Utility spots: science policy, knowledge transfer and the politics of proximity

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Summary

How we think about and act on the *usefulness* of scientific research has epistemological and political implications: what knowledge consists of, how it comes about and to what ends. In this dissertation, I situate the usefulness of scientific research in concrete places for knowledge exchange. The exchange of knowledge within and between environments is shaped by many spatial factors: from architectural designs, physical proximity and material infrastructures to city planning, regional development and geopolitics. And not only knowledge travels: also spatial models for research organisation circulate. Focusing on 'utility spots' instead of prominent scientists, dominant disciplines or powerful organisations is proposed as a fruitful way to highlight the intersection of political, societal, economic, cultural and scientific developments. This allows me to relate different utility concepts to the histories of science, universities, science policy, and the geopolitics of the Atlantic world in the second half of the twentieth century.

Chapter 1, 'Introduction. Situating Science Policy in Space', posits the central question answered in this dissertation: in which ways do spatial models of knowledge production shape and reproduce the concepts and politics of the utility of scientific research in the late-modern Western world? This question was incited by a recent controversy in Dutch science policy over value creation from academic knowledge production, or 'valorisation'. To better understand the limits and potential of such science policy concepts I use the spatial lens of the utility spot and situate, for example, valorisation in concrete places and times. I propose utility spot therefore as *heuristic* concept to uncover the intersection between *utility* and *spatiality* in historical reconstructions of the policy and practice of publicly funded research.

This spatio-historical approach to utility is the result of a critical synthesis of four strands of literature. Taking my cue from studies on the historicity of meta-scientific concepts (such as objectivity) and non-modern epistemologies of useful research (such as technoscience), I situate utility as a historical-epistemological category that shapes research practice. In addition, I stress the importance of place also for practices of knowledge exchange between academic and societal space, based on perspectives from historical geographies of scientific research and social studies of the circulation of scientific knowledge. To enable the identification and interpretation of utility spots in post-war history of science, policy and society I use a preliminary definition, which I will iteratively apply and refine in concrete (historical) cases throughout this dissertation:

> Utility spots consist of the spatial arrangements that facilitate and stimulate the political-epistemic interactions between heterogeneous actors, which actively shape the significance of research, with the public aim of creating and circulating useful scientific knowledge.

Chapter 2, 'Utility Spots in the United States: Architecture, Location and Circulation', describes the scholarship on specific places of knowledge production that have functioned as paradigms of useful research in the US between 1945 and 1990, from Bell laboratories to RadLabs and Silicon Valley. Special attention goes to the origins (and the immense economic success) of this last area and the role of the Stanford industrial park model more specifically. Historians of US science have extensively studied the political-economic, social and cultural conditions that made possible the emergence of such industrial parks around academic institutions. Based on this scholarship, I situate the rise of 'science parks' in a longer lineage of utility spots in the post-war US. It is in this period, namely, that a great variety of utility spots proliferated at, or close to, American universities.

From this historiographical survey I draw additional aspects of the utility spot concept. *Architecture* concerns spatial separations between different types of research (e.g. in terms of funding, classification or goal) that typically also mediate a political-epistemic boundary between 'academic' and 'useful' research. This is closely related to the *location* of useful research, which symbolically says a lot about what relations are considered desirable at that spot. This can be interpreted at a small scale, in terms of a relation between *proximity* and collaboration, and at a larger scale, as the participation in a political-economic *geography*. When a successful spatial model of useful knowledge production is put into *circulation*, local complexities tend to get abstracted into clear-cut *geometries* with the promise of reproducing such highly situated success elsewhere. The spatiality of useful research is thus very specific to the context in which it emerges, and the political-epistemic alliances on which it relies. In subsequent chapters, I combine these aspects to produce tangible histories of utility spots as the products of local conditions, regional environment, national political economy and international geopolitics. In addition, I emphasize that similar attention for local complexity should be applied at the receiving end of hegemonic spatial models of useful knowledge production.

Chapter 3, 'The Spatiality of Science Policy. Para-University Institutes for Sponsored Research, 1954–1963', focuses on the spatial origins of a science policy debate *avant la lettre* about the character of university research in the 1950s in the Netherlands. It concerned the acceptability of and criteria for the funding of research in universities and polytechnics by 'extra-academic' bodies, like the Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek (Dutch organisation for applied natural science research, TNO) and industry, especially Philips N.V. Such questions arose in various hybrid contexts, of which I discuss two: The Technisch Physische Dienst TNO-TH (Technical Physical Service), a hybrid place for cooperative and contract research at the Technical Physics department of the Delft polytechnic, and the Gezondheidsorganisatie TNO (Health Organisation TNO), a coordinating body for Dutch medical research who proposed to establish an extra-academic Medical Physical Institute. The issues in these, perhaps exceptional, utility spots were corroborated by a high-ranking science policy officer through a national questionnaire: many university laboratories in the natural, medical and engineering fields turned out to be hybrid amalgams of long- and short-term, pure and applied, free and sponsored research. This could cause friction on the lab floor, where different researchers served diverse purposes with varying remunerations, but was especially problematic in boardrooms, where policymakers, professors, trustees and industrialists tried to bring order to this messy reality.

This chapter uncovers how these developments informed an inter-university advisory report about sponsored research at academic institutes (the Kronig report) and a high-level policy discussion about the geographic decentralisation of TNO, both of which have not been covered in Dutch histories of universities or science policy. These discussions about the character and appropriate place of academic research demonstrate that, among historical actors, there existed a spatial understanding of the relation between utility and independence: use-oriented and cooperative research was imagined into para-university institutes to safeguard the university as house of fundamental research and these in-between places were stimulated because of their expected contribution to the development of regional economies. Ultimately, this chapter highlights how concrete hybrid spaces of exchange and cooperation were the spatial origins for abstract policy issues and contemplative debates about the value of research.

Chapter 4, 'The Geopolitics of European Universities and Advanced Institutes for Humanities, 1955–1975', takes a 'geopolitical' perspective on usefulness by portraying the first (conflicting) plans for a European University by international policy bodies such as the European Economic Community (EEC), the European Atomic Energy Community (Euratom), the Western European Union (WEU), and the North Atlantic Treaty Organisation (NATO). Each plan had to grapple with political-epistemic concerns about the appropriate geographical scope, involvement of the US and the tension between the political and intellectual costs and benefits of concentration. By looking at plans for new institutes of exchange outside existing university structures, this chapter takes serious *virtual* utility spots. Such spatial plans each embodied different world views—both in terms of geographical scope and in terms of utility concepts—depending on the politics of the overarching international organisation that proposed them. Even though the desired relations between knowledge production, transfer, and societal use were not always (or almost never) realised in a concrete spot, the process of imagination and speculation is productive in itself: it ties together heterogeneous actors from policy, science and society.

This chapter also demonstrates that the utility spot perspective extends beyond natural sciences and engineering to include also social sciences and the humanities. It turns out that the history of the Netherlands Institute for Advanced Study in the Humanities and Social Sciences (NIAS) can be tied to the geopolitics of the European University. As place, the institute partly corresponded to the emerging humanities research policy, which stimulated both disciplinary and interdisciplinary endeavours in comparison with the natural sciences. But, it also diverged from it because in the end, it did not seriously embody the 'complementary utility' of humanities research—that is, cultural transfer of relevant values to support reflection on the rapid societal changes sparked by technological developments. American examples of Princeton and Stanford provided the contours for the initial plans for NIAS, just like spatial models from across the Atlantic directed the plans for the European University. Spots travel, as stories but also quite literally as floor plans, and always require adaptation to local interests and possibilities.

Chapter 5, 'The Spatial Politics of Knowledge Transfer. From Science Shop to Science Park, 1970–1985', describes a shift in key concepts to denote the utility of research in Dutch science policy from 'societal relevance' to 'knowledge transfer' and 'innovation'. The chapter makes this shift tangible in terms of various utility spots that were imagined and built in the late twentieth century: science shops, transfer points, technological business centres and science parks. For Leiden University, I look at the conflicting succession of all of these spots, in comparison with science shops at other Dutch universities, a transfer point at the Eindhoven polytechnic, a business technology centre in Twente and a 'national experiment' with a science park at the university of Groningen. This allows me to bring out the spatial politics of knowledge transfer, which for example consisted

in an intra-academic conflict in the debate on transfer points between 'progressives' and 'pragmatists', who took diverging political-economic stances—roughly social-democrat or neoliberal—towards the utility of research. At the same time, university governors and entrepreneurial (biotech) professors actively fostered new political-epistemic alliances to direct new sources of funding to the campus. Especially the science park vision was effective in persuading municipalities, business communities, regional development funds, ministries, banks, and foreign companies to provide financial injections for knowledge transfer on campus. Based on a proximity argument—that physical and geographical proximity between university and industry would benefit both the regional economy and academic creativity—actual physical buildings for knowledge exchange were established.

From the analysis of science parks in the 1980s I conclude that we can read in these utility spots the changes taking place in global science and commerce, in national and local politics, as well as in university organisation. The spots engaged in commercial knowledge transfer were often modelled on American ideals, Silicon Valley and the science park in specific. These models circulated in policy memoranda, advisory reports and personal experiences between universities, polytechnics and regional business communities in the Netherlands and wider Europe. What is more, the utility spots discussed in this chapter were the root and representation of a new article on knowledge transfer in the 1985 Dutch Scientific Education Act. This act also expressed an epistemological shift: both in policy as in particular places of exchange, the circulation of scientific results was considered integral to the practice of academic knowledge production. Ultimately, it is this article that, twenty years later, was the condition for the emergence of Dutch valorisation policy. Valorisation, in turn, was modelled after the science park, the paradigmatic model of useful knowledge production that still dominates our spatial imagination today.

In this dissertation I propose and develop the *utility spot* concept as spatio-historical approach to the epistemology of useful scientific research. The preliminary definition that I started with, grounded in theory and historiography, has been iteratively sharpened through the analysis of primary sources on such spots. In Chapter 6, 'Conclusion. History and Future of Utility Spots', I set forth a refined definition of utility spots:

> **Actual and virtual** spatial arrangements that facilitate and stimulate the political-epistemic interactions between heterogeneous actors, which actively shape the significance of research, with the public aim of creating and circulating useful scientific knowledge. They **emerge at the intersection** of international ideals, national policy and local contingencies, where they **function as distorting mirrors** that reflect current problems and provide speculative solutions.

This could guide further research into previous, current and future organisation of scientific research with societal value. I suggest two specific two directions. One is the historical study of the politics of proximity (in multiple dimensions) at various utility spots. The other is an exploration of science fiction as potential rich resource of alternative spatial imaginaries of valuable scientific research.