

# Industrial Economic and Spatial Clustering in Singapore

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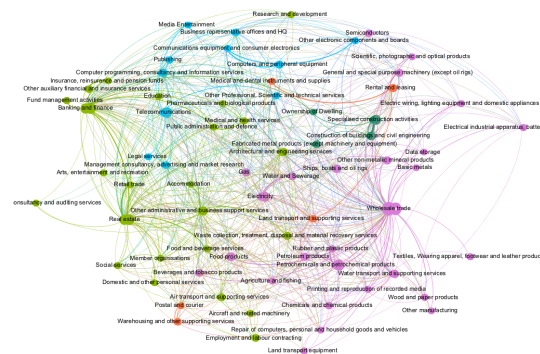
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## ABSTRACT

Economic activities between and within industrial sectors serve as a primary driver of urban growth. Clustering effects between sectors can occur organically or inorganically (e.g. through government intervention via subsidies or grants or policy regulations), and are defined by geography, value creation, and business environment<sup>2</sup>. Industrial clustering facilitates a business ecosystem that can benefit from economies of scale and the flow of information, goods, and services. Clustering effects may be observed differently depending on the nature and type of industrial activities. A better understanding of industrial clustering effects for industries will enable governments to formulate increasingly informed policies and strategies to foster the growth of economic ecosystems. It will also bolster strategic decision-making for firms and companies in evaluating the location, size, and type of economic activity for their businesses.

In this study, we analyzed economic and geographical data from Singapore in an attempt to understand if economic and spatial features in the context of a small city-state exhibit clustering effects. A small island of 719 km<sup>2</sup>, Singapore is ranked among the top ten countries in the world for per capita Gross Domestic Product (GDP). Using measures on the Total Requirements Coefficient between all economic sectors in the economy, our study analyzed the clustering network to identify sectors that exhibit strong economic linkages among each cluster. Geographical clustering effects are studied in detail using data on the geographical location of sectoral clusters as nodes, weighted by the cluster size in terms of nett floor area (NFA) at each cluster node.

Using the clustering network detected in the first stage of the study, we examined the relationship between economic linkages and spatial clustering across and within industrial sectors. To address this, cluster matching analysis was conducted to study the strength of the relationship between both types of clustering network. This study found that the economic and geographical clustering activity exhibit global similarity of approximately 0.6, which suggests that on a broad level, the economic linkages and spatial clustering of industrial sectors tend to be correlated. Lastly, pairwise asymmetric comparison between industries in the broad sector was proposed to evaluate if industries grouped together in the spatial cluster were also grouped together in the economic clusters.



**Figure 1.** Cluster result on 71 sub-sectors of Singapore.