Chapter 12
The Biotechnology System in Oxfordshire: A Long History

Helen Lawton Smith
Birkbeck University of London, UK & Oxford University, UK

Saverio Romeo
Birkbeck University of London, UK & Oxford University, UK

ABSTRACT

This chapter aims to bring together an understanding of the dynamics of the growth of sectoral systems and of their performance. These two approaches are combined to examine the evolution over time of the biotechnology system of innovation in Oxfordshire in the South East of the UK. It addresses the research questions of what are the key features of this local sectoral system and what are local strengths and weaknesses? A European Union FP7 HealthTies project (2011-13) has been a key source of data for this chapter.

INTRODUCTION

Research on systems on the evolution of systems of innovation from a geographic perspective has taken off since Philip Cooke's early work on regional system of innovation (Cooke, 1992, 1998) which had its origins in national systems of innovation (e.g. Lundvall, 1992 Nelson, 1992). This has been driven both by advances in theoretical analysis, and by the need for new policies to address regional inequalities and divergence (Asheim et. al. 2011). Another stream of literature on systems with a strong focus on sectors is that of sectoral systems of innovation (see for example Carlsson and Stankiewicz, 1991, Carlsson et al. 2002, Malerba, 2002, 2005).

Both of them aim to assess the dynamics and the performance of a system under scrutiny through a number of metrics. This paper aims to bring together the two approaches looking at the evolution over time of the biotechnology system of innovation in Oxfordshire in the South East of the UK. Literature on systems of innovation highlights how a rich, dynamic, and interconnected

DOI: 10.4018/978-1-4666-8348-8.ch012

environment of different players – government, academia, and businesses – is the precondition of a high-performance system. This paper starts from the assumption that the Oxfordshire & the Thames Valley system is a rich, dynamic and interconnected system. Based on this assumption, the paper shows the increasing growth in terms of sectoral performance and of impact on the regional economies of the biotechnology sector over time. However, as we will show, it has its weaknesses. Therefore, it addresses the research questions of what are the key features of this local sectoral system and what are local strengths and weaknesses?

The paper is based on a combination of sources and data from different research projects run by the authors. The European Union FP7 HealthTies project (2010-13) has been a crucial source of data for this paper. The HealthTies consortium aimed to benchmark different European based biotech hubs and draw policy conclusions from that activity[1]. The main partners were Oxfordshire (& the Thames Valley) plus three other European biotech centres (Medical Delta (Netherlands), Zurich, (Switzerland) and Biocat (Spain). The benchmarking process was supported by the development of a database of biotech companies operating in each region by each partner team. Every company was assessed through key performance indicators such as number of employees, turnover, number of patents in four disease patent classes, and the number and location of offices. The history of each was also analysed looking at historic data of the key performance indicators, but also through a qualitative assessment of the company highlighting key milestones such as merger and acquisition. The paper also relies on other literature and research – some of it undertaken by the authors and the Oxford Economic Observatory (OEO) - that has analysed the biotechnology sector in Oxfordshire since the 1990s[2]. The paper assesses the longevity and the quality in terms of performance of the system and how these are supported the research base in Oxfordshire.

BACKGROUND: LOCAL SECTORAL SYSTEMS OF INNOVATION

The development of the systems of innovation approach has been largely influenced by two main schools of thought: on one side Lundvall's (1992) interactive learning and on the other evolutionary theories, particularly related to technological change and technological trajectories (Edquist, 1997). Lundvall (1992) argues that innovation is a ubiquitous phenomenon and that agents who compose the system of innovation cannot know all the possible outcomes of their innovative activities. In order to reduce this uncertainty, innovation agents are continuously involved in interactive learning processes. The learning process is an element in processes of selection among different technological solutions. At this point, Lundvall meets the evolutionary theorists e.g. Nelson (1992) and Dosi (1998) who argue that technical change is an open-ended and path-dependent process where no optimal solution to a technological problem can be identified. Innovation is therefore a continuum without ever reaching a point of equilibrium, but with a sequence of sub-optimal solutions, each one related to each other. Lundvall's learning process is the basis of a continuous change based around interactions between different agents (Edquist, 1997). This implies that innovation is not a linear process, but a system of relations among components (agents, organisations), relationships among these, and their characteristics or attributes (Carlsson et al. 2002). Likewise Malerba (2002) defines a sectoral system as a set of products and agents carrying out non-market and market interactions designed to bring those products to market. A sectoral system has a specific knowledge base, technologies, inputs and demand.

The next step is to define the nature and the characteristics of these agents in a local sectoral system, focusing on the growth in this case is a cluster of biotechnology firms, over nearly thirty years. In doing that it is shown that the system of innovation approach takes different directions.