

## **Innovation system**

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I am extremely happy to participate in this international consultation on transforming Kerala to a knowledge economy and feel privileged to chair this session dealing with innovation system, the key pillar of a knowledge economy. The need to innovate is the basic prerequisite of a knowledge economy. Kerala has the history of chartering an innovation system centered around its people. Education and health were the primary emphasis for development. Along with public funds, private funds were also channeled for affordable health care and education thus making Kerala a development model in these sectors for rest of the country.

Innovation and technological changes are the key drivers for knowledge economy. In order to leverage from these two elements Kerala needs to develop an ecosystem based on an efficient knowledge system. A knowledge system that connects industry, education, research institutions and government is a critical element in contributing to regional and local innovation system. The efficiency of this knowledge system is predominantly determined by how well the knowledge is organized to contribute towards development at the local and regional level. Once the industry is enabled to use the knowledge created from education and research the industry will be able to offer knowledge intensive businesses and service activities. Studies have shown that manufacturing industries, especially MSMEs, are becoming increasingly innovative with higher R & D expenditure and greater integration with knowledge providers viz educational institutions and R&D centres.

Knowledge System can be strengthened by the creation of common infrastructure and developing missions/entities responsible for facilitating greater connect between components of the Knowledge System. Kerala has demonstrated this through the establishment of Kerala Startup Mission (KSUM) and Kerala Development Innovation and Strategy Council (K-DISC). KSUM has developed a vibrant startup ecosystem in the state. The state has initiated

a startup movement through the KSUM for forging and implementing forward-looking policies related to startups. KSUM supports the startups through a plethora of activities for strengthening them in the state through infrastructure, funding, linking startups to businesses and by providing all other support services. The present focus is to foster the growth of innovation led, technology startups. Kerala possesses a unique model of connecting academics, industries, R&D institutions and startups through the KSUM. KSUM is also responsible for the setting up of major infrastructure facilities and other allied services necessary for startups. The facility thus set up is shared by all the stakeholders across the state.

Kerala Development Innovation and Strategy Council is a strategic think-tank and advisory body constituted by the Govt. of Kerala. K-DISC brings out strategic plans, identifies new directions in technology and creates a conducive ecosystem in Kerala for fostering innovations through various engagements with academia, research and development organizations and with the government.

In knowledge economy, research priorities and policy issues should be explored by a group of institutions which form part of the knowledge system. 'Knowledge' as a concept should be unfolded into elements that can be analyzed and applied to both industry and regional innovation. Fundamental research is needed to understand how knowledge is transforming innovation processes enabling sustained economic development. The outcome of this research will lead to improving all the components that are part of the knowledge system. This will lead to the understanding of new interventions required in furthering developments of the economy through infrastructure creation, policy making etc.

The competencies required for driving innovation and embracing technological advancements towards the development of all sectors require a robust Higher Education System. The Higher Education system should (i) enable the creation of talents with innovation mindset (ii) produce agile work force with competencies in digital technologies (iii) lay emphasis on IP based research (iv) facilitate strong industry connect (v) generate entrepreneurs capable of creating businesses which can bring in sustainable economic development with access to national and international markets. These issues I hope will be taken up in next session.

Industry 4.0 is transforming the way businesses work and also the manufacturing landscape as a whole. Adoption of digital technology in all sectors, empowering such sectors will be a

game changer in Kerala's journey towards Knowledge Economy. In this effort, Inclusive development can be made possible if the digital divide is properly addressed. Kerala's proposed infrastructure for connectivity will address this. Traditional manufacturing technology will be accelerated by the Industry 4.0 technologies such as intelligent robots, autonomous drones, sensors and 3D printing which are proven to be exponentially growing technologies. The convergence of these digital technologies and existing industry will have positive impact in the local and global value chain. The innovation activities around these converged areas will need to be channeled to the global innovation system thus creating open innovation culture in Kerala.

An open innovation ecosystem which is connected to global innovation system especially in high technology areas will be a promising base for Kerala's growth and development based on Knowledge Economy. Such a vibrant ecosystem will reinvent itself with the dynamics of each of its components and also reorganize the organization of Knowledge and its flow in the value chain from time to time for the state's economic development. With this background I would like to invite Dr P V Unnikrishnan.