Part I The rationale for studying cluster dynamics

> *A district which is dependent chiefly on one industry is liable to extreme depression, in case of a falling-off in the demand for its produce, or of a failure in the supply of the raw material which it uses.*
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> Alfred Marshall 1920, p. 273

Who will win the globalisation race? For most nations, this question is very closely connected to the success of its firms and industries. Insights into the determinants of firm competitiveness have thus always been of chief interest – not only to policy makers, but also to economic scientists. In this context, the concept of 'Clusters' has attracted considerable attention since the early 1990s. This is attributable to the fact that clusters not only enhance firm competitiveness but also increase their spatial embeddedness. The concept argues that spatial concentrations of companies in the same or related industries are beneficial to firms. Due to their co-location, companies are able to forge trust based relationships, not only with other firms but with other important regional players (such as government institutions, local buyers, local universities and so on). Therefore, firm innovations spread faster, products become more specialised and are also upgraded at a quicker pace within than outside such clusters. As these positive cluster effects are based on local linkages between actors, the concept also offers an explanation of the phenomenon that despite increasingly global markets, companies in one industry tend to locate together (the 'globalisation-localisation paradox').

What is often forgotten in the euphoria about creating and enhancing regional prosperity through clusters is that areas facing severe structural problems today were thriving clusters in their time. However, as the technological evolution progressed, these regional structures proved unable to adapt and were rendered obsolete. At the background of an increasing number of countries pursuing some sort of strategy to create the next Silicon Valley, the question of whether clusters exhibit a life-cycle – or whether their deterioration can be avoided in a world of increasingly fast technological developments has to be asked. This study addresses the aforementioned issue by investigating *whether, how and when agents in clusters can adapt to adverse change events in their environment and what factors at the cluster level may assist them in doing so*. By comparing adaptive performance of clusters exhibiting different architectures, the model results shed light on empirical findings by linking them with theoretic research. Moreover, the findings indicate that the cluster's architecture that has evolved throughout its past history can be better or worse for its future survival. Finally, the study constitutes a first step towards a more dynamic perspective in cluster theory.