing technological solutions.
- The mission would address the **entire gamut of technology development**, starting from research to the development of product.
- The mission will help in **preparing the young generation of India in futuristic technologies.**
- The research community in India do lot of research, in fact, India is third in the world in terms of publications but **in terms of products, India lags behind**; the **mission** addresses this particular segment in the **form of translational research.**
- The research, its translation into a product and startup and entrepreneurship development for the same are one of the core segments of this mission.

Importance

- It will help in the **development of cyber ecosystem** in the country **which would in turn help the government in spreading its national initiatives** in sectors like health, education, energy, environment, agriculture etc. among the people.
- India has lot of talent in the technology field (engineers, that too without jobs), the mission will help in **channelizing that talent** effectively. This is possible as mission focuses on creating an Entrepreneurship and Start-up Ecosystem that will create a number of technology driven job opportunities in CPS and allied areas.
- It will make an ecosystem where researchers will do the job that feeds into the start-up or innovation system thus **providing boost to ideas that get generated in laboratories**.
- The mission will help in making **Indian entrepreneurs globally competitive** with respect to emerging technologies.

Challenges

- **Demographic Dividend**
 - Technologies like Artificial Intelligence may **scale down a lot of jobs** which are prevalent in the country.
 - This will make a lot of people unemployed, though some people may get jobs also.
- **Proper implementation of the program is a challenge**
 - Technology is progressing at a very fast pace, making them available to a common man is difficult.
 - Bringing government, industries and academicians together is another big challenge.
 - There are less instances when industries have actually lifted the technologies developed by the academic community.

Suggestions

- India has to make sure that it makes **optimal use of human resources** in every field be it research, start-up or entrepreneurship.
 - Start-ups will provide job opportunities. By inculcating good training skills, India can effectively utilize its large human capacity.
 - Besides IITs and NITs, government needs to ensure that quality education is imparted in other higher educational institutes also.
- **Government** can play only a role of **facilitator**, in reality, **industries and academicians need to come together** to build innovative services/products.
- **For proper implementation**, 25 hubs under the mission should be established in academic institutions and each hub should get a technology business partner as well as a representative from private industry. Also, these hubs should work as per the needs of the government, this will ensure **collective working of industries**,

academicians and government in developing technological solutions.

