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

Smit, J.P.

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Author: Smit, J.P.

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5. The Spatial Politics of Knowledge Transfer.

From Science Shop to Science Park, 1970–1985

5.1 Introduction

Actual and virtual utility spots structure science policy debates and circulate, never unmodified, between different geographical contexts. Utility spots in the post-war world express both existing tensions and desired relations between science and society. In the 1950s and 1960s, a small scientific and policy elite in Europe and the Netherlands debated the design and organisation of such hybrid places of exchange; sometimes to safeguard existing privileges, other times to make room for aberrant or new interactions between academic and extra-academic actors. This historical development of the spatiality of useful research in Europe, and more particularly in the Netherlands, reaches its conclusion at the science park. In this last historical reconstruction of Dutch utility spots, I focus on the (ambiguous) continuities and changes

between the ‘progressive’ 1970s and ‘pragmatic’ 1980s in the Netherlands: science shops, transfer points, technology centres and science parks.

As I have sketched throughout this dissertation, requests and demands to tune scientific research to communal and private interests was a typical trope of the late modern Western world. Market-oriented practices, like sponsored or contract research and special professorships, have existed and often flourished at academic institutions throughout the twentieth century. Still, something is said to have changed around 1980: only since then did the ‘privatisation’ of universities, ‘commodification’ of academic research and ‘commercialisation’ of science and technology really take flight.⁵⁵¹ In chapter 2, I touched upon the historical explanations for the US case, where military defunding, legal and regulatory changes, the globalisation of production as well as changes in dominant economic ideas overlapped, and intersected physically in hybrid settings like technology transfer offices, university-industry research centres and science parks. With a spatial lens, I will also approach the extent to which the organisation and nature of academic research, as well as the identities of European universities, changed after 1980.

First, I track the Dutch utility debate between 1965 and 1985 through a series of academic events (5.2). Then I visit both science shops (5.3) and transfer points (5.5) to make visible a policy shift from societal relevance to knowledge transfer (5.4). Subsequently, I reconstruct the arrival, establishment and adaptation of science parks in the Netherlands, from a technology centre in Twente (5.6) to a national experiment in Groningen (5.7) and a bio-science park in Leiden (5.8). In conclusion (5.9), I will discuss the emergence of a new epistemology of knowledge transfer in terms of a politics of proximity.⁵⁵²

5.2 Freedom and Utility of Scientific Research in the Netherlands

Consistently, the utility of academic research is debated in relation to its freedom. Societal, political and economic developments in the Netherlands, Europe and the US change the shape of this debate. The interuniversity congress on the freedom and restrictions of scientific research in 1954 thus did all but conclude the issue and in 1965 ZWO chairman and theology professor Bakhuizen van den Brink proposed to organise a second interuniversity congress. The OECD’s Maréchal report on fundamental research incited some soul-searching at the research council:

We don’t execute research ourselves, but we subsidise it, we stimulate it, we try to coordinate and promote cooperation ... we criticise. Continuously, we ask ourselves, what our

551 Hans Radder, *The Commodification of Academic Research: Science and the Modern University* (Pittsburgh, PA: University of Pittsburgh Press, 2010); Mirowski, *Science-Mart*; Berman, *Creating the Market University*.

552 This chapter is an extended and translated version of Jorrit P. Smit, “Kennisoeverdracht op de campus: transferpunten, bedrijfscentra en science parks in de jaren tachtig,” in: Flipse, A. & Streefland, A. (eds.) *Universiteiten en hun campussen: naoorlogse campusbouw en -ontwikkeling in Nederland*, Universiteit & Samenleving 15 (Hilversum: Verloren, 2020), 119–143.

own policy actually entails ... what do we actually do? This question ... gnaws at the root of our universities and colleges ... and will be prompted again in every phase of scientific development.⁵⁵³

The chairman of the research council considered an inter-university congress an ‘authoritative response’ to the limited views represented in Dutch society, as well as at the OECD. Both considered research only ‘in terms of natural science and its usefulness’. Instead, a congress could be an occasion to stress the complementary usefulness of the humanities. At the same time, the ‘collective responsibility’ of those scholars still had to be raised—a theoretical argument for the utility of the humanities did not necessarily match practice.⁵⁵⁴

In the end, no second interuniversity congress was held to discuss this question. But a decade later, in 1975, a symposium did take place on ‘restrictions to the freedom of science’.⁵⁵⁵ The venue this time was not the Zoological Garden of The Hague, but the Pieterskerk in the old city centre of Leiden; and the congress united not academics from different institutions, but rather Leiden researchers and societal representatives; and politics was this time not a priori excluded from the discussion, but rather put at the centre of debate as the relation between ‘ideology’ and the university. By 1975, the societal responsibility of scientists had transformed from an abstract argument into a practical reality, in tune with the relatively progressive atmosphere in Dutch society in the 1970s. After the student protests of 1968, a start had been made with the internal democratisation of the universities that had to break the power of the professors—and ultimately democratise society as a whole.⁵⁵⁶ In 1973, a decade of liberal-Catholic cabinets came to an end when Joop den Uyl, of the Dutch labour party (PvdA), headed a progressive, social-democrat coalition. ‘Dispersion of power, knowledge and income’ was the new government’s motto. In this ideal, universities and science could not live ‘an isolated life, nor can they be directed by the needs for economic expansion. They are at the service of society, subjected to new values and norms.’⁵⁵⁷

Societal relevance of scientific research was a hot topic in 1975. A year before, the first full-fledged Minister for Science Policy, Boy Trip, had presented the *Nota Wetenschapsbeleid* (White Paper on Science Policy). After the tumultuous internal democratisation of university governance and education, Trip’s central concern was the external democratisation of academic research: it had to be oriented to ‘societal priorities’. Obviously, there was a politics to the priorities of society. ‘In what way is “society” understood here?’, asked a student member of the Leiden university council in response to the memorandum.⁵⁵⁸ Quite conservatively, society seemed to be comprised of the business world and the state. Democratic organisations—like

553 NA, ZWO, 2.25.36 inv. nr. 406, minutes from council meeting, 20 December 1965.

554 Ibid.

555 The following section is based on: Jorrit P. Smit, “Geen waardevrij bolwerk van de vrijheid meer: De ‘identiteitscrisis’ van de Universiteit Leiden in de jaren 1970,” in *Universiteit en identiteit. Over samenwerking, concurrentie en taakverdeling tussen de Nederlandse universiteiten*, Universiteit & Samenleving 14 (Hilversum: Verloren, 2017), 47–70.

556 Hans Daalder, “The Netherlands: Universities Between the ‘New Democracy’ and the ‘New Management,’” in *Universities, Politicians and Bureaucrats: Europe and the United States* (Cambridge University Press, 1982), 173–232; Peter Baggen, “De wereld veranderen: universiteit en overheidsbeleid in Nederland, 1960–2000,” in *Universitaire vormingsidealen. De Nederlandse universiteiten sedert 1876* (Hilversum: Verloren, 2006), 93–108; Smit, “Geen waardevrij bolwerk van de vrijheid meer,” 48–50.

557 Government declaration, 1973. The Den Uyl cabinet was a coalition of three ‘red’ parties—PvdA, PPR, D’66—and the confessional parties KVP and ARP.

558 ‘Wetenschapsbeleid en vragen minister Trip ter discussie in u.r.’, *Acta et Agenda* 6, no.33 (2 May 1974).

unions, activist groups, political parties' research institutes, and consumer associations—were not included in the priority-setting schemes. Communist newspaper *De Waarheid* therefore interpreted Trip's policy as an 'undisguised plea for the tuning of university research to the needs of large enterprises'.⁵⁵⁹

The tuning of university research to societal priorities also raised, again, the issue of the nature of academic research. One could conclude from Trip's memorandum that the demand to increase societally relevant research might lead to more organised research *outside* university walls. In one voice the universities, represented by the Academic Council (AR), argued that this was based on a too traditional and isolated image of the universities. They would not accept any 'limitation to the nature of university science'.⁵⁶⁰ Or, as Leiden University summarised the views from their different faculties, research groups and councils: 'Universities and colleges perform research on basically all terrains of science, and this research can be both fundamental and explicitly oriented to applications'.⁵⁶¹ The case for the university as place for useful research was made not only on the basis of its autonomy, but also with reference to its public nature, which would make results optimally available for well-being and prosperity.

The quatercentenary of Leiden University was an occasion to present a renewed image, in tune with the social-political atmosphere of 1975.⁵⁶² Opening its doors for a week-long 'open house', the oldest university of the Netherlands tried to shake off its ivory-tower image. A digital 'mass game of chance' directed visitors—mostly relatives of students and high-school pupils—in a random fashion from building to building to show them the variety of things that 'the university can do and how she thinks'.⁵⁶³ Additional attempts to boost the university's image comprised an exhibition in the Rijksmuseum in Amsterdam, a weekend supplement in a national newspaper, press conferences and a summary of the final debate on national television. The lustrum committee had envisioned this debate on the freedom and utility of science as the grand conclusion of the festive week. It was organised, in the late-Gothic Pieterskerk, as a 'forum academicum': a 16th-century special court where academic ideas could be put to the test of society. With the theme 'restrictions to the freedom of scientific education and research' the organizers of the quatercentenary hoped for fireworks. The university would defend its freedom by making clear to the outside world what societal contributions resulted from it; representatives from politics and industry were invited to challenge this legitimization narrative.⁵⁶⁴

As in 1954, several professors (from all faculties) had prepared discussion pieces, which were published in a collected volume. This became an integral part of the university's publicity offensive. At a preceding press conference, the Leiden scholarly community had presented a joint front: ideology

559 'Plan van Regering: Wetenschappelijk onderzoek aanpassen bij concern,' *De Waarheid*, 17 December 1974.

560 AUL, Curatoren/College van Bestuur 1952–1989 (CvB), inv.nr. 4211, Academische Raad to boards of universities and colleges, 24 January 1974.

561 AUL, CvB, inv.nr. 4211, University board to Minister of Education and Science, Coordination Science Policy, 7 December 1973

562 See also: Willem Otterspeer, *Het bolwerk van de vrijheid: De Leidse universiteit in heden en verleden* (Leiden University Press, 2008), 203–207.

563 'Per computer door feestend Leiden,' *De Telegraaf*, 21 May 1975; 'Academieschouw Leiden 1975', *Acta et Agenda* 7, no. 4 (5 september 1974).

564 The representatives from society were mr. W. J. Geertsema (commissary of the Queen for the province of Gelderland), mw. mr. A. Goudsmit (former member of parliament for D'66), W. Gortzak (Wiardi-Beckman foundation of the Labour Party PvdA) and Dr.ir. A. E. Pannenburg (board of directors, Philips).

needed to be ‘integrated’ into scientific work under clear conditions. And after the lustrum, the university board included a copy of the collected volume, titled *Restrictions to the freedom of scientific education and research*, with their official response to Trip’s Science Policy memorandum. In the volume, one historian argued that before democratising university research, an attack was required on the caricatural contra-ideology of strict academic freedom and isolated autonomy. A. J. Staverman, a part-time professor of polymer chemistry who also held a position at TNO’s Central Laboratory, focused in another essay on the precise conditions for the integration of ideology. The increase of ‘societally serviceable research’ at universities worried him: sometimes it was more about winning arguments than finding the truth. He proposed new criteria for the evaluation of societally oriented research that integrated ideology in scientific practice: ‘left-societal’ criteria valued the proposal with respect to change, equality and emancipation, while ‘right-societal’ criteria related to existing institutions like industry, defence and health care. The university board stressed in their letter to Minister Trip that these criteria were missing in national science policy but were essential for further democratisation of university research.

The final debate on the Friday afternoon, which was aired on national television two days later, had to provide a stormy climax, but blew over. One newspaper reported how no cracking reactions from the public were to be heard in the ‘hollow space of the chilly Pieterskerk’.⁵⁶⁵ A former member of parliament, for the liberal-progressive D’66, brought the ‘fuse close to the powder keg’ when she described the university as an ‘elite group occupied with internal fights’. And a research director from Philips killed some dreams by stating that science could not solve all societal issues. ‘Nice little rockets’, the newspaper concluded, but not strong enough to create a spectacle.⁵⁶⁶ University board chair K. J. Cath, on the other hand, evaluated the lustrum as ‘a party without a dissonant’. The university had ‘presented itself convincingly to society’.⁵⁶⁷

A decade later, at the next lustrum in 1985, fireworks *did* crack in the old city centre of Leiden. De Nieuwe Lente (The New Spring), a group of activist students, obstructed a speech by the Minister of Education and Science, Wim Deetman, because they rejected his policy of university budget cuts and rising tuition fees. But that same afternoon, on the other side of the Leiden railway tracks, the state secretary for Economic Affairs Piet van Zeil spoke unhindered as he lay the foundation stone for an ‘Academic Business Center’ close to the university laboratories in the Leeuwenhoek polder. Instead of cuts, Van Zeil announced subsidies for the stimulation of knowledge transfer (*kennisoverdracht*). That same week, city councillor Jos Fase (Economic Affairs) presented ‘the best imaginable birthday gift’ to the celebrating university: two American

565 “‘Vuurwerk’ ging niet af op Leids slotfeest,” *NRC Handelsblad*, 24 May 1975.

566 Ibid.

567 ‘Penningen, prenten en boeken voor werkers voor Eeuwfeest,’ *Acta et Agenda* 7, no. 39 (12 June 1975).

biotechnology companies would open subsidiaries in the Leeuwenhoek. It was the occasion to baptise the area a *Bio Science Park*. State secretary Van Zeil thought it ‘uplifting’ that the university was ‘so open towards contact with the world of business’ but, presciently, warned that science parks and business centres should not become new ‘status symbols’.⁵⁶⁸

Societal relevance, ideology and criticism of contract research were omnipresent by 1975. By 1985, however, the societal legitimisation of the university and the embrace of the commercial world went hand-in-hand. In the rest of this chapter, I follow this development from democratisation to commercialisation by visiting various utility spots and science policy concepts. I will start at science shops and societal relevance, and via transfer points and technological business centres, end up at the science park. Meanwhile, I will discuss the related concepts of knowledge transfer and innovation. During this tour of the Dutch epistemic landscape between 1975 and 1990 it will become clear that different spatial solutions were offered to what where, in principle, the same practical issues. The increasing visibility of business enterprises on the university campus of the 1980s can therefore be described both as the continuation of existing industrial-academic networks, only in a different spatial form, and as a displacement within the social networks and material flows that surround university knowledge production. The utility spot concept is helpful here to draw out the different ideals of the organisation of knowledge and society. As specific spots gather different actors and allies in hybrid situations of exchange, they can have long-lasting effects. The displacement of knowledge transfer, from science shop to science park, is thus the start of further structural discontinuities.

5.3 Science Shops in the Seventies

In response to the *verwetenschappelijking* (scientification) of society and the alleged value neutrality of scientific research, education programmes were established in the early 1970s to study the relations between research and society. This student involvement and staff engagement also fitted the democratic reorganisation, introduced by the Wet Universitaire Bestuurshervorming (WUB, law on university governance reform) in 1970. In a new type of project education, dubbed Wetenschap en Samenleving (‘Science and Society’), students actively related their field of study to concrete societal problems. These programmes first emerged at chemistry departments, where awareness of the entanglement of research with industrial interests was rather prominent.⁵⁶⁹ To try and achieve the true ‘vermaatschappelijking’ (societalisation) of university curricula and research, these students and staff members subsequently

568 “‘Bio-science-park’ in Leiden. Ruimte voor 15 tot 20 bedrijven in Leeuwenhoek,” *Leidsch Dagblad*, 7 February 1985; ‘Van Zeil slaat eerste paal: “Bedrijvencentrum goed voor kennisoverdracht,”’ *Leidsch Dagblad*, 8 February 1985.

569 Jan van Diepen, “De institutionalisering van twee wetenschapswinkels,” in *Een deurtje in de toren: Tien jaar wetenschapswinkels*, ed. Frans Pennings and Jan Weerdenburg (Utrecht: Studium Generale, 1987), 43–50; Hutter, “Chemie, chemici en wetenschapsbeleid.”

created science shops as more permanent places where the societal questions could be addressed. These spots were the direct extension of the student movement and project education.

The science shops not only followed changes within the university, but also tied in to the changing (inter)national political climate. Their ambition to make science serviceable to society was in the spirit of the relatively progressive Dutch 1970s, characterised by the first left-leaning cabinet after two decades of conservative-Catholic coalitions. The government headed by social democrat Joop den Uyl took as its motto 'spread of power, knowledge and income'.⁵⁷⁰ From the bottom up, utility spots emerged at various universities and faculties where this ideal materialised: *wetenschapswinkels* (science shops). Before long, starting with the Universiteit van Amsterdam and Universiteit Utrecht, all Dutch universities had a science shop on campus.⁵⁷¹ The shops had a strong ideological and ethical basis: opposing the 'disproportional' share of the national research budget earmarked for industrial and commercial parties, the shops aimed to achieve a 'more just distribution of knowledge, income and power' and contribute to the emancipation of underprivileged groups.⁵⁷² The latter aspiration situates the science shops in a broader wave of societal engagement, like academic activists who opposed the Vietnam War and demonstrated their solidarity with North Vietnam via knowledge transfer.⁵⁷³

At these places for 'non-commercial knowledge transfer' the 'shop staff' strove to break the almost self-evidently strong bonds between institutes of higher education and multinationals like Philips and Shell. Instead, they stimulated alternative relations between knowledge and power. Science shops were not out to discredit science, but rather optimistically desired to make scientific results available to the general public and to orient research to societal concerns. Regularly, science shops were physical places on campus—buildings, offices or counters—where one could literally walk in with a question. The shops were either of a broad character, as university service, or focused on a particular discipline, like chemistry or law. Generally, the shops focused on two activities: mediation between a question 'from society' and a particular researcher or research group, and pursuit of own research projects, often shaped as some kind of co-creation with the clients. The shops in this way not only stimulated the transfer of existing knowledge, but also promoted the orientation of university research to issues that were relevant to underprivileged and less articulate groups—although questions from well-financed groups were increasingly accepted as the shops professionalised.⁵⁷⁴

Around the same time, other activist scientists established utility spots with similar aims, but further removed from academic sites. These activists were members of two national associations of engaged researchers, which considered the

570 Government declaration, 28 May 1973.

571 Nicole Elisabeth Farkas, *Bread, Cheese, and Expertise: Dutch Science Shops and Democratic Institutions* (Ph.D., New York, Rensselaer Polytechnic Institute, 2002), 47–87.

572 Frans Pennings, "Het deurtje in de toren. Inleiding op de bundel," in *Een deurtje in de toren: Tien jaar wetenschapswinkels*, ed. Frans Pennings and Jan Weerdenburg (Utrecht: Studium Generale, 1987), 13–26.

573 Peter de Goeje, *Met solidaire groet. Technische en wetenschappelijke hulp aan Vietnam 1971–2011* (Leiden, 2011); Smit, "Geen waardevrij bolwerk van de vrijheid meer," 52.

574 Frans Pennings and Jan Weerdenburg, eds., *Een deurtje in de toren: Tien jaar wetenschapswinkels* (Utrecht: Studium Generale, 1987); Farkas, *Bread, Cheese, and Expertise*, 64–68; Joseph Wachelder, "Democratizing Science: Various Routes and Visions of Dutch Science Shops," *Science, Technology, & Human Values* 28, no. 2 (2003): 244–73; J. S. Sijbrandij, *Counter-Research: A History of Science Shops in the Netherlands* (Master thesis, 2017).

ministerial proposal from 1974 to tune research priorities to society insufficiently ambitious. The first was the twenty-year-old Verbond voor Wetenschappelijk Onderzoekers (Union of Scientific Researchers, VWO) founded by concerned (academic and industrial) scientists in the wake of the threat of nuclear warfare. The second was the Bond voor Wetenschappelijke Arbeiders (Union of Scientific Workers, BWA), which presented itself as a progressive reaction to the VWO: it was born in the wake of the student protests of the 1960s and called for democratisation of governance and research.⁵⁷⁵ The two organisations joined forces in a working group on science policy and in 1977 conceived the plan to establish Instituten van Maatschappelijk Gericht Onderzoek (IMGO), or research institutes with a societal orientation. Not only did the IMGO unite the two factions within the engaged science community, but also the Minister of Science Policy, Trip, gave his approval.⁵⁷⁶ Universities, however, were less enthusiastic: they desired to keep research of service to society (*maatschappelijk dienstbaar onderzoek*) within their own walls.

Indeed, compared to university-based science shops, IMGOs were established on an autonomous basis and focused more on their region than on research. They shared the orientation towards those groups that had little or difficult access to scientific knowledge. Such financially weak and underprivileged groups would have to be organised to a certain degree, so IMGO employees would be able to collect their questions, involve them in research and institutionalise these contacts subsequently. In practice, the four experimental IMGOs that were eventually founded functioned as ‘scientific service bureaus for the people’ rather than as research institutes. Their outlook was directed more to society than to science: they made knowledge *accessible* and *translated* between the world of science and the questions they received.⁵⁷⁷ Where science shops had epistemic dreams—the societal reorientation of university science—these institutes fantasised about being as useful as possible to a local community.⁵⁷⁸ The latter was attempted by locating the IMGO in regions without a strong knowledge base, for example the IMGO ROEM (for regional development, energy and environment) in Zeeland, or with a strong knowledge demand, like the agricultural IMGO in Wageningen.⁵⁷⁹

‘Societally relevant research’ and ‘knowledge transfer’ were highly controversial notions also in the Dutch 1970s. Science shops and IMGOs functioned as niches in this debate that, by way of contrast, made shortcomings of the existing system manifest. In the wider landscape of ‘interface’ activities in the Netherlands, as it was phrased in an evaluation of IMGOs in 1982, they distinguished themselves by their specific focus on underprivileged groups. And the initially very progressive, or strong ‘leftist’ character of the science shops put them at odds with the vested interests of university governors and professors.

575 T. Fortuin and T. van Oostrum, *IMGO. Een stap vooruit. Rapport van het evaluatie-onderzoek inzake het (toekomstig) functioneren van Instituten van Maatschappelijk Gericht Onderzoek* (Den Haag: Sdu, 1982).

576 Jan Weerdenburg, “Tien jaar wetenschapswinkels,” in *Een deurtje in de toren: Tien jaar wetenschapswinkels*, ed. Frans Pennings and Jan Weerdenburg (Utrecht: Studium Generale, 1987), 29–42.

577 Fortuin and Oostrum, *IMGO. Een stap vooruit*.

578 H. Jacobs, “Van IMGO naar wetenschapswinkel: Kleine stappen op een lange weg,” in *Een deurtje in de toren: Tien jaar wetenschapswinkels*, ed. Frans Pennings and Jan Weerdenburg (Utrecht: Studium Generale, 1987), 51–55.

579 The other two IMGO’s were located in Rotterdam (focused on mental health) and Utrecht (focused on work and health).

Some of the latter also questioned the quality of this kind of research or feared it would put fundamental research in a tight corner. But as ‘knowledge transfer’ became more strongly emphasized in university and ministerial governance, the interest for science shops amongst the established groups grew: now these shops could help them account for this demand.⁵⁸⁰

5.4 From Societal Relevance to Knowledge Transfer, 1970–1985

Following the international economic crises of the seventies, governments, businesses and investors all over the world put their money on technological innovations as the source of high-grade employment and ‘knowledge-intensive’ products and services. The new markets this could open would reboot the stagnating economy. The Dutch government too formulated the ambition to ‘renew’ industry. Several memoranda and committees advocated an offensive industrial policy to forestall the displacement of employment to low-income countries.⁵⁸¹ Where the post-war industrialisation policy of the 1950s had introduced state support for traditional heavy industries, this neo-liberal industrial renewal policy directed ‘stimulating measures’ (ranging from fiscal benefits to innovation advice) to small and medium-sized businesses. The lagging renewal of the national industrial structure was attributed to the failure to appropriately use existing scientific knowledge and technical expertise. To undo this harm, the authors of the *Innovatienota* (1979) recommended that public techno-scientific institutions orient their research more to ‘the needs of society in general, and business in particular’.⁵⁸²

The turn of Dutch university science towards industry and innovation, as prescribed in the *Innovatienota*, also did not appear out of thin air. Before the dust settled after the democratic reform of university governance in the 1970 WUB, Trip presented plans in 1974 for the ‘external democratisation’ of publicly funded research. This call for science to be of more value to society came as much from the critical student movement and activist groups geared at socio-technical issues like the environment, nuclear energy and geopolitics. At the same time, the tight-knit epistemic network between universities, polytechnic colleges and multinational companies changed shape as the research laboratories shrank in size and orientation. International competition and market saturation forced companies like Shell and Unilever to concentrate R&D activities in one location (respectively Amsterdam and Vlaardingén) and make them less specialised and less fundamental. Instead, corporate research became more responsive to the company’s production and planning needs.⁵⁸³ At the same time, the central coordination role of TNO, through mixed organisations in

580 Pennings, “Het deurtje in de toren,” 14–15; Wachelder, “Democratizing Science,” 253; Sijbrandij, *Counter-Research*.

581 Important memoranda were the *Nota Selectieve Groei* (1976; presented by minister EZ Ruud Lubbers); the *Innovatienota* (1979; presented by minister for Science Policy Ton van Trier (CDA), minister Arie Pais (OW, VVD) and Gijs van Aardenne (EZ, VVD)); the WRR-report *Plaats en toekomst van de Nederlandse industrie* (1980) from which ensued the Wagner committee and that presented the report *Een nieuw industrieel elan* (1981).

582 Evert-Jan Velzing, *Innovatiepolitiek: Een reconstructie van het innovatiebeleid van het ministerie van Economische Zaken van 1976 tot en met 2010* (Delft: Eburon, 2013), 50.

583 Homburg, *Speuren op de tast*, 44–51.

various economic sectors, disappeared. After repeated criticisms of its functioning, it was reorganised into an executive applied research branch and competed with universities and polytechnics for contract research from industries that outsourced their R&D departments. This mirrored a change in policy focus at the Ministry of Economic Affairs, from support of knowledge supply to demand-side subsidies.⁵⁸⁴

After 1975, 'societal relevance' and 'priority setting' were increasingly replaced by 'knowledge transfer' and 'innovation' whenever the usefulness of university research was discussed. Thus, it appears tempting to draw a line between an idealistic, 'progressive' decade of the 1970s and the pragmatic 1980s. But there exist many continuities between them. This compares to David Baneke's argument that the earlier discourse of societal relevance, and the later discourse of marketization, were responses to the same organisational issues: expansion (mainly of university education), cost increases and general inefficiency.⁵⁸⁵ In the seventies, democratisation and professional governance were both measures to change authoritarian and arbitrary power relations. By 1980, these problems were all but resolved, and so university boards adopted new, often Anglo-American, management methods, while many of the democratisation measures were reversed. Many of the structures established for idealistic motives by engaged scientists in the 1970s—such as the science shops—could be applied to much more pragmatic ends in the tougher economic climate of the 1980s: where researchers' responsibility was once ethically motivated, it was now often narrowed down to financial accountability. In this whole period, we can therefore better speak of idealistic *and* pragmatic tendencies, alliances and factions, and focus on the shifts in their relative political and rhetorical power.

A good example is the shift in the meaning of knowledge transfer, embodied in the displacement from science shops to science parks. In 1985, 'stimulation of the transfer of knowledge for the benefit of society' was adopted as additional task for universities—alongside teaching and research—in the Wet op het Wetenschappelijk Onderwijs (Scientific Education Act). But this was no longer in the spirit of Den Uyl's motto to 'spread knowledge' in society. Liberal MP Greetje Ouden-Dekkers introduced the amendment on knowledge transfer to embed bottom-up academic activities in law, with reference to science shops, but especially highlighting contract research and 'transfer points'.⁵⁸⁶ The act itself forbade earmarking structural funds for this task because 'knowledge transfer is integral to modern ideas about the process of knowledge development, with foundational research at the basis'. The 1985 knowledge transfer act repositioned universities as an 'infra-structure' (sic) of venerable research which could 'bear fruit' in the short and long term. Ultimately, the national government denied responsibility for useful outcomes: local knowledge transfer

584 Lintsen et al., *Tachtig jaar TNO*, 54–62; van Rooij, "Gaps and Plugs," 36–38.

585 David Baneke, "De veranderende bestuurscultuur in wetenschap en universiteit in de jaren zeventig en tachtig," *BMGN – Low Countries Historical Review* 129, no. 1 (2014): 25–54.

586 *Herziening regeling van het wetenschappelijk onderwijs (Wet op het wetenschappelijk onderwijs). Amendement van het lid Ouden-Dekkers*. Parliamentary Papers 1984–1985, 16 802 (38), 15 February 1985; 'Plan universiteit: wetenschapswinkel voor regio,' *Nieuwsblad van het Noorden*, 17 June 1980.

was just a small chain in ‘extremely complex’, field-specific ‘knowledge trajectories’ that evaded control by any one country or one university. The only way to stimulate the short-term usefulness of this resource was incidental support for new activities oriented to the business world—like transfer points and academic business centres.⁵⁸⁷ These utility spots promised control and promotion of these diffuse developments in science, society and the economy.

By the mid-1980s, ideas about the place for knowledge transfer had shifted markedly from non-commercial to commercial knowledge transfer, and from science shops to science parks. This shift is characteristic for broader developments between 1974 and 1985. As mentioned above, the inevitable budget cuts of the 1980s were partly motivated by the idea that universities were not producing enough societal returns. Although one might think that this would make the role of science shops more important, the reverse happened. On the one hand, science shops were indeed institutionalised by many universities. In 1978, it had still been a problem that non-commercial knowledge transfer did not fit the task description of the university.⁵⁸⁸ As they transformed from bottom-up activist places into professional organisations, they let go of the political ideal of reorienting the university research agenda into more societally relevant directions and were increasingly connected to educational programmes.⁵⁸⁹ But for a while, then, universities proudly paraded their science shops to fulfil the demand for relevance and knowledge transfer. On the other hand, research planning and accountability became stricter, so less flexibility remained for researchers to accept science shop projects.

The coalition surrounding commercial knowledge transfer, at the same time, increased in strength. The Ministry of Economic Affairs started to promote the development of transfer points (*transferpunten*) as ‘little siblings’ of the science shops. These were to transfer knowledge from the university to (paying) commercial parties. Ironically, these mediating organisations ran into many start-up difficulties and turned to the science shops to learn from their decade of experience with the ‘societal use’ of university research.⁵⁹⁰ The eventual legislation for knowledge transfer, in 1985, is evidence, however, that the transfer point community outstripped the science shop coalition: Wilbert Gooren and Arnold Korsten advised, in a 1983 study of transfer points, embedding knowledge transfer in the law on higher education to overcome organisational difficulties (which the science shops had also experienced previously). The annual transfer point conference in 1984 came to the same conclusion.⁵⁹¹ This resonated with the views of the Minister for Science, Wim Deetman, who asked universities ‘to do something with their knowledge’. In the aftermath of a recession every sound mind understood that it was preferable

587 *Herziening regeling van het wetenschappelijk onderwijs (Wet op het wetenschappelijk onderwijs). Vijfde nota van wijziging.* Parliamentary Papers 1984–1985, 16 802 (139), 3 April 1985.

588 ‘Wetenschapswinkel. Universiteit moet project schrappen,’ *De Volkskrant*, 30 August 1977; ‘Staatssecretaris Klein: Universiteit ging te ver met wetenschapswinkel,’ *Trouw*, 31 August 1977.

589 Wachelder, “Democratizing Science”; Farkas, *Bread, Cheese, and Expertise*.

590 Pennings, “Het deurtje in de toren. Inleiding op de bundel,” 20.

591 Wilbert Gooren and Arnold Korsten, *Kennisoverdracht aan kleine en middelgrote ondernemingen via transferpunten in Nederland: verslag van een onderzoek.* (’s-Gravenhage: Staatsuitgeverij, 1983), 8–20; C. M. A. de Koning, *Transferpunten in Nederland: een literatuuronderzoek naar het ontstaan, de organisatie en de ontwikkelingen* (Zoetermeer: Ministerie van Onderwijs en Wetenschappen, 1986), 29–35.

if this took place ‘at a charge, which makes a huge difference for the minister’s budget’.⁵⁹² At an international conference on technology transfer, in September 1984, Deetman stated his ambition to make ‘external knowledge transfer’ to knowledge users, business in particular, an explicit task of university staff. Without much ado he thus welcomed the knowledge transfer amendment from his fellow party member Ouden-Dekkers. By the time the new law came into effect, in 1985, most science shops were in heavy weather and transfer points, as well as the first technology business centres and science parks, took their place as spatial imaginaries of useful knowledge production.⁵⁹³

5.5 Transfer Points: Distinct Entrances for Entrepreneurs

Already in the 1979 *Innovatienota*, the minister for Economic Affairs had imagined a nationwide *transfer system* that would make the Dutch knowledge potential better accessible. Transfer points were established on the ‘demand’ side—at state institutions that supported industry, like the Rijksnijverheidsdienst and TNO—and the ‘supply’ side, at polytechnics.⁵⁹⁴ The points would provide entrepreneurs with a ‘distinct entrance’ to the epistemic resource of the institutes of higher education. As ‘active intermediary’ the transfer points could lower the threshold between academic and societal actors, specifically small and medium-size businesses. Their questions, and the results of science, had to be translated in two directions, all as part of a national transfer network in which supply and demand were attuned in the ‘knowledge circuit’.⁵⁹⁵ As part of subsidies for the stimulation of innovation (from the department of Science Policy at the ministry of Education and Science, O&W), the state promised to finance a handful of ‘transfer officers’ per institution. But after a start-up period of five years, the transfer points were expected to support themselves through contract research.

These ideas for systematic access to the country’s epistemic resources were proposed in the advisory committee for the *Innovatienota*. One of its members was Wim Koumans, professor of transportation technology at the Technische Hogeschool Eindhoven and a national authority in the field of knowledge transfer to small and medium-sized enterprises (SME). The ‘transfer professor’—a nickname he received when he left Eindhoven for TNO—actively oriented the polytechnic to society.⁵⁹⁶ Responding to an initiative of the local chamber of commerce and the Koninklijk Instituut voor Ingenieurs (KIVI, Royal Institute for Engineers), Koumans took a leading role in the establishment of a ‘bestuurscommissie contacten bedrijfsleven’ (executive committee for business contacts). Before the word existed, a transfer system materialised in Noord-Brabant:

592 ‘Wetenschapswinkeliers hebben het moeilijk,’ *De Volkskrant*, 19 May 1984.

593 H. Bodewitz, “Wetenschapswinkels en wetenschap en samenleving,” in *Een deurtje in de toren: Tien jaar wetenschapswinkels*, ed. Frans Pennings and Jan Weerdenburg (Utrecht: Studium Generale, 1987), 79–84.

594 Gooren and Korsten, *Kennisoverdracht aan kleine en middelgrote ondernemingen via transferpunten in Nederland*.

595 *Innovatienota*, 5.4.2.2.

596 *TH berichten*, 7 January 1983.

the Eindhoven committee functioned as transfer point, linked in with regional partner institutions like TNO, the Rijksnijverheidsdienst and the economics college in Tilburg.⁵⁹⁷ In its first year, they received 140 questions, of which 40 were disregarded, 40 sent to the Tilburg department of Business Studies, and the remaining 60 spread over other institutes.

Anticipating the *Innovatienota*, the committee's rationale was to offer the local SME better access to the polytechnic. The TH Eindhoven presented this consciously as their way of serving society. Additionally, mirroring the epistemic motivation of the science shops, they expected to benefit from the 'immaterial use from the confrontation with the problems of practice'.⁵⁹⁸ This would 'ground' their researchers, 'despite the ivory tower the outside world pushes them in (sometimes against their will)'.⁵⁹⁹ Koumans situated the local developments in a global context: the Dutch economic position could be strengthened by focusing on knowledge-intensive instead of labour-intensive products, for which the transfer of useful ideas from science and engineering to society was necessary.

At first, the plans for a national transfer system applied only to the polytechnics and state institutions for applied research and industrial support. The Wetenschappelijke Raad voor het Regeringsbeleid (WRR, Scientific Council for Government Policy) even strongly advised against establishing transfer points at general universities. Preferably, universities would maintain their orientation on research of a 'free fundamental' character and develop it in connection to teaching. The application-oriented nature of transfer points would only pollute that atmosphere.⁶⁰⁰ The cautious advice of the WRR notwithstanding, within a few years most universities housed transfer points, staffed with state-funded transfer officials.⁶⁰¹ The universities thereby responded proactively to the recommendations of the *Innovatienota*, probably also motivated by fear of anticipated budget cuts. In Leiden, policy officer Andrieske Leistra went to great efforts to translate the government memorandum into a tailor-made model for Leiden, embedding the call for renewal and knowledge transfer in the local situation. The university board shared this internal report, which they dubbed the 'Leistra model', in the spring of 1980 with the parliamentary committee for science policy to underline that the universities too could 'play an important role in innovation'.⁶⁰²

University boards themselves shaped the usefulness of their institutions partly in the image of the polytechnics. Engineers at the same time triggered, and carved out, attention for innovation and knowledge transfer within the university. This fitted the national situation, where engineers and industrial researchers of Philips and Shell were (still) asked to chair advisory committees on the future of science and technology policy.⁶⁰³ Transfer points at polytechnics and universities were based on the 'THE model' that Koumans actively spread.⁶⁰⁴

597 'Transferbureau gepresenteerd. Contacten THE met bedrijfsleven nemen sterk toe,' *TH berichten*, 16 January 1981.

598 'THE intensificeert contacten in de regio met bedrijfsleven,' *TH berichten*, 7 April 1978.

599 'Contacten THE-bedrijfsleven slaat in regio aan,' *TH berichten*, 24 November 1978.

600 Wetenschappelijke Raad voor Regeringsbeleid, *Plaats en toekomst van de Nederlandse industrie*, Rapporten aan de Regering (Den Haag: Staatsuitgeverij, 1980).

601 By 1981 the 'system of transfer points was completely functional'; all three polytechnics as well as the universities of Groningen and Nijmegen had established transfer points, and the remaining universities were 'pondering knowledge transfer and contract research'. *Wetenschapsbudget 1983*, Parliamentary Papers 1982–1983, 17603, p.54.

602 AUL, CvB, inv.nr. 4215, letter by College van Bestuur to chairman Vaste Commissie Wetenschapsbeleid van de Tweede Kamer, 'Innovatienota', 8 May 1980.

603 In 1981, former Shell CEO Gerrit Wagner chaired the committee that wrote the influential advisory report *Een nieuw industrieel elan*; in 1986, Philips CEO Wisse Dekker chaired the committee on technology policy.

604 Koning, *Transferpunten in Nederland*.

In Groningen, he shared his lessons for success and emphasized the ‘informal, freebooting’ atmosphere in the committee. Only with a pioneering attitude had they been able to leave the beaten university tracks and show scientists ‘how high the [thresholds to the] ivory tower’ were for local businesses.⁶⁰⁵ And Leistra (who had an engineering qualification) invited transfer professor Koumans to discuss innovation-oriented research and transfer points. In Leiden, they hoped to reproduce his success by putting together an informal group of like-minded spirits with an interest in innovation—one of whom was an external member of the university council, and agricultural engineer, J. D. Enthoven, who had been rather early in his recognition, in October 1979, of innovation as a ‘beautiful opportunity’ for the university. From 1981 onwards this group gained formal status as the Commissie Contacten Bedrijfsleven (CCB, Business Contacts Committee) and included two more external members: representatives of the local chamber of commerce and the polytechnic in Delft.

These developments thus allowed Leiden University to institutionalise (and stimulate) their contacts with the business world.⁶⁰⁶ It was also an occasion to strengthen the epistemic and organisational ties in the region, especially with the polytechnic in Delft. Via the CCB, Leiden was able to participate in the transfer point at the TH Delft. The oldest polytechnic of the Netherlands followed in the footsteps of Eindhoven when it opened such a utility spot, in January 1982.⁶⁰⁷ At the opening, a beaming rector of Leiden University, clinical chemistry professor A. A. H. Kassenaar, declared that this interuniversity cooperation would not only benefit both institutions, but also contribute to a faster recovery of the national economy.⁶⁰⁸ Kassenaar, who himself was rather active in knowledge transfer, claimed that Leiden, the oldest university of the country, would profit from the transfer point because it would give a boost to their somewhat professorial public image.⁶⁰⁹ Instead of falling under the rubric of ‘conservation’, the university as a historical monument reminiscent of times past, the transfer point would connect it to the ‘design of our future society’.⁶¹⁰ That would happen by facilitating and strengthening interactions with local and regional SME, for which the university could carry out useful research.

Kassenaar and his colleague from Delft presented the initiative for a transfer point as evidence of the claim that the university was embedded in ‘today’s society’ and worth every (tax) guilder. Besides these concerns about the university’s image, they also repeated the epistemic justification for increasing interactions with local businesses: it would give a much-needed impulse to the creativity and orientation of academic research. Both the image and the epistemic argument ran pretty much parallel to those for the science shops, established a few years before. But the politics of knowledge

605 ‘Plan universiteit: wetenschapswinkel voor regio,’ *Nieuwsblad van het Noorden*, 17 June 1980

606 University historian Otterspeer treats these developments only very briefly, but quite accurately, as combination of internal and external factors. Otterspeer, *Het bolwerk van de vrijheid*, 265–268.

607 ‘TH Delft helpt nu ook kleine ondernemingen,’ *De Volkskrant*, 16 January 1982.

608 AUL, CvB, inv.nr. 1922, Kassenaar, ‘Samenwerken in een transferpunt,’ 22 January 1982.

609 Otterspeer, *Het bolwerk van de vrijheid*, 225.

610 Ibid.

transfer differed fundamentally. A Groningen university working group that prepared the establishment of a transfer point in 1980 described it as ‘a kind of science shop for the privileged’.⁶¹¹ Such irony was wasted on most persons involved in science shops. In Leiden, the shop staff dug their heels in. In an advisory report about a possible transfer point they acknowledged that shop and point shared the objective to serve society by making academic knowledge and experience ‘directly usable and applicable’. But they also stressed that it was a highly political choice *what kind of science* one made relevant to *which* (part of) society—neither concept was uncontested. In conclusion, they warned that the transfer point’s overemphasis on relations with commercial parties could ‘sell out science to the highest bidder’.⁶¹² So, although university governors promoted the transfer point as a legitimate answer to the demand to increase their institution’s societal relevance, many university employees disagreed.

The politics of knowledge transfer divided the academic world. Two groups stood opposite each other: ‘progressives’, who preferred expansion of the science shop, and ‘pragmatists’, who pinned their hope on a growing amount of external funding for research—in which case the paying party (mostly industry) could profit from the creativity of the established scientists or department’.⁶¹³ The academic factions mirrored national political developments: Den Uyl’s ‘progressive’ Labour party joined the government again in 1981, but this cabinet quickly collapsed, after which a liberal-conservative coalition under the leadership of Ruud Lubbers took over—and opened the door to ‘pragmatic’ neoliberal policies. In Leiden, many university council members belonged to the progressive camp. They shared the concerns of the science shop about the turn to the market and contract research, because those developments might decrease the willingness of researchers to perform (often unpaid) societally relevant research for a science shop client. At the other end, however, the mostly pragmatic members of the CCB also had to rely, in first instance, on the voluntary participation of ‘enthusiastic’ individuals and departments for the ‘renewal process’.⁶¹⁴ As both the science shop and the transfer point appealed to the surplus time and labour of researchers, they inevitably ended up in each other’s hair.

The opposite political-epistemic factions each hoped to set conditions for either a pragmatic or a progressive atmosphere in the university. The transfer point representatives asked the university board to promote a climate in which ‘innovation stimulation has a full-fledged position within education and research’. The science shop owners, on the other hand, proposed to set selection criteria for assignments, questions and contracts from commercial parties, so as to safeguard the public nature and responsibility of university research. Especially ‘anti-social, military and nuclear’ projects had to

611 ‘Plan universiteit: wetenschapswinkel voor regio,’ *Nieuwsblad van het Noorden*, 17 June 1980.

612 AUL, CvB, inv.nr. 1922, ‘Notitie van de adviescommissie voor de wetenschapswinkel, inzake de instelling van een transferpunt RUL,’ 8 February 1981.

613 AUL, CvB, inv.nr. 1922, Commissie voor Onderwijs en Wetenschapsbeoefening to College van Bestuur, ‘innovatie-nota,’ 4 May 1981.

614 AUL, CvB, inv.nr. 1922, ‘Innovatie,’ March 1981.

be turned down. Such progressive criticism did not find fertile ground with board chairman Cath—a former director of a paper company who was the first holder of this post at Leiden, in 1972, and became known for moving ideological discussion deftly to pragmatic terrain.⁶¹⁵ He sided with the pragmatic CCB and refused to set any conditions for cooperation with industry in advance. The form of innovation, Cath reasoned, had to be left to the ‘freedom of the individual and the department’.⁶¹⁶ Thus, the board chairman employed the cherished principle of academic freedom to provide university access to the business world.

Between 1978 and 1985, thus, the majority of Dutch institutes of higher education opened their doors and vision to a new realm of commerce and industry. This was more a displacement and broadening of attention, than a radical new phenomenon. As national policy shifted from industrialisation to industrial renewal, the focus also shifted from large-scale heavy industry to small, science-based or high-tech SME. With this shift the previous (in)formal tolerance of relations between academic and commercial actors transformed into a legislative expectation and policy stimulation. Transfer points and contact committees would mediate these interactions and strengthen the ties between the two worlds. The establishment of these rudimentary utility spots, first in Eindhoven—fuelled by the local chamber of commerce and transfer professor Koumans—and later also in Twente, Groningen, Nijmegen, Delft and Leiden, fitted (and surpassed) the policy recommendations of the 1979 innovation memorandum. Even before they started to function, the transfer points had already led to increased cooperation between polytechnics and general universities with respect to knowledge transfer. Delft and Leiden, Eindhoven and Tilburg, as well as Groningen and Twente joined forces to share specialties, questions and experience.⁶¹⁷

Interestingly, the universities climbed onto the innovation bandwagon before they were explicitly asked to do so. Years before ‘transfer of knowledge for the benefit of society’ belonged to their official task description, enthusiastic university governors and entrepreneurial professors engaged in contract research and transfer points. They justified this in the discourse of the preceding decade: contracts and contacts with industry could make departments reflect ‘whether they were pursuing the right, societally relevant, fundamental research’.⁶¹⁸ Precisely this epistemic interpretation of societal relevance—that it was a legitimate, indirect means to orient research—caused friction within the university walls. Pragmatists, like Koumans and Kassenaar, and progressives, like the science shop representatives, mostly shared the conviction that demand-driven contact with the outside world boosted the creativity of academic research. But beyond this, their paths diverged. Where the former focused on industrial renewal and innovation, the

615 Otterspeer, *Het bolwerk van de vrijheid*, 221; Smit, ‘Geen waardevrij bolwerk van de vrijheid meer,’ 50–51.

616 AUL, CvB, inv.nr. 1922, Cath, K.J., ‘Nota voor de vergadering van het College van Bestuur op donderdag 13 mei,’ 11 May 1981.

617 ‘Universitair bureau kan overheidssteun niet missen. Emmer bedrijf schoolvoorbeeld van werkwijze Transferpunt,’ *Nieuwsblad van het Noorden*, 2 February 1984.

618 Gooren and Korsten, *Kennisoverdracht aan kleine en middelgrote ondernemingen via transferpunten in Nederland*.

latter aimed for societal change and equality. The (lack of) financial support for each shows how the wind was blowing: the government offered support for transfer points, but cut the science shops budgets.

5.6 Technological Business Centres: On-Campus Innovation

Transfer points and science shops were first of all contact points between academic and non-academic actors. Their main function was mediation between the problems and questions from practice, be it from industrial or civic parties, and the methods and knowledge of academic expertise. This did not always suffice, in epistemic or financial terms. Forwarding practical questions to researchers did not solve them, nor did it generate great income. At several universities and polytechnics, more extended plans were created to stimulate the interaction and cooperation between research and entrepreneurship in concrete, hybrid spaces. For example, a business technology centre emerged in Twente, and in Leiden an academic business centre was established. I will discuss how these centres gathered new coalitions around university research, which formed the basis for the subsequent foundation of science and technology *parks* around institutes of higher education.

The Technische Hogeschool Twente (TH Twente) was founded in 1963 to stimulate regional economic development in the Eastern part of the Netherlands that had previously relied on the textile industry. By the late 1970s, the polytechnic was in tune with its times when the forward-looking rector H. H. van den Kroonenberg spread the image of an ‘entrepreneurial’ college. It was the appropriate location, then, for Control Data’s first ‘Business and Technology Centre’ (BTC) on European soil. Software giant Control Data had already spread such centres all over the US and TH Twente imported the North American model of knowledge transfer focused on housing start-ups and spin-offs in its vicinity. William Norris, one of the founders of Control Data, was well known not only for microelectronics breakthroughs but also for his societal commitment: from a liberal standpoint, he reasoned that not just the state, but also entrepreneurs should stimulate the revival of deprived neighbourhoods and regions.⁶¹⁹ The business and technology centres that Control Data founded in the US were therefore often situated in poorer quarters and cities, so as to trigger new economic activities there.⁶²⁰ Each centre consisted of shared laboratory, production and office facilities, keeping down the expenses for small businesses. In addition, computer education, technology transfer and management support had to ensure higher success rates of the start-up companies.⁶²¹ Besides sharing costs and support, ideas and knowledge had to flow

619 In the Netherlands, Control Data was a household names amongst scientists because it supplied computers and software to Dutch universities in the 1970s. See: T. van Helvoort, *Een verborgen revolutie: de computerisering van de Rijksuniversiteit Groningen* (Uitgeverij Verloren, 2012).

620 William C. Norris, “Applying Technology: The Key to the Future,” *The Journal of Business Strategy* 6, no. 3 (1986): 38–46.

621 Paul Benneworth and Franziska Eckardt, “Kennispark Twente as Global Science Scape,” *GSS Working Paper*, no. 5 (2017).

within the centres themselves, and around them. A 'Technology and Enterprise Match Room' enabled the exchange of information about technical possibilities and innovative products, and close relations were nourished with the surrounding knowledge institutions. Control Data's BTC was thus a utility spot that combined aspects of the science shop and the transfer point, by focusing on underprivileged groups and regions and using commercialisation as mode of knowledge utilisation.

Did this politically hybrid character survive the trip over the Atlantic? Ir. Gijs van Driem of TH Twente visited the Minneapolis Business and Technology Center in 1978 as part of a research project in cooperation with TNO. Later, Control Data helped Van Driem establish a similar spot in Europe. This support came not only in the form of a spatial model and expertise, but also as an investment of *f*1m (around €890,000 in 2020 terms). In addition to this international encouragement, TH Twente had to make local allies. The social-economic rationale of uplifting backward areas resonated well with the objectives of the Overijsselse Ontwikkelingsmaatschappij (OOM, Overijssel Development Agency). This state-funded regional development board invested in initiatives that would stimulate economic renewal, employment and entrepreneurship. OOM was prepared to contribute the same amount as Control Data, and so did Amro Bank.⁶²² With *f*3m in hand, the newly established Bedrijfstechnologisch Centrum Twente (BTC) agreed a hire-purchase plan with the Enschede municipality for a new building directly opposite the TH Twente. Similar to the original North American model, this BTC functioned in relation to an economically backward region and in close vicinity to a public source of new knowledge. The latter had to enable easy contact and knowledge exchange, which, by the way, was not merely a paper transaction. The transfer point of the polytechnic would mediate, initially at no cost, between beginning enterprises and the university departments. But a fee would be charged whenever an appeal was made to university researchers.

The BTC thus also fitted in with the local knowledge transfer environment. How this functioned in Twente had been studied by two young innovation consultants, Han van der Meer and Jaap van Tilburg. Both had recently graduated from the polytechnic with degrees in management and innovation studies. On the basis of their report, rector Kroonenberg decided to offer loans to start-up companies, which they could use for example to hire space in the BTC.⁶²³ TH Twente later received national subsidies for this knowledge transfer support after the same consultants had presented a report on spin-offs from Dutch knowledge institutes to the Ministry of Economic Affairs. This had been requested by a project group on Technology Policy, whose main focus was industrial renewal via technological innovation. The report must have appealed to

622 'Bouw begonnen van bedrijevencentrum Twente', *NRC Handelsblad*, 30 June 1982.

623 This concerned the Tijdelijk Ondernemers Plaatsen' programme (TOP, temporary placement of entrepreneurs). Innovatie Adviesburo van der Meer & van Tilburg, *Nieuwe bedrijven vanuit en rond de TH Twente. Een onderzoek in opdracht van de TH Twente*. Enschede, 1981. Boer, *Een kleine en kwetsbare instelling*, 196.

the policymakers because the innovation advisors argued that knowledge transfer flowed not only in one way, from science to enterprises. In reverse, the adventurous spirit of American entrepreneurialism also trickled into institutes of higher education.⁶²⁴ In this way, the hybrid space of the BTC could contribute to the incremental change of the universities and polytechnics themselves.

Van der Meer and Van Tilburg hailed the American cultural orientation to the ‘flourishing of the individual’ in connection with the growing attention for small and innovative companies as a motor of Dutch industry. Just as important, this could break the conservative culture of institutes of higher education: researchers should dare to start a business. From that perspective, Van der Meer and Van Tilburg viewed even the looming budget cuts more as an opportunity than as a problem. It would break self-evident career paths, which was a primary trigger for the emergence of new enterprises—at least according to professor of entrepreneurship Albert Shapero, whom they esteemed highly.⁶²⁵ Based on their study of the TH Twente, Dutch knowledge institutes and the theoretical, often American, innovation literature, they concluded that an ‘innovative climate’ had to be generated around institutes of higher education, in American style: with risk capital, incubators and science parks, so that spin-offs and knowledge transfer would contribute to economic growth *and* cultural change.⁶²⁶ Culturally, this embrace of American values might have breathed progress, but it did so in a political-economic pragmatic way.

In 1982, the state secretary for Economic Affairs laid the foundation stone for the Bedrijfstecnologisch Centrum Twente in Enschede. Around the same time, the first plans for a *laboratoriumverzamelgebouw* (shared laboratory building) were being discussed in Leiden. The earlier mentioned Business Contacts Committee (CCB) established a working group for this purpose with a heterogeneous composition: researchers, from natural science and economics faculties as well as the academic hospital, were joined by laboratory directors, building managers, and representatives of legal and financial departments and the local chamber of commerce.⁶²⁷ The first step towards realising material structures for the transfer of knowledge had been made a year before by cell biologist Johan Ploem. This professor at the faculty of Medicine had proposed to establish a ‘laboratory for application research’, in a memo to the Ministry of Education and Science. At the time, the idea circulated within the pragmatic CCB, but they had not dared make it public because it deviated strongly from the ‘existing structures’ of the university. Internally, they therefore gathered a broad range of actors to support the idea and externally, they found support in the reports from, and meetings with, the innovation advisory

624 Innovatie Adviesburo van der Meer & van Tilburg, *Spin-offs uit de Nederlandse kenniscentra. Samenvatting van een onderzoek in opdracht van het Ministerie van Economische Zaken*. (Enschede, 1983).

625 Upon their invitation, Shapero lectured in Twente in 1983. Innovatie Adviesburo van der Meer & van Tilburg, 10.

626 Paul Benneworth and Roel Rutten, “‘Individuals’ Networks and Regional Renewal. A Case Study of Social Dynamics and Innovation in Twente,” in *Innovation in Socio-Cultural Context*, ed. F. Adam & H. Westlund, Routledge Advances in Sociology 84 (London; New York: Routledge, 2013), 196.

627 AUL, CvB, inv.nr. 2093, subcommittee II of Commissie Contacten Bedrijfsleven to College van Bestuur, 25 August 1982. Including attachment ‘Notitie Innovatief Onderzoek’.

bureau Van Meer & Van Tilburg. The spin-offs report made clear that almost all institutes of higher education were considering following the Twente example and establishing something like a BTC. Eventually, this would be remodelled for the Leiden locale as an 'Academisch Bedrijvencentrum' (Academic Business Centre, ABC), which would subsequently function as the core of a *bioscience park*.

Ploem had been dreaming of this for years. In his inaugural lecture, *Innovatie in het klein* (Innovation in miniature, 1980), he had already referred to Silicon Valley. By way of example, he focused on FACS Systems, a spin-off from a larger firm, that developed cell separators, which had many applications in Ploem's medical-biological field:

Together with a large number of small companies—most of which are housed in low rises surrounded by gardens—FACS Systems is situated in a laboratory park close by Stanford University in California. One finds oneself here in the area now known as 'Silicon Valley', named after the material ... used for the production of so-called integrated circuits.⁶²⁸

With this image, Ploem connected successful innovation to an idyllic, parklike environment. Repeatedly, he stressed the importance for innovation processes of (informal) personal contacts, which were stimulated by keeping distances small. For the Leiden situation, he translated this American dream image into an institute for application research.⁶²⁹ Like the Stanford Industrial Park in Silicon Valley, this institute had the objective to intensify cooperation between university and businesses and to offer general support to smaller companies. Ploem pictured two vertical structures, or high-rises, which were connected by horizontal bridges. On the one side, there were specialised university laboratories; on the other laboratory penthouses. Commercial parties could rent the latter at the level of their choice, so that knowledge flowed effortlessly from the academic lab, through a connecting hallway, into their penthouse. Architecturally, the institute for application research would bridge the innovation gap.

This concrete spatial solution appealed to the local business community. The Leiden chamber of commerce and the regional association Fabrieken voor Rijnland (Factories for Rijnland) welcomed the ideas for buildings that mixed science and commerce. To them, it was finally a solid response to the 'communication problem' that several entrepreneurs had already identified on several occasions. Earlier plans, like the transfer point that Leistra brought to their attention, had not satisfied them. The university had to become 'much more practical', demonstrate its 'product package' and develop a 'marketing strategy'. Business leaders like A. G. Karl, director of a Mitsubishi importer and from 1984 onwards of the

628 Johan Sebastiaan Ploem, *Innovatie in het klein* (Universitaire Pers Leiden, 1980), 3.

629 AUL, CvB, inv.nr. 4215, CvB Leiden to dr.ir. B. Okkerse, 2 March 1981. Including attachment: 'Notitie betreffende het Instituut voor Applicatieonderzoek.' Rector Kassenaar, professor Ploem and transfer officer Leistra spoke in Den Haag with the director of research policy Okkerse at the Ministry of OW.

Dutch & Japanese Trading Federation (Dujat), mobilised their personal experiences abroad to argue that the attitude of Dutch researchers could be much more positive towards the commercial world.⁶³⁰ Academic representatives recalled that American industry and university research were more oriented towards each other.

Over the course of 1982, professor emeritus Willy Brand introduced the idea of a shared laboratory building to the Leiden entrepreneurs. Brand, specialised in developmental economics, had recently been named chair of the CCB. He mentioned the BTC Twente as example and emphasized that also in Leiden the municipality had to take care of the ‘spatial conditions (such as infrastructure)’.⁶³¹ So far, the city of Leiden had been interested only in *generic* shared office buildings, in the hope that the financial advantages would attract small business owners to the area. The university, represented by rector Kassenaar, tried to win over the local business community so that together they could pressure the municipal government into supporting a shared space for ‘high technology businesses’. The plans for such a building provided concrete common ground where the local academic and commercial communities could do something about the ‘communication problem’.⁶³²

The talks between university and business representatives took place at the Leiden chamber of commerce within the Commissie Contacten Universiteit (University Contacts Committee, CCU), which was established in early 1982 as a platform for academics to present themselves to the city’s entrepreneurs. To resolve questions about the feasibility of a shared laboratory building, the chamber of commerce commissioned an advisory report from Frons, a consultancy specialised in regional economic development.⁶³³ Social geographer S. A. van Keulen carried out a feasibility study into the ‘concentration of facilities ... for the purpose of effective cooperation and symbiosis between the business world and the university departments’. In the final report, *Een Know House voor de RUL?* (A Know House for State University Leiden?), he drew quite reserved conclusions.⁶³⁴ Frons was ‘sometimes even very sceptical’ about the applicability of Anglo-American examples to the Dutch situation: both in the US and the UK, many ‘science parks’ emerged as part of a broader development of business parks, whose attractiveness and effectiveness was often exaggerated by project developers and regional governments.⁶³⁵ Instead of dreaming big, the consultant tried to lower expectations, especially of the academics involved. The proposals of the university working group for the building were perhaps overambitious: the imagined academic business centre not only housed, but also supported and stimulated, spin offs; and it had to be a place for ‘commercial production’ following the results of academic research; and it had to

630 NA, Secretariaatsarchief van de Kamer van Koophandel en Fabrieken in Leiden/Kamer van Koophandel en Fabrieken voor Rijnland (KvK-Leiden), 3.17.27 inv.nr. 342, minutes Commissie Contacten Universiteit (CCU), 5 March 1982; 2 July 1982; 8 October 1982.

631 NA, KvK-Leiden, inv.nr. 342, minutes CCU, 2 July 1982.

632 Ibid.

633 NA, KvK-Leiden, inv.nr. 342, minutes CCU, 5 maart 1982.

634 S. A. van Keulen, *Een know-house voor de Rijksuniversiteit Leiden? Verkenning van realiseerbare mogelijkheden voor een advies inzake een laboratorium verzamelgebouw of soortgelijke faciliteiten ten behoeven van het bedrijfsleven, te realiseren in nauwe relatie tot de Rijksuniversiteit Leiden.* (Amersfoort: FRONS, 1983).

635 Keulen, 8–10.

be responsive to temporary research needs of existing large companies. In terms of existing utility spots, the planned Leiden centre was a combination of the BTC Twente, Ploem's institute for application research and Anglo-American science parks.

In the consultants' eyes, there was little solid ground on which to build these ambitions. The academics had not paid much attention to the match between university expertise and local industry. From quick market research, Van Keulen concluded that the surrounding region housed very little science-based industry. The available academic expertise, on the other hand, was quite specific and entailed different disciplinary demands for the new utility spot. For fields like micro-electronics and social sciences, small spaces for knowledge exchange could easily be accommodated in existing buildings. While this 'light know house' was cheap and efficient, it would not suffice for biochemical, pharmaceutical and medical technology projects. These required a 'heavy know house', in a new building and with advanced, immobile laboratory facilities.⁶³⁶ But, taking the scarcity of high-technology industry in the area into account, Van Keulen strongly advised against this heavy and more expensive option. If the existing transfer point improved its 'aftercare', it would suffice as contact point for most local and regional enterprises. This aftercare consisted of putting more effort into bridging the gap between what was considered 'scientifically concluded' and what was 'ready to be applied in production'. From the other end, the SME in the Rijnland region would have to drop their initial hesitations about cooperating with the university. Only then could they really profit from the (low-cost) support from science.⁶³⁷

Frons' recommendation was a light know house: the transfer point as a distinct entrance for third parties and about fifteen small, temporary and low-tech laboratory spaces. The university working group was underwhelmed and characterised this the *kasplant optie* (hothouse plant option). At most, it was a testbed for a potential expansion at a later stage. First, small innovative businesses had to be attracted through boosted mediation activities: commercials, summer courses and 'service subscriptions'.⁶³⁸ The university board was quite elated about the active involvement of the Leiden business world with their plans, and promised to keep them in the loop.⁶³⁹ Also the Frons consultancy remained engaged: it secured a subsidy, of f450,000, from an employability fund of province Zuid-Holland, advised about the concrete design of the shared laboratory space and undertook more elaborate market research.⁶⁴⁰ In the midst of 1983, the actors for the first time spoke of the *Academisch Bedrijven Centrum*, or ABC (Academic Business Centre), for what they had once imagined as an application lab, BTC or know house.⁶⁴¹

636 Keulen, 14–20.

637 Keulen, 45–49.

638 AUL, CvB, inv.nr. 2093, 'Rapportage door Werkgroep Laboratorium Verzamelgebouw,' March 1983.

639 AUL, CvB, inv.nr. 2093, CvB to KvK, 'Kennistransfer,' 15 June 1983.

640 Erfgoed Leiden (EL), Stadsarchief Leiden (SA VII), 1001C inv.nr. 610, Zuid-Holland Province to Leiden municipal executive, 'Toekenning subsidiebedrag project Werkgelegenheidsfonds,' 13 April 1984.

641 AUL, CvB, inv. nr. 2093, Frons, *Opzet voor een Academisch Bedrijvencentrum in de gemeente Leiden* (Amersfoort 1983).

5.7 Science Parks: National Experiments, Regional Hope

The establishment of transfer points and academic business centres in the early 1980s reflected and shaped the displacement in the organisation of university knowledge transfer mentioned earlier—from relevance to innovation. Several parties had an interest in an increased focus on exchanging knowledge *and* values with the business world in particular. Local enterprises and regional associations of SME were in need of innovative products and new markets. The ministries of Economic Affairs and Social Affairs had a stake in restraining unemployment and stimulating new ‘knowledge-intensive’ commercial ventures. With the help of job creation measures [*werkverruimende maatregel*], for example, innovative companies and transfer points could deploy jobless academics, who retained their unemployment benefits.⁶⁴² Banks, pension funds and foreign multinationals, at the same time, were on the lookout for the next high-tech start-up that would boost their profits in a dull market. Researchers at university departments suspected budget cuts and hoped to increase their income from the ‘third stream’ to ensure the continuity of their programmes. In fashionable fields, like biotechnology and micro-electronics, the idea even lived that *only* in commercial settings could certain scientific findings be developed appropriately. And surrounding all this, swarmed economic and management consultancies that advised universities, governments and businesses how to reform their practices and culture to be on the winning side.

These political-epistemic coalitions gathered around the initiatives for transfer points and business centres in close spatial proximity to university laboratories. The next step would be the creation of a *science park*, in which research, knowledge exchange and commercial development could flourish in true symbiosis. At least, that was the lesson that most local actors drew from British and American examples like Cambridge Science Park, Stanford Industrial Park in Silicon Valley and Mile 128 close to MIT. A *science park* was considered to comprise the establishment of new and existing companies, preferably in the high-tech sector, close to a scientific or technological research institution, like a university, a polytechnic or a government laboratory. Typically, not the entire company, but only its research and development department would relocate to the science park. As for the *park* aspect, lush greenery, ponds and picturesque walking paths surrounded the companies, which were housed in modernistic low rises. As a whole, the physical proximity of science and commerce in a science park produced an image of dynamic creativity, serendipitous encounters and effortless knowledge transfer. This image also appealed to the Dutch imagination, in politics, science and broader culture. Amusement park *De Efteling* planned to open

642 AUL, CvB, inv.nr. 2093, ‘Laboratorium Verzamelgebouw. Nota in vervolg op nota dd. 21-9-’83.’ It was reported that Leiden counted the highest number of unemployed academics (750) of all university towns.

a *Cosmo-Science Park* and the three architects competing for the Prix De Rome of 1986 were in the final round requested to design a *wetenschapspark* (science park) on the Marineterrein in Amsterdam.⁶⁴³

Again, there was a politics to proximity. Several journalists and researchers did not share the innovation enthusiasm. Cynically, they spoke of *wetenschapplantsoenen* (science gardens), *recessietaal* (recession language) and *wildgroei* (morbid growth) whenever a municipality or university proudly announced a new science park.⁶⁴⁴ This scepticism was not wholly unfounded, as several towns and project developers had stakes in, or speculated on, land use: 'any self-respecting municipality prefers to pass off fallow industrial terrain under the guise of science park.'⁶⁴⁵ In addition, quite some researchers were critical of the proximity argument for economic development.⁶⁴⁶ Local city councils and institutes of higher education maintained that this was not just a rhetorical image to safeguard ulterior interests. The proximity that characterised science parks, they stressed repeatedly, was truly crucial for smooth knowledge exchange. At first, the Frons consultants considered locations more distant from the university: cheaper, less affected by regulation and politically uncontroversial. But the board of Leiden University pressured Frons to include the proximity argument in its advisory report. Which Frons did:

experiences abroad have taught us that the right distance is a very delicate issue, similar to shopping malls and bus stops. A researcher is as *lazy* as a bus passenger; if he has to walk more than a few hundred metres for a meeting or advice, forget about it. In that way, the knowledge potential of the university remains unutilised.⁶⁴⁷

Science parks also incited spatial politics on a larger, regional scale. A 'Silicon Valley on the Dinkel river', for example, was supposed to revive the Twente region in the east of the Netherlands. At the polytechnic in Enschede, the city council therefore started a Business and Science Park, around the previously founded BTC.⁶⁴⁸ To support such initiatives geared at industrial renewal, the national government had established regional development companies. The subsequent oil crises and globalisation in general had hit regions like Twente, Limburg and Groningen hard. It made it even more difficult for them to recover from the disappearance of mining and textile industries. The development companies distributed loans and subsidies to execute 'integral structural plans'. In Twente and in Groningen the plans for a science park fitted the ambitions of the regional development companies. In these geographically peripheral, and economically deprived, regions, science parks were symbols of hope, renewal and employment—an image that universities and city councils gladly used to wrangle government funds.

643 The *Prix de Rome* organisers acted with remarkable foresight: since a few years, the Marineterrein is officially being developed into an 'urban district with space for open innovation, special forms of housing, sports, recreation and greenery', <http://marineterrein.nl/en> (visited June 23, 2020).

644 "'Science Park", Terlouwen Groninger hardnekkigheid', *Leeuwarder Courant*, 10 February 1983; 'De taal van de recessie', *NRC Handelsblad*, 6 July 1983; 'Wildgroei van science parken baart wetenschappers zorgen', *De Volkskrant*, 23 December 1988.

645 'Budel in the air,' *De Volkskrant*, 3 June 1988.

646 M. S. van Geenhuizen, "Science Parks, een eerste inventarisatie," *Stedebouw en volkshuisvesting* 68, no. 5 (1987): 168–75; Evert-Jan Witteveen, *Science parks en wetenschappelijke bedrijventra in Nederland: diffusie of illusie van technologie* (Rotterdam: Erasmus Universiteit Rotterdam, 1989); Massey, Wield, and Quintas, *High-Tech Fantasies*.

647 AUL, CvB, inv. nr. 2093, Decisions and memoranda, CvB Leiden University, 22–23 maart; 22 april 1983; Frons, *Opzet voor een Academisch Bedrijventrum in de gemeente Leiden*, (Amersfoort 1983), 3.

648 Boer, *Een kleine en kwetsbare instelling*, 198; 'Business- & science park Enschede is succesvol,' *Nederlands dagblad*, 25 January 1986.

The science park in Groningen, for example, was sold as a 'national experiment' to the committee of the integral structural plan for the 'North of the Country'.⁶⁴⁹ Although the experiment fitted within these regional themes and national structures, it were local individuals who fuelled it. Biochemist Bernard Witholt took the lead, in the early 1980s, and imagined a vibrant science park on the fallow university terrain called the Paddepoel. The Dutch professor, who was also a naturalised American, captured his thoughts on innovation in a somewhat woolly report. A science park in Groningen was, in his view, part of a globally interconnected system: the spread of new technologies was making the world economically homogeneous and the planet Earth increasingly became a 'completely integrated organism'.⁶⁵⁰ This inescapable integration should not, as in the preceding decades, be left to (inter)governmental think tanks or multinationals (cf. chapters 3 and 4). Instead, in the eighties, small innovative high-tech companies would call the shots. The university was genetically related to these new world leaders: it was the 'womb and day care' for 'embryonic enterprises'. The science park, surrounding the university, was the next pedagogic step: 'an elementary school for young technological entrepreneurs'.⁶⁵¹

Witholt and some other professors gathered the support of the Groningen university board, with whose help they requested government subsidies. As in the Leiden case, an economic consultancy firm functioned as hinge between academics, business leaders and public authorities. The Ministry of Economic Affairs involved Job Creation BV to evaluate the science park plans from the North of the country. In this way, the ministry explicitly placed Witholt's plans in the framework of regional economic development and employment. Job Creation namely had experience with establishing shared office buildings in response to massive redundancies in the technical sector. Both in the UK steel industry and for a data subsidiary of Philips in The Hague, Job Creation attempted to create conditions and support with which the technically skilled workers could start new firms.⁶⁵² The management advisors applauded the 'courage and imaginative power' in Groningen. But they seriously doubted the plan's emphasis on making fundamental research applicable.⁶⁵³ Before, policy officers of the Ministry of Education and Science had also interpreted the optimism in Groningen as founded in 'a naïve approach to complex matters'.⁶⁵⁴ From a management perspective, Job Creation therefore recommended that an 'energetic' professional manager, marketing support and technological entrepreneurs were added to the set-up. The ministry agreed, and made the subsidy to the university conditional on implementing the consultants' advice: extra-academic actors functioned as experts on the question of innovation on the academic campus.

649 NA, Ministerie van Onderwijs en Wetenschappen: Directoraat-Generaal voor Hoger Onderwijs en Wetenschappelijk Onderzoek 1975–1992 (OW-DG HOWO), 2.14.5168 inv.nr. 5297, 'Rijksuniversiteit Groningen: Science park experiment 1982–1984.'

650 Bernard Witholt, *Science Park Groningen. Innovatie: Waarom, hoe, waar en wat* (Groningen, 1981), p. 2.

651 Witholt, 5–15.

652 NA, Kamer van Koophandel en Fabrieken voor 's Gravenhage 1978–1989, 3.17.13.06 inv.nr. 213.

653 NA, OW-DG HOWO, 2.14.5168 inv.nr. 5297, 'Analyse van een voorstel voor een science park aan de Rijksuniversiteit Groningen,' 4 February 1983.

654 NA, OW-DG HOWO, 2.14.5168 inv.nr. 5297, Memorandum 'Science Park RUG: commentaar op het rapport van de interfacultaire commissie,' by dr. C. A. Ladage (OCW), 23 August 1982.

In subsequent years, the structural funds were diverted to establish the Stichting Science Park Groningen (SPG Foundation). As figurehead, they searched for a ‘dynamic’ leader with ‘pronounced entrepreneurial qualities’. SPG offered a financial and organisational framework for commercialisation of scientific research, for example by tracking and supporting starting entrepreneurs with ‘innovation stipends’ (cf. practices in Twente).⁶⁵⁵ As in Eindhoven and Leiden, the local city council and chamber of commerce were enthusiastically involved in the north-east of the country. Even in Groningen, which was typically of a ‘red’, social-democratic orientation, there were in the background only some ‘whispers of criticism about the capitalistic tenor of these plans’.⁶⁵⁶ When national budget cuts threatened the technical subjects, the chamber of commerce threw itself into the breach for the university. The controversial ministerial budget-cuts operation *Taakverdeling en concentratie* (Task division and concentration) aimed to cut back numbers of courses on offer at each university and thus distribute specialties over the country. In Groningen, applied chemistry and applied physics were on the ministerial budget-cut nomination list. The chamber of commerce argued, however, that these ‘regionally relevant’ subjects should stay at Groningen, especially because they were crucial to the science park in the making.⁶⁵⁷

5.8 Bio Science Park Leiden: Political Compromise and Risky Research

As in Twente and Leiden, in the Paddepoel in Groningen they also first built a shared office space (the Zernikom) before extending the national experiment to the establishment of new companies on a ‘Zernike science park’. In Groningen, this had been the aim from the start, but in Leiden the establishment of a *bio science park* followed the transfer point and academic business centre in a more ad hoc fashion. Two factors, one local and one international, created the opportunity for the city council and Leiden university board to baptise the ‘Leeuwenhoek’ polder into a science park.⁶⁵⁸ On the one hand, the zoning plan for this area, where many university laboratories were situated, was the subject of a political conflict between local politicians, the university and the business community. On the other hand, American biotechnology companies wanted to open European subsidiaries in Leiden, initiated by university professor Rob Schilperoord. Where the first issue made local actors susceptible to the idea of industrial activities around the university by way of compromise, the second pushed developments into a higher gear. Above all, the Leiden case demonstrates that the international circulation of a shiny spatial model can occur only when it fits with local networks and concerns.

655 Ton van Helvoort, “De publieke functie van universitaire wetenschapsbeoefening. Amerikanisering als leidmotif bij de scheikunde aan de Groningse universiteit,” in *Onderzoek in opdracht: de publieke functie van het universitaire onderzoek in Nederland sedert 1876*, ed. L. J. Dorsman and P. J. Knechtmans, Universiteit & Samenleving (Hilversum: Verloren, 2007), 91.

656 ‘Een dagje campagne met de Partij van de Arbeid,’ *Nederlands Dagblad*, 13 May 1986.

657 ‘KvK: regio-gericht beleid RUG moet worden gehandhaafd,’ *Nederlands Dagblad*, 2 February 1983.

658 Leeuwenhoek refers to the early modern microscopist Antoni van Leeuwenhoek (1632–1723), but also translates literally as lion’s corner.

The ground politics of the Leeuwenhoek polder played a role in the establishment of a science park. After the Second World War, all Leiden university natural science departments and laboratories were gradually relocated to this former farmland north of the Amsterdam–The Hague railway line. In this way, environmental risks from experiments and inner-city disturbances were avoided as much as possible. A decade before business centres, know houses and science parks became the talk of the town, tensions between the municipality, the university and the state started to arise about the use of the Leeuwenhoek. In the 1960s, the university aired its discontent about high land prices, which the city justified by claiming they were making big sacrifices too. In 1975, state intervention seemed to lighten the atmosphere: the government bought 31 hectares in the Leeuwenhoek to build a new academic hospital.⁶⁵⁹ In 1977, however, the Ministry of Education and Science changed strategy and decided to establish the new buildings on the original hospital location. When they acquired the plot of land, the ministry had stipulated that it could compel the city of Leiden to buy it back. Subsequently, both the city and the university claimed to have first right to the land that fell vacant.

It was not long before the city and the university ‘locked horns’ about the zoning plan and property relations in the Leeuwenhoek polder.⁶⁶⁰ They interpreted the government’s intentions differently. Councillor Waal (PvdA) believed that the buy-back was clearly intended to provide the city with more building opportunities, while the university board emphasized that the area was still purposed for university use (viz. the 1975 zoning plan for the Academic Hospital). The academics planned a new faculty of Social Sciences, an expansion of the biology laboratories, student housing and the relocation of the botanical laboratory in the newly available space.⁶⁶¹ City counsellors, on the other hand, sought solutions for the Leiden housing shortage: between and around the laboratories they proposed to build around 2,000 homes.⁶⁶² For a short while, it even seemed like the Nederlandse Aardolie Maatschappij (NAM, Dutch Oil Company), performing a geological survey, would also get involved in this battle for the potential of the polder.⁶⁶³

The plan to build houses in the Leeuwenhoek also encountered resistance within the city council. Once, the laboratories had been moved from the densely populated city centre out of public safety concerns. Now, one would invert this logic by bringing residential areas back to the experimental spaces. And, what was more, new concerns had risen about the safety and health risks of the laboratories, as well as the storage and transport of chemicals, radioactive waste and toxic emissions.⁶⁶⁴ A tirade by scientist Dr. S. J. Roorda, manager of the Gorlaeus Laboratory for chemical and life sciences, stirred up the debate. In the university newspaper *Mare*, he fumed that the radioactive hydrogen isotope tritium was ‘belching

659 ‘Grondverkoop vrijwel rond in Leeuwenhoek. Voor nieuwbouw AZL en universiteit,’ *Leidsch Dagblad*, 21 February 1975. This plan reserved about 11 ha for ‘shopping and dwelling’.

660 ‘Leiden en de universiteit in de clinch over Leeuwenhoek,’ *Leidsch Dagblad*, 18 December 1978.

661 ‘Hortus Botanicus naar Leeuwenhoek,’ *Leidse Courant*, 16 July 1977; ‘Universiteit wil sociale faculteit in Leeuwenhoek,’ *Leidsch Dagblad*, 9 June 1978.

662 ‘Prijsvraag voor gevarieerde bouw in Leeuwenhoek,’ *Leidsch Dagblad*, 25 October 1977; ‘Gemeente wil 2458 woningen bouwen in Leeuwenhoek. Veel aandacht voor bejaarden en studenten,’ *Leidse Courant*, 4 January 1979.

663 ‘NAM gaat bodem Leeuwenhoek onderzoeken. Metingen staan bouwplannen niet in de weg,’ *Leidse Courant*, 26 January 1979.

664 ‘Raadsleden beducht voor gevaaren laboratoria. Risico’s in Leeuwenhoek te groot voor woningen?’ *Leidsch Dagblad*, 16 February 1979.

out of the chimney' of the Sylvius Laboratory, a biochemical research facility. Although both the public health inspector and the university board rejected these claims, the image of a hazardous area remained.⁶⁶⁵ Additional risk analyses of the entire area, by Adviseurs voor Industriële Veiligheid (Advisors for Industrial Safety, AVIV) and the public health inspectorate, did not provide definitive answers either. To the discontent of both the university and the city council, the experts refused to burn their fingers on delicate issues like the exact radius of safe zones around laboratories. Ultimately, they declared, situating housing in the Leeuwenhoek was a *political* choice.⁶⁶⁶

The university put the risk analysis to good use by building a substantive argument on top of it: academic research and teaching activities might be impeded by future conflicts with surrounding residents.⁶⁶⁷ The laboratory managers put more flesh on the bones of this argument, by claiming that the continuing development of science would create only more and more previously unknown and potentially hazardous substances. The implied unpredictable risks of innovative scientific research hinted at the broader societal discussion about recombinant DNA research, in which 'progressives' and 'nature conservers' held opposite views on the amount of restrictions on genetic manipulation.⁶⁶⁸ This (inter)national debate also existed in miniature in the Leeuwenhoek. In the local newspaper, *Leidsch Dagblad*, progressive thinker and biochemistry professor Rob Schilperoort faced nature conservationist Lucas Reijnders, representative of Natuur & Milieu (nature and environment, a non-profit foundation). Whereas Schilperoort considered the potential environmental and ethical harm of genetic manipulation negligible, especially in comparison to 'the petrochemical industry or exhaust fumes', Reijnders took the risks and public fears much more seriously.⁶⁶⁹ This translated into spatial terms with respect to different types of genetic research, categorised in different risk levels from C-I to C-III (forbidden anywhere in the Netherlands at that point). In the Leeuwenhoek, laboratories could not be established on the campus grounds closest to residential areas, and those more remote only allowed up to medium risk C-II research. The fact that no ordinary citizen turned up for the public hearing about plans for C-I level research in Leiden was evidence for Schilperoort that these concerns were 'fear of the unknown'. A fear that could not challenge the incredible potential of biotechnology.

The laboratory managers navigated this debate by claiming that limiting the use of such substances would infringe the 'societal obligation' of the university.⁶⁷⁰ Thus, they capitalised on the public fears, to recommend strongly against placing housing in the Leeuwenhoek, so as to prevent future conflicts. The Ministry of Education and Sciences, still awaiting an agreement between university and city about the use of the land, endorsed this argument of the academics in a letter to

665 Tritium is a radioactive (and extremely rare) isotope of hydrogen gas. 'Raadslid wil afzien van woningen in Leeuwenhoek. Walenkamp (CDA) gealarmeerd over gevaar Sylvius laboratorium,' *Leidsch Dagblad*, 20 April 1979; EL-SA(V), 1001A inv.nr. 2930, 'Verklaring College van Bestuur Leiden n.a.v. interview met Dr. S.J. Roorda in Universiteitsblad *Mare*,' 25 April 1979

666 EL-SA(V), 1001A inv.nr. 2930, Municipal executive Leiden to AVIV, preliminary contract for Leeuwenhoek risk analysis, 17 April 1979; 'Leidse raadsleden willen vervolg-onderzoek: "Beperk risico's in Leeuwenhoek,'" *Leidsch Dagblad*, 30 January 1980; 'Na advies inspectie volksgezondheid. Leeuwenhoek in impasse,' *Leidsch Dagblad*, 11 September 1980.

667 'Woningbouw in de Leeuwenhoek niet verantwoord. Leidse universiteit vindt de risico's te groot,' *Leidsch Dagblad*, 7 March 1980.

668 B. C. J. Zoeteman, *Biotechnologie en de dialoog der doven: Dertig jaar genetische modificatie in Nederland* (Bilthoven 2005).

669 'Resterend risico verwaarloosbaar' and 'Lucas Reijnders: Gevaren worden altijd onderschat,' *Leidsch Dagblad*, 23 May 1981. See also: Rob Schilperoort, *Het Dynamisch DNA. Een molecuul met geschiedenis en toekomst*. (Leiden: Universitaire Pers Leiden, 1980).

670 EL-SA(V), 1001A inv.nr. 2932, prof. E. Havinga to CvB, 22 January 1980; *Leidsch Dagblad*, 7 March 1980.

councillor Waal: 'given the societal relations at the moment', future residents could, legitimately, sue for the closure of university buildings, based on the risk analysis.⁶⁷¹ It might not come as a surprise that by 1980 there was a 'slightly irritated atmosphere' in Leiden.⁶⁷²

The *innovative* landscape of a *science park* turned out to be a compromise in this long-drawn-out conflict. In the autumn of 1979, it was again Leiden professor Egbert Havinga who proposed a spatial compromise for a political-epistemic issue (ten years earlier, he had pointed Piekaar and Uhlenbeck to what became NIAS villa in Wassenaar). Concurrent with the publication of the government's innovation memorandum, Havinga suggested a science park idea in response to the risk analyses of the Leeuwenhoek. The organic chemist reasoned that establishment in the area of 'clean, advanced industries with relations to the university' was in everyone's interest. An industry park close to the laboratories would lead to:

stimulating interactions between neighbours (industry) and university ... as a consequence of the easy exchange of ideas, experience and *know how*. Industry will flourish under such beneficial conditions and will make a positive contribution to employment.⁶⁷³

671 EL-SA(V), 1001A inv. nr. 2930, mr. J. Donner (OW) to Mr. C. J. D. Waal, 'Leeuwenhoek,' 11 April 1980.

672 EL-SA(V), 1001A inv. nr. 2930, Telegram by municipal executive Leiden to CvB, 17 March 1980.

673 EL-SA(V), 1001A inv. nr. 2932, Havinga to CvB and director of Spatial Policy, Buildings and Material Affairs ir. W. C. Wildervanck, 20 November 1979.

674 EL-SA(V), 1001A inv. nr. 2932, CvB to university council, 'Voorstel Leeuwenhoek,' 5 March 1980.

675 'KvK haalt fel uit naar Leids gemeentebestuur,' *Leidsch Dagblad*, 8 January 1980; 'Gedachten-experiment in Leiden. Industriepark bij Leidse universiteit?' *Chemische Courant*, 10 January 1980.

676 When policy officer Leistra took stock of possible innovation initiatives in early 1980, contacting Koningsveld was at the top of her list. AUL-CvB, inv. nr. 2415, 'RUL en innovatie,' 14 February 1980

677 'Akkoord Leeuwenhoek. Gemeente doet stap terug: minder woningen,' *Leidsch Dagblad*, 21 October 1981.

After Havinga had proposed this to the spatial policy and building service of the university, he repeated his advice in a memo to the university board in January 1980. Subsequently, the proposal was forwarded to the university and city councils.⁶⁷⁴ By that time, Havinga's plan had received support from an unexpected ally. During his new year's speech, the chairman of the chamber of commerce—A. Koningsveld, director of a Leiden plating company—attacked the city council for its lack of a daring, offensive economic policy.⁶⁷⁵ As an aside, he elaborated upon the importance of increasing cooperation between scientists and entrepreneurs. It was his 'little fantasy' to develop an industrial park with high-end employment in the 'controversial Leeuwenhoek', similar to the 'spectacular example in California'.⁶⁷⁶ The hope that 'something like Silicon Valley' would develop in Leiden also convinced the city politicians; after another year of tussle about the zoning plan and safety zones, the municipality agreed to the establishment of office space and industrial buildings, rather than housing.⁶⁷⁷

From this political perspective, the science park appears not only as a compromise in a local conflict between city and university, but also as in tune with the needs of entrepreneurs and the ministry. Similar developments at Utrecht University demonstrate that this was not just a local curiosity of Leiden. Since the first plans existed to move all university departments (since the 1950s) to an outer-city area, the Uithof, the zoning plan strained relations between the university, city politics

and local entrepreneurs. Early in the 1980s, the city switched from a mono-functional to a multi-functional approach to city planning. Now, the Uithof could no longer consist merely of buildings with a teaching and research function and the city council planned housing in between the laboratories. As at Leiden University, the academics at Utrecht feared the accompanying stricter environmental regulations. In line with the then fashionable ‘mixed’ urban development ideas, planner Groeneveld advised in his report to follow the suggestion of the local chamber of commerce: to situate small businesses oriented to the university at the Uithof. This compromise was the best way out of the ‘deadlock in the decision-making process’.⁶⁷⁸ Ultimately, in the 1980s, no science park would be developed in Utrecht, according to one journalist because the distances to the scientific institutions were already small enough.⁶⁷⁹ The epistemic arguments applied in both the Leiden and Utrecht case—the importance of physical proximity for knowledge transfer, the unpredictable risks of new scientific developments, and the freedom from environmental restrictions required for academic work—clearly also served as support for a compromise in spatial politics.⁶⁸⁰

The fact that a few years later, in 1985, road signs with *Bio Science Park* appeared in and around Leiden had to do with the active involvement of one Leiden biochemist in the global rise of biotechnology. Professor Rob Schilperoort played a central role, mostly behind the scenes, in drawing American biotech companies to the Leeuwenhoek. In the late 1970s, he had been riding the international wave of biotechnology and he was praised for his scientific work on the genetic causes of plant diseases. Besides his scientific work, he became the linchpin in Dutch (bio) technology policy, especially as chairman of the Biotechnology Programme Committee (PCB). The PCB had been installed, in 1981, jointly by the ministries of Science and Economic Affairs in response to the series of innovation reports that called for a new industrial zeal. Under Schilperoort’s leadership, the committee inquired amongst scientists and industrialists which knowledge and skills were required and feasible in the biotechnology field. On the basis of this survey, they developed lavishly funded ‘innovation-oriented research programmes’. These had the general aim to orient scientific research more towards the market, and specifically to connect university biotechnology to existing business by way of more application-oriented research.⁶⁸¹ To foreign companies and investors, the PCB was introduced as some kind of *supertransferpunt* (super transfer point) for the entire field of Dutch biotechnology.⁶⁸²

Schilperoort functioned as the figurehead of this super transfer point. The Dutch commissioner’s office for foreign investments used his international scientific network and excellent reputation whenever they tried to convince American biotechnology enterprises to establish branches in the Netherlands.⁶⁸³

678 J. C. Groeneveld, *Science park: mogelijkheden voor Utrecht. Een oriënterende studie in samenwerking met de Kamer van Koophandel en fabrieken voor Utrecht en omstreken en het Planologisch en Demografisch Instituut van de Universiteit van Amsterdam*. (Utrecht, 1983), 74–80.

679 ‘Over de zin en onzin van science parcs bij universiteiten,’ *NRC Handelsblad*, 22 August 1989.

680 Today, however, the entire Uithof is dubbed a science park. See: Marja Gastelaars, ‘Wie er wel naar toe verhuisde en wie niet. De selectieve verhuisbewegingen van de Utrechtse faculteiten richting Uithof,’ in *De universitaire campus. Ruimtelijke transformaties van de Nederlandse universiteiten sedert 1945*, ed. A. C. Flipse and A. Streefland, Universiteit & Samenleving 15 (Hilversum: Verloren, 2020), 99–118.

681 Programmacommissie Biotechnologie, *Innovatie-programma Biotechnologie. Kader, hoofdlijnen en operationeel plan*. (Den Haag, 1982), p. 11.

682 NA, Commissariaat Buitenlandse Investerings in Nederland 1967–2001 (CBIN), 2.06.173 inv.nr. 328, ‘The Netherlands offers fertile soil for biotechnology companies.’

683 NA, CBIN, 2.06.173 inv. nr. 328, Maatschappij voor Industriële Projecten, ‘Eerste Amerikaanse partners voor de MIP,’ 11 December 1984.

The successful persuading of Centocor and Molecular Genetics, in 1984–1985, was also one of the first significant achievements for the Maatschappij voor Industriële Projecten (Partnership for Industrial Projects, MIP), a new investment vehicle of the ministry of Economic Affairs: they invested more than f3m in Centocor's move to Leiden. Also Zuid-Holland province and the city of Leiden tempted the American entrepreneurs with f0.25m each. In raising these local public funds, Schilperoort again played a role by interesting Ewald Keijser, a department head at Economic Affairs in Leiden, in the bio science park formula. The biochemist had become acquainted with this phenomenon on his transatlantic acquisition travels for the foreign investments office. Policymaker Keijser quickly embraced the science park idea and beamed that biotechnology would 'breathe new life into the city' and that it would dominate its economic and societal life for the coming 75 years.⁶⁸⁴ According to Keijser, pictured in the local newspaper next to a large fermenter for the production of penicillin, the future of Leiden depended on bringing in small and medium-sized biotechnological companies. No longer a *lakenstad* (cloth city), but a city characterised by 'pure innovation, renewal to its fullest: biotechnology'.⁶⁸⁵

In step with the science park ideals, Keijser was convinced that the emerging biotechnological field could be fully developed, scaled up and applied in practice only under commercial conditions. Again, Schilperoort was one of the first to realise this. Together with a board member of the paint multinational AKZO, he co-founded Holland Biotechnology (HBT), which became one of the first tenants of the Academic Business Centre. It promised to transfer and translate results from academic research to the market. Market research by Licentec (a subsidiary of Control Data) convinced, among others, Rabobank, PCB and TNO to invest in late 1984 in the new small company. University professors fuelled this initiative to commercialise biotechnological results, which put the fundamental issue of commercialisation of academic knowledge on the university agenda.⁶⁸⁶ Centocor and Molecular Genetics joined HBT in the Academic Business Centre, which ran into the limits of its capacity by the end of 1985. The university and the city decided to erect a new building for it, and city councillor Jos Fase, for Economic Affairs, was finally able to change the zoning plan in such a way that a *bio science park* could grow. The two American biotech subsidiaries were the direct occasion for this decision.⁶⁸⁷ As mentioned above, Fase presented the move of the American companies, and the inauguration of the bio science park, as a beautiful birthday gift to the celebrating university in February 1985.⁶⁸⁸ The relatively ad hoc decision to baptise the Leeuwenhoek *Bio Science Park* thus symbolises the displacement in ideas about and attitudes towards knowledge transfer at the university.

684 'Bio-technologie zal Leiden nieuw leven inblazen,' *Leidse Courant*, 13 September 1984.

685 Ibid.

686 De Stichting Contacten Bedrijfsleven (SCB, Foundation Contacts Business) was established to enable the university to participate in HBT, without speculating with public funds. AUL-CvB, inv. nr. 2094, 'Nota commercialisatie universitaire kennis,' 3 October 1984.

687 EL, 1640 inv.nr. 171, Proceedings Leiden city council, 11 February and 1 July 1985.

688 "'Bio-science-park" in Leiden. Ruimte voor 15 tot 20 bedrijven in Leeuwenhoek,' *Leidsch Dagblad*, 7 February 1985; 'Van Zeil slaat eerste paal: "Bedrijvencentrum goed voor kennisoverdracht,"' *Leidsch Dagblad*, 8 February 1985.

In the collective memory, Schilperoort is remembered as the helmsman of the Leiden science park.⁶⁸⁹ This status is not undeserved, although the prominence of his role was possible only in relation to national innovation policy, local political concerns and international technological and commercial developments. But the stories of the BTC in Twente, the Zernike Science Park in Groningen, and the business contact committee in Eindhoven also demonstrate to what extent the success of an industrial park on an academic campus relies on the efforts and enthusiasm of single or a handful of entrepreneurial professors and innovative governors. Without Witholt, Schilperoort, Koumans and Kroonenberg, there would not have been an ambitious plan to begin with.

High-tech fantasies drove both university and local governments into unknown territory—and new kinds of (financial) risks. In Leiden, policymaker Keijser thought this was part of the game; the city had to act ‘inspirationally’, for example by investing capital via a participation company. ‘Take risks, why not.’⁶⁹⁰ Others were a little more hesitant about the economic promises of biotechnology. Prof. Arthur Rörsch, a biochemist at Leiden and TNO, had no issue with the ethical and environmental risks of genetic manipulation. But he warned the local politicians about the science park because biotechnology was ‘an extremely risk-bearing business’. Rörsch predicted that three-quarters of the starting companies would go bankrupt by the end of the first year.⁶⁹¹ No matter whom you asked, the Leeuwenhoek was a risky area in the eighties. Some would talk about tritium or DNA, others about spin-offs and safety zones. The projection of a *science park* onto this area, was both a cause and a solution. The architecture, planning and aesthetics of the science *park* therefore had to emanate control—over all the different types of social and environmental risks—and the promise of innovative, profitable, effortless knowledge transfer.⁶⁹²

5.9 Conclusion: Science Policy at the Science Park

Dutch spaces for knowledge exchange, or utility spots, were explicitly modelled on American ideals in the 1980s: the TH Twente would become the core of the ‘Dutch Silicon Valley’, the University of Groningen dreamed of ‘some kind of Instrument Valley’ and in Leiden ‘something like Silicon Valley’ had to develop.⁶⁹³ The rhetoric around the plans for transfer points, business and technology centres and science parks had to gather sufficient allies and support for these new spatial modalities of knowledge transfer. The (Anglo-) American models circulated in policy memoranda, advisory reports and personal experiences between universities, polytechnics and regional business communities.

689 Recently, a special ‘Schilperoortpark’ has been founded in the Leeuwenhoek. See Cor Smit, *BioPartner. Startmotor en smeerolie van het Leiden Bio Science Park* (Leiden: Primavera Pers, 2020) as well as recent articles by Frank Steenkamp in local and university newspapers: ‘Een loopgravenoorlog om een lege polder,’ *Mare*, 21 November 2019; ‘Hoe een eigenwijze prof de biotech naar Leiden bracht,’ *Mare*, 30 January 2020; ‘Van struikelstart tot vloeiende estafette: hoe Leiden groot werd in bioscience,’ *Leidsch Dagblad*, 13 March 2020; ‘Bioscience is in Leiden voorlopig nog niet uitgebloeid,’ *Leidsch Dagblad*, 20 March 2020.

690 ‘Bio-technologie zal Leiden nieuw leven inblazen,’ *Leidse Courant*, 13 September 1984.

691 ‘TNO-topman waarschuwt Leiden voor “sciencepark,”’ *Leidsch Dagblad*, 15 June 1985.

692 Cf. Wright, ‘The Virtual Architecture of Silicon Valley.’

693 ‘Vallei van de winnaars,’ *NRC Handelsblad*, 13 June 1981; ‘Kabinet stopt 200 miljoen in Oost-Groningen,’ *Parool*, 8 March 1980; ‘Vestiging van twee Amerikaanse bedrijven in Leeuwenhoek: Impuls voor biotechnologie in Nederland,’ *Leidsch Dagblad*, 14 December 1984.

This knowledge about and new local experiences with the science park and business centre models circulated also within Europe. The European Economic Community organised several seminars, conferences and networks to share expertise and experiences.⁶⁹⁴ Entrepreneurial Dutch academics presented at such occasions as well. Witholt, for example, observed that regardless of the highly organised and integrated Dutch knowledge network, no science parks had ‘developed spontaneously’.⁶⁹⁵ But, he reflected, this was largely a terminological issue, because in a way ‘much of the Netherlands can be viewed as a science park’. The ‘national experiment’ in Groningen was the first explicit attempt to direct the existing networks into new directions. But, in 1985, it existed only as organisation with a virtual presence. To become real and effective it required:

a concrete identifiable location ... where starters and project participants can meet and exchange experiences, joy and grief, and where the community can see visible evidence of the existence and growth of a Science Park in its midst.⁶⁹⁶

In the Dutch situation, expertise about knowledge transfer and innovation appeared to flow from the geographically peripheral institutions to the ‘centre’ in the west of the country—whereas subsidies typically flowed the other way around, to reinvigorate these economically deprived regions. From Eindhoven, Enschede and Groningen, the experiments with transfer points, business centres and science parks spread to the Randstad, as we could observe in Leiden.

Undoubtedly, science parks symbolised the future. This progressive aura consisted partly in its American nature, and partly in its scientific and economic novelty. But of course, it was an open question *whose* future exactly. That was at issue in the politics of knowledge transfer and proximity that surrounded the clashes between science shop and transfer point, city council and science park. Who counted as a ‘progressive’ depended on the political and cultural context, and the meaning of the term was fluid. In the opposition between science shop owners and transfer point translators there was a clear line drawn between progressive and ‘pragmatic’. Progressiveness resembled 1970s social-democratic ideals of a fair distribution of power and knowledge, with a special concern for underprivileged groups, and was distinguished strongly from an orientation to the market, SME and economic growth. In the recombinant DNA discussions, however, ‘progressive’ were those scientists with a nose for the commercial potential of genetic manipulation—a context in which left-leaning environmentalists were dubbed nature conservers. Local figureheads of the progressive stance were the dynamic innovation consultants, Van der Meer and Van Tilburg. They hailed the American culture of individualism and entrepreneurialism as the desirable

694 See for example: John Michel Gibb, ed., *Science Parks and Innovation Centres: Their Economic and Social Impact: Proceedings of the Conference Held in Berlin, 13–15 February 1985* (Amsterdam: Elsevier Science, 1985); Jürgen Allesch, ed., *Regional Development in Europe: Recent Initiatives and Experiences*, Proceedings of the Fourth International Conference on Science Parks and Innovation Centres Held in Berlin, November 12–13, 1987 (Berlin, New York: Walter de Gruyter, 1989).

695 Bernard Witholt, “Science Parks and Innovation Centers in the Netherlands,” in *Science Parks and Innovation Centres: Their Economic and Social Impact*, ed. John Michel Gibb (Amsterdam: Elsevier Science, 1985), 37–47.

696 Ibid.

future for a backward Europe. Oddly enough, they legitimised this with a reference to the 'cultural philosophy of our times', E. F. Schumacher's *Small Is Beautiful* (1973).⁶⁹⁷ This 'slogan from the seventies' had first been embraced by ecologists and 'environmental freaks' who criticised globalisation and advocated a society on a smaller scale. While 'the men who earn the money' had neglected this idea at first, ten years later 'top industrialists' appropriated the philosophy of small is beautiful: SME as 'the most important motor of the Dutch industry'.⁶⁹⁸

For various actors, however, embracing the science park vision was not always born out of ideals, or even a free choice. Local businesses, regional governments, universities and the state acted out of the distress of the recession. Institutes of higher education feared budget cuts, beginning with the task division operation in 1982, which fitted in with the neoliberal ideal of a withdrawing state. The new modalities of knowledge transfer discussed here accorded with the political agenda of structural renewal of the Dutch economy via innovative SME. If not for regular support and expansion of teaching and research programmes, the polytechnics and universities did find incidental grants and longer-term subsidies for these new utility spots. This conjoined new political-epistemic actors to the university: both public ones, like the ministries of Economic Affairs and Social Affairs, provincial employment funds, and regional development agencies, and private parties, like chambers of commerce, banks and foreign companies. From transfer point to science park, the scientific institutes were able to persuade familiar and unfamiliar partners to provide financial injections for knowledge transfer on campus.

Four claims about knowledge transfer were central in this development from science shop to science park. First, that there existed two gaps. One 'technological gap' between continental Europe and the more entrepreneurial United States and Japan. And one 'innovation gap', between academic knowledge production and commercial production within Europe and the Netherlands. Second, that both these gaps could be bridged by providing the conditions for new, high-technology enterprises. Additionally, this would stimulate national economic growth and regional employment. Third, that the most important condition for the successful transfer of knowledge from institutes of scientific research to high-tech start-ups was physical and geographical proximity. Fourth, it was claimed that the proximity of industry and university would also benefit the latter; the increased exchange between science and practice would reboot and reorient the creativity of academic research.

This fourfold argument materialised into utility spots, actual physical buildings for knowledge exchange, from ABC to BTC and Bio Science Park. In these utility spots, we can thus read the changes taking place in global science and commerce, in national politics, as well as in local issues and university

697 Innovatie Adviesburo van der Meer & van Tilburg, *Spin-offs uit de Nederlandse kenniscentra*, 5–6.

698 'Top-industriëlen zijn het erover eens: Kleine bedrijven gaan het grote geld maken,' *De Telegraaf*, 22 January 1983.

organisation. The physical places of exchange discussed in this chapter were the root and representation of the new article on knowledge transfer in the 1985 Dutch Scientific Education Act. This article allotted transfer points and science parks an official place within university structures. It 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 valorisation policy. Therefore, we should understand the concept of the valorisation of scientific knowledge with reference to the spatial model of useful knowledge production embodied in science parks. Its main characteristics were geographical proximity between academic research and small high-tech companies in a controlled environment, sustained by public and private funding, management consultancies and local political compromises, to tap as much economic value from the university knowledge reservoir.

