

## **'Innovation Clusters' as 'Growth Poles' to Propel Industry 4.0 Capacity Building of small and medium enterprises (SMEs) and Startups**

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**Abstract :** Industry 4.0 envisages 'smart' manufacturing and services, taking the automation of the 3rd Industrial Revolution to the autonomy of the 4th Industrial Revolution. Powered by innovations in technology and business models, this disruptive transformation is revitalising industry by integrating silos across and beyond value chains. Motivated by the challenges faced by SMEs and Startups in understanding and adopting Industry 4.0, this paper aims to analyse the concept of Growth Poles and evaluate the possibility of its application to Innovation Clusters that strive to propel Industry 4.0 adoption and capacity building. The proposed paper applies qualitative research methodologies including focus groups and survey questionnaires to identify the various factors that affect formation and development of Innovation Clusters. Employing content analysis, the interaction between SMEs and other ecosystem players in such clusters is studied. A strong collaborative culture is a key driver of digital transformation and technology adoption across sectors, value chains and supply chains; and will position these cluster-based growth poles at the forefront of industrial renaissance. Motivated by this argument, and based on the results of the qualitative research, a roadmap will be proposed to position Innovation Clusters as Growth Poles and effective ecosystems to support Industry 4.0 adoption in a region in the medium to long term. This paper will contribute to the current understanding of the role of Innovation Clusters in capacity building. Relevant management and policy implications stem from the analysis. Furthermore, the findings will be helpful for academicians and policymakers alike, who can leverage an 'innovation cluster policy' to enable Industry 4.0 Growth Poles in their regions.

**Keywords :** digital transformation, fourth industrial revolution, growth poles, industry 4.0, innovation clusters, innovation policy, SMEs and startups

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