# Introduction

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**Biographical notes:** Daniele Archibugi is a Research Director at the Italian National Research Council, IRPPS in Rome and Professor of Innovation, Governance and Public Policy at the University of London, Birkbeck College. He has graduated in Economics at the University of Rome and taken his PhD at the University of Sussex. He has worked and taught at the Universities of Sussex, Naples, Cambridge and Rome. He has been Leverhulme Visiting Professor at the London School of Economics and Political Science and Lauro de Bosis Professor at Harvard University. He is an adviser to the European Union, the OECD, several UN agencies and various national governments.

Wine is hardly a new product. Already widely drunk and traded in the Middle East and around the Mediterranean several thousand years ago, it has slowly but consistently diffused itself across the five continents. Anybody who has ever taken part in a vintage will remember how easy is to produce wine: it simply requires collecting and pressing grapes and storing the juice in barrels until it ferments. But even an inexperienced drinker quickly finds that each wine tastes different. These differences in taste are so valued by consumers that a vintage bottle of wine can be a luxury or positional good, as expensive as a diamond. However the bulk of the annual production of wine is not expensive: it is a rather reasonable and affordable beverage widely diffused to the tables of restaurants and households. As with any other consumer product, its sales are affected by traditional factors: price and quality.

In spite of its ancient genealogy, over recent years the world wine industry has been heavily transformed. As Keith Smith shows in an introductory paper, two major supply and the demand factors are affecting the wine industry. On the one hand, the total volume of wine produced is declining; on the other, the total value of production is increasing. In a nutshell, we are drinking less wine, but of better quality, with higher unit prices. The era in which a litre of honest unbottled table wine was cheaper than a litre of gasoline still exists in Italian, French and Spanish towns, but is drawing to a close. The business of wine is becoming more and more lucrative, provided that increasingly global norms of quality are met.

As we might expect, profits and growth are bringing in new players. The traditional Mediterranean countries that for many centuries accounted for the bulk of wine production are now challenged by producers in other continents: Australia, South Africa, the USA, Argentina, Chile and soon also China, have become major producers and exporters of wine. Still, the forces of tradition are very strong, and France, Italy and Spain continue to be the three largest producers. But both traditional producers and newcomers are under new pressures. Not surprisingly, one of the key cards used by firms to win the competitive race is innovation. Keith Smith and Ian Marsh show how Australian production has transformed by mechanical process innovations, while the combination and increasingly science-based processing of grapes have shaped product innovation. The pace of innovation in the wine industry suggests a much broader lesson: no industry should be considered mature since almost all of them can be affected and transformed by new technologies. While the discourse on national competitiveness is generally focusing on the high tech part of the economy, the wine industry provides clear evidence that innovation can be pervasive and can reshape even the oldest industries. A subdivision of the economy into the high and low tech components can therefore be rather misleading since some companies in the low tech industries are often more innovative than some of those in the high tech ones.

The case of the wine industry also shows that industrial knowledge seldom emerges in isolation. On the contrary, it is associated with geographical clusters, networking and interactions between science and production. Almost all the contributions to this special issue highlight the importance of clusters of innovators. Martin Bell and Elisa Giuliani show the relevance of the interconnections between firms and public research centres in the context of a traditional producer such as Italy and a successful newcomer such as Chile. Fulvia Farinelli shows how the strengths and the weaknesses of a regional innovation system are a fundamental component for development in the Argentinean context. Andrea Morrison's and Roberta Rabellotti's paper is devoted to a traditional strong wine production region, Piedmont, highlighting how the recourse to universities and public research centres has become a key factor in preserving competitive advantage in the face of global market competition.

Although the basics of wine production are very simple, to master it successfully in terms of its complex inputs and high output standards is a very demanding task, requiring effective knowledge management. Elisa Giuliani shows that tacit knowledge continues to be a crucial component, although it is today very different from the one which dominated the craftsmanship for so long. To be able to transfer and sometimes to codify this knowledge is often a key for success. It also emerges that local or national innovation systems are not necessarily successful if they are not properly integrated into a global strategy. The case of Australia, discussed by David Aylward, Keith Smith and Ian Marsh, shows how the lack of an appropriate internal context may lead to mergers and acquisitions and to the domination of the industry by a few multinational corporations.

The transformations in the world wine industry scrutinised in the papers of this special issue provide an illuminating case study of the interaction between the forces of technological change with those of globalisation in an industry often regarded as traditional and mature. They suggest that virtually all sectors of the economy can be revolutionised by innovation and can provide good market opportunities, that both tradition and innovation play a key role in competitive success, and that development strategies can draw on such change. How these factors play out, however, depends not only on how countries manage the knowledge transitions that underpin modern wine production, but how they relate to the increasingly globalised context that shapes both the technology of the industry and its patterns of corporate control.