Preface

This book collects the main results of the *Cleverbio* Project. "*Cluster development and growth in bio-tech: enabling factors and best practices*" (Cleverbio) is a project funded by the *European Commission* within the *Fifth Framework Programme*, within the topic "*Quality of life and management of living resources*". The consortium which carried out the project is composed of six partners: University of Milano-Bicocca (scientific coordinator), Department of Biotechnology and Biosciences, Milano, Italy; Associazione Impresa Politecnico (financial and administrative coordinator), Politecnico di Milano, Milano, Italy; East Region Biotechnology Initiative (ERBI), Cambridge, UK; East Jutland Innovation, Aarhus, Denmark; Heidelberg Technology Park, Heidelberg, Germany; Ecole Superieure d'Ingegnieurs de Marseille, Marseilles, France.

The project studied the cluster development in the biotechnology sector. Clusters can be defined as the geographical concentration of different actors such as interconnected companies, specialised suppliers, service providers, institutions, which compete and cooperate in the same industry. Cluster development is a complex process and usually involves a number of actors such as governmental departments, economic development agencies, public administrations, universities and research centres, companies of different types, financial institutions.

There is a wide body of literature on clusters. However, most works concentrated on the description of the cluster: who takes part to the cluster, his role, how the interactions take place, which are the main advantages of creating and being part of a cluster. Much less attention has been paid to the dynamics of a biotech cluster: how the cluster developed and develops, which are the key factors enabling the cluster to grow, the main problems faced. The project aimed to give an answer to these questions.

The project objective was to define a normative model for cluster development in the biotech sector, which identifies key mechanisms to favour the growth and development of a cluster and the best practices in use to manage a cluster.

To achieve the above objectives the project has carried out:

— an empirical study on biotech clusters, examining how they work and identifying the critical factors enabling the growth and development of a cluster in the biotech sector;
— a detailed analysis of dynamics, triggers, barriers and problems related to a cluster, in order to capture the best practices and provide key recommendations.

The empirical work consisted of the in-depth analysis of the five clusters represented in the consortium, concerning five different European countries: Denmark, Germany, France, Italy, UK. The clusters examined are at different stages of development:

— Cambridge is the most important cluster in Europe and one of the strongest biotech area at worldwide level,
— Heidelberg is a major European cluster and one of the strongest in Germany,
— Aarhus in Denmark as well as Marseille in France are at an early stage of development,
— Milano in Italy is at an embryonic stage of development.

Moreover, other clusters have been analysed, such as Paris-Evry (France), Uppsala (Sweden), Biovalley (Switzerland), Bay Area and San Diego (US) to have a more comprehensive sample.

The ultimate result of the project has been to build a normative model for cluster approach in biotech. The normative model identifies the following aspects:

— pre-requisites to cluster approach, i.e. the conditions which allow a cluster to grow;
— driving forces for cluster growth and development, i.e. key mechanisms enabling the cluster to develop;
— best practices in cluster development and management (in relation to barrier removal, solutions to typical problems to be faced etc.).

The book also shows that biotech clusters born and develop on the basis of different processes: some were born and grew spontaneously thanks to the original co-presence of the key success factors (spontaneous clusters) and some others were born as the result of the actions of public actors. Among the latter, this book shows that different mechanisms and policies were at the origin of the process (industry restructuring policies and industry development policies). Finally in few cases the process of clustering started as a result of a combination of different original conditions (hybrid clusters).

This book therefore intends to be of help for: (i) scholars studying the cluster phenomenon and the process of clustering in the biotech (but also, to a larger extent, in high tech industries); (ii) policy makers, involved in the process of undertaking supporting actions to the development of the biotech sector; (iii) managers of institutions, agencies, initiatives in charge of promoting the development of biotech clusters.

The book is composed of ten chapters. The first chapter provides a brief review of the concept of cluster and gives information about the Cleverbio Project. The second chapter gives an overview on the biotech industry (types of firms, business models, sources of competitive advantage). The chapters from three to seven give an overview on the five cluster examined: Cambridge, Heidelberg, Aarhus, Marseille, Milan, whereas the chapter eight describes the main characteristics of other major biotech clusters in the world. Finally, the chapter nine describes the normative model, showing pre-requisites, driving forces and best practices in biotech clusters, and the chapter ten draws some conclusions, identifying the different development processes and clustering forms in the biotech industry.

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