
Towards a European Research Area? Lessons from Biotechnology

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Abstract

The article discusses the question of whether there is a significant shift of technology and innovation policies from the national to the subnational and especially to the European level—and does so against the background of biotechnology policies. The first argument is that regionalisation has not led to a loss of influence of national policies. The second argument is that there is a significant shift of legal responsibilities from the national to the European governance level. National authorities, actors and debates nevertheless play a crucial role in the negotiations and decision-making processes at the European level. The third argument is that great problems are faced in developing a consistent and coherent European research and technology policy. European technology and innovation policy efforts have until now been unable to compete with the national policies of the leading Member States.

Introduction

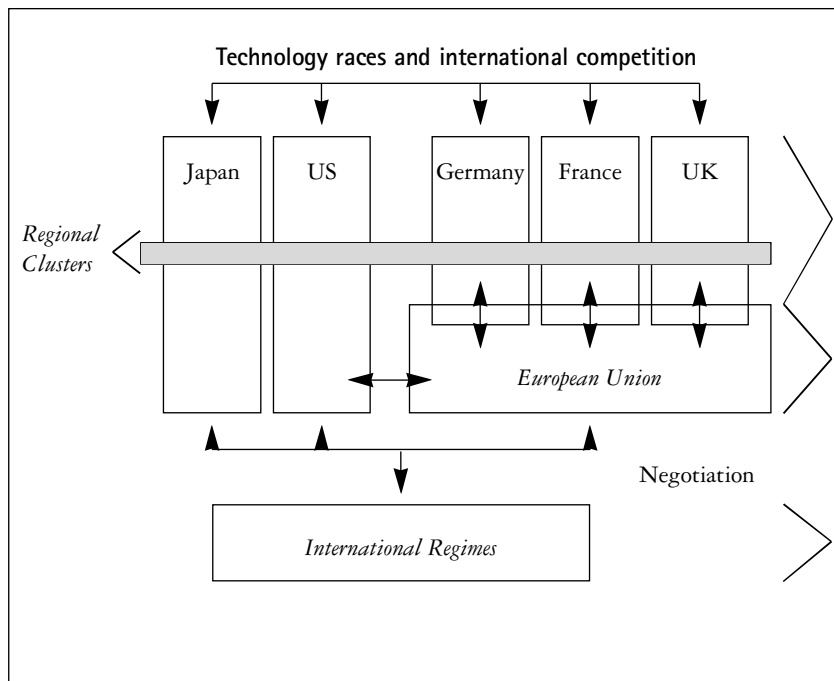
Biotechnology is a new field of scientific research and industrial innovation activities that reaches far beyond national institutional frameworks and policies. The generation of new knowledge takes place in research institutions that are linked up by international scientific discussions and co-operations with foreign counterparts. And the economic commercialisation of biotechnology is determined by the activities of both established multinational enterprises and new start-up firms which compete and cooperate mainly on the international level.

Moreover, biotechnology policies, too, have been subdivided into a multi-level governance structure in the last two decades. On the subnational level regional biotechnology clusters and innovation policies have emerged and have constituted specific modes of regional interaction between firms, banks and venture capital organisations, federations of industries, universities and technology-transfer institutions (Braczyk *et*

al. 1998). And on the European level the European Community has not only set a legal framework for biotechnology research and production, field trials, gene-manipulated food and plant protection but has also installed specific biotechnology research programs and—most recently—has developed a concept to link up the technology policies of the Member States and strengthen European integration in this policy field (Gottweis 1998; Grande 2001; European Commission 2000).

Against this background I will make a contribution to the question of what remains of specific national systems of (biotechnological) innovation and especially of distinct national technology and innovation policies (Bartholomew 1997; Kuhlmann 2001; Grande 2001): Is there a significant shift of policy efforts from the national to the subnational and especially

Figure 1. Multi-level governance and innovation systems in biotechnology

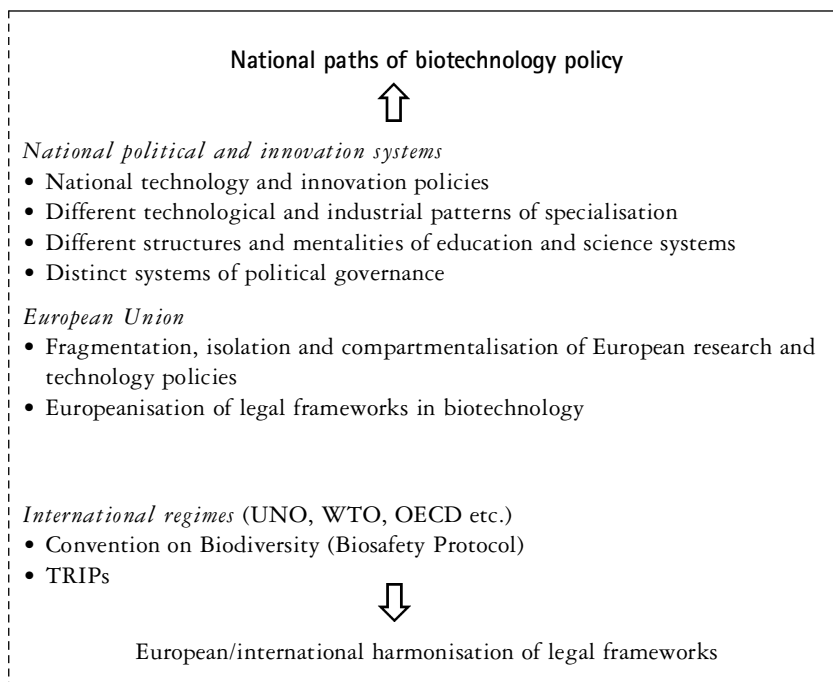


to the European level? And are the competencies of national policies being eroded under these circumstances? (see Figure 1).

Subnational policies and regional clustering

Let me first take a brief look at the subnational level—and the role that national policies play in the emergence of regional biotechnology clusters.

In the US earlier and in Western Europe since the 90s, we can observe an increasing concentration of biotechnological research and commercialisation activities in a few regions or districts—a phenomenon that is of growing importance for the competitive advantage of the leading nations in Biotechnology. Typical characteristics of regional biotechnology clusters are a critical mass of scientific knowledge embodied in excellent research institutions and qualified scientists, a high density of start-up firms, the



existence of venture capital, of technology-transfer institutions and of local science parks as well as close (and often informal) collaboration structures between scientists, firms, banks, and local government etc. (Prevezer 1997; Center of Technology Assessment in Baden-Württemberg 2000).

In Western Europe (and—with the exception of California—even in the US) regional biotechnology clusters did not evolve of themselves as autonomous projects of regional actors within regional structures, but were instead strongly supported by specific national initiatives and programs—in the form of small business innovation research programs (in the US or the UK) or inter-regional contests (like the BioRegio contest in Germany). Such national initiatives, especially the German contest, turned out to be major impulses in bundling regional resources and competences and were crucial forces in connecting the regional actors (Audretsch 2001; Cooke 2001; Dohse 1998).

So my *first argument* is that biotechnology regions are first of all part of the national systems of innovation and governance. The competitive advantage of the leading nations in biotechnology depends increasingly on the existence and efficiency of such regional centres of excellence. The national technology policies have reacted (sometimes very successfully, as in Germany) to this challenge. National programs, initiatives or contests have played (and still play) an important catalytic role in the evolution of regional biotechnology clusters. Regionalisation therefore has not led to a loss of influence of national policies. Instead it seems that this is a guided regionalisation, stimulated and co-ordinated first of all by national policies—and, of course, underpinned by additional efforts of regional authorities.

European governance I: Legal activities

Over the last twenty years the European Community has reached a new level of governance in biotechnology—mainly in two areas: in the implementation of a legal framework for biotechnological research, production and commercialisation, and in the institutionalisation of specific biotech-

nology research programs (Cantley 1995).

Since the end of the 80s the responsibilities for the implementation of a *legal framework* have shifted heavily from the national to the European level. Meanwhile, the negotiations, decisions and responsibilities dealing with legal aspects take place mainly at the European level. But even this significant shift has not led to a dramatic loss of influence of national authorities, actors and controversies until now. We can observe this when we take a look at the discussions about re- or de-regulation of the existing European guidelines which have taken place since the mid-90s, where the European Commission remained as a reactive actor. Three indications:

First of all, under the influence of industrial and scientific demands and a low public acceptance of the technology, the governments (and ministries) of the Member States blocked existing guidelines and put the Commission under pressure several times to develop more restrictive ones (Dreyer and Gill 2000). The national governments turned out to be the proactive authorities in this debate. Secondly, the European lobbies and pressure groups, even the well-organised industrial federation EuropeBio, have only small staffs in Brussels. The bulk of legal and political expertise still comes from the national federations (Grant 1993), and they do not only try to influence European policy directly but are also in close contact with their national governments and aim to influence their initiatives in European negotiations. Finally, while the legal responsibilities have shifted to the European governance level, the public controversies and conflict mediations around the technology mainly take place in very distinct national settings (Behrens 2000). Until now the European debate on biotechnology is not much more than the addition of the national debates that the national authorities have to moderate and struggle with.

Therefore my *second argument* is that of course there was a significant shift of legal responsibilities from the national to the European governance level in the 90s. But this cannot be interpreted as a hierarchical construction—with the Commission as the new leading actor at the top. Even here national authorities, actors and debates play a crucial role in European negotiations and decision-making processes.

European governance II: Innovation and technology policies

In the second field of European biotechnology activities, *technology policy*, one can hardly identify such a comprehensive shift. It is true that there are specific biotechnology programs within the European Union's framework programs. In financial terms these programs have increased substantially since the 80s, even if they have not been able to compete with the national efforts and resources of the leading Member States up to now (Bongert 2000). But European technology policy has not been able to connect the national research infrastructures of the Member States, has not been able to intensify the European co-operation between academia and industry or to co-ordinate the national technology and innovation policies of the Member States. The Commission itself stresses this negative record in the 'Communication Towards a European Research Area' by stating that 'It cannot be said that there is today a European policy on research. National research policies and Union policy overlap without forming a coherent whole', and adding, 'Above the European research effort as it stands today is no more than the simple addition of the efforts of the 15 Member States and the Union' (European Commission 2000: 7). All this is also applicable to biotechnology—with the exception of the Human Genome Program (Ernst and Young 2001: 68).

But what are the reasons for this 'fragmentation, isolation and compartmentalisation of national research efforts and systems', to use the Commission's own words again?

The *first reason* for the failure of a coherent European technology policy is that all leading nations are involved in an international technology race and a fierce struggle over competitive economic and technological advantages around this technology. This struggle does not only take place between economic blocs—the US and Western Europe, for instance—but also between the leading Member States of the EU (Ernst and Young 2001: 67f). In this competitive environment, national technology and innovation policies are of high strategic importance (Kuhlmann 2001; Dolata 2001).

The *second reason* is the remarkable lack of industrial interest in European technology policy and especially in European research programs. In contrast to the information technology industry, the research and development of the pharmaceuticals and chemicals industry is traditionally self-organised and self-financed. The industrial actors involved here, especially the big players, do not only self-organise their research and development activities, they also prefer to collaborate and co-operate with academic institutions and other firms directly, without the support of public programs. And they go shopping whenever and wherever they like—and pay the bills. They do so not only because of their philosophy; they can do so because of the particularities of this technology: it is small-sized, very specialised and decentralised. This supports fluid and self-organised collaborations within the industry and between industry and academia—without the state's help (Dolata 2002).

My *third argument*, therefore, is that the problems in developing a consistent and coherent European research and technology policy are based firstly on the fact that the national policies are of high strategic importance for obtaining competitive advantages, and secondly on the fact that the Commission until now has not been able to depend on powerful industrial counterparts that want or need a strong European policy in this field.

Conclusions

Some stimulating *conclusions*:

First of all, the Europeanisation of biotechnology policy has developed differently. A significant shift towards the European governance level can be observed in the implementation of a legal framework for this technology. The main reason for this is that its international harmonisation is—like norms or standards in other technologies—a major prerequisite for research, production, commercialisation and trade in this area. In contrast to this, the strategies and policies that aim at getting competitive advantages are still the domain of national policies, programs, negotiations and decisions. Over and above that, the national settings are the main levels where the public controversy around this technology takes place.

Secondly, today there is no doubt that biotechnology policies are embedded in a multi-level governance system. But this is not a hierarchically structured system where the policies of the Member States are subordinate to the European level of policy-making. I have tried to show that a lot of responsibilities remain at the national level and that even when there is a significant Europeanisation of efforts, national authorities, actors and interests play a prominent role in the European decision-making process.

Thirdly, the European system is not only a system of negotiation (it is of course that, too) but at the same time an area of fierce competitive struggles, technology races and strategies to win economic advantages. Germany, Britain and France clearly intend to compete for the pole position in European Biotechnology—and they are doing so with distinct national policies. One can hardly explain the lack of coherence and coordination in European technology policy when one loses touch with this competitive level of political interaction.

Last but not least, returning to my starting point: what remains of national innovation and technology policies? The answer is: a lot. In general the focal point of the biotechnology policies of the leading Member States has shifted from the support of home-based multi-national enterprises to the promotion of innovative landscapes that are attractive for both further scientific development and economic commercialisation—and that are attractive for investments from wherever. To this end in Germany, for instance, from the mid 90s onwards, political initiatives were started to stimulate the emergence of regional biotechnology clusters, promote the evolution of new start-up firms, bring the academic education and science system in line, strengthen the technology transfer from academia to industry and increase the federal research and development budgets in biotechnology. European policy cannot compete with all this. National technology and innovation policies are not dead.

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