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6. THE RISE OF THE UNIVERSITY'S THIRD MISSION

6.1 INTRODUCTION

The last decades have seen a fundamental upheaval in the organisation of modern life, and the university as an institution has been as widely affected by these changes as business, governments, and civil society groups. Higher education has been confronted with increasing marketisation of the State and aggressive re-regulation of the public sector. Internationalisation has created new potential markets for students, alongside increasing access to research collaborators, but it opened universities up to competition with and comparison against institutions in other countries. The growing importance of knowledge production and innovation for economic life has created new potential roles for universities and challenged the traditional societal privileges and monopolies which they have long enjoyed. But these changes have come at the same time as an evolution in the process of change: a growing role for the State in creating and regulating markets in public services has come with a greater role for the State in guiding this reform process.

This reform process has created both the opportunity for and the necessity of questioning the meaning of 'university'. In particular, the question of what are the appropriate tasks, duties, privileges and resources for higher education and universities has been asked. In the 1970s, the idea that universities were bedrocks of democratic society, providing citizens with resources to take advantage of better societal opportunities prevailed. The institution emerged as a reaction against the corporatist post-war State, something made clear in the 1968 social protests (Daalder & Shils, 1982). The societal duties of what Delanty called the Democratic Mass University (2002) were clear: to provide an independent intellectual space where citizens as students and researchers could develop their agendas and orient society towards their interests, thereby freeing society from its dependence on corporatist interests which favoured private over public interests (Daalder, 1982). The corollary of the Democratic Mass University was universities positioning themselves as semi-detached from their host societies which provided very generously to support these institutions and their independence.

But the 1980s marked a sea-change in the willingness of societal partners to pay for independent universities. Economic stagnation in the West during this decade (Preston, 1994) led national governments to fear losing their economic lead to emerging economies, which at the time included Japan, Taiwan and Brazil (Reich, 1991). The European Commission argued for a revitalisation of technology programmes to create competitive European industries, with universities contributing alongside businesses in increasing investments in research, development, and

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innovation activities (Delors, 1988; Sharp, 1990). Universities also emerged after 1989 as increasingly important players in regional development activities, which became oriented towards stimulating innovation-based growth (Landabaso, 1999). As higher education resources were the most evenly distributed of territorial innovation assets, governments at all levels were keen for universities to make a greater contribution to their national innovation systems and competitiveness (Goddard & Chatterton, 2003).

With so many external stakeholders pressuring universities to do more, the 1970s position of semi-dependence became unsustainable (Delanty, 2002). Universities responded by opening up to external agencies and actors, becoming more engaged with society and increasing their economic contributions, the emergence of the 'third mission' (Benneworth & Jongbloed, 2009). But these direct pressures for involvement and relevance were not the only pressures to which universities were subjected.They also included legitimacy, governance, marketisation, internationalisation and commodification of higher education (Jongbloed et al., 2007).

When we talk here about the 'third mission' of universities, we are talking about how universities consciously and strategically make these societal contributions and it is clear that the last quarter-century has seen increasing emphasis on improving the performance of their 'third mission' activities. This emphasis has clearly been driven by the wider environmental changes which universities have encountered. But at the same time, their proactive involvement in third mission activities has also contributed to changing stakeholder expectations of what universities can achieve.

In this chapter, we study this relationship between the rise of the university's third mission and the wider university reform process, analysing the third mission as neither independent from nor subject to the wider reform process. Rather, we characterise it as a semi-autonomous but also interdependent element of a more fundamental transformation of higher education which universities have both shaped and been subject to. To develop this argument, we adopt the following structure. In section 2, we study the drivers that incited universities to engage in third mission activities. Section 3 shows how these drivers have put pressures on universities and how they responded. In section 4, we discuss the rise of third mission activities in The Netherlands to illustrate our central argument. We argue that the rise of the third mission (Molas-Gallert et al., 2002) was initially regarded as something peripheral to universities besides the core idea of a university encompassing teaching and research. However, the increasing centrality of this third mission makes it vital to understand its relation to other university tasks. This leads us to section 5 and our contention that any comprehensive understanding of higher education reform must also include these formerly peripheral, but increasingly central engagement activities in the idea of a 21st century European University.

6.2 MODERNISATION AND THE UNIVERSITY INSTITUTIONAL LANDSCAPE

It is now common to acknowledge a 'third mission' for universities that deliver benefits for host societies. It has been defined as social, enterprising, innovation activities that universities carry out alongside their teaching and research activities

whereby additional benefits are created for society (Montesinos et al., 2008). The third mission in its current form was first identified by the OECD CERI think tank in 1982, which recognised a number of innovative practices in a range of entrepreneurial universities such as Leuven and Warwick. The basic contours are well-understood, although sometimes in a slightly reductionist form, as a concern with commercialisation and profit takes precedence over the creation of wider societal value added (*cf.* Clark, 1998; AWT, 2007). But the idea of the third mission did not emerge from outside the system. Rather, it emerged from universities' responses to a wider set of drivers. Exploring these drivers in more detail provides greater insight into the dynamics of the third mission and its interrelation with the evolving idea of a university. These interrelations are set out in more detail in Table1.

6.2.1 The Perpetual Funding Crisis of the 'Endless Frontier'

The first driver for the rise of the third mission was higher education's perpetual funding crisis in the 20th century. The watershed for the recognition that universities are increasingly important for national economic success and social stability (Greenhow, 1831; Fawcett, 1924, Hutchinson, 1975; Shinn, 1980) came with World War 2. This was decisive in formalising universities' developmental role in advancing economic wellbeing by establishing a link between university research and business innovation which culminated in Vannevar Bush's 1945 blueprint for the university-industrial complex, *Science: the Endless Frontier* (Etzkowitz, 2008). This created an expectation of endless expansion of scientific research.

But at the same time, this entrenched a funding crisis for universities with unlimited expectations and limited resources. They faced an environment of perpetual resource scarcity (Martin, 2003; Ziman, 1994). Since the 1980s, this situation has been greatly exacerbated by changes to higher education funding. This period saw a shift away from governmental block grants (Geuna, 1999; Slaughter & Leslie, 1997), reduced core funding for researchers (Slaughter & Rhoades, 1996) and a shift towards policy instruments that were oriented towards thematic priorities (Lepori et al., 2007). Universities sought to fill this funding gap by generating new revenues from their existing asset bases, including by increasing commercialisation activities (patents and spin-offs) and income-generation activities such as consultancy (OECD, 2004).

Government regulation and legislation were critical in conditioning the landscape for the commercialisation mission, as governments generally extended universities' latitude to benefit from their discoveries and more incentives to aggressively commercialise their findings. In the US, the archetypal reform was the 1980 Bayh-Dole Act, which allowed universities and businesses to retain the ownership of patents originating in federally funded research in place of federal agencies. The German Federal Government passed a law in 2002 obliging researchers to report inventions to employers and mandated shared intellectual property rights between academics and universities (Kilger & Bartenbach, 2002). In France, laws in 1982 and 1999 sought to promote the transfer of publicly- funded research to industry,

permitting state employees to create companies and undertake consultancy (Kilger & Bartenbach, 2002).

A second area which has drawn much attention is the promotion of university spin-off companies as a means of revenue generation and technology transfer (OECD, 2001; Rogers et al., 2001). The United Kingdom created a £40m fund in 1999, the University Challenge Fund, to foster spin-offs. In Canada, the Industrial Research Assistance programme, which supported spin-off company creation and growth, funded nearly 40% of Canada's early stage university spin-off companies. In Finland, TEKES and the Ministry of Trade and Industry started providing loans for new spin-off companies, whilst France created several seed capital funds to support early-stage university spin-off companies. The rise of the third mission can therefore be regarded as an attempt by universities to secure necessary resources and by policy-makers to stimulate universities to support strategic economic well-being. These two tendencies came together to lead universities to make strategic investments with stronger financial management supporting third mission activities.

6.2.2 Liberalisation and the Commodification of Scientific Knowledge

The second societal change was the rise of neo-liberalism with its dual tenets of deregulation for the private sector and re-regulation for the public sector. Great emphasis was placed on introducing private sector methods to public sector delivery, seeking to spur innovation and reform by creating markets and a competition mechanism (Grit, 2000). At the same time, the State attempted to enforce competition by increasing the regulation of public services, creating markets in areas that would be considered as natural monopolies (Ferlie et al., 1996; Ackoff, 1999). This was seen in the rise of the 'new public management' philosophy, which seeks to reduce free-riding and satisficing activity by public services by developing formalised contractual centre-service relationships which regulate the provision of resources but also reward output performance. On the one hand, NPM is based on performance improvement philosophies in which performance data are gathered as part of a continuous improvement process. But on the other, data are also used to reward outputs and therefore provide a direct stimulus to deliver desirable outcomes. These approaches have been applied in different ways with varying intensity to the higher education sector, at an increasing tempo as from the late 1980s (Grit, 2000).

The impact for the higher education sector was an evolution in government steering and financing of teaching and research. National governments granted more organisational and financial autonomy to academic institutions, withdrawing from detailed control of universities (Neave, 2000; Van Vught, 1989). They emphasised national priority setting and resource provision, granting institutions autonomy to allocate resources internally (Neave, 2000). Universities were given clear signals from governments across Europe that it was acceptable for them to set priorities for their missions and tasks that were dependent on clients' capacities to pay for their services. Greater autonomy in combination with the financial pressures already mentioned increased incentives for universities to meet the demands of external bodies that were able to pay them directly for their services, including the business sector.

At the same time, national governments and the European Commission signalled the importance of technology transfer, knowledge exchange and university-business partnerships (EC, 2005). Universities were encouraged to work more closely with the private sector to enhance the relevance of their research and facilitate the use of research results by industry (OECD, 2004). Governments provided small and medium-sized enterprises and high-tech firms with funding to help them better utilise public sector research in their innovation efforts (Larédo & Mustar, 2004; Rothwell & Dodgson, 1992). These trends came together to create a situation where universities were increasingly held accountable by governments for their impact which was measured in terms of their third mission performance.

6.2.3 The Changing Nature of Knowledge Production

A third shift in universities' environment emerged with the increasingly complex nature of knowledge production. On the one hand, the speed and complexity of the advance of the scientific frontier meant that individuals were increasingly pressured to specialise in narrow disciplinary areas in order to remain at the forefront of the field. But on the other, scientific problems were becoming more and more complex, requiring experts from a diverse range of backgrounds – often with different and not necessarily cognate theoretical assumptions—to work together to solve these problems (Ackoff, 1999). New kinds of discipline, role, discursive spaces and institutions are being created to facilitate the integration of experts and expert knowledges into solutions to these complex knowledge problems.

There have been important consequences for universities operating in these environments, changing the scientific environment in which researchers work, involving specialisation and the creation of disciplines evolving from existing fields (Bonaccorsi, 2008). These new disciplines are characterised by greater diversity of research topics and offer policy makers a tool to address this diversity at different levels (Bonaccorsi, 2008). Funders have responded by shifting research away from core theoretical research towards research 'at the boundary', fields addressing many issues which combine knowledge and technology across disciplines.

The rise of the third mission in universities can therefore also be understood as an evolution in disciplinary organisation, creating disciplines and multi-disciplinary fields that include non-academic users. These fields can function in increasingly multi-disciplinary environments to address polarisation and specialisation in existing domains. Universities have created institutes and centres to accommodate the rise of new scientific fields. Furthermore, they have opened to stakeholders that are willing to fund scientific research. This has made universities' more sensitive to 'steering policies' and has therefore often been encouraged by governments as a way of ensuring the wider success of their steering policies.

6.2.4 Competitiveness and the Urgent Imperative of Usefulness

The final societal change was the emergence of the knowledge society, with the increasing importance of knowledge capital as a foundation of economic success,

embodied in individuals as knowledge capital and people's ability to work together to create knowledge (Romer, 1994; Solow, 1994; Gibbons et al., 1994; Temple, 1998). A connection has been drawn between capacities for economic success and capacities to innovate, with innovation representing the mechanism whereby stocks of knowledge are translated into economic growth (Van der Ven et al., 1997; Boschma, 2005; Moulaert & Sekia, 2003). Hence, there is a recognition of the growing importance of co-operation between actors who possess the requisite knowledge to create new kinds of knowledge, which include new co-operative mechanisms, new kinds of innovation, new innovation actors, and new roles for existing innovation actors (Chesborough, 2003; Von Hippel, 2003; Benneworth, 2007). Universities play a pivotal role here.

Policy-makers have become increasingly aware of the economic and political value of universities in contributing to stimulating innovation (Salomon, 1985; EC, 1995).They have pushed for universities to accept broader, explicit societal responsibilities complemented with more explicit societal expectations, such as contributing to the Lisbon Agenda of making Europe the most competitive global knowledge economy (EC, 2005). A Commission report of 2003 illustrates this shift in accountability:

> Given that they live thanks to substantial public and private funding, …, universities are also accountable for the way they operate and manage their activities and budgets to their sponsors and to the public. This leads to increasing pressure to incorporate representatives of the non-academic world within universities' management and governance structures. (EC, 2003).

The rise of the third mission in universities can therefore be understood as responding to the demand for useful knowledge by seeking to create different kinds of knowledge through engagement with other kinds of (commercial) knowledge producers. This, in turn, has changed the internal university calculus around what constitutes appropriate kinds of knowledge. This has had wider institutional implications for universities concerning the suitability of particular institutional forms of teaching and research that are necessary to create and support this knowledge.

6.3 UNIVERSITIES AS DRIVERS OR RECIPIENTS OF CHANGE?

These pressures have radically altered the environment in which universities operate compared to the environment just three decades ago. In the heyday of the Democratic Mass University, the societal role was seen as universities' contributions to creating and developing well-rounded and critical democratic citizens. In contrast, universities are now increasingly expected to be able to demonstrate their societal role. On the one hand, universities and funding agencies have placed great effort in attempting to develop accountability mechanisms and reporting techniques that are able to objectively measure and steer universities' societal impacts. On the other, universities are mobilising their partners to convince politicians and policy-makers that they are valuable institutions for competitive knowledge economies. These changes have altered the nature of universities as institutions and the framework in which the reform agenda is carried out. It is this wider set of changes we seek to analyse.

We highlight three important changes which have emerged as part of universities' responses to increasing their engagement activity:

- The fact that universities need to speculate and take risks in managing their capital base has necessitated increasingly centralised management structures to ensure that risk levels are suppressed at the level of the university.
- The fact that universities are encouraged to capitalise on intellectual property rights has made them increasingly institutionalised as private actors which can exclude actors on the basis of an inability to pay.
- The need to generate a return from their intellectual property through science parks, incubation units, technology transfer organisations and spin-offs has seen universities become more and more concerned with the relevance and openness of the knowledge they create.

We argue that it is not enough to consider the rise of the third mission as a discrete and isolated event. Certainly, the wider reforms to higher education of the last quarter century have made it easier for universities to become more externally-facing and to respond to and interact with new kinds of societal stakeholders. But at the same time, these reforms have been pulled towards ensuring that universities can become increasingly entrepreneurial, engaged and open to particular kinds of stakeholders. This has taken a hold because certain kinds of innovative and experimental institutions have made the potential of a university to drive innovation a reality.

We are not arguing that higher education reform has been consciously and rationally driven by a desire to create entrepreneurial universities. Our argument is more subtle – the success of some exemplar universities in engaging with society and generating economic benefits has made engagement – the third mission – an ongoing reference-point for reform. Reform has been attracted towards more engaged models of higher education and what is a university. This leads to our central argument: higher education reform attempts to accommodate increasing university engagement have influenced other elements of the systems, including governance, funding, accountability and expansion. Whilst we primarily talk about research as a driver for this process, its manifestation and influence are also visible in teaching, with students increasingly regarded as individual consumers rather than as collective beneficiaries, the imposition of a pay-wall around teaching activities (and the end of continuing learning) and the removal of student co-determination from decision-making in university governance structures.

The reforms which paved the way for universities to trade on their own account do not just have implications for the way they carry out engagement activities. They have also enabled a much wider institutional evolution. To some degree, the rational university reform process is an attempt to complete a set of reforms begun intuitively in the 1980s to unlock universities' potential now that more is known about the various characteristics of successful universities. These inter-relations are presented in Table 1. If our contention is true, then far more attention will have to be paid to the evolving environment and structures for university engagement.

To illustrate our argument, we offer a case study from our country, The Netherlands, where there have been pressures on universities to engage with society.

These pressures have focused on business engagement. With larger sums of government funding attached, business engagement is an increasingly determining principle in institutional decision-making. We ask how the Dutch example of whole system evolution can best be understood. We begin by specifying our overall research question in terms of the Dutch case study as follows: *How are the wider changes in Dutch higher education linked to specific changes in Dutch HE that are related to improving the usefulness and impact of university research?* To address this question, we specify further operational sub-questions, which structure the rest of this chapter:

- How has Dutch valorisation policy emerged in the last quarter century and what are the incentive structures in place for universities to become more actively engaged with external stakeholders?
- How have universities reacted to the opportunities created by this policy framework and how has this changed the nature of the university in The Netherlands?
- How has the success of universities in the field of innovation led to changes in the way the national government has sought to regulate the higher education sector in order to maximise the societal benefits produced by the institution?

6.4 THE RISE OF THE THIRD MISSION IN THE NETHERLANDS

Since the early 1980s, Dutch policy-makers have been concerned with increasing universities' societal contributions. Instead of talking about third mission activities, they used the word valorisation to discuss societal, enterprising and innovation activities. Panic responses to the 1980s crisis gave way to attempts to invest in the knowledge infrastructure in the 1990s, and this evolved into the 2000s' emphasis on innovation as a structuring theme of successive governments. Universities' behaviours have likewise evolved from very limited, project-led responses in the 1980s to more systematic and competitive attempts to obtain funds in the 1990s and to becoming increasingly entrepreneurial and socially engaged in the 2000s. However, a Dutch case study highlights the fact that in this broad evolutionary narrative of a shift away from the democratic mass university towards the entrepreneurial university, institutions have evolved at their own pace. Despite the general direction of change, one can make a clear distinction between institutions whose success has informed policy developments (leading policy) and those which have lagged, but which have nonetheless evolved to become far more entrepreneurial than democratic mass universities.

6.4.1 The Emergence of Valorisation Policy in the Netherlands

The Dutch economy experienced a period of 'stagflation' in the late 1970s, primarily as a consequence of the oil shocks that created a large domestic surplus. This surplus drove currency appreciation at the same time as competitors' markets were slumping, leading to a collapse of exports in one of Europe's most open and export-dependent economies. The short-run impact of this competitive crisis was that, as from the 1970s, public spending was extremely pressured and governments sought to find cheap ways to stimulate economic growth. In the longer run, the principle of investing

Table 1. The inter-relation between societal pressures, the rise of the third mission and European reform processes

Societal shift	*Societal manifestation*	*Implication for HE*	*HE response*	*Involvement with wider reforms*
Perpetual funding crisis of the 'endless frontier'	Increasing pressure from funders on universities to diversify activities, finding new funders and sponsors.	Increasing relevance of science means that always more activities than can easily be funded	Strategic institutional investments in capacity Stronger centralised financial management	Managing own risks, taking own responsibility Privatisation of funding for universities
Liberalisation and commodification of scientific knowledge	Universities in competition for privileged position with other kinds of organisation; 'unbundling the university'	Leading to new forms of accountability, new management systems and relationship management	Management & strategies to hit targets Centralisation of data collection	Changing accountability relations and control New public management: by targets, results
The changing nature of knowledge production	Blurring of roles in knowledge production: increasing emphasis on what works, matters.	Individual specialisation and problem complexity → new disciplines/ co-operative norms emerging	Creation of new institutions and centres Opening to external paying stakeholders	Shift from core to line-item HEI funding Steering by networks by policy-makers
Competitiveness and the urgent imperative of usefulness	Pressure from policy-makers to contribute to solving urgent societal problems	Need to be sensitised and responsive to societal pressures	Creation of new commercialisation roles, infrastructure Investment/ stress on revenue generation targets	Alternative sources of revenues, cost-sharing Funding research at disciplinary/ academy margins not core

Dutch hydrocarbon income exclusively in productive infrastructure was established so as to prevent the recurrence of a similar inflationary bubble.

The first wave of Dutch valorisation policy took place against this extremely bleak fiscal picture, with ministries seeking inexpensive policies which leveraged value from past investments to create economic benefits. The Science Ministry developed two experimental programmes which have continued to this day. The Innovation Oriented Research Programme (IOP) aimed to encourage knowledge exchange between firms and universities and the Open Technology Programme (OTP) sought to encourage nearer-to-market university research (details on funding programmes in all three phases are provided in Table 2). The OTP was overseen by the Foundation for Applied Sciences (STW), founded in 1981 to stimulate excellent utilisation oriented technology research (Van der Meulen & Rip, 2001). The Ministry of Economic Affairs became interested in the potential of research spin-offs, and in the mid-1980s it funded all 14 Dutch public universities to create technology transfer offices to promote university companies. However, the unimpressive results led to the cessation of the subsidy, whereupon all but one of the universities closed their technology transfer offices. The funds released were invested in the creation in 1989 of Syntens, an agency to promote innovation in small businesses (Benneworth & Hospers, 2007). The Dutch Organisation for Pure Scientific Research (ZWO) became the Dutch Research Organisation (NWO) in 1988.

By the mid 1990s, Dutch public finances had stabilised, but so much of the hydrocarbon funds had been invested in public physical infrastructures that further investments seemed senseless. The rules were amended to invest in knowledge capital that was eligible for the '*aardgasbaten*', provided that those investments contributed to national competitiveness and well-being. This opened the door for the creation of the three Economic Reinforcement funds (1994–1998, 1998–2002 and 2002–2009). This stimulated the second wave of valorisation policy, providing research funding that was targeted at encouraging university-public-business co-operation. This also saw the introduction of sectoral research policies such the Biopartner programme created to support the emerging biotechnology industry, or Microned, which provided the investment to allow the transformation of Dutch research strengths in materials science into a nanotechnology industry.

The third wave was marked in 2003 by the Programme for Government of the Balkenende-II cabinet in which 'innovation' became one of three government principles (alongside administrative streamlining and norms and values). The 2003 Science Ministry budget ('*Wetenschapsbudget*') stated that 'Universities should be a breeding ground of new knowledge and insights. At the same time it is essential that there is an intensive interaction between universities and society' (MOCW, 2003). The Ministry of Education, Culture and Science reaffirmed the general position in 2005 that outreach activities were a task for Dutch universities which not only encompassed education, training and the communication of research results, but also collaboration with private and public actors, the pursuance of intellectual property, the creation of spin-offs, and the encouragement of entrepreneurship.

In addition to the continuation of the Economic Reinforcement Funds (which received a huge boost with higher oil prices in the wake of the second Gulf War), a

Table 2. Policy instruments facilitating knowledge transfer with societal organisations

Instrument	*Description*	*Budget*	*Date*
Phase 1: prompting university valorisation			
Innovation-Oriented Research Program (IOP)	Competitive grants for innovative research projects in public-private cooperation	€66m 2006–09	1980–present
Open Technology Program (OTP)	Competitive grants to stimulate projects in universities with a potential for application and commercialisation	€43m pa 2000–08	1981–present
Transferpunt (Industrial Liaison Offices)	Funding for universities to operate a single contact point (industrial liaison office) to facilitate SME knowledge access	*f.* 21m (c. €10m)	1983–1987
Phase 2: investing in knowledge infrastructure			
(ICES/ KIS 1 - Economic Reinforcement Fund)	Subsidies for cooperative research alliances involving public research institutions and private companies	€113m	1994–1998
(ICES/ KIS 2 Economic Reinforcement Fund)	Subsidies for cooperative research alliances involving public research institutions and private companies	€211m	1998–2002
Biopartner	Subsidies, seed funding and venture capital for start-up companies in the life sciences	€21.2m 2006–09	2000–2004
Phase 3: innovation as a defining policy principle			
ICES/KIS 3 - Bsik	Knowledge and Research Capacity: Subsidies to set up public-private research consortia	€802m	2003–2009
Innovation vouchers	Subsidies for SMEs to commission contract research at universities and other public research institutions.	€25m pa *	2004–present
Technopartner	Subsidies and venture capital for private start-ups	€21.2m 2006–09	2004–present
Valorisation Grant – SBIR	Subsidies for feasibility studies and seed funding	c. €1.5m pa	2004–present
Casimir	Incidental grants to foster staff mobility between universities and private companies	€2.8m (2007)	2005–2007
Smartmix	Subsidies for cooperative alliances, creating innovations and developing focus and mass in excellent research.	€100m pa	2007–present

Source: Zomer et al. (2010).

number of new programmes were established to encourage regular contacts between universities and SMEs, such as the Innovation Voucher scheme, Technopartner and SmartMix. These policies aimed to disseminate university research to businesses and create the absorption capacity in businesses for that knowledge, such as the resources to pay for that knowledge or the skills and expertise to participate in co-creation activities. This phase drew to a close following the fall of the fourth Balkenende cabinet and the final reporting of the Dutch Innovation Platform in the run-up to the June 2010 elections.

The overall effect of these changes was seen in the substantive shift in the funding environment for Dutch universities. According to Lepori et al. (2007), whilst around 50% of project funding research instruments were academic-oriented in 1970, by 2002 this had fallen to around 18%, the remainder consisting of either thematically-oriented or innovation-oriented research instruments. Table 2 presents an overview of the key policy instruments and programmes that promote entrepreneurial activities and knowledge transfer between scientific researchers and other societal organisations in the period under consideration.

6.4.2 The Engagement of Dutch Universities in Third Mission Activities

The history of Dutch university valorisation activity in the last three decades can also be divided into a similar set of periods which overlap with but are not completely identical to those of the evolution of valorisation policy. All Dutch universities have identifiable societal missions, from the founding of Leiden University in 1575 in response to the fall of Leuven to Spanish occupation to the creation of Maastricht University in 1976 to revitalise the mining regions. This meant that Dutch universities have always been sensitive to policy pressures, but their responses have also been shaped by their internal cultures and perceptions and opportunities and demands from other external stakeholders. This is evident in the way that universities have responded to the stimuli provided by ministries responsible for scientific research and economic affairs.

The first phase of government valorisation policy did not arise exogenously, but was a specific response to a university which had been successful in its valorisation activities. As from 1978, the University of Twente (Van den Kroonenberg, 1996) began to stress its regional territorial contribution to a crisis in the textiles industry in the East of the country. As from 1976, it was active in an early science council valorisation experiment, 'Project Industrial Innovation', which worked with about 10 companies to understand the (then-poorly understood) process of technology transfer. In 1979, it established a *Transferpunt* (transfer point, or industrial liaison office) to provide a single point of contact for firms wishing to access university knowledge. The university identified that it had already created a number of spin-off companies from its research base and was persuaded by the Ministry of Economic Affairs to undertake more research into the opportunities in that field. This led to its inclusion in the White Paper which put forward the idea of technology transfer offices for universities, which formed a key part of the phase 1 government policy for valorisation.

An important influence in dictating universities' responses in the second phase of government policy was the EU Regional Development Policy, and in particular, its increasing orientation towards supporting innovation activities. In 1989, 12 experimental regional pilots were carried out across Europe, developing regional technology plans for these 12 regions, including South Limburg. The success of the policy and its expansion through RITTS, RIS, RIS+ and RISI programmes offered an alternative source of income for universities that would orient themselves towards innovation activity and were located in eligible areas. Because European Funding was largely restricted to deprived former industrial and restructuring agricultural areas, only a few Dutch universities were eligible. But in those regions (including the north, south and east), the eligibility of innovating funding provided an incentive for universities to produce an ongoing stream of valorisation projects which absorbed these funds and the University of Twente was certainly active in this area of creating valorisation projects (Schutte et al., 2001). The other external influence at this time was the 'dot com' bubble, when all high-technology firms, even those with questionable plans structures and prospects, were temporarily able to obtain substantial venture funding from investors, many of whom were soaked when the bubble burst. After 2001, universities were much less sanguine about the prospects for high-technology investments, in part because a number had suffered losses in investing in high-potential businesses which proved useless.

The third wave of government policy can also be regarded as an attempt to restore momentum to universities which had become more risk averse and less willing to support business innovation. The 2004 Innovation White Paper ('*Pieken in de Delta*') argued for the creation of three spin-off hotspots around the universities of Delft, Leiden and Twente, as well as further support for the valorisation complex involving Philips and the Technical University in Eindhoven. The substantial sums involved and the increasing allocation of funding to scientific infrastructure rather than to staffed transfer projects allowed universities to think up ways of using these funds to invest strategically in their science base. An alternative reading of the third wave of valorisation policy was an attempt to extract concessions from universities to contribute substantively to the flagship Innovation Agenda in return for significant infrastructure investments.

Between 1990 and 2003, third stream income of universities rose significantly, with industry–funded research rising from some €50m to €160m, underlying greater collaboration between universities and other societal organisations. Whilst in 1996, 10 of the 14 Dutch universities lacked support structures to create spin-off companies (Tilburg & Kreijen, 2003), by 2005, 12 universities had created holding companies or technology transfer offices to support technology transfer activities (VSNU, 2005). Yet, it is not fair to portray this as a one-way increase in universities' commercialisation activities. Both patent data and spin-off numbers peaked in the 1990s and have subsequently stagnated or declined. Dutch universities increased their patent output from approximately 80 applications in 1981 to over 330 by 1998 (Tijssen et al., 2006). But after 1997–1998, there was a decline to around 240 annually. This highlights the fact that the final stage of university involvement in commercialisation was more oriented towards maximising the benefits that it

had brought for those universities than increasing the amount of activity undertaken.

6.4.3 The Dutch University Valorisation Journey 1978–2010

The Dutch case neatly illustrates the central plank of our argument that university valorisation and the third mission did not evolve as uniform or straightforward responses to external pressures, and certainly not to government policy instruments. Rather, universities were active in shaping – and in some cases pre-empting – those responses. Only 14 universities had a public role in basic research. They have some capacity to capture policy makers' demands, even though there are other non-university public research organisations. There has been a pattern of reform in the higher education sector by consent because of the relatively small sectoral size. The third mission of Dutch universities has evolved through an ongoing negotiation process between government and universities which has shaped policy and action, producing outcomes which have become the basis of subsequent negotiations. But university interests in this process are neither uniform nor straightforward, with universities paying attention to their capacities and internal stakeholders' interests, in this case their researchers. Dutch universities have evolved through three distinct phases of valorisation towards an end point that could not be anticipated—nor was that desired—at the start of this journey.

The first stage of the engagement in third mission activities by Dutch universities was when they became sensitised to the idea of applied research. In the 1970s, the Dutch academy responded to societal unrest by going back to its historic societal missions, i.e. to ensure that people from particular social groups (the 'pillars') could access higher education (Daalder, 1982). Even in the Technical Universities, it was very difficult for professors – when they so desired – to engage with business, partly out of a fear that business engagement was a cover for the development of weapons and nuclear power (Van den Kroonenberg, 1996). In the first phase, subsidies were made available for collaborative research. A new institution, STW, was founded to oversee the allocation of these subsidies and the focus of the Dutch Science Council was extended beyond pure research. It was not compulsory to collaborate with business, but researchers who wanted to engage with business were provided with appropriate opportunities. Universities were also given incentives to develop infrastructures to support business engagement. This helped to mobilise a community of engaged researchers in some universities who benefited from accessing additional government research funds, conditional on business engagement.

The second phase began when universities became institutionally interested in the idea of engagement and started to develop projects to bring money to the university as a whole rather than to particular researchers. The availability of European funds provided them with a means to develop technology transfer infrastructures, including transfer offices, incubators, spin-off programmes, venture capital funds, and IP management activities. A few high-profile successes abroad, notably Leuven's technology transfer activities, encouraged universities to try to manage their knowledge base more proactively and profitably. In this phase, emphasis shifted from the

individual to the collective. The first university innovation strategies began to be articulated, not only explaining how particular projects worked, but how innovation and its attendant funding streams contributed to and supported the wider life of the university (Schutte, 2000). In the first phase, the engagement was remote from the managing centre, whilst in this second phase, it was often increasingly remote from academic units via a technology transfer infrastructure which functioned autonomously to create funding benefits from existing knowledge resources and university infrastructure.

In the third phase, engagement with business developed to become a more central and strategic university element, with university structures stimulating and encouraging academics to engage, as well as supporting engagement projects within a strong infrastructure. This phase was identified as early as 1998 by Burton Clark in the University of Twente, where he highlighted the five characteristics of the entrepreneurial university, including a 'strong managing centre' and an 'extended development periphery'. But a key part of this phase was the recognition amongst universities of a need to bring the engagement mission under control in order to maximise the benefits which it brought to institutions. There was a growing reluctance to engage in endless new research projects – much more thought was given to how particular projects fitted into strategic frameworks, determining the overall evolutionary direction (or 'profile') of the whole university. Science parks became far more intertwined with universities' evolving estates needs, offering incubation and business engagement space rather than commercial real estate opportunities for businesses.

At each stage of this development, universities had to respond to external drivers, but they also had some latitude to shape the direction and outcomes of that particular step. The third mission for Dutch universities did not simply evolve as successive governments developed policies that sought to exploit universities' knowledge bases. Universities, the Dutch university system and the wider environment in which universities operate evolved as a consequence of these changes. The public law on universities' mandate was revised to encompass a more specific societal duty for universities. Understanding the third mission, its relation to universities' other missions, and the impact of the range of reform processes to which Dutch HE has been subject therefore requires an understanding of this multi-stage evolutionary process whereby universities evolved from democratic mass universities to hosting communities of applied researchers, to organising technology transfer projects and finally to becoming commercially engaged institutions.

6.4.4 Engagement as an Outcome of a Complex Policy Development Process

A further complexity is the fact that different universities have played different roles in the evolution process, as their relative power and influence in the process evolved. Early on in the process, the University of Twente found itself leading policy ideas, proposing the creation of the Transferpunt, and creating a spin-off company support programme. This was because it had been founded in 1961 to support industry in the Twente region, and because, as from the mid-1970s when that industry collapsed, it had striven to reinvent itself as a source of new industries for the region.

At the same time, members of the university perceived the opportunities for business collaboration to create revenues that could enhance its research capacity. In 1987, the university adopted the strap-line 'the Entrepreneurial University'. The daring nature of that decision can be better appreciated if one remembers that when it created a consortium of like-minded universities, they chose the name 'European Consortium of Innovative Universities' (ECIU) because of the *avant garde* associations of the entrepreneurial university idea in the 1990s.

But the University of Twente was not the only university to influence governmental policy. Particularly noteworthy was the role of the Innovation Campus at Eindhoven, led by Philips and involving the Technical University of Eindhoven, which was strongly supported by the municipality and strategic bodies for the Eindhoven City region, south east Brabant and the Province of Noord-Brabant. Other developments which caught the attention of policy-makers in the Hague included the Life Sciences cluster around the Leiden University Medical Centre and the Technical Services cluster located next to the Technical University of Delft. The potential of these clusters to contribute to national economic success encouraged policy-makers to tailor their valorisation policies to ensure that they stimulated these emerging valorisation complexes.

The third mission in Dutch higher education evolved at different paces in different institutions within a commonality in the direction of evolution. The University of Twente was a leader during this period, seeking to use the idea of being an entrepreneurial university to offset its weaknesses as a relatively new university with few students, a limited disciplinary offer and no medical school. In contrast, the (ancient) University of Utrecht was far more of a laggard in the development of an entrepreneurial culture, only engaging with the idea of commercialisation when it was clear that there was a sufficient match with its assets, strategies and interests to offer a real opportunity to generate new resources to support its core interests. In the mid 1990s, the University of Utrecht and its research institutes started to create support structures for spin-off companies and patenting. An incubator facility for life science companies was established in 2004, which is relatively late compared to other universities in The Netherlands. The reason why the University of Utrecht is more of a 'laggard' is partly because it has been such a strong recipient of core government funds and partly because its culture traditionally valued basic research and discouraged engagement with business. Therefore it saw no need to pursue external funding and it has been much more careful in ensuring that the conditions for external funds did not outweigh the benefits attached to enhancing its research capacity.

When mentioning the 'third mission' in Dutch higher education, the different pace of progress through the journey should be acknowledged. It should be appreciated that the contemporary landscape for the 'third mission' involves tensions between leading and lagging institutions mediated through policy-makers seeking to achieve their own goals and initial aims. Figure 1 shows how the evolving 'idea of a third mission' can be seen as a landscape of interrelations between leading and lagging universities. These tensions create a dynamic and evolving policy environment in which national policy makers and leading universities attempt to increase the engagement of researchers in third mission activities, while lagging universities

are encouraged to adhere to norms that stress the engagement in third mission activities not to risk the loss of legitimacy. It is important to underline with this diagram that the locus of change is not entirely dictated by the leaders. It is the centre of gravity between leaders and laggards, or what the sector as a whole can achieve, that frames the overall locus.

These changes did not happen in isolation, nor can the evolution of the third mission – shaped as it is by changes in universities – be distinguished from the broader process of evolution through which universities have progressed in response to the Reform agenda. The Dutch example illustrates our broader argument that the rise of the third mission is often taken for granted as a response to external drivers or policy stimuli, overlooking the role of universities in the construction of the response and activities by which the 'third mission' has been delivered. At the same time, its interconnection with other key elements of the reform process (Table 1) highlights how leading universities have been constructing the reform process to their own benefit. Governments have encouraged this approach because of the successes of the leading universities. These have become adopted as best-practices and norms towards which the rest of the sector should converge. We therefore contend that this demonstrates the value of continuing to study the university third mission as a lens to understand and reflect on universities' societal contributions and the continuing effects of reform on the institution and the idea of a university.

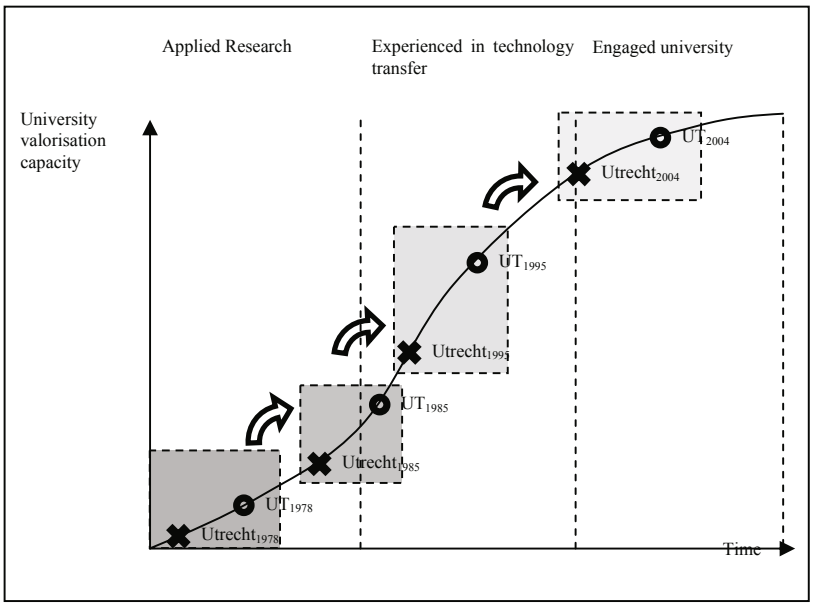

Figure 1. Dutch university and HEI system progression towards engagement 1978–2004.

Source: authors' design.

6.5 UNIVERSITY COMMERCIALISATION AND THE CHANGING INSTITUTIONAL IDENTITY

In this chapter, we have argued that commercialisation has become an intrinsic part of what universities do. This has a number of consequences for the academic study of higher education. The third mission was a response to demands from government, industry and other societal actors for universities to become more self-reliant as institutions (covering their costs) but at the same time creating benefits for a range of societal actors, principally by supporting business innovation and boosting national competitiveness (Clark, 2004). The idea of a third mission for universities—as currently understood—emerged at a particular time and place within a changing society. Over time, it has acquired a degree of autonomy as something shaping not only debates about universities' societal impacts, but also the meaning of university. The third mission has emerged from this evolutionary process to become a mature additional mission of universities, supported by individual universities as well as at a national policy level. The idea continues to evolve, with successes being extended and failures leading to evolutionary dead-ends and policy lacunas, as policy-makers distance themselves from those failures.

The 'third mission' has become one of the key threads of the higher education system, entangled with governance, research excellence, quality assurance, funding and other key lines within the contemporary landscape. As systems evolve, these threads influence the configurations and capacity which emerge, because they are salient in the debates and decision-making processes whereby resources are allocated and the system functions. The implication is that a more detailed understanding of the third mission and its relationship to other elements of the reform process is neeeded. This must not just be limited to understanding how government attempts to reform higher education have stimulated the third mission, but also how the institutions that have emerged seeking to becoming more commercially engaged have in turn shaped governmental attempts to reform university governance, funding and curricular and research structures.

The Dutch story is not unique. In other countries, universities are leading the emergence of the third mission at the same time as they are progressing through the broader reform process. Many of these institutions are well-known from the literature, as well as for the reasons why they have this leading position. Leuven in Flanders has this position on account of the success of patents managed by Leuven R&D which generated substantial income for the parent university. Warwick University has generated a unique profile as a university that focuses on high-technology manufacturing, despite strong national disincentives. Lund University has used reach-out activities to build local political support for its wider scientific ambitions, culminating in its recent award of the €10bn European high-energy laboratory, the European Spallation Source. Tampere University in Finland has also worked with its regional partners to position its region as a high-technology centre worthy of further investment and as a counterweight to investment in Helsinki. Karlsruhe University has recently merged with a research centre to create a strong commitment to commercialisation in order to maximise its benefits from the *Exzellenzinitiativ* in which it has been remarkably successful.

We conclude our chapter with a call to researchers and policy-makers to be more aware of the complexity of the role of the third mission in contemporary higher education. Commercialisation and engagement are no longer add-ons that are peripheral to the university research and teaching enterprise, but represent an additional enterprise for the academy. This means that university societal impacts are not only dependent on small commercialisation projects, but are also shaped by the wider institutional and regulatory environment in which they operate. At the same time, university efforts to engage and commercialise their research shape the wider higher education system. Those seeking to understand or shape higher education systems, or indeed both, must recognise the progress made by universities in responding to society's demands, problems and strictures and be aware that this complicates, rather than simplifies the networks with which governments seek to steer higher education.

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