Supporting the contribution of

Higher Education Institutes

to regional development

Self-Evaluation Report of

Twente

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FOREWORD

This self-evaluation report on the Twente region is the result of the project "Supporting the Contribution of Higher Education Institutions to regional Development" of the OECD/IMHE. Twente is the only region in the Netherlands that participated. All higher education institutions in the Twente region have cooperated and were involved in this study.

The report was written by a group of writers, consisting of the two largest institutions: *Saxion Hogescholen* and *Universiteit Twente.* The complete project was carried out under the supervision of the regional coordinator who was supported by a group of experts. All institutions have provided input and made comments on draft versions of the report. Additional useful contributions came from the *Innovatieplatform Twente.*

A steering group, chaired by a board member of the *Saxion Hogescholen* was set up for the project, consisting of representatives from government, industry and the higher education institutions. The steering group discussed, monitored and approved the structure and methodology of the study, and agreed on the content of the report.

Various regional stakeholders, from the profit and non-profit sectors, were involved in the self-evaluation. 35 people, many holding key positions in the region, were interviewed. Without exception, everybody was very helpful, an important positive signal for the importance attached to the outcome of this study for the higher education institutions and the development of the Twente region.

For the higher education institutions, interaction with the region is of crucial importance. In the accreditation of study programmes developing, utilizing, maintaining and strengthening this interaction is a prerequisite for good education and good, independent provision of services. Therefore, we are convinced that this self-evaluation was not a once-only activity. The various parties involved will incorporate the findings into their quality assurance policies and systems.

It can be concluded that this project will further strengthen the cooperation between higher education and regional stakeholders aimed at strengthening the economic, social and cultural development of Twente. The report is a good basis for this. The last chapter (the way forward) indicates in what fields in particular this strengthening is likely to succeed.

In this respect, it is worth mentioning that the follow-up of the self-evaluation will also be embedded in the objectives and activities of the *Innovatieplatform Twente.* The themes named as spearheads by that platform have been explicitly included. The Province of Overijssel and Network City Twente set up the *Innovatieplatform* Twente in December 2004. All major parties from industry and higher education that (can) contribute to the further development of the region are represented in the platform.

We are grateful to all contributors for their professional engagement, and expect that this report will be used as the basis for further development of the Twente region.

Drs. J.W. Boomkamp
Chairman of the Steering Committee

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1 OVERVIEW OF THE REGION

Matthijs Hammer, Gert-Jan Hospers and Peter van der Sijde

1.1 The geographical and demographic situation

Figure 1.1 Geographical map of Twente in relation to the Netherlands

Source: ITC, 2005

1.1.1 Location of Twente

The region of Twente, in of the Province of Overijssel, is located on the eastern border with Germany and is part of the *Euregio*, a transregional cooperation between bordering areas in Germany and the Netherlands. The size of Twente is 143,000 hectare; there are about 600,000 inhabitants, who live in 14 municipalities; half of them live in one of the three cities Enschede, Hengelo or Almelo. These three cities have a function towards the neighbouring towns for medical care, industrial estates and (large) companies.

Twente is located on the axis that runs from Amsterdam via Berlin to Moscow. It is 150 km from Amsterdam and 500 km from Berlin. This corridor consists of e.g. the motorway A1 (E 30) that in Twente intersects with the A35 (and connects the north-west of Twente with the south-east) and connects Twente with Zwolle (the capital of the Province) and Germany. There is an international intercity connection by train from Amsterdam to Berlin that stops in Hengelo and direct connections to the European rail nets (Netherlands: Thalys, Germany: ICE, France: TGV).

Twente has an airport (*Airport Twente*); originally a military airbase and now also used as a civilian airport (charters for holidaymakers and air taxis). The military part of the airport is to be closed down in the next couple of years. Via water, Twente can be reached by the *Twente Kanaal* (Twente Canal), which is connected with the seaport of Rotterdam. The Twente Canal is used for commercial freight

transport as well as for recreational purposes and runs from Zutphen via Hengelo to Enschede. At Goor it branches to Almelo.

Figure 1.2 Geographical map of Twente

Source: ITC, 2005

1.1.2 Industry

In Twente there are a number of large companies with an international reputation, e.g. Texas Instruments (microelectronics), Urenco (uranium enrichment), Siemens, Philips, Stork, Eaton-Holec (all in the metalelectrical sector), Vredestein (tyres), Grolsch (beer), Ten Cate (industrial textiles), Polaroid (photographic films), Cannondale (bikes), Bolletje (industrial bakery), Uniq (salads), Zwanenberg (fine meat products), Akzo (salt production), SASOL (chemical additives), Thales (military radar equipment). Furthermore, there are two main cultural institutions located in Twente: the Nationale Reisopera (National Travel Opera) and the Orkest van het Oosten (The Netherlands Symphony Orchestra).

1.1.3 Demographics

Table 1.1 Main demographics of Twente

	1980	**1985**	**1990**	**1995**	**2000**	**2004**
Number of inhabitants	553,600	563,848	573,635	586,720	596,394	615,303
% Inhabitants living in cities				48%		49%
Between 15 and 65 years				68.7%	68.8%	66.7%
% men	50.1%	50.0%	50.0%	50.1%	50.1%	50.2%
% women	49.9%	50.0%	50.0%	49.9%	49.9%	49.8%
Average income per				€ 23,300	€ 25,100	

	1980	1985	1990	1995	2000	2004
household						
% participation in the labour process				54.4%	61.0%	64.6%
Unemployment				7.6%	3.8%	6.6%
Number of emigrants			1,992	2,042	1,842	2,806
Number of immigrants			2,908	2,942	3,848	2,650
% Living below the poverty line					9.6%	

Data have been used of the year mentioned or of a year just proceeding or following that particular year.
Source: I&O Research, Enschede

One of the problems Twente will face in the future is a growing shortage of teachers in secondary education as well as a decreasing supply of managers in primary education. Therefore, efforts are taken now to investigate the set-up of a Twente *Instituut voor Lerarenopleidingen* (Twente Institute of Teaching) in which UPE Edith Stein, Saxion UPE and the University of Twente will cooperate in order to educate students for a job at primary and secondary schools. This is related to the general problem that many graduates leave the region after their studies in Twente. Explanations for this 'brain drain' are a lack of suitable jobs and the feeling that the *Randstad* (the cities of Amsterdam, Rotterdam, The Hague and Utrecht) rather than Twente, is the 'place to be'.

1.1.4 Knowledge institutes

Higher Education Institutions (HEIs) are concentrated in the largest city of Twente, Enschede: the University of Twente (UT), Saxion University of Professional Education (Saxion), AKI Visual arts and design academy, ITC (International Institute for Geo-information Science and Earth Observation), Telematics Institute, TSM Business School, SWOT (business school). The Educational Centre Edith Stein (ES), a large part of the ROC van Twente (Regional Training Centre, community college) and the SMEOT (training school for the metalelectrical sector) are located in Hengelo, and the STODT (a technical training centre) is located in Almelo. For a detailed overview of the HEIs in Twente, see appendix A.

The table below (table 1.2) shows the distance to the closest HEIs in the Netherlands and Germany.

Table 1.2 Higher Education Institutions close to Twente

Institution	City	Type of HEI	Distance from Enschede (km)
Saxion Deventer	Deventer	UPE	60
Windesheim	Zwolle	UPE	75
Emmen	Emmen	UPE	75
Saxion Apeldoorn	Apeldoorn	UPE	75
Theological University Kampen	Kampen	University	85
Arnhem Nijmegen	Arnhem / Nijmegen	UPE	85
Radboud University	Nijmegen	University	100
University of Groningen	Groningen	University	140
Fachhochschule Münster	Münster (D)	UPE	70
Universität Münster	Münster (D)	University	70
Fachhochschule Osnabrück	Osnabrück (D)	UPE	95
Universität Osnabrück	Osnabrück (D)	University	95

(D) = Germany
Source: Saxion, 2005

1.1.5 Business development support

In the Twente region there are many organisations that support companies and offer networking opportunities. The *Kamer van Koophandel* (Chamber of Commerce) is an organisation where every company has to be registered; it supports organizations in commercial contacts (national/international), export and start-up. There are a number of organisations that represent the

interest of their members nationally and regionally – e.g. MKB-Oost, the organisation of SME in the Eastern part of the country, VNO-NCW Midden Nederland, the employers' organisation in this part of the Netherlands. Other organisations are the IKT (Industrial Circle Twente) supporting members through seminars and network activities and TKT (Technology Circle Twente), a business club of high-tech companies in Twente. To support innovation processes there is Syntens and the *Innovatieplatform Twente* (Innovation Platform Twente), and to support finding locations and getting investments etc., there is the Regional Development Agency, Oost N.V. For a full list of these industrial institutions / societies in Twente and their scope, see appendix D.

1.1.6 The Twente identity

For centuries, Twente has had a regional identity. This identity becomes clear when the region is evaluated according to the four regional criteria of Paasi. These criteria are clear borders, symbols, institutions and a 'mental map'. Twente is a territorially bounded area, the area is recognizable as such and it is clear which area belongs to Twente and which does not. Twente has symbols, like a dialect of its own, a flag (with the Twente horse), a regional anthem and regional products (e.g. *Twentse krentenwegge*: black raisin bread). Twente has many regional institutions: governance (*Regio Twente*; the region of Twente), society (e.g. *Twentsche Courant Tubantia*; regional newspaper, *FC Twente*, national league football), and a strong industrial base.

The Twente notion is rooted in the consciousness of many Dutch people and spread by national VIPs such as the comedian Herman Finkers, singer Ilse DeLange, and marketing and PR-guru prof. Dr. Anne van der Meijden. This are examples of the clear and recognizable identity, and industry increasingly recognizes it as an opportunity to differentiate itself from other regions.

1.2 The economic base of Twente

1.2.1 Twente's strong industrial past

The present economic structure of Twente is the result of the region's specific economic history. Until the 19th century, Twente was a rather rural area with a population of farmers and traders that lived in the countryside and in small villages. The composition of the soil of Twente was too poor to make it entirely into an agricultural area. When the farmers could not work in the fields in winter, they took up spinning and weaving. It was this home industry at farms that laid the basis for the growth of the regional weaving industry, which developed into the largest textiles companies in the world. After the separation of Belgium from the Netherlands in 1830, King William I looked for a place to build a national textiles sector that could produce cotton for the colonies overseas. The weaving knowledge of the Twente people and their strong labour ethics made the national government support the development of a modern textiles industry in Twente. In Almelo, Borne and Enschede large textiles factories were built, whereas Hengelo specialized in related industries such as metal, machinery and electronics. The demand for qualified workers soon was so high that immigrants from the northern provinces (Drenthe, Groningen) and Germany came to work in Twente's industry.

To make the hard transition from country to factory life tolerable, the manufacturers invested in green parks and decent working class neighbourhoods such as the Garden Villages *Pathmos* en *'t Lansink.* Also libraries, art collections and sporting facilities were established as well as a financial bank in 1861, the *Twentsche Bank* which in 1964 merged with the *Nederlandsche Handelsmaatschappij* (Dutch trading society) to the *Algemene Bank Nederland* (ABN). Nowadays this bank is better known as the internationally operating *ABN-AMRO bank* after the merger with the *AMRO bank* in 1991. In addition, the industrial heritage consists of those quarters in several cities, which were built to provide housing for the thousands of employees during the industrial revolution. Therefore, the actual shape and design of the cities and the local infrastructure incorporates in many ways the characteristics of the past.

During the 19th and first half of the 20th century Twente was constantly growing in textiles and metal manufacturing, providing not only mass products, but also specialized clothing, synthetic fibres and

metal-electronic equipment. In the 1950s, however, the regional textiles sector entered a period of structural decline: competition from low-wage countries, the post-war loss of Dutch cotton colonies, increasing technological efficiency and lack of entrepreneurial alertness led to a cut-down of 80% of regional employment in textiles between 1955 and 1980. To counter the loss of 40,000 jobs, the region's stakeholders joined forces and lobbied in national government circles to get academic education for Twente.

1.2.2 Still recovering from the crisis?

The regional lobby succeeded: in 1964 the UT was opened as a campus university of technology offering degrees in mechanical, electronic and chemical engineering as well as applied physics and mathematics. The area's strong industrial heritage and the technological university were seen as an ideal combination to build a modern technology-based regional economy. During the 1970s, it was clear, however, that the region could not grow solely on the basis of technology. Unemployment was still high, while the enrolments at the university were stabilizing. To diversify the economic structure, investments were made in new growth sectors, especially services. In line with that, the UT set up degrees in social sciences such as management studies, public administration and educational sciences. Meanwhile, also other regional higher education institutes were expanding: the *Hogeschool Oost Nederland*, the *Hogeschool voor Techniek en Gezondheidszorg* (both now part of Saxion), ITC as well as AKI. Backed with European funds in the 1980s Twente could gradually recover; the region's infrastructure was improved and the area managed to climb back to the third place in the national league of industrial regions. Manufacturing still is important in the regional economy with food, chemicals, metal/electronics, defence industry, transport and building as well-known examples. Ten Cate, today producing fibres like artificial grass, carbon fibres and aramid fiber products for the aircraft industry, is one of the few remnants of Twente's long textiles history. Consumer and business services (e.g. finance and communication), which have been at the top of the Twente planners' lists since decades, have been growing rapidly only since the 1990s. Especially transport, communications, financial services and business services have been on the rise, realizing a growth that is higher than in the rest of the Netherlands. The same is true for public services: thanks to large medical institutions like the Roessingh rehabilitation centre, MST (*Medisch Spectrum Twente*) and ZGT (*Ziekenhuis Groep Twente*), and related economic/scientific activities, especially Twente's health care sector is on the rise. In terms of high-tech clustering, the region now has a worldwide reputation for its performance in medical technology, telematics, nanotechnology and tissue engineering.

1.2.3 Towards a more diversified economic base

Due to the tendency of diversification the sector structure of Twente has become more balanced over the last decades. This can be concluded from the recent development of the regional 'concentration index' (i.e. a sectoral index in which a higher level indicates a higher concentration of firms, employment and value added in only a few sectors): twelve years ago in Twente this index amounted to 39.6% (Dutch average: 37.0%), but now it is 36.7%, which is close to the national average of 36.5%. Nevertheless, the sectoral shares in employment show some significant differences between Twente and the Netherlands. Although the share of people working in manufacturing and building declined over the period 1996-2004, the region still employs many people in the secondary sector (26.3% versus 18.1% in the rest of the Netherlands). The reverse can be seen in the primary sector: only a few people from Twente work in agriculture (0.8% versus 1.4%). Despite its recent rise, the employment share in the tertiary sector has not reached the overall Dutch level yet. With a share of 72.9% service workers, Twente has 7.6% less service jobs than the Dutch average of 80.5%. From a national perspective, only the number of jobs in Twente's public health services like hospitals, homes for the elderly and specialized medical services (e.g. heart centre), is relatively high. All in all, the long industrial legacy of Twente is important to the present day.

The sectoral dynamics of Twente's economy is rather ambivalent. Thanks to leading knowledge-intensive and export sectors (electronics, metal, machine-building and fibres) and leading knowledge institutes, the regional innovation potential is high. At the same time, the actual regional innovative performance lags behind this large potential.

The level of R&D expenditures is 2.1% of Twente's gross regional product, which is more than the 1.6% nation-wide. In addition, the number of patent applications is higher than in the rest of the country.

This innovative potential, however, does not lead to a similar high level of regional innovation; to be sure, Twente develops slightly more product innovations than other Dutch regions, but far less process innovations. The rate of new business formation in Twente over the last five years has been 0.1% higher than in the Netherlands, but not in innovative sectors, where start-ups are 0.1% lower than the Dutch average.

Most firms are local SMEs; only 0.41% of all firms are large companies (Dutch average: 0.43%) and only 0.49% of the business comes from abroad (national figure: 0.67%).

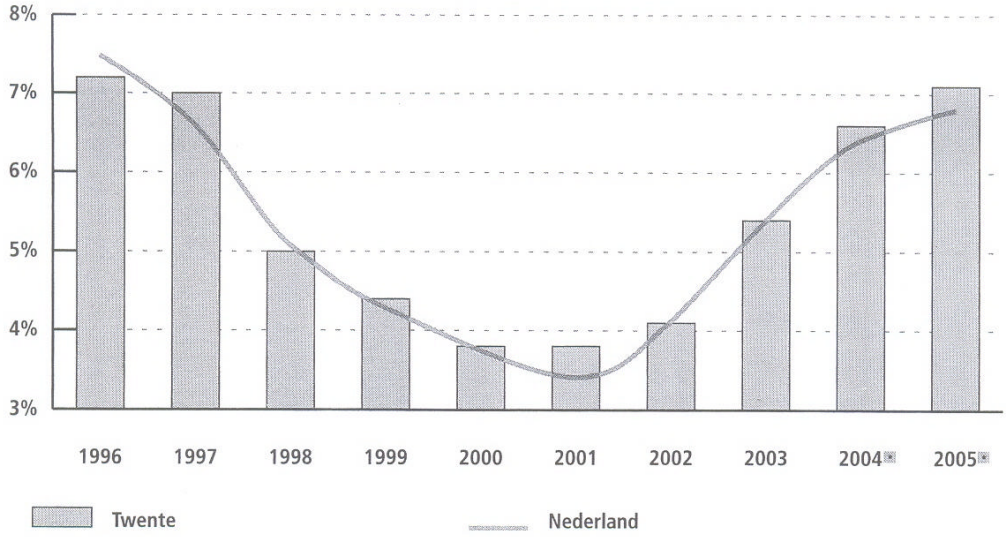
The problem of Twente's innovation paradox of high potential combined with low performance could be that a relatively large share of regional R&D is carried out by only a few actors. The majority of the patent applications, for example, come from a small group of knowledge-intensive firms around the UT. By finding new ways to exploit the knowledge-potential, the economic growth of Twente can be continued.

1.2.4 Labour market and long-term performance

The Twente economy represents 3.5% of the total number of jobs in the Netherlands. The participation level (i.e. the number of workers related to the potential work force) is 64.6%, which is lower than the Dutch average of 65.1%. Compared with other regions manufacturing and building offer relatively many jobs in Twente. Although employment growth takes place in the services sector, the rise of jobs in the area emerges particularly from a rise of the regional participation level. Unemployment figures show a less favourable development. At the moment, the level of unemployment in Twente is slightly higher than the Dutch average: in 2004 about 6.6% of the working population in the region were out of work compared with 6.4% in the Netherlands as a whole. This is a gap of 3%. Three years ago these levels were about 3.8% and 3.4%; a difference of 8%. The rise of unemployment, however, is part of the general downward economic trend since 2002 that can be felt throughout the nation. Twente's share of unemployed young people (15-29 years), however, is much larger than in the rest of the country. In the last two years the regional growth of youth unemployment, for example, has been about three times higher than the national average. Over this period the unemployment rate among higher educated people has risen faster (more than two times) than in the Netherlands. It must be said, however, that the traditional lower starting level in Twente plays a role here as well.

Between 1985 and 2005 the economy of Twente has performed better than in the sixties and seventies. Nevertheless, the region's economic development has been structurally weaker than in the rest of the Netherlands, in terms of employment, income and value added. In 1985, for example, unemployment in Twente was 18.5%, while the Dutch average was 15.4%. The unemployment rate in Twente in relation to the Dutch average has been lower only once over the last twenty years, namely in 1996 (see also figure 1.3). Also in terms of gross regional income per capita, there has always been a structural gap between the relatively poor Twente and other Dutch regions (figure 1.4). Compare, for example, the GDP (Gross Domestic Product) per head in 2002: in the Netherlands this amounted to €27,641, whereas the Twente figure was €21,966. A similar structural lag can be observed in the development of sectoral value added, that is the contribution of the single sectors to the regional economy. Over the period 1996 until now, the average growth of the total regional added value was lower than that in the rest of the country. Twente's transport and communications (including information and communication technology), trade and commercial services realised high growth rates in their value added, although they did not reach the Dutch average. In leisure, finance and the environmental sector, however, the growth of value added over the last ten years has been higher than the national average. In total, these statistics demonstrate that the long-term performance of Twente continues to be less favourable vis-à-vis the Netherlands.

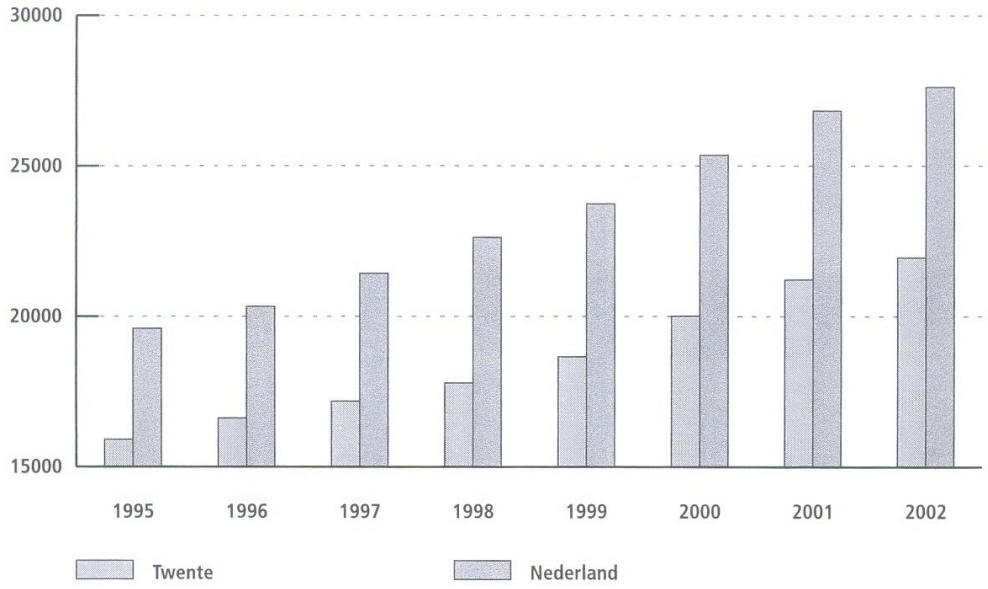
Figure 1.3 The development of unemployment in Twente and the Netherlands (1996-2005)



Bron: CBS, bewerking Economisch Bureau ING

Twente 2004 en 2005 en Nederland 2005: raming Economisch Bureau ING

Figure 1.4 GDP per capita in euros in Twente and the Netherlands (1996 – 2002)



Bron: CBS, bewerking Economisch Bureau ING

1.3 The governance structure in Twente

1.3.1 Tasks and responsibilities of authorities

Like all areas in the Netherlands, Twente falls under the Dutch system of administrative governance. The Netherlands is a decentralised unitary state with two types of 'lower governments' besides the national government (*rijksoverheid*): provinces (*provincies*) at the regional/county level and municipalities (*gemeenten*) at the local level. The Netherlands has twelve provinces with hundreds of municipalities; Twente and its fourteen municipalities (Enschede, Hengelo, Borne, Almelo, Losser, Oldenzaal, Dinkelland, Tubbergen, Twenterand, Hellendoorn, Wierden, Rijssen-Holten, Hof van Twente and Haaksbergen) are part of the province of Overijssel. The lower governments have an autonomous position, but the extent of their autonomy is determined by the national government. The higher administrative levels also supervise the lower ones and can demand cooperation from them. The set-up of this system implies that the tasks and responsibilities of Dutch provinces and municipalities are largely dependent on the national government. In matters of macro-economic and social-distributional policies, the national level is in charge. When it comes to the provision and allocation of local amenities, the lower governments come on the screen.

Generally speaking, provincial authorities have the right to decide on all regulations that they deem important for the development of the province. In implementing the regulations, municipal cooperation can be required. In turn, municipalities have to submit their local plans to the province for approval. In practice, the province settles regulations with a supra-local scope in the field of spatial development, infrastructure and socio-economic development. Within the limits of these provincial regulations, municipalities have important allocation tasks. The local authorities, for example, take care of public order, traffic, education, transport, culture and recreation within their municipalities. For this purpose, they dispose of only a limited amount of own financial means (received for example from local taxes), totalling not more than 10% of the local budget; the majority of the municipal funds still comes from the national government and is earmarked for special purposes. In conclusion, the different tiers of government in the Netherlands are highly interdependent. Municipalities have a certain degree of discretionary power on local matters, but they are subordinated to the national and provincial government. Unsurprisingly, local stakeholders regularly complain about some 'superfluous centralism'. Especially in Twente such complaints can be heard about the province; the municipalities in Twente feel, as the economic engine of Overijssel is in their region, that they deserve more power in relation to the province governing from Zwolle.

1.3.2 Network city and the region of Twente

In all post-war national plans for regional administrative reform, Twente has been designated as one of the areas where such reform should take place. This designation can be seen as recognition by the national government that Twente – although part of the province of Overijssel – does have an administrative right to exist. Historically speaking, there is indeed reason to see Twente as a separate entity; see chapter 1.1.6. The recognition and reality of Twente as a single territorial unit, however, has never resulted in a new, official administrative status for the region. As a matter of fact, Twente has a historical record of forty years of inter-municipal cooperation. In varying combinations the cities, towns and villages in Twente have tried to join forces since 1966 and work together more closely for the benefit of overall regional development. Plans for a City Belt, District Twente, Province of Twente, Twin City (Enschede-Hengelo) and Twente City, however, failed because of internal conflicts or due to opposition from the national government.

Over the years, the close inter-municipal deliberations, consultations and cooperation initiatives still led to progress. For one thing, the municipalities got to know each other's opportunities and sensitivities better, which sets it apart from other regions in the Netherlands. For another thing, building on the historical experiences Twente has been able to establish a Network City and a Region. Both bodies are platforms for strategic cooperation between municipalities in the region. Since 2001, Enschede, Hengelo, Borne and Almelo have met in Network City Twente (*Netwerkstad Twente*) to develop strategic visions and jointly set-up regional flagship projects such as Knowledge Park Twente.

Besides this city network, there is the construction of the Region of Twente (*Regio Twente*) in which all municipalities discuss matters of region-wide importance.

The emphasis of this cooperation is on the content, not on the cooperation structure. To this body, the members have delegated a few competencies, mainly in the field of infrastructure and tourism. The Region, for example, is responsible for the functioning of public assistance (fire brigade), public transport (buses, taxies) and information on health matters (Area Health Authority) on a regional scale. Enlarging the powers of the region to matters like spatial planning and economy has not been possible until now, because the participating municipalities fear to lose their individual autonomy.

A factor that may explain the lack of administrative cooperation in Twente is the absence of a large natural centre city whose leading position is recognized and accepted by all the other municipalities. Thus, due to inadequate cooperation Twente still lacks a strong regional authority. This result contrasts with the high degree of 'social capital' in the region, which counts among the highest in

In the region 89% of the population participates in a local social-cultural network (e.g. a business association, soccer club or music society), while the West-European average is 26%.

Western Europe.
This is a positive sign, because social capital enlarges mutual trust and facilitates doing business. Obviously, the solution of the regional cooperation paradox (the population is highly cooperative, but the authorities are not) has to be found in the nature of cooperation: making far-reaching decisions on the region differs from collective action in social networks.

1.3.3 Governance in the economic and education domain

As in all policy domains, spatial-economic and educational policy at the regional level cannot be separated from national and provincial plans in this field. At the moment, the economy of Twente is subject to national policy (funds within the framework of Dutch regional-economic policy) and provincial policy (Triangle-strategy and Regional Innovation Platform). In the recent policy document Peaks in the Delta (Ministry of Economic Affairs, 2004), Twente figures as one of the five Dutch regions that have been designated as R&D-Hot Spots. In the new Dutch regional policy a radical shift has taken place from an approach aimed at regional equity to a policy geared towards regional efficiency. In this respect, the designation of Twente as an R&D-Hot Spot is an important recognition; it shows that the Dutch government sees Twente as a region with opportunities rather than a place with problems. The Triangle is a project of *Oost NV*, the joint regional development corporation for Overijssel and Gelderland, promoting closer research cooperation between the UT (Technology Valley), Nijmegen (Health Valley) and Wageningen (Food Valley). With the help of all these partly overlapping policies Twente should develop into a Top Technology Region with a focus on innovation in clusters like materials and health technology. A similar goal has been formulated in the Region's Regional Economic Development Plan for Twente (REOP), although in this strategy also recreation and tourism receive a great deal of attention. At the moment, ES, Saxion and UT investigate the possibilities for the establishment of a *Twente Instituut voor Lerarenopleidingen* (Twente Institute of Teaching). This institute should help to attract more students for a job at primary and secondary schools. In this way, it is hoped to give in to the shortage of teachers and managers in primary and secondary education that is threatening the region of Twente. The municipalities in Twente also have economic plans of their own (e.g. health technology in Enschede), but they have to deal more with the day-to-day matters of economic development, such as providing services. Local authorities may also sell land and develop business parks in cooperation with private developers and other parties (e.g. the universities or schools). Thus, recently an Educational Boulevard for vocational education was built. In a similar way, local authorities and the university are cooperating now to redevelop the Business & Science Park in Enschede into a Knowledge Campus.

1.4 Conclusion

Towards a SWOT analysis of Twente
As was stated above, Twente is a region with a distinctive development path. It is a clearly recognizable region marked by its strong industrial past and moving now into a largely technology-based future. Within a European and global context, it is hard to judge whether the region of Twente can regain its competitiveness of the past. In an attempt to assess the economic perspectives of Twente, researchers often have related the region's internal characteristics to the external challenges the area is facing. In this respect, a number of SWOT analyses have been made, mapping the strengths/weaknesses and opportunities/threats for Twente and its economy. Table 1.3 lists the main findings from these studies. In general, international developments, technological change and the demand side of the economy gain importance. Twente could take advantage of these opportunities in particular by exploiting its strategic location and its unique position as an area where trend and tradition on the one hand and city and country on the other are complementary. Such a positive scenario is only feasible, however, if Twente is able to solve its weaknesses. Investments in infrastructure and in amenities that keep and attract higher educated people may be needed for this. But whether these investments are made, probably depends in the first place upon the willingness among the municipalities to join forces and develop strategies for the benefit of the whole region.

Table 1.3 Strengths/weaknesses of Twente vis-à-vis external opportunities/threats

Opportunities for Twente	**Threats for Twente**
Further integration/enlargement of EU Technological change/knowledge economy Growing demand for quality of life	Interregional competition in Europe Dependency of footloose companies Less growth in low-tech/mass production
Strengths of Twente	**Weaknesses of Twente**
Strategic position on East-West axis Highly-developed knowledge infrastructure Nature and tranquillity in green surroundings	Bad infrastructural North-South connections Lack of a dynamic and vibrant urban environment Inability of municipalities to cooperate well

References

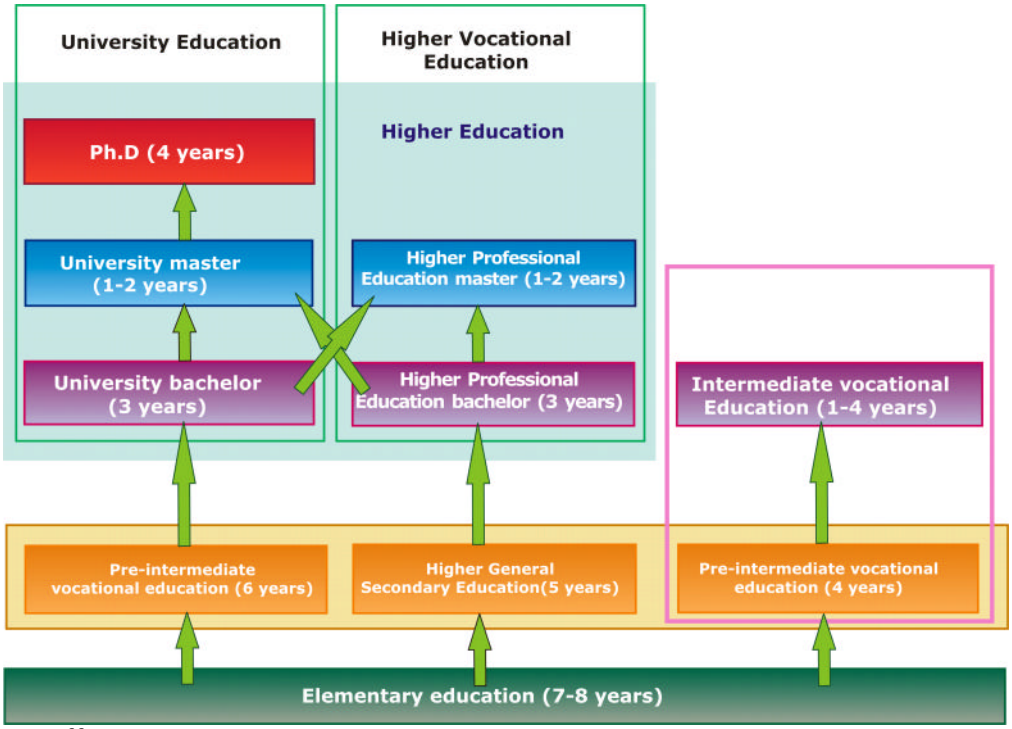
Hospers, G.J. and R.M.P. van Lochem (2003), *Ondernemend Besturen in Twente: Van Koning-Koopman Willem I tot VOF Twente,* KvK/IKT/VNO-NCW, Enschede
Hospers, G.J. (2004), *Twente: Een Regio tussen Trend en Traditie,* Karmac: Lelystad
ING Bank (2005), *Ondernemen in Twente: Regio in Economisch Perspectief,* Economisch Bureau ING: Amsterdam
Kamer van Koophandel Regio Veluwe en Twente (2005), *Statistieken,* KvK: Enschede
Kokhuis, G.J.I. (2000), *De Geschiedenis van Twente: Van Prehistorie tot Heden,* Twents-Gelderse Uitgeverij: Oldenzaal
Ministerie van Economische Zaken (2004), *Pieken in de Delta: Gebiedsgerichte Economische Perspectieven,* EZ: Den Haag
Nederlands Economisch Instituut (1998), *Twente 2000+: Regionaal-Economische Visie op Twente,* NEI: Rotterdam
Regio Twente (2004), *Regionaal Economisch Ontwikkelings Plan Twente,* Regio Twente: Enschede
Timmers, W. (ed.) (1997), *Zó is Twente,* Twente University Press: Enschede

2 CHARACTERISTICS OF THE HIGHER EDUCATION SYSTEM

Ben Jongbloed

This chapter presents an overview of the main characteristics of the higher education system in the Netherlands. Section 2.1 presents some key facts about the system as a whole (types of institutions, number of students, degrees). Section 2.2 discusses the different types of higher education products, that is teaching and research. Section 2.3 presents a description of policymaking with respect to higher education and shows the different policy networks where policies are discussed and initiated. Section 2.4 is about the funding of higher education while section 2.5 discusses institutional collaboration. The final section (2.6) reflects on the regional dimension in Dutch higher education policy.

Figure 2.1 Educational system of the Netherlands



Based on: Nuffic 2005

2.1 Main features of the Dutch higher education system

2.1.1 Types of institutions

The Dutch higher education system is a binary system and consists of a university sector and a higher professional education sector (see figure 2.1). The university sector is also known as the Wetenschappelijk Onderwijs (WO) sector. The higher professional education sector is known as the Hoger Beroepsonderwijs (HBO) sector; abroad[1] referred to as University of Professional Education (UPE). Both the universities and the UPEs have their own function, as defined in the Higher Education and Research Act (WHW) of 1993: “The universities prepare students for independent scientific work in an academic or professional setting and the UPEs prepare students to practise a profession and enable them to function self-consciously in the society at large”.

[1] In 1999 the Minister of Education, Culture and Science officially gave *hogescholen* the right to use the title of *University of professional education* in an international context.

In Twente, all types of Higher Education Institutes are present.

University sector
The university sector consists of 13 traditional universities (including the UT), the Open University, a university for business administration (the private Nijenrode University), four institutions for theological training, and a humanistic university. Apart from Nijenrode University, all of the above-mentioned institutions receive government funding on a regular (formula-funding, see section 2.) basis.

Higher professional education sector
The higher professional education sector consists of 44 UPEs that include general institutions as well as institutions specialising in a specific field, such as agriculture, fine and performing arts, or teacher training. UPEs are primarily responsible for offering programmes that prepare students for particular professions. These tend to be more practically oriented than the programmes offered by universities. Saxion, Edith Stein and AKI are part of the UPE sector.

The UPEs are a relatively recent addition to the Dutch higher education landscape. As late as the early-1980s they essentially constituted a mixed bag of around 350 very small, highly specialised vocational schools that were still classified by the government as secondary education providers. It was not until 1985 that they officially became part of the higher education sector. In 1987, a substantial number of mergers took place that reduced the number of *hogescholen* to 85. The mergers created a number of new *hogescholen* that were larger, at least in terms of enrolments, than several of the existing universities. During the 1990s merger processes continued, leading to today's total of 44 HBO institutions. Today, the curricular and programme diversity of the UPEs varies from large institutions, offering degree programmes at bachelor and sometimes master levels in most major academic fields, to smaller institutions specialising in the provision of arts, education, health-related or technical programmes. Unlike the universities, UPEs do not provide PhD degrees and they do not receive government funding for their master's programmes.

One of the issues in the debate on the future of higher education in the Netherlands revolves around the issue of (applied) research in the UPEs. Currently the UPEs do not receive any government funding to support this function, but many participants in the debate see a particular role for UPEs in strengthening the local economy by means of knowledge transfer and applied research aimed at the small and medium-sized enterprise sector (SME). The government responded to these calls by introducing the position of a lector, which is a special position (funded out of targeted funds) to be filled by an academic that engages in applied research and knowledge interaction with regional partners. (More on this in the final section of this chapter.)

International education sector
The higher education system also includes a third branch, with a relatively small number of students. It is known as *Internationaal Onderwijs* (IO), or the international education sector. There are 13 IO institutions of which 5 offer university degrees. They offer advanced training courses that originally were designed for people from developing countries who have work experience and whose jobs require highly specialized knowledge. These thirteen institutions provide postgraduate training and education in the English language in a variety of sectors and subjects to mid-career professionals from developing and transitional countries. The IO institutions support capacity building in the students' home organizations. The institutions also engage in research and advisory services in their areas of expertise.

The courses last from a few weeks to two years. The IO institutions also offer PhD programmes jointly with Dutch universities. For this, different agreements with some of the Dutch universities have been made. Today, the IO institutions have been placed under the umbrella of the

research universities. For instance, the ITC institution is now a separate operational unit in the University of Twente. The IO institutions receive yearly subsidies from the government. Part of the subsidy is intended to provide scholarships to international students.

2.1.2 Overall size of the HE system

In the academic year 2002/2003, there were around 180,000 students in the thirteen Dutch research universities (see table 2.1). The UPE sector had some 340,000 students in that same year (table 2.2). Apart from these bachelor and master's students, the research universities offer PhD positions to some 7,500 PhD students.[2]

Table 2.1: Student enrolment, universities 1996-2002

	All universities				University of Twente			
	full-time	part-time	dual	total	full-time	part-time	dual	total
96/97	153,189	11,406	-	164,595	6,169	16	-	6,185
97/98	147,643	11,814	-	159,457	5,700	36	-	5,736
98/99	146,879	12,185	-	159,064	5,591	57	-	5,648
99/00	149,612	12,808	42	162,462	5,672	68	-	5,740
00/01	152,648	13,825	74	166,547	5,813	75	-	5,888
01/02	158,277	14,195	84	172,556	6,021	134	1	6,156
02/03	165,356	14,607	79	180,042	6,458	134	1	6,593

Source: VSNU, digitaal ontsloten cijfers onderwijs

The number of students in universities has remained rather stable over the past 10 years, showing a decline towards the end of the 1990s and a recovery in the early years of the new century. About 64% of university students are in the social sciences and humanities programmes, a quarter in the natural sciences, engineering and agriculture. The remaining students (some 10-12%) are in medical programmes.

Table 2.2: Student enrolment, UPEs 1997-2004

	All hogescholen				Of which:			
	full-time	part-time	dual	total	Saxion	Edith Stein	AKI	ITC
97/98	235,429	44,741	2,080	280,162	8,751	876	583	1,242
98/99	239,515	48,487	3,261	290,530	8,801	926	599	1,290
99/00	246,495	54,675	4,977	305,810	9,402	952	576	1,046
00/01	247,832	60,868	7,073	315,773	9,881	1,022	590	1,002
01/02	249,361	66,147	9,115	324,623	10,569	1,044	598	923
02/03	249,713	65,628	10,430	325,771	10,850	1,040	563	1,032
03/04	259,210	67,828	11,792	338,830	11,257	1,108	538	944
04/05	271,295	66,611	11,623	349,529	11,890	1,192	500	892

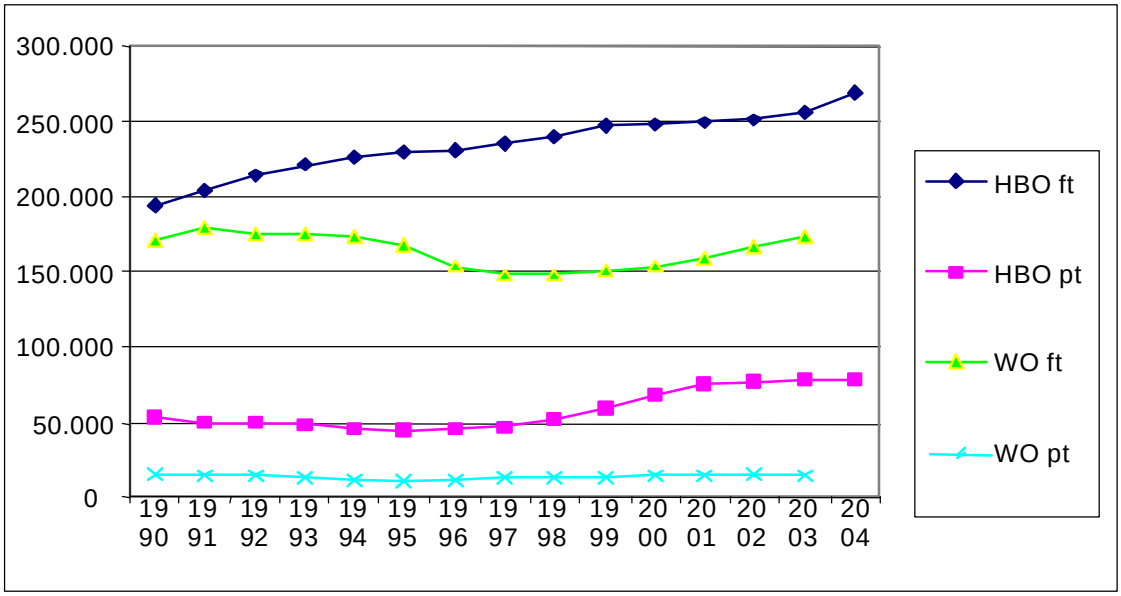
Note: Includes BA as well as MA students.

Source: HBO-raad, kengetallen.

[2] PhD students have a position in the university and formally are part of the research university's staff. The University of Twente has some 170 PhD students.

Figure 2.2 shows the trends in student enrolments in the university sector (WO) and the UPEs sector (HBO), making a distinction between full-time and part-time enrolments.

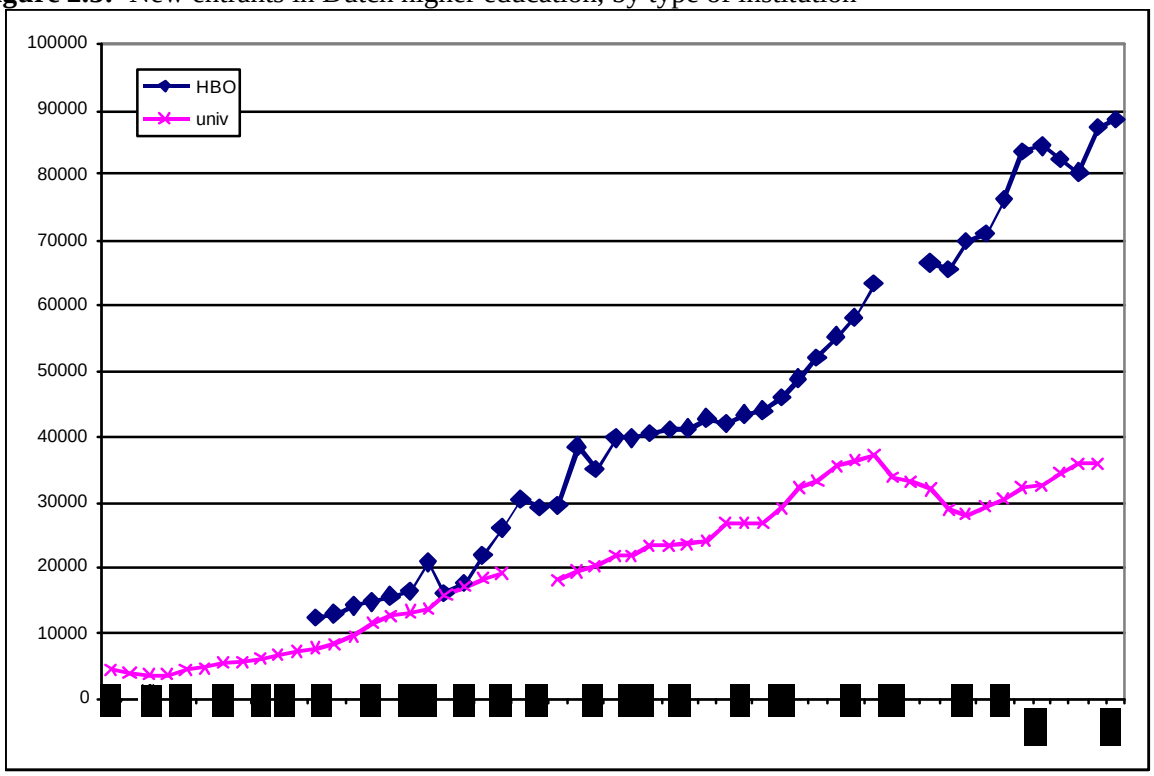
Figure 2.2: Student enrolment in UPEs (HBO) and universities (WO), full-time (ft) and part-time (pt), 1990-2004



Source: CBS Statline, www.cbs.nl.

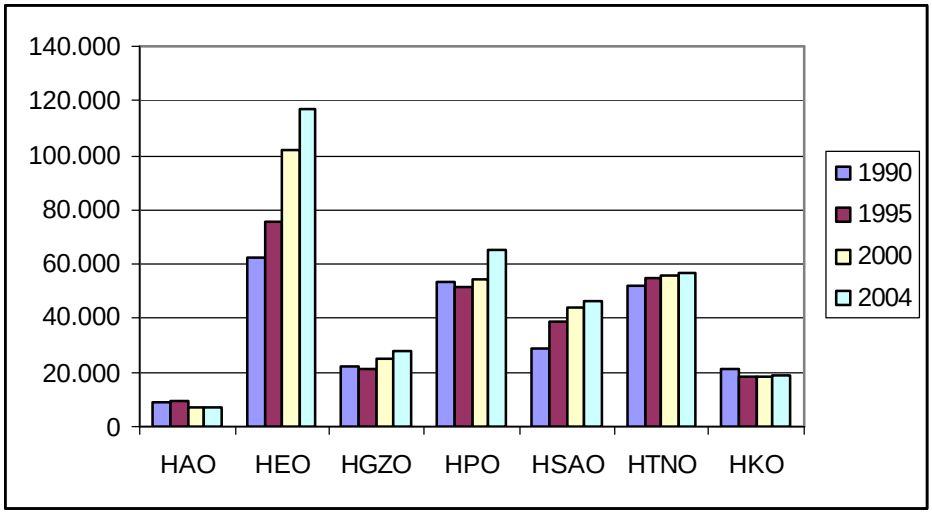
Student participation is increasingly concentrated in the UPE sector. This is also clear from figure 2.3, below, which shows the number of new entrants over the period 1950-2000.

Figure 2.3: New entrants in Dutch higher education, by type of institution



Source: CBS Statline, www.cbs.nl.

Figure 2.4: Students in UPEs by broad groups of disciplines, 1990-2004



Source: CHEPS, based on data from HBO-raad website

By far the largest share of HBO students are in economics and business-related programmes. This sector (HEO, in figure 2.4, above) has seen a sharp rise over the period 1990-2004. The number of students in agricultural programmes (HAO) experienced a decline, while engineering (HTNO) proved rather stable. Socio-agogic programmes (HSAO) and health related programmes (HGZO) saw a rise. Enrolments in teacher training programmes (HPO) have climbed back up again in recent years after having dropped in the mid-1990s. It goes without saying that within the broad groupings of programmes some specific programmes may have experienced declines or increases in the student intake. In particular, the traditional natural sciences and mathematics have seen the numbers of students decline, whereas in information technology, biology and some of the health-related programmes students' numbers have gone up in the past ten years.

2.2 Demand and supply of teaching and research

In today's knowledge-driven society, efforts to achieve optimal economic development include the provision of sufficient numbers of graduates with the required knowledge and skills to become available to the labour market. While the idea of manpower planning has long been abandoned, the need for well-founded labour market forecasts, differentiated by occupation and education, has remained. In the Netherlands, the Research Centre for Education and the Labour Market (ROA) of Maastricht University has been making forecasts of the developments in supply and demand in the labour market, differentiated by occupation and education, for more than fifteen years. Each forecast covers a period in the future of five years, and they are made every two years. The forecasts made are used to create policy-oriented reports and to provide information, often in the form of data files, to ministries and institutions in the field of education and the labour market, and to publishers of study and career advice material. The most recent ROA report, entitled "The labour market differentiated by occupation and education until 2008" (ROA, 2003), predicted good labour market prospects for graduates from universities and HBO institutions and identified a shortage of graduates to take on jobs in the education, health and engineering sectors.

The combined job centres run by the government, represented in the Centres for Work and Income (in Dutch: *Centrum voor Werk en Inkomen*, CWI), collect data on vacancies. Partly based on these data and based on the ROA and other government agencies' economic analyses, the Council for Work and Income (in Dutch: *Raad voor Werk en Inkomen*) publishes labour market analyses and forecasts. These also show a continued high demand for graduates, partly as a result of the ageing of the Dutch society (replacement effect) and the changing structure of the Dutch economy.

With respect to the public research system in the Netherlands, we have to mention that the public science and research community comprises the research universities, the Academy of Arts and Sciences (KNAW) and its 18 research institutes, plus the research council (NWO) and its 9 institutes. Universities conduct most of the basic research. Applied research is carried out (partly publicly funded) by the five Large Technological Institutes (GTIs), the four Leading Technological Institutes (LTIs), the Netherlands Organisation for Applied Research TNO (an independent contract research organisation) and its 14 institutes, and, finally, by the DLO agricultural research institutes.

The so-called Leading Technological Institutes *(LTIs)* were conceived in 1997 as – virtual – organisations in which companies and knowledge institutes (including universities) participate (public-private partnerships). There are four institutes which operate in the separate fields of nutrition, metals, polymers and telematics. These LTIs aim at stimulating R&D co-operation between public and private partners in areas of importance for the economy and society. The Telematics Institute is based in Enschede.

2.3 Policy-making in higher education [3]

The Dutch national government has traditionally played an important role in the coordination of higher education. However, over the years the autonomy of both the research universities and the UPEs has increased on various areas, such as finance, human resources, infrastructure and the programming of teaching and research. In particular after the mid 1980s, the autonomy of research universities increased substantially thanks to a new policy framework. One may argue that at the beginning of the 21st century the Dutch government is still heavily involved in the area of higher education, but the nature of its involvement has substantially changed. Generally, it seems to be less interventionist and leaving formally more room to manoeuvre for others such as the universities. At the same time we can easily observe an intensified engagement of the government with respect to research. This is not only visible through more state regulation, but also through the use of market-based mechanisms to increase the performance and efficiency of the higher education sector.

Steering from a distance

In 1985, the white paper "Higher Education: Autonomy and Quality" introduced the concept of 'steering from a distance', and argued that the national government should fulfil a facilitating role instead of trying to plan the system from the top by detailed regulation. The higher education (HE) providers were given a large degree of autonomy and responsibility. The Act included the outline of the funding mechanism for the HE sector as well. Funding for education was to be formula driven (with a high emphasis place on degrees conferred and graduation rates). Core funding for academic research, however, was largely based on historical considerations – its roots lying in an agreed upon number of academic staff.

The Higher Education and Research Act gives the institutions considerable freedom of programming. They are first of all responsible for maintaining quality, providing an adequate range of teaching and research programmes and ensuring access to education. Quality evaluation is exercised by the institutions themselves, by external experts and, on behalf of the government, by the Inspectorate for Higher Education. In principle, the government assesses on an ex post basis only whether funds have been deployed effectively and whether the intended results have been achieved. If major shortcomings are identified, the institutions will be informed accordingly. If discrepancies between ideal and reality persist, notably in the field of quality, the government has the option – with due regard to the proper procedures – of using coercive powers backed up by sanctions.

Accreditation

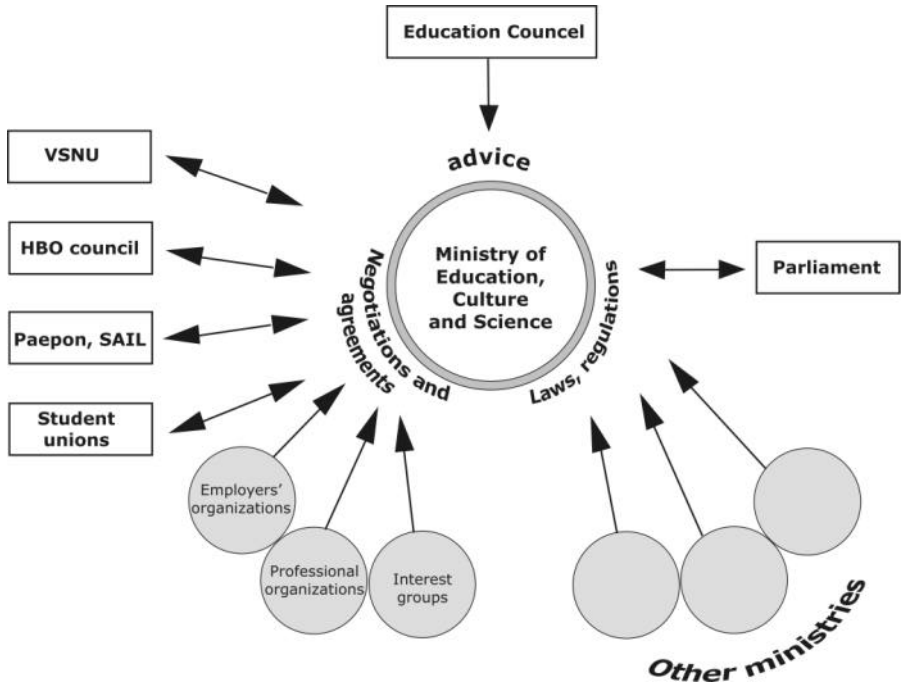
The existing evaluation system was adapted recently, mainly as a consequence of the developments around the Bologna process. The year 2003 marks the transition for the quality assurance systems of

[3] First paragraph is based on De Boer, 2005.

Dutch higher education (e.g. Jeliazkova & Westerheijden 2004:328). Complementary to the quality assessments, an accreditation system was introduced. In June 2002 the Dutch parliament passed the Accreditation Act and during the summer of that year the Netherlands Accreditation Organization (NAO) was founded. About a year later, the Dutch and Flemish governments signed an agreement of cooperation and the NAO became the NVAO. Assessment agencies, such as the Quality Assurance Netherlands Universities (QANU), conduct the actual external assessments of the academic teaching and research programmes.[4]

Evaluating research
In 2003 the national system of evaluating research was changed, although self-evaluation and external visitation (peer review) are still the main components.[5] Research institutions have to evaluate themselves every three years. Every six years these internal evaluations are complemented by external peer reviews. The report of the external review committee is the central document for the research institution to account for its research with regard to various stakeholders. The evaluation system is carried out under the auspices of the university, the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organization for Scientific Research (NWO).

Figure 2.5: The formal policy network



Based on: F. de Vijlder (1998) [6]

2.3.1 The policy network regarding higher education
When it comes to the capacity, contents and quality of the education programmes offered by higher education institutions, the prime mover in policy-making is the Minister of Education, Culture and

[4] In 2004 the NVAO has authorized five assessment agencies to assess the programme's qualities. One of them, the QANU is a privatised organization, branched off from the VSNU.
[5] The evaluation system aims at three objectives with regard to research and research management: 1) *Improvement* of the quality of research through an assessment carried out according to international standards of quality and relevance; 2) *Improvement* of research management and leadership; 3) *Accountability* to higher levels of the research organizations and funding agencies, government, and society at large.
[6] *National Policies to Strengthen the Economic Role of HE-Institutions in the Netherlands. National Level Case Study: The Netherlands.* Report for TSER/HEINE-project. Enschede: CHEPS

Science. However, in reality there is a complicated network of institutions and agencies that influences policy-making. This is shown in figure 2.5.

Parliament, naturally, decides on legislation, including the budget for the higher education sector. The common interests of the universities are represented by the VSNU, the Association of Dutch Universities. The *HBO-Raad* (the Association of *Hogescholen*) is the parallel organization for the UPEs. Like the VSNU, the *HBO-Raad* is the employer party in the negotiations on collective labour agreements and performs a number of other coordinating roles for its members, the individual higher education institutions. Students are represented in the student associations, which have frequent talks with the Minister in the "Students' Chamber".

The *Education Council* is an important and independent advisory board of the government. Its reports – either written on the instigation of the Minister or on its own initiative – touch on important issues in the (wider) educational field. There are other advisory bodies and agencies that regularly touch on education-related issues. Worth mentioning are the WRR (the Netherlands Scientific Council for Government Policy, an independent think tank for Dutch government), the Social and Economic Council of the Netherlands (SER), the Netherlands Bureau for Economic Policy Analysis (CPB) and the Social and Cultural Planning Office (SCP).

Apart from these bodies, the Ministry of Economic Affairs, and the Ministry of Finance have to be mentioned, although in fact all other ministries in one way or another have a say in educational policy-making. Apart from the ministries already mentioned, the key players, advisers and policy-makers in the policy arena for science and technology are,:

Advisory bodies

AWT (Advisory Council for Science and Technology Policy)
KNAW (Royal Netherlands Academy of Arts and Sciences)
SER (Social and Economic Council of the Netherlands)
WRR (Scientific Council for Government Policy)
CPB (Netherlands Bureau for Economic Policy Analysis)
Rathenau Institute (to study the societal implications of science and technology)
COS (the System of Sector Councils for Research and Development, set up to provide recommendations on how scientific research can best be geared to meeting society's needs. There are five sector councils)

Funding bodies/agencies

Ministries/departments:

Ministry of Education (OC&W)
Ministry of Economic Affairs (EZ)
Ministry of Agriculture and Fisheries (LNV)
Ministry of Transport, Public Works and Water Management (VWS)

Intermediary bodies:

NWO Netherlands Organization for Scientific Research (Dutch research council)
KNAW (Royal Netherlands Academy for Arts and Sciences)
STW (the Technology Foundation)
ZonMw

SenterNovem (amalgamation of the Implementing agency for innovation and technology (Senter) and the Netherlands agency for energy and the environment (Novem))

Interest groups:

VNO-NCW (the Confederation of Netherlands Industry and Employers)
MKB Nederland (Royal Association MKB Nederland, representing the SME sector)
LTO-Nederland (Dutch Organization for Agriculture and Horticulture, representing the agricultural, horticultural, and green services industry)
VSNU
HBO-raad

Governance of science, technology and innovation in the Netherlands is profoundly divided between a decentralized style in research (the sphere of the education ministry) and a very hands-on style by the Ministry of Economic Affairs. The research and innovation system has grown to become very complex, with large numbers of organizations involved. While this produces a risk of 'stickiness', it also means there is a good measure of de facto coordination. A new, high-level council (the Interdepartmental Committee for Science, Innovation and Informatics, CWTI) has been created to prepare and co-ordinate policy decisions from various departments. The Interdepartmental Investigation Innovation Policy (in Dutch known as *Interdepartementaal Onderzoek Technologiebeleid* (IBO)) conducted in 2002, concluded that the portfolio of policy instruments for innovation of all Ministries was departmentalised and fragmented. Co-ordination and collaboration between Ministries was one of the options recommended by this government report.

2.4 The funding of HEIs

In general, the HEIs can draw on three so-called *geldstromen* (flows of funds). The first flow is the regular core funding of research universities and UPEs. The second flow refers to research grants provided by the Dutch Research Council (NWO). NWO offers competitive funding on the basis of research proposals from university researchers. The third flow of funds concerns the revenues from contract activities, consultancies and research commercialization activities carried out by the research universities and the UPEs. Often, income from interest, university bookshops, student restaurants et cetera is also included. A large part of the third flow activities refers to knowledge transfer in the sense of research carried out for industry and public sector organizations. A slightly smaller part refers to contract teaching for companies (and individuals – such as the MBA programmes offered by the research universities), short courses, and lifelong learning. Part of the projects in the third flow activity refer to research projects or educational activities for regional industry. However, the largest part is contract research carried out for government or not-for profit organizations. In table 2.3 below, an overview is given of the various income categories of the HEIs in Twente.

Table 2.3 Income of the HEIs in Twente in 2004

2004 (x €1.000.000,-)	Total income	1st stream	2nd stream	3rd stream
UT	205.0	150.3	24.1	30.6
Saxion	79.4	69.6	3.7	6.1
Edith Stein	5.5	5.0	0	0.5
AKI	4.0	3.2	0.7	0.2
ITC	32.3	22.2	5.0	5.0
SWOT	3.9	0	0	3.9
TSM	1.0	0	0	1.0
Total	331.1	250.3	33.5	47.3

Source: individual HEI's

2.4.1 The funding of research universities

Each research university in the Netherlands receives a formula-based lump sum for teaching and research. This lump sum allocation is driven by parameters that partly find their origin in teaching, partly in education and partly in historical considerations. The allocation mechanism is known as the 'bama' model, which stands for bachelor-master model, after the two types of degrees offered to university students. Bama has been operational since the year 2003. It is a distribution model that distributes a fixed amount of funding across the thirteen universities. Basically this means that the Minister of Education (or rather: Parliament) determines the budget for the university sector as a whole, and subsequently distributes this budget across the individual universities according to a set of fixed rules (a formula). Apart from the bama allocation, the universities receive allocations for academic teacher training, for academic hospitals, and for unemployment benefits paid to former university employees.

The bama model is largely output-driven, which means that the allocation for each university depends on the degrees granted to students (BA, as well as MA degrees), the number of new entrants per university, and the number of PhD degrees and (for technical universities) postgraduate designer certificates. A distinction is made between programmes in the social sciences and humanities and law, on the one hand, and the programmes in natural sciences, engineering, and agriculture on the other. The latter receive a higher weight in the formula, to reflect the higher cost of programmes in the laboratory-based fields. Medical programmes receive an even higher weight. The ratios between the weights are 1 : 1.5 : 3. In addition, the weight for bachelor's degrees is twice the weight for master's degrees. Apart from these variable allocations, each university receives a fixed – historically based – allocation.

The research function of universities is funded largely (say, two-thirds) on the basis of historical allocations, with the largest universities receiving a larger share. Part of the research funding, however, is performance-driven in the sense that the number of PhD degrees conferred translates into the budget allocated to each university. Also the number of master's degrees (and to a lesser extent, bachelor's degrees) affects funding. Again, degrees in the technical or natural science receive a higher weight (twice the 'low rate') compared to degrees in social science and humanities.

There is no allocation for regional mission related objectives. Such funds would be coming from competitive sources or regional authorities and would be offered to accomplish specific goals. In other words, funds for regional engagement derive mainly from specific funds – that is non-core funds. The institutions will have to apply for such funds or compete to get regional innovation or stimulation budgets.

2.4.2 The funding of UPEs

For most UPEs, funding is only based on the teaching load. For the UPEs that specialize in performing arts (e.g. AKI), funding is based on capacity considerations, that is on the number of first-year students admitted (after selection). Teaching load is a function of the following:

- the number of enrolled students
- the number of (bachelor) diplomas awarded
- the number of years graduates have been enrolled
- the number of dropouts
- the number of years dropouts were registered in the institution.

The funding formula stresses performance, especially in terms of graduation rates. So, again funding is performance-driven. Similar to the research university sector, higher weights are attached to students in the laboratory-based subjects as compared to students in classroom-based subjects.

Like for the research universities, there is no arrangement to take regional factors into account for the core funding of the UPEs. Again, specific funds must be generated from initiatives undertaken by the UPE itself.

2.4.3 IO institutions

The funding of the IO institutions is through a subsidy based on a basic allocation, so a fixed amount per institution to guarantee a minimum teaching and research capacity. The amounts have been established per institution and depend mainly on strategic policies and historical background. Furthermore the institutions receive allocations for unemployment benefits and for housing.

2.5 Inter-institutional relationships

Although research universities and UPEs have a different character, cooperation between the two types of institutions has more and more become a reality. Where in the past the focus was on small scale cooperation in teaching and pedagogic practices that went on the shop floor level of the institutions, today many cooperation agreements are signed at the top (or strategic) level of institutions.

Project: Reinforcement cooperation Saxion UT
Saxion and the UT have cooperated for a long time on a broad field of aspects. Since the beginning of this year, this cooperation has become a more structural character. For this purpose the executive board of both institutions started for this purpose a long-term project, Reinforcement cooperation Saxion UT. Aim of this project is to structure the cooperation on the field of teaching and research programmes as well as facility sharing.

Research universities and institutes for international education
Another type of cooperation exists between research universities and the institutions for international education. As explained earlier, the international education (IO) institutions have a distinctive status and mission. Often they are not included in the educational statistics and only to a limited extent are they influenced directly by overall higher education policy. Nevertheless, five of the IO institutions were recently embedded in the university structure and each has established administrative ties with a research university. For instance, the UT acts as an intermediary (administrator) in the administrative relation between the ITC in Enschede and the Netherlands Ministry of Education, Culture and Science.

3TU
The third type of alliance to be mentioned here is between the three technical universities (3TU), that is: the universities of Twente, Eindhoven and Delft. The cooperation covers topics such as the provision of graduate programmes, fields of research to be covered by each of the institutions and cooperation in attracting more funds from national and international sources.

For the most part, however, the research universities and the UPEs compete in different markets. They compete for Dutch students, international students, PhD students, research staff, public research contracts and contracts with private business – simply because the resources and reputation they derive from that contribute to their survival and their strive for a strong position in the market.

2.6 Regional dimension "inside" the national higher education policy
It is fair to say that the Netherlands is a small country. Combined with the fact that there are 13 universities (or 14 if you include the Open University) and some 45 UPEs, this means that every region is served by at least one higher education institution.

The situation for the UPEs is the result of a development over time that saw the UPEs formally become part of the higher education sector, followed by a period of consolidation that saw their number decline from almost 350 in the early 1980s to 45 in 2005 and that today sees many UPEs become involved in alliances with universities and other UPEs. The result of this, however, is that students – in particular the ones that do not live in or near the major metropolitan areas who wish to enrol in a particular educational programme at a *hogeschool* – often can find only one provider in their region. Therefore, within the region, the degree of competition in the *hogescholen* sector is lower than it was in previous times.

When it comes to the universities, the historical development has seen a policy of decentralization that left many decisions on educational output and research activity to the institutions themselves. Regional considerations only played a minor role in policy-making. With respect to the establishment of new universities, efficiency arguments related to the maximization of the available student potential, political arguments and, to a lesser extent, regional development motives have been predominant. As to the establishment of new institutions, the foundation of a third technical university in the eastern part of the country was favoured because the stimulating effect on the participation rate was expected to be the largest there and the university could add to the improvement and the overall structure and the socio-economic development of that area. Two other peripheral areas were disfavoured, viz. the province of Friesland, as a university there would withdraw students from Groningen University, and the province of Limburg, because of its peripheral situation and limited student potential.

So far, the regional mission has received more attention in UPEs compared to the research universities. This is because of the spread of UPEs across the country and the specific mission of UPEs and research universities. The latter pay attention to the advancement of scholarship in particular. UPEs have an important function in educating professionals for the labour market. Recently, the UPEs have been advocating a larger role in knowledge transfer and making contributions to their region. While they so far have not received a separate flow of funds for this, the *lectoraat* – a new position in the UPE, resembling an associate professorship – was introduced. Along with this, funds were made available for a limited number of years to create more interrelationships between UPEs and their region.

3 CONTRIBUTION OF RESEARCH TO REGIONAL INNOVATION

Peter van der Sijde

3.1 Introduction

This chapter describes the contribution of research by the HEIs to regional innovation. Section 3.2 starts with a description of the regional dimension in the missions of the HEIs. Section 3.3 highlights the most important framework conditions for promoting research and innovation to impact the region on the basis of a comprehensive model. Section 3.4 discusses the interfaces facilitating knowledge exploitation and transfer, and section 3.5 contains the strengths, weaknesses, opportunities and threats related to contribution of research to regional innovation in the region.

3.2 Responding to regional needs and demands

The UT's mission is being an entrepreneurial (technical) research university focusing on technological developments in the knowledge society. Internationally recognized excellence in research and teaching is its objective, as well as stimulating economic and social development via the resulting valorization activities in the region (see 3.3.3.1). The ITC presents itself as an internationally recognized centre of excellence in international education in geo-information and earth observation and is a gateway between the less developed countries and the Western world. The ITC has no explicit regional dimension in its mission, but contributes via its application-oriented approach to the development in the region (see 3.3.3.3). Saxion as a "broad" university of professional education is embedded in the region and their regional dimensions can be seen in the supply of educational programmes tailored to the economic, social and cultural needs of the region and via its knowledge centres (see 3.3.3.2). Edith Stein is a monosectoral university of professional education for the education of primary school teachers. It maintains contacts with all primary schools in the region (alone and together with *Expertis* – see 3.3.3.3). AKI as a university for arts education maintains a national and a regional focus in its mission.

Each of the universities made provisions to meet the regional needs and demands developing mechanisms to overcome the (perceived) incompatibility of the HEI and industry (see 3.3.3).

3.3 Framework conditions for promoting research and innovation

Recently (2001) a benchmark study (commissioned by the EU and the Austrian Federal Ministry of Economy and Labour) on "industry-science relations" was jointly published by Joanneum Research in Austria. This study presents a conceptual framework (see figure 3.1) to study these relations, based on the following assumptions:

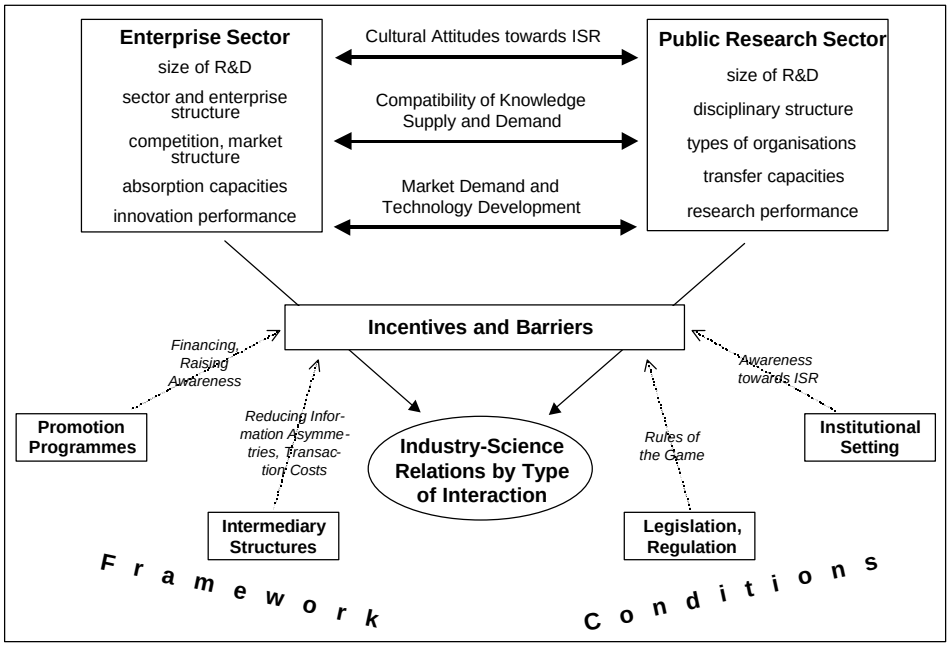
- The enterprise sector and the public research sector (which includes universities) are different;
- There are relations between these sectors. The relations are stimulated by incentives and hindered by barriers;
- The barriers and incentives can be influenced by framework conditions, such as "promotion programmes", "intermediary structures", "legislation and regulation", and "institutional settings".

The incentives stimulate the interaction of HEI with industry and visa versa. Incentives for the interaction are e.g. "mutual learning", which leads to the creation of new (practical) knowledge, "personnel mobility" – the exchange of personnel between the two types of organizations, "exchange of knowledge" – both codified (in papers and patents) and tacit knowledge, and "opening up of (new) networks" for use by both parties. Barriers are also present and they complicate the cooperation: "uncertainty of the outcome" – industry wants concrete results while universities (mostly) prefer to deliver a certain effort, without the output obligations, "information asymmetries" – difference in understanding the "supply" and the "demand" by both types of organizations, "different objectives" – the difference between contributing to science and shareholder value leading to different cultures, "financial obstacles" – although the picture is changing many companies still think that knowledge is

for free and that universities provide their services for free. The incentives and barriers can be summarized (see also figure 3.1) into:

- differences in culture and attitudes
- differences in supply and demand of knowledge
- difference between market demands and technology development
- The mechanisms that influence barriers and incentives are discussed in the remaining sections in this chapter:
- legislative and regulative issues (3.3.1)
- promotion programmes (3.3.2)
- institutional settings (3.3.3)
- intermediary structures (3.3.4)

Figure 3.1: A conceptual model for analysing industry-science relations



Source: EU and the Federal Ministry of Economy and Labour in Austria (2001)

3.3.1 Legislative and regulative issues

Ownership of intellectual property
In 1996, the Dutch ownership of intellectual property Act was changed with respect to inventions made by researchers in higher education institutions. Before 1996, ownership was with the inventor; since 1996 ownership has been with the higher education institutions.

The consequence of this is that only the HEI can enter into arrangements to exploit the Intellectual Property (IP) generated in the institutions. Further, HEIs themselves are allowed to set framework conditions regarding the ownership of IP; in general terms, there are three different modes:

- IP generated via HEI-financed research: in this case the HEI owns all rights to the IP
- IP generated in the framework of a (research) contract for a particular (large or small) company: HEI can enter into a contract specifying who owns what and which party owns the right to exploit the IP generated from this contract.
- IP generated in a research consortium: a research consortium formed to carry out a project under a European Framework Programme – the terms for exploitation are written down in a Consortium Agreement among the partners and at the end of the project the partners have to

submit an exploitation plan. Most often, the results are co-owned by all partners, although exceptions are possible.

Innovation Platform (national/regional)
The national government stimulates cooperation between HEIs and industry and in fact realizes the importance of the HEI in our knowledge economy. The document negotiated between the political parties in government (*Regeerakkoord*, coalition agreement) from 2003 states that "the Netherlands should be among the leading European countries in the area of higher education, research and innovation". To implement this view/intention the Innovation Platform[7] chaired by the Prime Minister was created; one of the tasks of the platform (after Finnish model) is to develop strategies for the development and exploitation of knowledge. The Platform is to propose concrete actions to the government, who in its turn will create means to implement these. On a regular basis, this Platform published reports for policy measures.

In 2004 the Provincial Government of Overijssel and the Network City Twente set up the Regional Innovation Platform Twente (independent from the national one), which represents regional industry and higher education, and has the objective to present Twente as a top technological region. In April 2005 a first report was issued (*Kan Twente sneller in de toekomst aankomen?* – Will Twente be able to arrive faster in the future?) in which the Platform published its work plan and actions.

Innovation Action Programme
The Twente region is a former Objective 2 region and since 2000 Twente has been in the so-called phasing-out phase; this means that there still are financial means to stimulate sustainable projects in the regions under the Innovative Action Programme (IAP)[8]. One of the action lines in this programme is "*technostarters*". In other action lines, cooperation between (higher) education and companies (industry) is stimulated and financially supported.

Human mobility
The recruitment (especially highly educated) personnel proved to be difficult for those coming from non-EU member states. Although arrangements for study purposes can be made, it is harder to retain former students from non-EU countries for the Twente economy.

3.3.2 Promotion programmes
(Public) promotion programmes provide financial resources for industry-science relations and thus compensate for high transaction costs, spillages, uncertainty of R&D results, and a lack of financing by risk-averse capital markets. In the Netherlands, and specifically in Twente, several actors have programmes to provide financial resources to promote and stimulate cooperation between industry and HEIs.

Ministry of Economic Affairs
To promote and stimulate cooperation between industry and higher education, the Ministry of Economic Affairs established some general instruments, which are (also) used in Twente:

- *Innovation-Oriented Research Programmes*, which promote technical-scientific research and its application by business and stimulate companies and research institutes to develop joint knowledge investment plans;
- *Open Technology Programme* of the research foundation STW (Foundation for Technical Sciences), which stimulates high-quality university research projects with high user involvement and good prospects for utilisation and research yield.

[7] http://www.innovatieplatform.nl
[8] http://www.technopartner.nl

BSIK
The national government issued a tender for the BSIK programme in 2003: a competitive fund out of which initiatives to strengthen the research infrastructure of the Netherlands are supported, using government income generated out of the receipts of natural gas exploitation. Sixty-seven research projects with a total investment volume of € 3.6 billion were selected in 2003 to receive research subsidies. The UT was quite successful in applying for BSIK project funds: NanoNed[9] (on nanotechnology), MicroNed (on microtechnology), Smart Surroundings[10], Free Band and Transumo[11] . The bulk of the BSIK funds are allocated to universities, taking the form of competitive grants for research projects in co-operation with the private sector.

Senter/Novem
Senter/Novem[12], a government agency for sustainability and innovation, is in charge of a number of (financial) instruments to create HEI-industry cooperation. For example, Senter/Novem promotes high-tech start-ups through the *Techno Partner* action programme, which aims at improving the start-up climate by:

- a seed facility to support the bottom end of the Dutch venture capital market, thereby helping high-tech start-ups to satisfy their capital requirements at an early stage;
- the Knowledge Exploitation Subsidy Agreement (SKE), the objective of which is the quicker utilisation of scientific knowledge by high-tech start-ups both inside and outside knowledge institutes and publicly financed research institutes; and
- *Techno Partner*, a platform offering information and expertise and creating and updating an inventory of the obstacles faced by high-tech start-ups.

Other financial programmes
Some other financial incentives are:

- WBSO (Law for the Stimulation of R&D): a tax incentive for industry and HEIs that carry out industrial research;
- Innovation Cooperation Programme;
- Innovation vouchers for companies to use with any knowledge supplier.

Foundation Innovation Alliance
In 2003 representatives from industry, intermediary organizations and the HBO-raad (Association of Universities of Professional Education) founded the Foundation Innovation Alliance, SIA, to foster and stimulate "knowledge circulation". Knowledge circulation is the process of knowledge sharing and creation between UPE, students and industry. The SIA secured money from the government to distribute financial incentives to UPEs to start knowledge circulation projects with a strong regional basis. Saxion has successfully applied for two of those projects in June 2005.

Foundation for Knowledge Development
Although UPEs are getting a research task (by law), traditionally they do not carry out research because of the lack of facilities and expertise; although since 2002 some UPEs have dedicated personnel for research.

Recently "*Lectoren*" are established to set up and implement research programmes; the "*lectoren*" are financially supported by the SKO (Foundation for Knowledge Development) for a period of four years.

UPEs can apply for "*lectoren*" in areas they themselves consider to be strategic for the further development of the UPE in the regional context.

[9] http://www.mesaplus.utwente.nl/nanofabrication/Links/nanoned.doc/
[10] http://www.ctit.utwente.nl/research/projects/bsik/smartsurroundings/
[11] http://www.ctit.utwente.nl/internal/bsik/transumo/
[12] http://www.senter.nl

3.3.3 Institutional settings

Institutional settings in HEIs determine the incentives and barriers for researchers in public science to engage in industry-science relations, including: evaluation criteria and procedures; individual remuneration; financing sources and schemes for R&D; institutional missions and organisational cultures; recruitment policies; auditing and strategic planning; administrative support etc. The main purpose of the institutional settings is to compensate for several failures in the knowledge market resulting in a low level of interaction between industry and science. By providing support in terms of searching for partners, negotiating contracts, and building up mutual trust, an attempt to overcome these inherent barriers to interaction is made.

In general, the Dutch HEIs follow three routes to exploit the results of research and to contribute to regional innovation:

- route 1: Cooperation with industry (e.g. contract research, strategic alliances, joint research & development institutes, joint ventures);
- route 2: Patents and licences;
- route 3: Creation of spin-off companies.

The routes used most often in the Twente region are "cooperation with industry" and the "spin-off" route. Route 2 is hardly used by the HEIs because it is not part of their strategic plan. Nevertheless, Twente applies for patents and licences more than any other region in the Netherlands[13]. Most of the applications are made by the regional SMEs.

IDC, see appendix G 6

The Industrial Design Centre (IDC) is a network for designers, manufacturers and higher education institutions in Twente. The network aims at raising the numbers of students in design studies and increasing the flow of creativity and product innovation in Twente. By matching the demand for and supply of expertise and design facilities, organising design meetings and coaching design projects, IDC has appeared to close a gap in this sector within the region. Since the Centre's establishment in 2003, almost 120 student projects, fifteen partner projects and ten facility projects have been completed. In addition, fifteen design meetings have been organised and over thirty products (re-) designed.

MTF, see appendix G 22

Mesa+ Technology Foundry is a partnership between several regional stakeholders in the field of Microsystems and Nanotechnology. Through this partnership, the MESA+ institute make available high-tech research-infra structure and services to regional industry and starting entrepreneurs (so called *Technostarters)* in the area of micro systems or nano-technology. This sector of industry normally doesn't allow for SMEs to be active (investments exceeds budget). By offering research facilities to be rented by our joint facilities for pilot production and office space near research groups the law of size is broken.

3.3.3.1 Route 1: Cooperation with industry

The Twente HEIs present themselves at specialized trade fairs, exhibitions inside and outside of Twente. Furthermore, they present their research to the wider community of students, faculties, alumni and regional stakeholders via their magazines and university papers. Information is disseminated also via the website of the universities, faculties and institutes.

All HEIs are engaged in teaching and (applied) research. Both activities have an impact on the region. The UT has the regional dimension as a derivate of its international strategy, while the UPEs are primarily anchored in the region. The regional anchoring is expressed in three policy items:

- The development and offering of a broad package of integrated educational programmes in which competencies are central in the individual learning routes (see chapter 4 for examples of the HEIs). Edith Stein, for example, together with *Expertis Onderwijsadviseurs,* offers an integral package of services in the area of education, training and continuous professional education of teachers and educational managers.

[13] According to ir. B.J. 't Jong, octrooigemachtigde at Arnold & Siedsma, Enschede (Tubantia 22-2-2005)

- The development of educational programmes to meet the regional needs (see chapter 4 for examples), e.g. Fast Forward, a post-bachelor programme of 24 months in which high-potentials (Saxion graduates) receive additional training and traineeships in three (regional) companies to explore and develop their potential further; the programme runs in its fourth year[14].
- The provision of research (capacity) via its knowledge centres:
    - S-CIO, Sciencia and IDC (Industrial Design Centre).
    - The project *RegioRegisseur* was a successful one-stop shop for (regional) SMEs continued by S-CIO.
    - The UT concentrates its research in six so-called Spearhead Institutes:
        MESA+, Institute for Nanotechnology;
        BMTI, Institute for Biomedical Technology;
        CTIT, Centre for Telematics and Information Technology;
        IMPACT, Institute of Mechanics, Processes and Control Twente;
        IGS, Institute for Governance Studies;
        IBR, Institute for Behavioural Research.

LEV'L, see appendix G 8

The National Expertise network Demand-led Learning and Working (LEV'L) is a network of teachers, employers, students and others involved in demand-led learning and working projects. The demand-led learning route starts from the job, a small business or agency being a powerful learning environment. Job-inspired demand is used to design the personal training & education plan (POP). In innovation projects students and employers design an iPOP. This method means, on the one hand, tailor-made training for small businesses or agencies and, on the other, providing them with access to specific actual expertise so as to increase their innovative capacity. Exam committees monitor the quality of the bachelor's degree, including frequently used validation procedures for ' Appreciation of Prior Learning' (APL).
More than ten universities for professional education have subscribed to Lev'l activities – as have various sectors and many companies. As a total, over 2500 students have followed this learning route.

Advice and Consultancy,
see appendix G 19

Advice and consultancy is an educational module with an added value, both for students and for professionals. Groups of students, acting as their own consultancy in school, accept orders from the field in order to pick up initial working experience. They thus learn how to function in actual situations (to assess relationships and political environments and to deal with problems strategically).

Companies and not for profit organisations, in turn, are provided with a professional solution to their problems, without the high payments usually required for regular consultants. The quality of the solution offered is guaranteed by the university teachers and the faculty, who, if need be, allocate additional working hours to the project. Annually, some fifty project groups work on issues referred to them by professionals.

In these activities, the regional dimension occupies centre stage: innovation, knowledge circulation and entrepreneurship. The establishment of *lectoraten* in the UPEs play a central role in each of the these areas

Alliances with (regional) companies and institute: For all HEIs, strategic alliances with individual companies and clusters of companies, regional organizations and (local/regional) governments are for all HEIs important preconditions for regional engagement. All HEI have good (working) relations with the municipalities, and the regional governments, regional organizations (e.g. *Medisch Spectrum Twente* - the research and teaching hospital, *Roessingh*, and the schools in the region). There are also important alliances among the HEIs, e.g. Edith Stein cooperates with the UT, Saxion and SLO (National Institute for Curriculum Development in Enschede). ITC is in alliance with the Virtual Valley Twente for the creation of a 3D city model ("Digimap") and in the areas of its expertise with the local and provincial governments. On the socio-cultural level the AKI plays a key role, there is, e.g. the annual *Tart* (technology & art) manifestation. *Tart* is a cooperation between AKI,

[14] See appendix G5

Saxion, UT and the Municipality of Enschede.

Role of the students in the regional engagement: The majority of students do practical assignments and/or traineeships in companies and institutes and via "knowledge circulation" students, the HEIs and companies learn from each other[15]. Specific learning routes have been developed to implement the knowledge circulation, particularly in the UPEs, e.g.:

- *Work-study programme*: students both study and work (see section 4.6);
  - Project LEV'L: a (national) experiment (led by Saxion) in cooperative learning in which the student is at the university for the first two years of study and after that s/he goes to a company for two years to acquire the remainder of the necessary competencies to graduate;
  - *Innoleren*: a regional experiment based on LEV'L
- *Student consultancy*: consultancy by students under supervision of the teaching staff, e.g.
  - HRM consultancy on career counselling and psycho diagnostics, and reintegration of employees. Faculty and students carry out consultancy.
  - Spatial planning and management consultancy, named Advice and Consultancy by faculty and students (see Best Practice above).

Facility Sharing: The HEIs have many up-to-date and high-tech facilities, which (small) companies do not own, but could be of interest. Under certain conditions these facilities are open to third parties. Examples are:

- Microsystems Foundry Twente: MESA+ established an accelerator and in this building some 10 to 15 companies are housed. In total the institute is involved in some 25 companies, that include first, second and third generation spin-off companies;
- T-Xcell: Thales and UT cooperate in this in order to commercialize mutually interesting technologies by sharing facilities;
- Wireless Campus: The Campus of the UT is a test bed for new wireless technologies;
- NDIX: The Netherlands-Germany Internet Exchange.

NDIX, see appendix G 23

NDIX, *Nederlands Duitse Internet eXchange* (Netherlands German Internet eXchange), is a 100Mbs Internet exchange platform, provided through a dark fibre network (Trent). Trent started as a research network connecting the University of Twente with key industry partners in Internet research providing the possibility of joint research and technological testing of network components. Soon after the first parts of the network had been taken into use, new opportunities arose – testing and developing applications. The University of Twente, the Province of Overijssel and the city of Enschede co-started the NDIX as an exchange point at the same time.

At the moment, over 45 companies, municipalities, schools and HEI are connected to the NDIX via dark fibre of Trent and 15 people find employment in these two initiatives. Costs for Internet Infrastructure in Twente are lower than the Dutch average.

3.3.3.2 Route 2: Patents and licences

Currently, the UT is the only HEI that owns a limited number of patents; patents are usually the result of contract research for industry. Table 3.1 gives an overview of the number of patents that are owned and/or developed by the research institutes and the size of the third flow of funds activities over the last couple of years.

Table 3.1 UT research figures

	2002	2003	2004
Total 3rd flow budget in m euros	27	25.3	29.0
Number of patents	40	49	29
Number of researchers	1,304	1,352	1,390

Source: Annual Report UT, 2004

[15] Van der Sijde (2005), Kenniscirculatie en een ondernemende kennisinstelling – ingredienten voor een ondernemende regio. Tijdschrift voor Hoger Onderwijs, 23 (1), 44 – 61.

The 2004 UT Annual Review mentions that there were 5.4 patents per 100 research FTEs in 2002, 5.9 in 2003 and 3.2 in 2004. Recently, facts and figures were also published on Twente and the Netherlands for 2002; the figures show that in Twente per 1,000 companies there are 8 patents, while the country's average is 6.4. A recent study[16] shows that 80% of the university money for research is matched with third flow of funds money. The HEIs do not have their knowledge actively patented.

3.3.3.3 Route 3: Entrepreneurship and creation of spin-off companies

In the Twente region, entrepreneurship and spin-off creation have been stimulated since the early 1980s.

Over the years, an elaborate support structure has been built up and both UT and Saxion cooperate, stimulate entrepreneurship and spin-off companies. The regional stakeholders play a very important part in this. Especially internationally, the Twente region is recognized as an entrepreneurial region – primarily as a result of sustained and coordinated policy of all stakeholders. Special mention deserves the cooperation in this field with Oost N.V. and the Ministry of Economic Affairs in the stimulation and financing of programmes for promoting entrepreneurship and university spin-offs.

Promotion and stimulation of entrepreneurship

The stimulation of entrepreneurship is an important policy issue in the university that receives both attention in education (via the UT expertise centre Nikos[17] that implements a Minor programme for technical students and a second one for business students and a Master programme on Innovative Entrepreneurship; at Saxion the course in Small Business & Retail Management of the School of Business Engineering & Entrepreneurship provide a similar – Minor – programme), in research (via the institutional plans of the research institute and the S&T plan of the UT) and valorization (via the UT holding company and Saxion Centre for Innovation & entrepreneurship, S-CIO). Both Nikos and the "*Kenniskring*" and "*Lectoraat*" KIO (*Kennis Intensief Ondernemen*) are active in the promotion and stimulation of entrepreneurship in the academic communities.

Spin-offs

The promotion and stimulation of entrepreneurship at the UT is drawn into the following programmes:

- HTT: Holding Technopolis Twente, the holding company of the UT. In HTT, the intellectual property of the UT is commercialized and managed. It also plays a role in scouting of opportunities.
- TOP: Since the beginning of the 80s the UT has stimulated the creation of (research and knowledge intensive) spin-off companies and in 1984 established the Temporary Entrepreneurial Positions programme (TOP) and created some 350 new companies of which about 76% still exist and create on average some 150 new jobs annually (see figure 6.1). Nikos executes this programme (see also figure 6.1).

TOP, see appendix G 20

The goal of the Temporary Entrepreneurial Positions programme is to support graduates, university staff and people from trade and industry to start their own companies Twente. Candidates have to develop a business plan in which the feasibility of the idea is indicated. The TOP managers guide this process. After completion the business plan is scrutinized by the TOP committee and after approval the entrepreneur receives (free of charge):

- office space and facilities
- business and scientific mentor
- interest-free loan
- access to networks

The period of support is one year. From its start in 1984, 370 people have joined the programme and have established 320 new high-tech companies. The average size of a TOP company settles at 5 to 6 employees after some years. Some 150 new jobs are created by (former) TOP companies every year.

[16] C.P.M.J. de Waal, UT-Private, exploring privatization as an option to enhance the income generation and matching capacity of the University of Twente. Thesis EEP-MBA – IBO, 2005.
[17] Nikos, part of the UT Institute for Governance Studies – IGS

- Tissue Engineering Accelerator (see also 3.4.2.2): At the beginning of 2004, BMTI at the UT established an accelerator for biotech companies and currently houses and facilitates six companies.
- The Virtual Incubator: a feasibility study is carried out to explore the possibility of companies as an incubator coordinated by S-CIO. It is about to be implemented.
- Saxion prepares a spin-off programme called "Fast Forward in Entrepreneurship", based on Fast Forward (appendix G5).

3.3.4 Intermediary structures

Intermediary structures cover both physical and immaterial infrastructure such as technology centres, incubators, consulting networks, information networks and databases devoted to fostering industry-science relations, and represent those framework conditions which may directly be designed by policy.

In the process of cooperation between HEI and industry, intermediary "structures" or actors play a role (see also section 1.1.5). Specifically to enhance the innovation capacity in SME the Syntens[18] organization – in the past also known as "innovation centre" – plays an important role in bringing knowledge suppliers (e.g. the universities) and demands (from – regional – industry) together (a route 1 mechanism). Several other instruments to promote science-industry relationships have been in operation such as Oost B.V. (especially with regard to inward investment and "technostarters"). The cooperation is also stimulated via the large technological research institutes (the Netherlands Institute of Applied Science - TNO[19]; a research and technological organization, RTO) of which there are only a few left in Twente after the recent reorganization and concentration in the Eindhoven area.

There are also *Leading Technological Institutes* (LTIs, in Dutch *Technologische Top Instituten*). One of them, the Telematics Institute[20] created in 1997, is based in Enschede. Projects carried out by the Telematics Institute are jointly defined (industry and Telematics Institute) and co-funded by the Dutch government and Dutch business and industry.

3.4 Interfaces facilitating knowledge exploitation and transfer

3.4.1 Mechanisms to exploit knowledge from the HEIs

In the previous section, three routes of exploitation of research were introduced. Quite different are the independent mechanisms installed by the HEIs. In Twente there are two examples of these independent mechanisms:

- Independent expertise and demonstration centres
    - Membrane Application Centre Twente, MACT, a service centre for membrane applications;
    - Laser Applications Centre (a cooperation between UT and *Koninklijke Metaalunie* – Royal Society for the Manufacturing Industry) that jointly will boost innovations in the sector.
- "Facility sharing". Both the UT and Saxion opened up its facilities for industry in general and SME in particular. In the sections on Saxion and UT, specific examples of facility sharing are mentioned.

3.4.2 Incubators, science parks, clusters and venture capital

3.4.2.1 Science parks

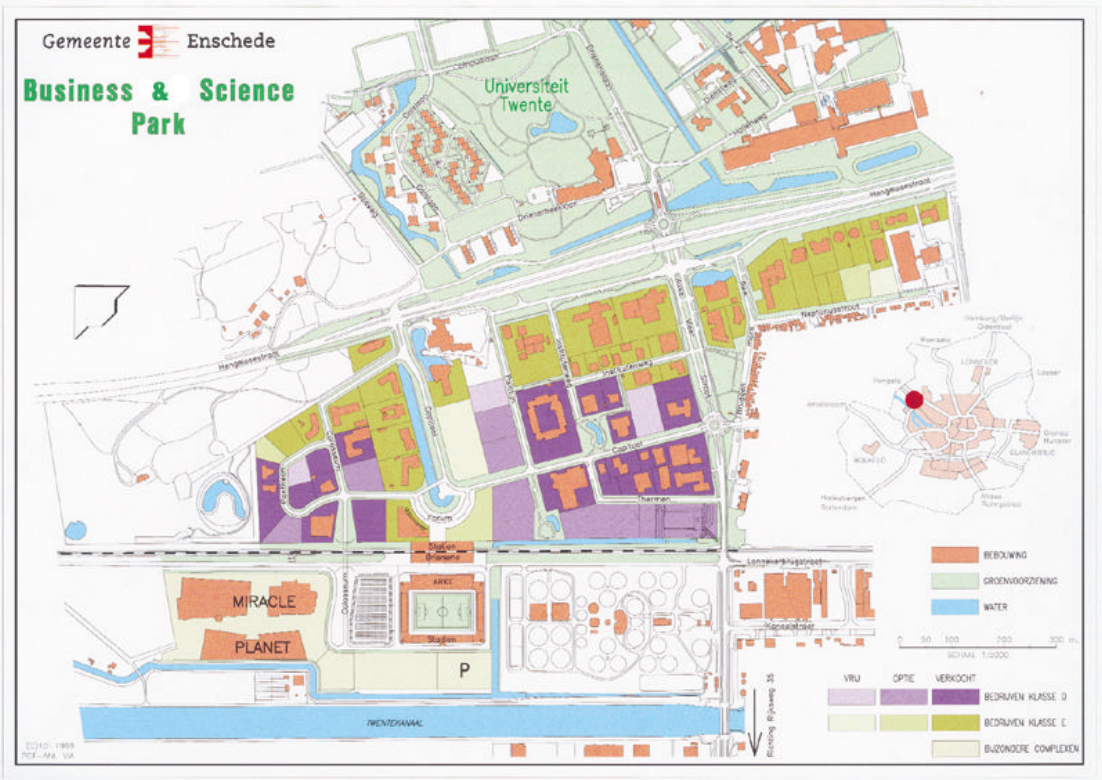
Within the Twente region, there are two Science Parks; the Business & Science Park and the Knowledge Park Twente. The Business & Science Park (BSP) is located next to the Campus of the UT (see figure 3.2). It is an area for companies that combine science and business. Since the early 1980s, the BSP has developed via several stages into an industrial estate with a high interaction

[18] http://www.syntens.nl.
[19] http://www.tno.nl
[20] http://www.telin.nl

between science and business. In total it comprises about 40 hectares and the location of the Business & Technology Centre Twente (see 3.4.2.2). Since September 2002 there have been about 200 companies on the park of which 93 provide services, 86 are knowledge intensive companies and 21 are in different areas. In total, some 4,000 people are employed on the park.

Knowledge Park Twente.
Knowledge Park Twente (KPT) focuses on the economic strengthening of Twente and the east of the Netherlands – it offers locations for innovative companies and stimulates the creation of value added jobs by initiating spin-offs and start-ups from research, joint research facilities and project development. The valorization of knowledge is the key activity to generate jobs. Its aim for 2020 is to have 10,000 new knowledge intensive jobs in Twente. KPT is located around the Campus of the UT and is a venture in which the UT, the Municipality of Enschede and the Regional Development Agency Oost N.V. cooperate intensively.

Figure 3.2, map of the Business & Science Park and the UT



Source: Municipality of Enschede

3.4.2.2 Incubators
The oldest incubator in the Twente region is the BTC Twente (Business & Technology Centre Twente[21], modelled after the American initiatives of Control Data Corporation in 1982. At the moment, it houses some 80 companies and it has a policy of easy in – easy out and the company can have more space in the building as it grows. Next to this, BTC Twente stimulates formal and informal contacts between its incumbents and companies on the Park. The management also functions as a coach to the companies. Via the BIC Twente, BTC Twente is a

Tissue engineering, see appendix G 24

Tissue engineering is a business-accelerator programme. Goal is to improve the business perspectives of new products and services that have become available from research by the Institute for Biomedical Research (BMTI). The activity has been set up within a private company in public private partnership (40% public, 60% private). Since its start in 2003, 6 new companies have started.

[21] [21] http://www.btc-twente.nl

member of EBN (European Business & Innovation Centres Network, a pan-European organization). Both the UT and Saxion are shareholders of the BTC Twente. At the University Campus there are two "accelerators", incubators for speeding up growths in the start-up phase of companies: one in the area of nanotechnology (related to MESA+) and one in the area of tissue engineering (related to BMTI).

Saxion explores the concept of "virtual incubators" and a pilot study is in progress for the Deventer Campus; if proven feasible at the Deventer Campus then it will also be implemented at the Enschede Campus. In May 2005, the ROC of Twente opened its incubator called @Campus Business Centre in Hengelo – primarily focused at companies created by its own students, but open for companies created by graduates of other educational institutions and industry.

3.4.2.3 Formal and informal venture capital

In general, it can be remarked that the situation regarding venture capital in Twente is poorly developed. Of course, there are a few initiatives. Participation Company East Netherlands NV (*PPM Oost NV*) takes part in capital investments in companies in the provinces of Gelderland and Overijssel. The company will take part in the favourable business environment that exists in the east of the Netherlands. Especially interesting for PPM Oost NV are the high-tech and mature companies as well as infrastructure creating activities. PPM Oost is currently supporting roughly 60 companies with a capitalization of € 48 million. Shareholders include the UT and Saxion. Other venture funds are the *Reggeborg Groep* (this fund focuses – but not exclusively – on infrastructure investments) and *OPM* (Overijssel Participation fund – this fund invests in Overijssel companies, not restricted to any type of company. Of course, banks do play a role in these activities via their own participation funds and/or private banking activities.

Also with regard to the informal investors ("business angles"), similar remarks can be made: they are either not there or very hard to find. Some banks do have "matching services", (matching "capital" with "companies"), and on an irregular basis, meetings are organized between (informal) investors and companies ("Seventh Heaven", an initiative of the Dutch informal investors network, NBIB; in Twente organized together with the TOP programme). Currently, Nikos is making efforts to organize a network of informal investors in Twente.

3.5 Conclusions

In this section, some conclusions are drawn from the preceding sections. The conclusions are formulated in strengths, weaknesses, opportunities and threats of the Twente region with respect to the contribution of research to regional innovation.

Strengths	**Weaknesses**
1. Research focal areas: Clear choices have been made about the research focus of the region; the foci do determine the direction of further development. *2. Knowledge infrastructure*: Over the years, a good knowledge infrastructure has been built up. This infrastructure consists of "hard" elements such as laboratories, incubators, science parks, and of "soft" elements such as expertise and human resources. *3. Entrepreneurship*: The region put a major emphasis on "entrepreneurship" and this becomes visible in policy documents and in the creation of spin-offs from the HEI.	1. *Underutilisation of knowledge*: Although a lot of knowledge is produced in the region, a weakness is in the exploitation of it. 2. Absence of business angles and venture capital *3. Lack of "big names" on the BSP*: The R&D in the region is primarily carried out by the HEI; there are hardly any other public and private organizations doing this and function as a magnet to attract other organizations and attract and retain highly skilled personnel.

Opportunities	**Threats**
1. *Knowledge production*: All institutes contribute to the production of knowledge. As a result, there is a huge potential industry and regional SMEs can tap into. *2. Government policy on entrepreneurship and innovation*: The Dutch government recently launched its plan "Peaks in the Delta" in which Twente is recognized as an area that will receive extra attention (and grants). *3. Willingness to cooperate*: There is a great willingness the HEI to cooperate with industry and SMEs, as well with the other stakeholders. The cooperation of UT and Saxion with regional companies offers great opportunities.	1. *Sub optimisation*: Although there is the willingness to cooperate between all actors in the region, there is nevertheless the threat that it is "easier" to do it all by yourself. *2. Competitive funding*: As more funds are coming available, the threat is that these funds are becoming available for just one actor competing with actors from outside the region and not cooperating within the region.

4 THE CONTRIBUTION OF TEACHING AND LEARNING TO LABOUR MARKET AND SKILLS

Derek Jan Fikkers, Ben Jongbloed

4.1 Introduction

This chapter is about the contribution that the higher education institutions in Twente make to the supply of well-educated individuals in their region. With the advent of the knowledge-based society it has become clear in recent years that the regional development and social cohesion in a region is heavily dependent on the knowledge infrastructure and the linkages between knowledge producers and local industry and local labour market. The challenge is to link all actors more closely, and not just to seek a more direct relationship between higher education institutions and business, but to look at all parts of the chain and also look at relationships between individual higher education institutions in Twente, As will become clear in this chapter, Twente has made significant progress in building closer relationships of this kind, but still the gaps between higher education institutions are significant as are the gaps between higher education and regional actors. The challenge is to engage higher education institutions with all aspects of the regional development process in a region. This is not necessarily asking them to change their mission from a national (or even international) one to a more regional one, but to align the national and regional missions and recognise that these missions are not necessarily mutually exclusive. The research universities as well as the universities of professional education both contribute to the region's stock of human capital and offer courses as well as research findings that are an input into the region's production process and contribute to its cultural and social well-being. However, by working together and building closer partnerships between the knowledge providers and local stakeholders the teaching and learning in higher education institution can better meet the demand for skills and resources in the region.

To achieve a higher contribution in this respect, the argument is put forward in this chapter that the entrepreneurial character of the University of Twente (i.e. its students and its academics), and the natural links that exists between the UPEs in Enschede and Hengelo on the one hand and regional business, schools, and government organisations on the other provide a good base for exploiting the knowledge base in Twente for the advancement of the region. In recent years, a vision for the further socio-economic development of Twente has been formulated by the regional authorities and regional stakeholders (as expressed in the Technology Valley idea). In chapter 3, we already mentioned the contribution that *research* in Twente's higher education is making. This chapter will look at teaching and learning and address where and how it interacts with the local community. To understand where mutual benefits can be improved, however, it is important to first learn where one is coming from. Therefore, we start with a quick characterisation of the region and then look at the mechanisms that affect the interaction between higher education and the region.

Chapter 1 of this report has painted a picture of the economic identity of the Twente region. The present economic situation is a result of the past and the needs that derive from trends that may be observed in today's economy. As was observed in chapter 1, the regional economy is still characterized by a large presence of traditional sectors like manufacturing and construction, which represent more than a quarter of employment. This is much higher than the average for the Dutch economy and stands in contrast with trends that suggest that more technology-oriented (even high-tech) activity will become more important for the Dutch – and indeed the Twente – economy. Projections carried out by labour economists, regional government and some of the regional think tanks have indicated that Twente has the potential to further develop the sectors of medical technology, telematics, nanotechnology and tissue engineering. Combined with the presence of some large companies with an international stature and some large medical institutes, a move into a more technology-oriented direction holds some promise for Twente. It is a topic that is discussed actively by many regional and national stakeholders (see chapter 6 of this report), the most prominent of which, the Innovation Platform Twente, has received wide support from government and regional authorities.

Further developing the regional innovation potential and moving towards more high-tech economic activity, however, requires the presence of a well-educated labour force. While the education providers in Twente recognize this, there still remains a relatively high unemployment rate among the youth of Twente – even among the higher educated. At present, the Twente region is performing less well economically than other Dutch regions and actual regional innovation performance is only mediocre. The challenge that exists is how higher education providers can turn some of their R&D resources and graduates to the needs of the Twente economy. As will also become clear from other chapters in this study, there certainly are opportunities, but a collective effort is called for to generate more value added around the higher education institutions and a number of knowledge-intensive firms around them.

This chapter therefore will pay attention to the question how and where the higher education institutions of Twente draw upon the specific characteristics of their region when it comes to their educational provision. Do existing educational programmes as well as the new programmes to be introduced reflect or interact with regional industry? To what extent does regional demand or regional expertise inspire the shape and contents of the curriculum? And when it comes to collective efforts, to what extent do the HEIs in the region facilitate voluntary associations and coalitions?

We will show that the needs of the region lie close to the heart of the teaching activities in two out of the three UPEs in Twente. The regional research university, unlike the other higher education institutions in Twente plays a more nationally oriented role in its education/training activities and a national/international role in its research. This holds even stronger for ITC. We will also argue that the region has particular strengths and weaknesses. Particular strengths are in high quality programmes, as evidenced in teaching quality assessments; regional innovation potential in selected areas (health, technology); the strong linkages between Saxion and regional industry; and moreover in the internationally renowned ‘entrepreneurial and innovative character’ of UT. Weaknesses are to be found in the fact that barriers still exist between SME and higher education; and that most linkages are initiated, managed and monitored only on a decentralised level in HE institutes.

The next section (4.2) presents some of the choices made by the HEIs in Twente in as far as these touch upon the interaction between their educational provision and the region. Section 4.3 then discusses the extent to which labour market information feeds in the educational programmes. This leads to a section on student recruitment: where do Twente’s students come from? The main section in this chapter is about the various instruments (and examples) of interaction between the HEIs and their region (section 4.4). Other topics related to the interaction between regional demand and curricula are treated in section 4.5. The final section (4.6) summarizes the various topics and examples of interaction between region and the education portfolio of the higher education institutions in Twente and presents some conclusions.

4.2 Strategic choices made by the HEIs

As was already stated in chapter 2, the higher education institutions that currently operate in Twente to a large extent have developed in response to regional needs and national policies responding to these needs. This holds for the universities of professional education (UPEs) that offer higher vocational training and carry out some applied research, as well as the research university – the UT.

Like elsewhere in the Netherlands, the UPEs in fact were established on the initiative of professional organizations to cater for the regional demand of qualified professionals. The history of the UPEs goes back to the guilds in the 18th century when schools were set up to cater for the needs of agriculture and industry. For Twente, this meant that vocational training institutes were set up to respond to the needs of sectors like machinery, manufacturing, construction and the textile industry. Out of these institutes the higher vocational training institutes (*hogescholen*) grew, and in the 1980s the UPEs, as they came to be known officially, became part of the higher education sector. Over time, the scale and scope of the UPEs evolved to what it is today. The variety in programmes offered by the UPEs in Twente nowadays does not differ substantially from that of other UPEs in the Netherlands. However, the link between the UPEs and their region – including regional business – has always

remained intact. It is fair to say that every region in the Netherlands has its own UPE – with some of the larger cities (including Enschede) having the luxury of more than one provider of higher professional education situated in their region.

For the research universities, the natural link between region and institution is less obvious. Although the decision to set up a technical university in Twente in 1962 was based partly on regional criteria, the university's programmes were not explicitly tied to regional demands and the foundation of the university should not be seen as compensation in a Keynesian sense.[22] The reason is that the market of every Dutch research university is the Netherlands as a whole – and for some it even extends beyond the Netherlands. Many universities in the Netherlands however do feel a strong obligation to their region; partly based on the simple fact that they are physically located in a region and most of their students and staff live there. At the same time the research university is active in carrying out research, consultancy, contract education and other services for the public organizations and private businesses in the region. The education provided by the UT is heavily intertwined with its research. Academic research today increasingly takes place in interaction with public and private actors in society.[23] This is the case even more so for a primarily technical university. This implies that regional needs and the regional R&D agenda do have an impact on the university's teaching and learning activity.

In the remainder of this section we present the strategic choices made by the higher education institutions (HEIs) in Twente and the extent to which they pay attention to regional educational demands.

4.2.1 University of Twente

The mission statement of the UT[24] as set out in its strategic plan explicitly states that the university regards itself as an entrepreneurial research university. While it strives to operate in national and international fields, the mission statement also stresses that the university would like to see its educational and research activity contribute to the economic and social development of its regional environment. This environment covers the North-Eastern part of the Netherlands, Twente and the Euregio[25].

> To the East, the regional partners of the UT feature in the so-called TRIANGLE project (see chapters 3 and 6) aimed at encouraging the utilisation and bundling of knowledge and opportunities within the food, health and technology sectors.

These knowledge clusters are concentrated around Wageningen/Gelderse Vallei (Food Valley), Arnhem/Nijmegen (Health Valley) and Twente (Technology Valley).[26] The universities of Twente, Nijmegen and Wageningen, together with companies such as AKZO Nobel, Vitatron, Abbot and Axis, and the provinces of Overijssel and Gelderland, have formed a steering group (Triangle) to promote innovation and to strengthen the regional economic base. For the UT, the region extends beyond Twente to the North and the East. An important partner situated to the north of the University of Twente is the University of Groningen. Here collaboration – mostly in research – takes place in the fields of nanoscience, biomedical engineering, life sciences and medicine and technology.

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[22] Florax (1992: 70) stresses that the foundation of the UT was not a direct answer to economic decline in the region. Its foundation was part of The Hague's higher educational policy for a longer time. A few years earlier, a similar institute was founded in the municipality of Eindhoven in the South of the country.

[23] This is known as the Mode 2 type of knowledge production – contrasting to the Mode 1 type. In Mode 2 knowledge production takes place in the context of application, while in Mode 1 it is the context of discovery (see Gibbons et al., 1993).

[24] Universiteit Twente, Instellingsplan 2005-2010. In particular section 1.

[25] The Euregio is an area covering both sides of the Dutch – German border and covers the municipalities/cities of Enschede, Hengelo, Oldenzaal and Gronau, Münster, Osnabrück.

[26] See chapter 3, and the report 'Peaks in the Delta' (*Pieken in de Delta*), published by the Dutch Ministry of Economic Affairs (2004).

4.2.2 Saxion

Saxion aims at offering higher vocational education in a wide range of educational types. Saxion is increasingly aiming at developing, utilizing and managing knowledge in interaction with professional fields and society. Interaction among different disciplines and communication with society, according to Saxion's strategic plans, are crucial for this because socio-economic innovation and knowledge breakthroughs increasingly appear to take place on the interfaces of disciplines and in interaction of higher education institutions with business and industry.

With respect to the latter: Saxion also aims at being anchored in the region. For Saxion, the region is broader than the Twente region. According to its strategic plan, Saxion's hinterland extends over the province of Overijssel and parts of both Gelderland and Overijssel. Also, the German, Euregional area is theoretically considered as hinterland. Much more than research universities, UPEs serve regional goals. The majority of Saxion students are from the Twente region (see section 4.4).

Masterclass MBA, see appendix G 10

The Masterclass is a course for students with high potential, employed in local organisations or living within a radius of fifty km from Twente, with an academic or UPE background and with a minimum of five years' experience. The course consists of two parts:

1) A two-year Masterclass programme which offers a multidisciplinary approach covering twelve business areas;
2) After successful completion of the Masterclass, participants may enter the Executive MBA year of Career Centre Twente.

On completion of the course, the participant identifies and tackles strategic management issues and is able to analyse, assess and implement change in his/her own organisation. The key for success is the emphasis on participation of local organisations - direct benefit from a strong and lasting local network.

Saxion tries to accomplish this anchoring and interaction for example through the so-called knowledge centres and knowledge circles (see chapters 2 and 3). The knowledge circles are built around the *lector* and actively seek to connect to regional stakeholders. Given the regional economic characteristics in the City Triangle (*Stedendriehoek*) region and the Twente region (see chapter 6), these stakeholders are mainly active in design, technology, health care, tourism, urban development, sustainability and security. They are therefore closely related to the clusters mentioned by the Twente Innovation Platform.[27]

4.2.3 Edith Stein

Edith Stein is one of 40 locations in the Netherlands where students can receive a training to become a schoolteacher in the primary education sector. ES is located in Hengelo and maintains close contacts with about 300 primary schools in Twente and the regions to the east and north of Twente (Salland, Achterhoek). This illustrates the institution's wish to respond adequately to the demands in the region. As a result of the close relationships with regional schools, many of the institution's graduates find a job in the region's schools in primary and secondary education. ES has an Advisory Board consisting of 15 persons, many of them heads/directors of local schools (primary and vocational). This board gives advice on the curriculum and the relationship between education and the professional field.

To combat the future shortage of teachers and school managers in primary schools, ES is seeking close contacts to every single regional educational institute in the region. The two *lector positions* (see chapter 3) in the field of educational innovation underline the ambition of ES to solve the regional problems in Twente. Details of the employment in this sector are stated in appendix I.

4.2.4 ITC

ITC does not serve an explicit regional goal in its educational provision. It is not aimed at the Twente region. In contrast, it solely aims at being an internationally recognized centre of excellence in its chosen disciplinary specialization – that of geo-information and earth observation. ITC's education and research activities are aimed at an international market – in particular developed countries in

[27] See also chapters 3 and 6.

Africa and Asia.[28] Since 1950, over 17,000 students have graduated from the institute. These students originated from more than 160 countries. This makes ITC the most international higher educational training institute in the Netherlands. ITC does not recruit students particularly from the Twente region.

4.2.5 AKI

AKI has no specific policy on attracting students from the Twente region.[29] AKI promotes itself as an international academy of arts.[30] Many teachers and students participate in international programmes. In 2003, some 229 foreign students studied at AKI. This is about 43 percent of the total number of students. Foreign students are mainly from European countries, in particular Germany.

4.2.6 SWOT

SWOT (*Stichting Wetenschappelijke Opleidingen Twente*) was founded in 1967 by some major Twente organizations and the UT. It especially aims at educating middle- and higher-level managers. Since 1967, about 1, 2000 students have graduated from SWOT. SWOT's goal is providing scientific education, especially to young and mid-career professionals in the business sector. Similar management institutes can be found all over the country. Therefore, SWOT explicitly aims at students from the Twente region[31] and the main share of its students originates from this region. SWOT therefore explicitly serves a regional goal, for example through its successful Regional MBA programme.[32] Nevertheless, it recently opened branch offices in the cities of Utrecht and Nijmegen.

Small Business Growth Programme, see appendix G 3

The "Small Business Growth Programme" is an entrepreneurship /business administration course for directors, business unit managers and (family) successors in the SME sector. Participants will have at least a few years of managerial experience and are mostly from the Twente region. The programme stimulates access to and use of the local network. The emphasis is on business disciplines and/or personal management skills in reference to day-to-day problem matter. Participants are asked to write and implement a business plan, assisted by an experienced and technically oriented business administration student of Saxion or Twente University (UT). There is mutual benefit from the interaction between participant and student - the former uses theory developed by the latter, and the latter obtains access to practice (SME field work). The programme is offered twice a year. The group size varies from fourteen to sixteen participants. Group 33 has recently been established.

4.2.7 TSM

TSM Business School is the international graduate school of the UT. It was founded in 1987. Since then, it has presented itself as an innovative institute for postgraduate management education. Unlike SWOT, TSM does not aim at students from the Twente region. The majority of its students are from abroad or from the rest of the Netherlands. TSM does not serve an explicit regional goal in Twente, although one of its successful courses ('Small Business Growth programme'[33]) does have a substantial number of students from Twente.[34]

4.3 Labour market information

To stay in close contact with society and to monitor the trends in labour demand, the HEIs in the Twente region keep a close watch on labour market trends in their region. The labour market for university graduates and UPE graduates is monitored intensively in the Netherlands. On a national level the Dutch Statistical Agency and several research institutes do this. Also, universities and UPEs have in recent years started to cooperate in collecting labour market information on their graduates.

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[28] ITC, annual report, 2004.
[29] Telephone interview with Ms. Egging, AKI-employee.
[30] ArtEZ annual report, 2003.
[31] Information provided by Ms. Audrey de Jonge, SWOT-employee.
[32] See appendix G10.
[33] See appendix G3.
[34] Telephone interview with Ms. Josien den Ouden, TSM-employee.

There are national initiatives (the Alumni Monitor of the Dutch universities that uses a uniform questionnaire[35]) as well as local initiatives and graduate surveys carried out by individual universities. Both the UT and Saxion monitor the careers of their graduates. An example from the UT is the figure (showing hot spots) below that shows the location of the university's graduates.

Figure 4.1: Concentration of graduates from the UT

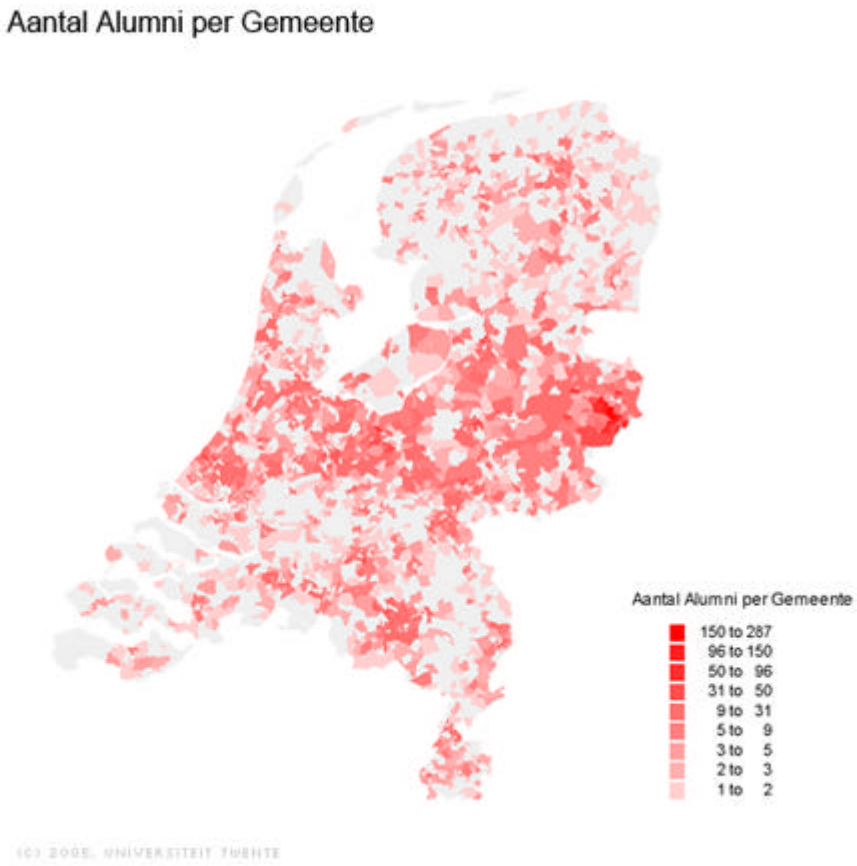

Figure 4.1 shows the place of residency of the UT's alumni. The intensity of the red colour correlates with the concentration of university graduates. The Twente region holds a relatively large number of university graduates. However, some other metropolitan areas also hold a large number of graduates from Twente.

On a decentralized level, several faculties and departments in both Saxion and the UT collect data on their alumni (see also section 4.5; alignment of curricula with demand). The quality of these analyses differs widely across departments. On a central level, on the other hand, one can say that the data generated by the UT is good and detailed. This is shown for example by the map above. While Saxion so far has not introduced its own graduate surveys, it is currently putting such a system in place. However, the graduate surveys in the Netherlands provide little information on the evaluation that employers make of the education their employees have received. There is only little information available on the question whether the quality of graduates meets employers' expectations and whether the quality differs across higher education institutions. Only through the national system of teaching quality assessments that take place every five years is that issue addressed – but in a partial way only.

[35] Research questions focus on the job level, the type of jobs, the relationships with the original curriculum, et cetera.

Apart from the HEIs, the regional authorities monitor the labour market situation in their region in order to inform their policies. Reports are commissioned – for instance to the Research Centre for Education and Labour Market (ROA) – to forecast the labour market in the Province of Overijssel (ROA, 2005) and the region of Twente in particular (Etil, 2003).[36] These reports are an effort to forecast the regional labour market by occupation and education. They sketch the general picture for the province and show the trends in labour demand for several sectors in the regional economy. Also projections are made for the outflow of graduates from the various levels of education in the province/region. From the confrontation of supply and demand the most pressing labour market needs (shortages or excess supply) follow for the various occupations and levels of schooling. Reports like these are an input in policy-making of municipalities and provinces. On the national level, such labour market analyses made for the Netherlands as a whole are an input in some of the policies aimed at 'activating' workers (*Raad voor Werk en Inkomen*, 2005) or informing students about the situation on the labour market in the short to long run. The extent to which educational providers use such analyses depends on the type and level of education and differs across the respective educational programmes and disciplines.

Labour market projections are important for UPEs such as ES, which educate teachers, or for Saxion when it comes to supplying graduates for the health and care sectors. ES closely monitors developments in the demand for teachers and managers in primary and secondary education. Projections for this field are made by the Ministry of Education and depend heavily on demographic trends. For the UT, labour market projects have been an input in the initiatives that focus on the setting up of a Medical School Twente, which aims to train (graduate) students to professions such as medical doctor or medical specialist (see chapter 1).[37]

4.3.1 A lack of human capital[38]?

In this section, an investigation will be made on the possible lack of human capital in the Twente region. Different indicators are used to have a closer look on the supposed lack of human capital in the Twente regions. These indicators are mainly quantitative and derived from secondary data. We will have a closer look on the jobs and vacancies in the Twente region; the percentage of human capital in the region; and the migrational flow of academic students and graduates. Of course, the indicators are not exhaustive. However, they can clearly show whether or not the region is facing a lack of human capital.

Human capital percentage

Another indicator for a possible lack of human capital is the percentage of human capital in the region in comparison with the Netherlands or comparable regions. In figure 4.2, the share of human capital is illustrated for Twente in comparison with six comparable NUTS-4 regions in The Netherlands. These regions are comparable in the sense that they either roughly have the same number or inhabitants[39] or

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[36] ROA (2005), *RATIO II. De Overijsselse arbeidsmarkt naar opleiding en beroep 2003-2008*, Maastricht: ROA. and: E,til bv (2003), *RATIO. De Overijsselse arbeidsmarkt tot 2006. Regiorapportage Twente*. Maastricht: E,til.

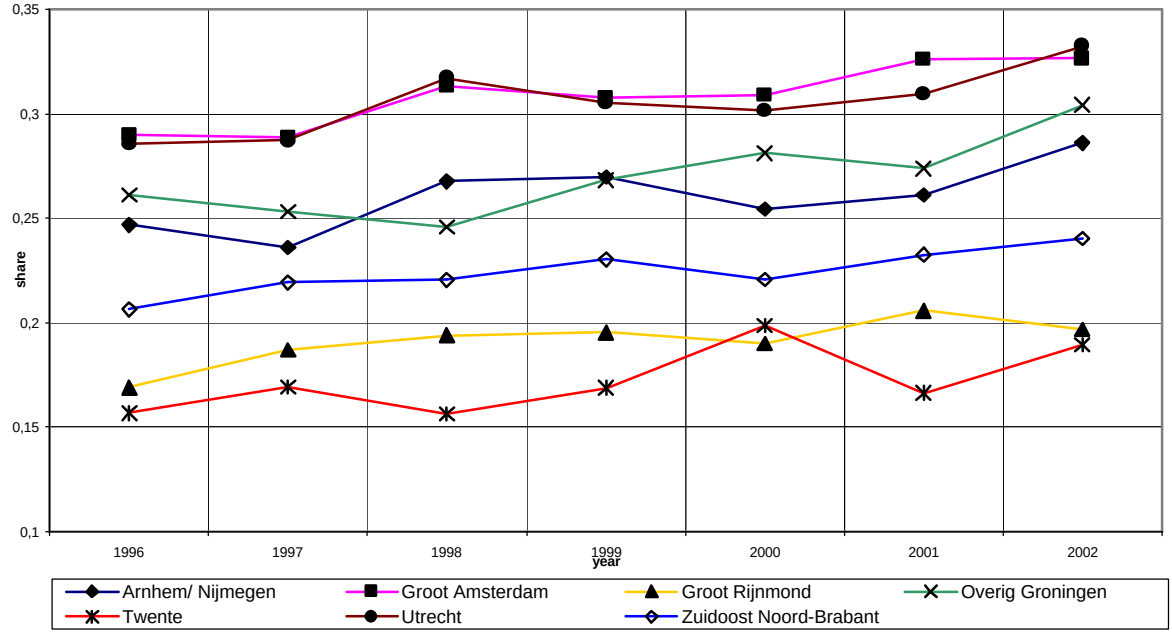
[37] The Medisch SpectrumTwente (MST) is one of the biggest non-academic hospitals in the Netherlands. It is located in Enschede and Oldenzaal. While not an academic hospital, it does have a substantial training function. It has 1070 beds and 3800 staff, including 180 medical specialists. MST takes care of 11 medical training programmes (including cardiology, surgery, neurology) and three specialization programmes (clinical pharmacy, clinical chemistry and clinical psychology). The hospital collaborates closely with the medical rehabilitation centre *Het Roessingh*, located in Enschede. Together with the municipality of Enschede, it is the MST, the Roessingh, various regional technological institutes and (small) businesses in the medical field, and the UT (in particular its Medical Technology department) that are cooperating in an ambitious regional initiative called *Care and Technology* to stimulate innovation and economic activity in the city of Enschede and the Twente region in general. The focus of this programme is health care and technology and the goal is to make Enschede one of the 'hot spots' for medical research and development in Europe.

[38] In this chapter, the authors operationalize human capital as having finished education at the level of either bachelor (ISCED-97 level 5a) or master (ISCED-97 level 5a) or PhD-level (ISCED-97 level 6). In the Dutch context this implies graduation at a university of professional education or a research university.

[39] Arnhem/ Nijmegen; Utrecht; Zuidoost Noord-Brabant

have comparable educational facilities[40], in casu a university and colleges for advanced education. It can also be because they are mentioned in the same breath as Twente in the Space Memorandum, or the related plans[41].

Figure 4.2: Development of the share of human capital in 7 Dutch NUTS-4 regions (15-64y) [42]



Source: Statistics Netherlands

Brain drain; from the figure above, it seems clear that the Twente population is rather uneducated in comparison with populations of comparable regions.

This has remained unchanged over the last years.[43]

4.4 Student recruitment

4.4.1 University of Twente

While the catchment areas of the UT is the Netherlands as a whole, many of its students originate from the East and to a lesser extent the North and 'middle' parts of the Netherlands. Table 4.1 below shows the origin of the students for the UT and two of its main competitors (the universities of Groningen and Nijmegen).

A quarter of the secondary school leavers from Twente that qualify for a university place decided to study at the UT. The university also attracts relatively many students from the rest of the province of Overijssel and the province of Gelderland (the regions 2, 3 and 4 in the table below). A relatively large part of qualified secondary school-leavers (32.4%) choose to move up north to the University of Groningen. This is mainly due to the fact that the University of Groningen is about three times the

[40] All regions mentioned
[41] All regions mentioned, especially Arnhem/ Nijmegen and Zuidoost Noord-Brabant (economic key-regions, outside the Randstad area)
[42] Source: Statistics Netherlands. One may notice a remarkable increase in Twente in the year 2000. This increase is found in other sources as well. However, related to the total amount of human capital in Twente in 1999, this is an increase of more then 17 percent. Such an increase is most probably caused by wrong measurements.
[43] One must notice the striking discontinuity in the 2000 Twente figures. This cannot be explained, yet it can be witnessed in multiple sources.

size of the UT and has a much broader choice of programmes compared to the UT that still is heavily oriented towards the engineering sciences.

On the subject of student recruitment it is worth mentioning that the educational providers in Twente have engaged in a co-operative effort to facilitate secondary school students in the Twente region moving on to the higher education providers in Twente. In section 4.6, under the heading of the LINX project, we will discuss the efforts to strengthen this regional education supply chain.

Table 4.1 Secondary education graduates from selected regions that chose to go to the University of Twente or some of its main competitors (2001)

	Percentage of a region's students that chose to study at:				number of students
Region	University of Twente	Groningen University	Nijmegen University	other univ.	
1. Twente	26.1%	32.4%	11.2%	30.3%	686
2. Apeldoorn & midden Ijsselgebied	14.8%	24.1%	18.4%	42.7%	555
3. Zuidelijke Achterhoek	11.8%	13.5%	34.9%	39.8%	229
4. Zwolle-Meppel	10.2%	44.3%	5.6%	39.9%	537
5. Oost-Groningen	9.7%	74.5%	0.6%	15.2%	165
6. Harderwijk-Amersfoort	9.1%	8.9%	2.0%	80.0%	537
7. Assen-Hoogeveen-Emmen	8.0%	73.0%	2.1%	16.9%	374
8. Groningen	7.1%	72.9%	1.0%	19.0%	594
9. Arnhem	6.9%	11.6%	29.2%	52.3%	448
10. Friesland	5.8%	76.1%	1.0%	17.1%	607
11. Other regions (having a percentage less than 5 for the UT)					241
Number per university	787	2,405	1,415		17,084

Source: UT: Policy plan Education marketing.

4.4.2 Saxion

In contrast to the UT, Saxion's marketing and recruitment policy explicitly aims at attracting the Twente youth. This is mainly due to the difference in missions between UPEs and universities in the Netherlands. UPEs, more than research universities heavily focus on their region. As a result the majority of Saxion students originate from the Twente region.

Table 4.2 Origin of students studying at Saxion UPE: new enrolments from inside and outside the Twente region (year 2004)

	Full-time		*Part-time*	
Origin	Number	%	Number	%
Twente	2,067	62 %	252	54 %
Rest of Netherlands	943	28 %	80	17 %
EUREGIO	231	7 %	113	24 %
Rest of Germany	64	2 %	26	5 %
Rest of World	37	1 %	0	0 %
Total	3,342	100 %	471	100 %

Source: DOS, Saxion, 2005

We are not aware of the existence of detailed figures for the various 'schools' that exist within Saxion and therefore cannot evaluate to what extent some of Saxion's programmes are serving a particular regional demand.

4.5 Interaction between HEIs and the Twente region

4.5.1 Introduction

This section focuses on the question to what extent the HEIs from the Twente region take into account the specific demands and characteristics of their region when it comes to the contents and supply of

their educational programmes. Are regional needs or regional characteristics in some way reflected in the teaching and learning that goes on in Twente's research university or its UPEs?[44] We will address the various manifestations of interaction between Twente's higher education institutions and the region under the following subheadings:

1. alignment of curricula with demand
2. student internships
3. work-based learning
4. staff mobility
5. field trips by staff
6. supporting graduate entrepreneurs
7. continuous professional education
8. design and development activity by UPEs

4.5.2 Alignment of curricula with demand

Like for any research university in the Netherlands, the UT's educational programmes lead to a recognised (Bachelor's or Master's) degree that has a certified value on the Netherlands market and abroad. The university's degrees therefore have a value that extends beyond the region. Thus, the university's programmes are not specifically addressing regional needs. However, at the same time one may also argue that all its degree programmes meet regional needs and the very fact that a lot of students are from the region is underlining this. It is also a fact that some of its programmes are directly geared to the regional demand, either because the participants are from the region or regional enterprises, or because the curriculum contains a large amount of regional content.

As a result of the national orientation of Twente's research university, the extent to which its curricula reflect regional demand for educated labour[45] is not an issue that is on the minds of the university's programme directors and deans. That is, when it comes to Bachelor's or Master's degrees, the existing programmes do not have many regional ingredients. However, regional demand does play a part in the continuing professional training (lifelong learning) courses (in Dutch terms: the *post-initial* programmes) or modules offered (see section 4.5.8 below). Information on regional interest in courses provided by the UT does play a part when new programmes are discussed, but it is not the all-determining factor.

In the light of the economic strategy of the Twente region and that of the UT and Saxion in particular, the regional demands and ambitions were an input in the discussions to initiate a programme in Technical Medicine at the UT a few years ago. Also, recent initiatives to set up a Medical School in collaboration with the MST hospital, the Roessingh centre for rehabilitation and Saxion should be mentioned here. In this initiative, the ambition of Twente to manifest itself in the area of health and technology and the presence of some large medical institutes and high-tech businesses in this area were combined along with the interests of regional authorities and representatives from society. The university offers three programmes in this field: Biomedical Engineering, Clinical Technology and Healthcare.

In the bachelor's degree programmes offered by the UT, regional industry and (public/private) service providers are present when it comes to injecting practical elements in programmes in disciplines such as engineering, information technology, business science and public administration. Examples of practical elements are students doing 'project work' or thesis assignments to solve a real-life question. However, the regional industry's needs are supporting teaching and learning process; it is not the other way around. The same holds for guest lecturers from industry doing part of the teaching. In the master's degree programmes and to a lesser extent in its bachelor's programmes offered by the UT,

[44] For a full overview of the study programmes offered by Twente's HEIs, see appendix K
[45] Please note that when the word 'education' is substituted by 'research' we arrive at the topic of external involvement in defining the HEI's *research* agenda. This issue is addressed in chapter 3.

the curriculum is inspired by the research carried out in the university's faculties. From year one on, the programmes are progressively research-driven, so to speak.

For the UPEs in Twente, regional enrolment and participation in continuing professional training (lifelong learning) courses is a more natural phenomenon. Here we see a direct manifestation of regional interest/demand for UPE graduates. Practical assignments and exercises are an integral part of the UPEs' bachelor programmes.[46] The UPEs' curricula are defined in close communication with representatives from industry and professional organizations. Earlier, we gave the example of the Advisory Board set up by Edith Stein. In general, the alignment of curricula with the professional field is part of the accreditation requirements for a degree programme, for instance in engineering, law or medical professions.

Less formal manifestations of alignment between curricula and regional demand are contacts between lecturers and alumni. For instance, the UT is offering its alumni a lifelong (i.e. permanent) e-mail address, thus securing the means to stay in touch with its alumni. On top of that, UPEs and research universities are frequently involving external (including regional) stakeholders in some their governing structures. 'External personalities', 'laymen' or 'regents' are included in programme committees or sounding boards. For the UPEs, this interaction with stakeholders in particular addresses the attention paid to entrepreneurial attitudes and skills in the curriculum. Saxion especially aims at drawing regional stakeholders in curricular renewal. Through installing curricular renewal committees, Saxion tries to keep its curricula in contact with the regional labour market. Such committees are more common among UPEs than among research universities. For instance, Saxion offers regionally oriented bachelor programmes in Physiotherapy, Podotherapy, Nursing and a Nurse Practitioner master's course. More than the Master's programmes at the university, the Professional Master's programmes of the UPE address regional needs and incorporate regional partners. For instance, the nurse practitioner Master's programme came out of national (and regional) concerns about the shortage of professionals that could take on jobs situated in the 'middle area' between registered nurse and general practitioner. Regional demands also affect the training of managers and teachers by Edith Stein UPE. Labour market projections for Twente show a large shortage of teachers in secondary education as well as a large demand for qualified managers in primary and secondary education.[47]

Educating at school, see appendix G 12

Educating at school (*Opleiden in de school*) is a four-year university route that can be accomplished in three years. The core matter is offered within the apprenticeship school (a primary level school). This means, that this school and the UPE adopt an extra responsibility through supporting this apprenticeship as a potential future job for the trainee.

Education and training in practice allow for theory and practice to better go hand in hand. The students work - in contact with fellow students, teachers and trainers - on the development of their own expertise. The shared responsibility of schools for the study ensures, on the one hand, high quality apprenticeships in the practice schools and, on the other, activities in the UPE that, more than before, focus on everyday school practice.

The number of schools prepared to cooperate as practice schools has increased to nine in the past year. Of the first student group 60 % qualified within three years and 30 % in four years – whilst 10% failed to complete. The programme would normally be expected to take students four years. This pattern of cooperation is so successful that a special project has been started with highly committed schools in Losser and Denekamp.

The Textile Technology department of the national research organization TNO is located in Enschede (see chapter 1). This department is a member of the Expertex group, a co-operation combining research and education in the field of textiles and clothing. The activities of Expertex are located in

[46] Examples: (1) 'Project Week' offered by Saxion and (2) projects carried out by students of Saxion and the UT through the Industrial Design Centre.
[47] See: Jaarverslag ('Yearly Report') 2004, Hogeschool Edith Stein (p.3).

the former *Hogere Textielschool* (textile training institute) in Enschede. Here, TNO's Textile Technology department, the textile training department of Saxion Hogeschool Enschede, and the textile training of ROC Twente Plus and ROC Oost Nederland (both vocational schools) are located. A close cooperation exists with the discipline group Textile Technology at the UT. Expertex is supported by professional organizations in the textile, carpet and clothing industry, *'De Voorzorg'* Research Association and the *Overijsselse Ontwikkelings Maatschappij* (the region's development agency). An important area of interest in Expertex Research is process intensification, which aims to perform textile upgrading processes in a shorter time and at lower temperatures. Part of the research is conducted in European research programmes.

4.5.3 Student internships

The second type of interaction between educational supply and regional demand takes place through students doing internships or thesis work in a private firm or public organization in the region in order to become acquainted with their future job as a graduate. This kind of interaction takes place, first of all, by having the HEIs' lecturers supervise the student interact with representatives from the organizations that provide internships. On the one hand, this exchange of knowledge and the experience of students may feed into curricula and, on the other, offers regional businesses more insight into the educational supply of the HEIs. In this way, industry, hospitals, and public organizations like police have an impact on the offerings of HEIs while the latter on their part provide solutions to the practical problems posed by regional firms and organizations.

For the UPEs, internships are an integral part of the student's curriculum. Usually, UPE students will do an internship taking up most of the third year of the program.

At the teacher-training institute Edith Stein, the internships provided by primary and secondary schools are part of a greater package of teaching and learning experiences offered to students. Two projects in particular stand out: *Project Denekamp*, and *Opleiden in de School.*[48] For the research university, the internships and thesis work is organized less uniformly. Information on the number of months that students spend on internships or practical assignments outside of their educational institution is absent. However, examples of this type of interaction are numerous. For instance, students in programmes such as Industrial Design and Industrial Engineering at the UT from day one on have to spend time on project work as part of their training. Part of the assignments[49] is carried out in response to demands by firms, some of which are situated in the Twente region. Another example is the UT bachelor's programme *Advanced Technology.* This is a so-called 'broad bachelor' in the area of engineering, where students are also required to address a practical case. Because the programme is linked to the research of the engineering faculties, some of the practical cases are inspired by the knowledge needs of regional firms that are active in the key technology fields identified.

The directors of the UT's programmes, however, stress that they do not regard it as part of their mission to explicitly respond to regional demands. Again, the reason is that the university's programmes are supposed to be more general. To the contrary, students are often encouraged to do part of their practical assignments in firms outside the Twente region or even abroad.

[48] See appendices G12 and G 13.
[49] For instance, developing a new product or new system, sometimes along with a marketing plan.

4.5.4 Work-based learning

A third type of regional interaction deals with having part of the training of students take. The student works in an organization for part of the time and spends part of the other time in the HEI. This type of student is known as a *dual student* in the Netherlands.[50] It is comparable to sandwich students in other countries. This mode of studying is different from the part-time mode, where the student only studies for part of the year and the other part is not – or at least not explicitly – related to his/her training. Dual students earn a salary for the number of hours they work in their job. The knowledge and experience gained by the dual student feeds back into the UPE and – the other way around – the firm takes advantage of the knowledge brought in by the student and his/her supervisor.

Project Denekamp, see appendix G 13

Students of 'Education' (BE) do part of their final studies at a smaller regional branch school of secondary education (such as in Denekamp). They combine this apprenticeship with one at a primary school in a community local to the students of this secondary school. The project reflects as far as possible the concept of 'Educating in school'.

By training and educating students from within their apprenticeships, theory and practice can go hand in hand. The student operates in touch with fellow students, teachers and internal trainers of the primary /secondary school whilst developing his/her own expertise. The shared responsibility of schools for the study leads, on the one hand, to higher quality learning-working foci in school - and, on the other, to activities at the UPE relating more than before to everyday school practice.

Thus far, all participants are very enthusiastic. Students decide to link their research work during the final study year with this Lio apprenticeship. Meanwhile, a growing number of secondary schools show preparedness to participate in this project. It clearly has a positive image. Last year's result is that one student out of six failed to complete – whilst the other five qualified from this study programme with a presentation of their secondary school research project.

Table 4.3 shows the number of students, distinguished according to their mode of study. In 2004, Saxion has 14% of its students studying part-time. Most of them have a job in the Twente region. The number of dual students is relatively low – only one percent of total enrolment. For ES the corresponding figures are 17% and 3%. The UT has very few part-time students: in 2002/03 there were only 134, amounting to 2% of the total enrolment[51]. The demand for this mode of studying in the university is very low and, because of that, the university does not offer many part-time programmes in the bachelor's or master's phase.[52]

Table 4.3: Students by mode of study: Saxion and Edith Stein, 1995-2004

	Edith Stein	Saxion	Edith Stein	Saxion	Edith Stein	Saxion
	Full-time		Part-time		Dual	
1995	734	8,421	50	795	0	56
1996	792	7,953	67	766	0	62
1997	813	7,874	63	800	0	77
1998	831	7,757	95	883	0	161
1999	832	8,151	120	1,049	0	202
2000	846	8,276	176	1,319	0	286
2001	856	8,731	188	1,552	0	286
2002	852	8,969	188	1,629	0	252
2003	880	9,401	210	1,678	18	178
2004	960	10,126	199	1,631	33	133

Source: HBO-raad

[50] See table 2.2 for the total number of dual students in the Netherlands.
[51] Part-time courses are so far limited to *Educational Design Management and Media* and *Applied Communication Science*.
[52] Exceptions: Master's in Psychology, Educational science, and Research in social science and some higher-level teacher training programmes (master's) offered by the university. For numbers, see table 2.1 in chapter 2.

The three-year bachelor's programme offered by the research university does not leave much room for extended periods of work-based learning. In contrast, the UPE bachelor will often last four years. Saxion UPE offers selected students that have successfully completed their bachelor training the opportunity to take part in a two-year graduate training programme. High potential students take part in a management development programme and during three periods of 8 months each they receive work-based learning in companies, public organizations and service companies in the region. The programme is called Fast Forward and involves 67 companies and has been very successful.[53]

4.5.5 Staff mobility

Bringing in external (i.e. guest) lecturers or appointing 'outsiders' for part of the working week as a staff member in a research university or UPE may also bring about interaction with the region. The secondment of lecturers to industry or government is another – but less successful/ frequently found – example. Professors and teachers having positions on a "zero numbers of hours a week basis" are part of the research university staff. Many of them are from regional industry, banking and service organizations or health care organizations such as hospitals. Many professors in Business Science have a part-time position in the university.

The university has introduced the phenomenon of the practice professor (*Praktijkhoogleraar*), a position that does not have the right to award PhDs but that does confer other privileges and prestige to the holder. There are a small number of such positions, for instance in the fields of Civil Engineering, Management and Construction. In addition, one can mention the University Fund (*Universiteitsfonds*) that funds endowed chairs and part-time professorships. The University Fund pays the salary of 12 UT professors. It should however be mentioned that none of these chairs serve specific regional goals.

4.5.6 Field trips by staff

It is fair to say that the number of times that staff of HEIs voluntarily visits a private or public organization, for instance to monitor innovations in terms of products or working methods is low. The human resources policy of HEIs often does not provide any incentives to encourage staff paying visits to companies. Currently we do not have any information on the number of field trips by staff members. An alternative indicator might be the participation by staff in conferences and professional networks and boards. However, information on this is also absent.

4.5.7 Supporting graduate entrepreneurs

Increasingly, HEIs are paying attention to graduates that wish to start their own business. Connected to this they have set up programmes to enhance students' capacity to be enterprising. Teaching students entrepreneurial skills is becoming a part of the curriculum in some faculties. This means that, as part of their training, students do courses on becoming entrepreneurs, writing business plans or learning other skills connected to setting up and running one's own company.

The UT is profiling itself as the *Entrepreneurial University* and this image is well known across the world (Clark, 1998). It not only relates to the university's research and the way in which it tries to

IEBD, see appendix G 21

"Innovative Entrepreneurship and Business Development" is a one-year Master programme on Entrepreneurship and Business Development. Goal to be achieved is to recognize the opportunity of the innovation earlier than others, and, consequently, create new business upon this opportunity. The recognition and assessment of opportunities, the development of business concepts and their implementation is the basic process under study. Therefore, this programme provides the students with:

- Competencies to work in an entrepreneurial context
- Knowledge of entrepreneurship as a scientific field
- A network of innovative companies and entrepreneurs
- The opportunity to develop their own enterprise

The programme is open to all students who have completed the pre-master programme. This year fifteen students take part in this programme.

[53] See appendix G5.

commercialise the research findings, but it also extends to its curriculum and the activities of the Student Union. In the context of its Major-Minor model[54] introduced at the end of the 1990s, the UT offers an 'Entrepreneurship Minor' and elective courses in the area of business development. The interest of students and even representatives from local firms has proven to be quite high, with many entrepreneurs taking part in the programme. The goal of the minor is to stimulate and develop an entrepreneurial and innovative attitude within students and UT-related entrepreneurs. In addition, the minor aims to develop academic knowledge on knowledge-intensive entrepreneurship. The programme consists of academic and practical courses. Some students have a specific idea or plan about starting a business idea or company. The module concludes with one out of two courses: "Becoming an Entrepreneur" or "Managing an SME". In the former, drawing up a realistic business plan is the ultimate goal. External speakers and trainers from the business world take part as lecturers in the course. Both courses provide a link between practical entrepreneurial experience and theoretical knowledge of entrepreneurship. This year, the minor Entrepreneurship is entering its sixth year. Over the past five years some 100 students successfully completed the programme.

A successful example of supporting graduates to become entrepreneurial is the 'Small business growth programme" offered by TSM Business School. This is a postgraduate programme offered to professionals such as managers and directors from the business world. Participants are asked to write a business plan. An experienced student from UT or Saxion assists them.[55]

Student Union, see appendix G 25

The Student Union is a student lead umbrella organization for all the student organisations at the University of Twente. The union is responsible for every extra-curricular activity that takes place at the university. Therefore, it has to deal with 6,000 individual students. Besides, it manages three buildings that are solely intended for use by students: the Water Sport Complex and the "Pakkerij" and the "Bastille".

Saxion offers a four-year bachelor programme Small Business and Retail Management, aimed at training entrepreneurs and entrepreneurial managers. Using innovative teaching and learning approaches, students acquire the various skills and competencies required to start their own company, work in SME or to function as entrepreneurial managers in large-scale industries and/or multinational companies. In the context of its Major-Minor model[56] Saxion also offers an 'Entrepreneurship Minor' and elective courses.

Bachelor programme Small Business and Retail Management, see appendix G 15

Small Business & Retail Management" is a four-year undergraduate curriculum, aimed at the training of entrepreneurs and entrepreneurial managers.

The programme is based on entrepreneurial competences, defined in close collaboration with entrepreneurs. The method, therefore, is competence-based and practice-oriented. The problem-solving approach can thus be characterised as Problem Solving Entrepreneurial Learning. Development is tested by a series of individual assessments and recorded in a portfolio, where students gather proof of their entrepreneurial development.

Since the start in 1999, 450 students have graduated. At present, more then seven hundred students are on their way to achieving this as well.

The *Student Union* is another addition to the entrepreneurial character of the UT. It is the only organization of its kind in the Netherlands. It encompasses all of the university's students and student organizations in the fields of culture, social activity, sports, study, and other activities. It was founded in 1999. About 6000 students and 90 student organizations are affiliated with the Student Union. It is presented as a Best practice in this report because it is specifically aimed at stimulating student activism, that is students learning other skills and competencies – outside of their education programme. Skills that matter in professional life and graduate careers and that are recognised in a so-called digital

[54] Students, as part of their training in a particular disciplinary field (their 'major') are given the freedom to earn part of their credits outside of this field (the 'minor').
[55] See appendix G3.
[56] Students, as part of their training in a particular disciplinary field (their 'major') are given the freedom to earn part of their credits outside of this field (the 'minor').

portfolio that next to the university diploma can become a valuable part in the student's curriculum vitae. With the help of regional business (banks, consultancy firms, etc), some of them regional firms, the Student Union organizes training programmes to students that have a management role in their student organization. The entrepreneurial character of the Student Union also derives from the fact that it runs its own Union buildings and offers facilities and other support to students that run their own business as a student entrepreneur. The latter takes place through USE, University Student Enterprises. USE is part of the Student Union and may be regarded as the students' counterpart to the successful TOP programme that offers credit and other support to graduates and university employees starting their own business (see chapter 3).

The UT and Saxion also contribute to graduate entrepreneurship by organising special days during which a number of companies can present themselves to students. These 'company days' give an opportunity to students and companies not just to engage in closer contacts, but also to offer students ideas and training about starting their own company.

4.5.8 Continuous professional education

Contributing to regional development can also take place by postgraduate education aimed at individuals in the region that already have a job but seek additional training. Next to the regular educational provisions for 'traditional students', Twente's HEIs are also engaged in specially designed programmes, or programmes supplied 'on demand' through contract education and other forms of continuous professional education. This post-initial supply of educational programmes is a rather heterogeneous mix of activities. Initiatives are underway to increase the transparency of the CPE (Continuous Professional Education) supply and its relationship to initial education.

Appendix A presents some facts and figures for the HEIs. The data relates to the number of students enrolled in MBA-type programmes, short courses, and in-company training. From the table it is clear that in the spectrum of courses offered to professionals that seek additional training most offerings are concentrated on business administration and management programmes. However, most HEIs are also able to operate flexibly when a demand for a particular course arises. For instance a professional organization such as the one for physiotherapists can request on behalf of its members to have Saxion organize refresher courses or upgrading programmes.

What the table does not show is the option of taking a scientific master's degree education in the university or a professional master's degree at a UPE. This option is available to holders of a bachelor's degree or graduates that already have a master's or equivalent. Also the minor programmes (mentioned earlier) offered to the HEIs' regular students are open to 'outsiders'. This takes place through the transfer offices of the HEIs and individual departments or faculties.

Like other regions and cities, Twente has a large variety of private training establishments that offer training courses to individuals interested in continuous professional education. TSM Business School and SWOT are examples of initiatives set up from within the publicly funded HEIs. Today, TSM is part of the university again, after a period in which it had a more independent status. Some of the management courses offered by TSM and SWOT have already been mentioned. The Faculty of Business, Public Administration and Technology of the UT has established the *Centre for Education in Public Administration* (in Dutch: *Centrum voor Bestuurskundig Onderwijs, CBO*). It offers post-initial education and tailor-made in-company programmes for public organizations, municipalities, provinces, et cetera. An example is the two-year Master of Public Management (see appendix K) for managers and experienced professionals in the public sector.

Other short courses offered by the University are in fields like computer science, chemical technology and educational science. Post-initial training is offered in computer programming, polymer (or rubber) technology. The institute ELAN, part of the UT, is a centre of expertise for secondary education, offering teacher training to holders of Master's degrees and a large number of courses to secondary school teachers that wish to upgrade their skills or acquire particular competencies.

4.5.9 Design and development activity by UPEs

Again connected to the issue of encouraging entrepreneurialism – in particular in the UPEs – is the attention paid to applied research. The research activities carried out by the UPEs are mostly in the field of design and development (D&D). D&D activities differentiate the UPEs from research universities, where research is still heavily focused on advancing scholarship. The design and development of knowledge products that have a direct application in practice, such as physical products, production methods, advisory services, methods, manuals, is increasingly becoming part of the variety of services produced by the HEIs. Design and development can also help professional practice. In both the research universities and the UPEs, students that are in the final stages of their educational programmes and that are working on a thesis are frequently working on assignments in private businesses and public organizations. These assignments lie close to the research carried out in the university. This applied research is also encountered in UPEs. Through this activity, the academics supervising the assignments come in contact with practical and professional situations – some of which are located in the region.

Under the heading of applied research and design & development activity by UPEs one should mention the function of *lector*. The *lector* position was introduced in UPEs in 2001 in order to have UPEs contribute more to knowledge transfer and regional innovation. The other goal was to create more opportunities for UPE staff to make job promotion and raise the general level of the academics working in UPEs. The *lector* position is a senior staff position in the UPE and the UPE equivalent to the associate professorship in the research university. Government subsidies were made available to create around a hundred *lector* positions in UPEs throughout the country. Currently there are some 200 *lectors* in the UPEs. The *lector* is required to build a so-called *knowledge circle* of professionals from within the UPE and the regional business sector (in particular from SMEs). He/she is expected to work on stimulating the external orientation of the UPE in the *lector's* particular area of expertise, engage in innovating the curriculum, staff development of teachers and stimulating knowledge transfer between the UPE and its environment. Recent evaluations of the *lector*-ships provided evidence of very modest successes in these areas. However, the government recently decided to continue the *lector* experiment through its Knowledge Development Foundation for Higher Vocational Education *(Stichting Kennisontwikkeling HBO – SKO*).

Saxion has 10 *lectors* in its Enschede location. They cover the following knowledge fields:

- Assessment
- Sustainable energy
- Physiotherapy
- Industrial design
- Knowledge intensive entrepreneurship
- Media Technology Design
- Risk management
- Software engineering for real-time and embedded systems
- Strategic management
- Care and well-being

Edith Stein has two *lector* positions; they cover the knowledge fields:

- E-Learning
- Implementation of Educational Innovations

AKI has one lector in the knowledge field of "Artistic research and media theory".

In Chapter 3, the *lector* and knowledge circles are discussed more extensively. We should stress that the *lector*-ship is still very much 'under construction' in the Dutch UPEs. Debates on the funding of design and development activity in UPEs, its quality assessment and evaluations of the functioning of *lectors* are still going on.

4.6 Other mechanisms to promote the regional knowledge infrastructure

4.6.1 Enhancing the regional education supply chain

To encourage the flow of students from secondary education to higher education, all HEIs and secondary schools in Twente have started to work on finding ways to enhance the regional educational supply chain. The most prominent initiative in this respect is the so-called LinX-network. The goal of the LinX network is the realization of uninterrupted educational routes in general – from lower vocational education, through intermediate vocational education, to the UPEs in the Twente region. LinX connects all secondary and tertiary education institutes in Twente with the aim to optimize the study career of young adults and create training conditions for qualified students. It offers learning pathways and study-career activities. Workshops are organized for teachers, project managers, managers and career coaches. Plans for a so-called inter-institute (the LinX College) have recently been approved. Currently, more than 400 pupils take part and almost every course in secondary professional education has an integrated pathway leading to higher professional education.

LinX, see appendix G 9

LinX, established in 1996, is a platform for regional policy on exchanging educational and professional careers. It connects all secondary and tertiary education institutes in Twente in order to streamline the throughput of students in the educational pipeline and optimise the educational careers of young adults. LinX supervises all existing and potential projects and activities arising from study careers, and creates educational conditions around them.

The directors or members of the board of the partner institutions meet under the auspices of LinX to communicate exchange and coordinate the above activities. Turbulent change in secondary and tertiary schools drives an urgent need to communicate, arrange and re-arrange the learning routes as amongst the various levels. Conferences for teachers, project leaders, managers and career coaches are being organised, projects evaluated and new plans developed. Plans for a so-called inter-institute (the LinX College) to structure all activities for students, teachers and managers have been approved recently. Currently, over four hundred and fifty pupils follow educational career programmes each year in the institutes for higher education, whilst almost every course in secondary professional education has an integrated pre-university route. Every year also some forty 'problem' students are successful in secondary and tertiary schools. Furthermore, there is sound mutual information exchange and understanding between managers and teachers. The problem of a good connection is a shared problem with shared ownership.

4.6.2 Satellite campuses, ICT-based provision and outreach centres

Another initiative that contributes to the region's knowledge infrastructure is the existence of on-line education providers or branches of providers that have their main offices elsewhere. The UT has an auxiliary branch in the northern city of Franeker in the province of Friesland. This annex, the Carthesius Institute, is a centre of expertise on sustainable innovation. The institute is part of the Centre for Clean Technology and Environmental Policy (CSTM) of the UT. The Cartesius Institute provides research and consultancy services and offers educational programmes for national and international students, and professionals. The Cartesius Institute is relatively small. Only seven people work in the Franeker office. The University recently decided to terminate its branch in the city of Leeuwarden (160 kilometres from Enschede). Neither the Leeuwarden branch nor the Franeker one serves specific regional goals for the Twente region.

Another mechanism for flexible educational provision is the provision of courses through the Internet. The UT, like the other Dutch research universities and the Dutch UPEs, does not offer full-blown on-line courses through the Internet. Nevertheless, the Internet is used intensively in most courses. Through the so-called Teletop system, many facilities are offered to students over the Internet, allowing self-paced study to students. In this, the UT takes on a leading role in the Netherlands. Through this ICT-based system, university teachers can design websites for their courses. All websites have similar layouts and structures. The Teletop system is restricted to UT teachers and its students. The system therefore does not offer educational opportunities to a wider group of people in the specific region. The virtual forms of educational provision are entirely placed on top of the traditional place-based forms that already exist. This implies there are no tensions between the virtual

and real life forms of educational provision. The virtual forms of educational provision are entirely placed in the service of the already existing place-based forms.

4.6.3 Bachelor-Master and its consequences

A few years ago, the 'bama' system was implemented in the Netherlands. This system opens the way for flexible educational routes, especially between research universities and UPEs. Numerous switching possibilities between the two are coming into existence. From a bachelor at one research university it is possible to change to a bachelor or a master at another university. Also switches from research university to UPE and vice versa are to become more easy. For this purpose, the UT collaborates with Saxion in so-called bridging courses, or special *minor* programmes. Students with a bachelor's degree from Saxion that wish to study at the UT are given the opportunity to make preparations for this transfer during their last years at Saxion. This offers students straight access to the following university masters:

- Business administration;
- European Studies;
- Health Sciences;
- Industrial Engineering and Management; and
- Public Administration.

In the opposite direction, there are mechanisms in place for UT students that wish to transfer to a UPE.

Similar agreements have been made between UT and Edith Stein, and Saxion and ITC. Both pathways are easily accessible. This is mainly due to universal use of the ECTS credit system. Dutch universities and UPEs nowadays use the European Credit Transfer System (ECTS).

Data from the Association of Universities in the Netherlands show that in the past a relatively large part of students of the UT graduated at the UPEs in the region. This percentage is relatively unique in the Netherlands and indicates a successful collaboration between the UT and the UPEs in the Twente region. This cooperation contributes to the flow of students between the HEIs in Twente.

4.6.4 Mechanisms to monitor and accredit extra-curricular activities

An important mechanism through which students can have their extra-curricular activities accredited is the phenomenon of the individual learning pathway ('*persoonlijke leerweg'*) offered in the UPEs. Here, students are challenged to add particular components to their preferred programme. An example is the dual learning possibilities offered by the UPE, where students integrate learning on the job with learning in the UPE. This kind of learning mode is part of a wider set of developments that point into the direction of a more individualized approach to education that combines the supply of HEIs with credits earned in prior learning (recognition and assessment of prior learning).
The HEIs stimulate extra-curricular activity by offering compensation mechanisms to several students' organizations and individual students. Through these grants, students are compensated for any delays they may experience in earning their degree. Students receiving these grants are participating actively in students' unions, sports clubs, cultural organizations, et cetera.

The UT's Student Union in particular was set up to encourage the extra-curricular activities of students. Its role is to encourage students to actively take part in academic life and engage in social and cultural activities. The Student Union of the UT is responsible for every extra-curricular activity that takes place at the university.

Studium Generale at both the UT and some UPEs offers other activities that students can engage in outside of their regular curriculum. It organizes debates and seminars for students and the general public. Activities are based around particular topics and themes and have a scientific content. Students can earn credits by taking part in some of the activities but they do have to get permission first from a programme or exam committee. The same holds for voluntary work taken up by students.

4.7 Conclusions

In general, we may conclude that regional needs lie close to the heart of the teaching activities in two out of the three UPEs in Twente – that is: Saxion and Edith Stein. Also the SWOT business school has strong linkages to regional entrepreneurs. Examples of interaction have been presented in this chapter, ranging from the practical work (e.g. internships) students are carrying out as part of their training, to the supply of postgraduate education (including continuous professional learning) to regional entrepreneurs (and potential entrepreneurs). The UT, like all other Dutch universities, plays a more nationally-oriented role in its education/training activities and a national/international role in its research. This holds even stronger for the institute ITC, where education focuses in particular on students recruited from abroad.

Regional needs therefore are finding their way into the teaching and learning at the UPEs and (to a lesser extent) the university. The curriculum is often inspired or at the least enriched by the injection of practical cases and knowledge located in firms from the greater region of Twente. Students doing internships or doing their thesis work in private and public organizations interact with local organizations and contribute to the idea of knowledge circulation discussed in chapters 2 and 3. Trainers or lecturers from outside of the university over the years have become a regular feature of the university curricula.

We are summarizing this chapter by means of the SWOT matrix presented below. Important steps have been taken and progress has been made, but there is certainly more room for collaboration between the different HE institutions and between the HEIs and regional industry. There clearly is potential to increase the contribution Twente's HEIs can make to their region, judging from the Best Practices mentioned in this chapter, the present situation in Twente and the route that Twente's HEIs together with their regional stakeholders have set out for the future.

Strengths	**Weaknesses**
1. High quality programmes, as evidenced in teaching quality assessments 2. Regional innovation potential in selected areas (health, technology) 3. Strong linkages between Saxion and regional industry 4. Internationally renowned 'entrepreneurial character' of UT 5. Highly developed monitoring system of alumni and potential students by UT 6. UT's Student Union incorporates entrepreneurial spirit in students, involving regional players 7. Linx network (see BP) links up a multitude of regional education providers	1. Barriers still exist between SME and higher education (information gaps, accessibility problems, cultural differences) 2. Human resources policy of university does not reward regional activity by staff members 3. Most linkages are initiated, managed and monitored only on a decentralised level in HE institutes – commitment by Board is small 4. Twente's economic climate and performance is mediocre relative to other Dutch regions 5. Three-year Bachelor programme in research university leaves little room for internships 6. Two business schools (TSM, SWOT) plus post-initial management education by university and UPEs make for an intransparent supply 7. Technical (engineering) character of UT makes some potential students turn to other regions
Opportunities	**Threats**
1. Movement towards more knowledge-intensive economic activity in Twente Triple-helix like partnerships require multidisciplinarity and public-private interactions between industry & region 2. Introduction of Bachelor-Master structure requires rethinking of curricula, competencies and links with region 3. Broad regional support and plans exist to push Twente forward in selected fields (e.g. health care	1. Competition (instead of cooperation) between Twente's HE providers 2. Competition from other regions in the Netherlands that have more actively and visibly integrated the provision of HE programmes by their UPEs and research universities 3. Drive towards excellence makes research university (UT) drift away from region towards international playing field 4. Lack of success indicators for regional

and technology), requiring education's input 4. New lectors ('knowledge circles') in UPEs have to focus on interaction with region (& its SMEs) 5. Individualization in society will encourage HEIs to enable work-based learning and individual learning pathways (funded by student vouchers) 6. Future will see more easy integration (merger?) of higher vocational education and university education 7. Possible extension of regional activity to Germany's border (EUREGIO) region	interaction, combined with lack of (public) money will make HEIs pay little attention to regional needs 5. Globalization and international competition can make large high-tech firms decide to move abroad or acquire their teaching from in-house (or non-regional) providers

5 THE CONTRIBUTION OF THE HEIS TO TWENTE'S SOCIAL, CULTURAL AND ENVIRONMENTAL DEVELOPMENT

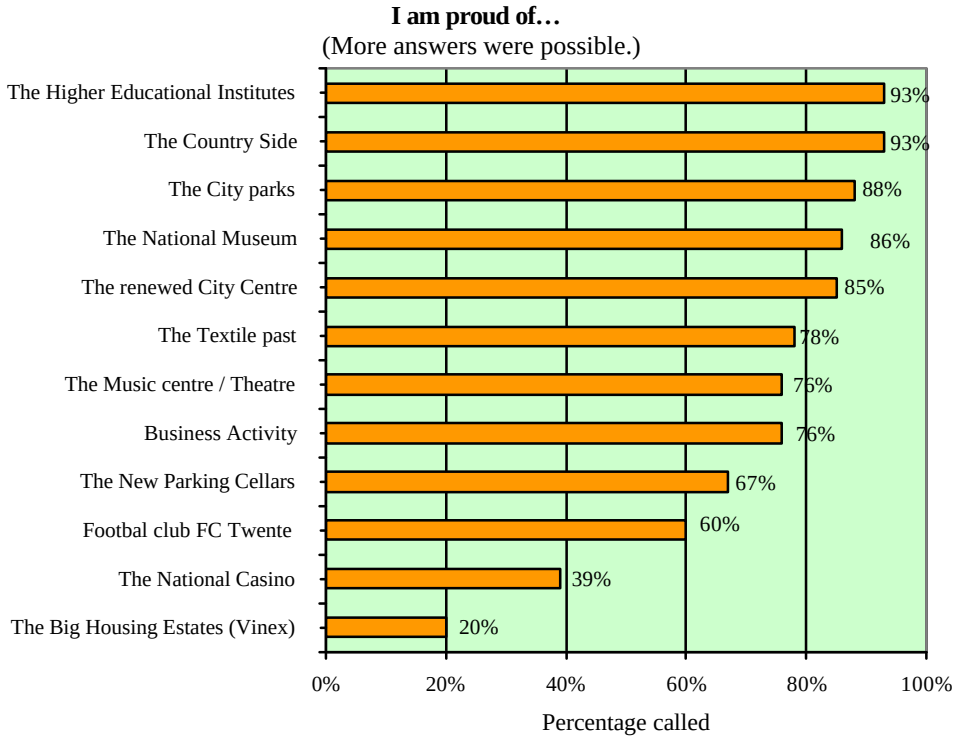
Gert-Jan Hospers

The social, cultural and environmental effects of higher education institutions on their region have been studied for a long time. Around 1611, Thomas Sagittarius, a learned man in Jena, was a pioneer in this field. According to him, universities and schools provided a higher level of regional health care provision, better marriage opportunities for girls and more piety among the population. Now, nearly four centuries later, higher education institutions still contribute to the social, cultural and environmental development of the areas in which they are located. It has to be said, however, that it is difficult to evaluate or even measure this contributory role. In turn, it is also hard to assess what the regional society would have been missing if one or more of the higher education institutions were absent in the region under study. Below, we will focus only on the direct and visible expressions of regional engagement of the higher education institutions in Twente, while keeping in mind that their indirect effects might be much larger.

5.1 The higher education institutions and their social role

A resent survey of the regional newspaper indicated that the citizens of Enschede are most proud on their HEI's and the social-cultural facilities (see figure 5.1). The higher education institutions in Twente offer a number of facilities to the regional community. This is done by sharing not only their 'physical capital' (e.g. buildings, leisure infrastructure), but also their 'human capital' (personnel, students). Especially in the social domain it is thanks to their students that the higher education institutions can provide a number of community services. In different stages of their bachelor and master courses, students carry out commissioned research on social issues in the region.

Figure 5.1 The results of an enquiry "where the citizens of Enschede are proud of".



Source: Twentsche Courant Tubantia / Newcom Research & Consultancy, 2005

5.1.1 Projects

Projects range from applied research by students in public policy on the political and social participation of citizens in Twente to medical support in hospitals by nurses under training and community work by trainees studying socio-pedagogical support.

> The restructuring of *Roombeek*, Enschede's neighbourhood that was severely damaged after the fire works disaster in 2000, is a telling example of a project that benefited from the knowledge brought in by students from the regional higher education system.

Often, such expertise support takes place within the framework of professional internships and final thesis projects in municipalities, health care organizations and other public service bodies in Twente.

5.1.2 Facilitating structures

The region has some facilitating structures that try to match the educational supply and regional demand for social expertise, like the *Wetenschapswinkel* (Science Shop – WeWi) at the UT, the *Kennis Instituut Stedelijke Samenleving* (Knowledge Institute Urban Society – KISS) and the *Henk Pronk Identiteitscentrum* (Henk Pronk Identity Centre – HPIC). KISS – a partnership of Saxion, the UT, several cities and (semi)public bodies in the East of Netherlands – offers research support to parties involved in the improvement of the quality of city life in the region. For this purpose, KISS organizes conferences, provides information and supervises urban research projects. In a similar way, HPIC, which is based at Edith Stein, offers advisory services on religious and philosophical issues. Apart from that, Edith Stein and Onderwijscentrum Twente jointly offer further training for teachers in the region, such as producing educational websites and philosophy with children. It was KISS, for example, that commissioned the research on the restructuring of the Roombeek neighbourhood by asking students do write their MA-thesis on possible futures for the neighbourhood.

KISS, see appendix G 7

The expertise centre for urban society and development (*Kennis-Instituut Stedelijke Samenleving*) is an association bringing together public and private interests around specific urban issues within the province of Overijssel. It aims at the mobilisation and diffusion of expertise in urban society and development. The centre mainly focuses on the topics of social integration/ safety/regional cooperation and urban development. Its main outputs are symposia and workshops on these topics in which academics and practitioners share their know-how and experience.

All members are committed to investing in a common exchange programme of information. The centre has existed for over three years now and has twenty-three member organisations: the five major cities of the region of Twente and the province of Overijssel, the province itself, housing corporations, police, institutes for higher education (Saxion, Twente University, Windesheim) and private companies. During this time, over fifty projects (workshops, discussion groups, symposia and site tours) have been discharged.

5.1.3 Occasional support

Besides these structural facilities for expertise support, the higher education institutions in Twente provide community services on a more occasional or seasonal basis. At their campuses, both Saxion and the UT organize public debates when controversial issues in the region emerge, like changes in the administrative system of Twente, the restructuring of the *Roombeek* neighbourhood or the forthcoming closure of the regional airport. Incidentally, also the ITC with its specific geo-information expertise offers advisory services in Twente, like recently, when it provided tsunami disaster information. Next, employees of Twente's higher education institutions often figure in regional media: lecturers and researchers in social or political sciences regularly act as commentators in regional broadcasting services (*TV Oost*) and newspapers (*Twentsche Courant Tubantia* and the weekly journal *De Roskam*).

5.1.4 Seasonal services by providing expertise

In addition, the higher education institutions in Twente provide services on a seasonal basis. At Saxion, for example, students in economics and finance help elderly people in completing their tax declarations. Also the younger generation in Twente benefits from the presence of the regional knowledge infrastructure: at the annual *Twente Summer Campus* in May secondary school students

from the region can get coaching at the university to prepare themselves well for their final examinations.

5.1.5 Associate professorships and knowledge circles

Thanks to the recent introduction of *lectoraten* (lectureships) and *kenniskringen* (knowledge circles) in which lecturers and practitioners disclose professional knowledge for societal purposes this regional engagement is growing. For example, there are active knowledge circles with regional spin-off in the field of Health Care & Welfare (Saxion), Physiotherapy & Paramedic Professions (Saxion) and E-Learning (Edith Stein). The associate professorships and the related knowledge circles have been in operation for only two years now. Therefore, it is too early to draw definitive conclusions about their effectiveness.

Interestingly, the Dutch government has allocated an above average number of *lectoren* (lecturers) to the higher education institutions in Twente: per 10,000 students there are 10.5 *lectoraten*, while the Dutch average is 5.8. This indicates that Saxion, Edith Stein and the AKI are considered to have a high innovation potential.

5.1.6 Partnerships for social services provision

Since the last few years, the higher education institutes in Twente have been actively engaged in partnerships aimed at social services provision in the region. Especially Saxion has developed initiatives in this field, like the organization of business and management games with members of local Rotary Clubs and joint projects to improve the regional labour market (see chapter 6).

5.1.7 Platform Enschede studentenstad

Finally, the City of Enschede and the local higher education institutions regularly meet in the *Platform Enschede Studentenstad* (Enschede City of Students Platform – PEST). The platform coordinates a fund that financially supports activities that promote Enschede as a vibrant place to study. The initiatives of PEST increase the quality of places for the youngsters studying in Twente. Obviously, this is also in the interest of the higher education institutions themselves.

5.2 The higher education institutions and their cultural role

The UT Campus *Drienerlo*, located between Enschede and Hengelo, and the city centre of Enschede are the main locations in Twente that show the significant cultural role of the regional higher education system. At the campus, we find the AKI, the university's Cultural Department *Vrijhof* and a large Sports Centre; in turn, the *Pakkerij*, the Saxion Campus and the Conservatoire are located in the heart of Enschede. These cultural facilitates are mainly operated by bodies within the higher education institutions themselves. Still, however, there are opportunities to jointly manage and market the cultural supply for the benefit of the regional community.

AKI Festival,
see appendix G 2

The AKI Festival is a public festival that informs the public about and involves them with the various AKI types of art. For a whole week, AKI runs its day-to-day operation from a big tent in the centre of Enschede. AKI undergraduates are given assignments to be carried out in public in the course of the week. Parallel to this, the public are invited, without charge, to join any one of 27 different workshops - both in the tent and in other public areas, such as empty shops. Attendance at all the workshops and other activities averages over 300 persons each day.

5.2.1 AKI

As an art college, the *AKI* provides training at BA level in the practice of visual arts and design as well as an MA degree for fine art within the AKI's *Dutch Art Institute.* Apart from this student education, the AKI organizes festivals (e.g. the AKI Festival), exhibitions and courses for a broader audience. The *Hardy Foundation*, for example, which is housed at the AKI, aims to promote the functioning of art and design in society. Within the Foundation students, alumni and other experts carry out contract research for third parties, mediate between artists and clients and offer courses for artists and designers that strive to be self-employed. The *tART Foundation* ('Technology and Art') is of a more specialized nature and explores – in collaboration with the UT – the interface between art and technology by means of education, events

and exhibitions in Twente. Artists also can consult tART for technical support. Last but not least, the AKI is well connected with the cultural institutes across the region: the work of its students and employees is regularly exhibited in cultural environments like *Rijksmuseum Twenthe, Concordia*, a number of local photo and sculpture galleries and even the green parks of Enschede (*Villa de Bank*). Apart from its role in the cultural domain, the regional role of AKI is limited though.

5.2.2 Vrijhof cultural department

The *Vrijhof Cultural Department* is the cultural heart of the UT Campus. The cultural associations in the Vrijhof, coordinated by the umbrella organization *Apollo,* initiate, organize and support cultural activities, often in cooperation with Saxion and the ITC. The cultural calendar consists of weekly and monthly cultural events (like the *Culture Burger* every Monday and the yearly *Culture Estafette*) and exhibition programmes. In addition, a number of seasonal courses and workshops are organized in the Vrijhof, varying from silk-screen printing, creative welding and designing furniture to oriental dance, theatre make-up and a capella singing. Most events and exhibitions taking place here are open to the public; for the courses and workshops, however, only students and employees of the higher education institutions (and their family members) can register. The same restriction applies for the rental of cultural facilities like training rooms for artists and musicians. The Vrijhof also provides accommodation to *Studium Generale* that organizes public lectures, debates, excursions and courses on topics of general academic and cultural interest. Obviously, it is difficult to assess what the impact of the Vrijhof Cultural Department and Studium Generale on the regional community is. The experience, however, is that with most courses and lectures special positions for students have to be reserved, because the interest from outside the university is mostly overwhelming. People read about the activities in the local newspaper and enrol. Over the last years, for example, mainly people from outside the university have participated in excursions that Studium Generale organized.

5.2.3 Sportcentrum

Next to the Vrijhof we find the *Sportcentrum* (Sports Centre) with a wide range of sporting facilities that are generally accessible for students and employees, not only from the UT, but also from the other regional higher education institutions. Those who buy a Union+Card get reductions in making use of the sports infrastructure at the campus. Special facilities in the sports centre include a dojo, an in-house and open-air swimming pool, cinder tracks and many fields for playing all kinds of ball games. The student associations in the Sports Centre, supervised by the *Sportraad* (Sports Council) play a key role in organizing the yearly *Batavierenrace*, a famous student run between the universities of Twente and Nijmegen in which also running groups from the region participate. All HEIs in Twente encourage the sporting development of their students. For those practising top sports there are adapted study programmes, while sports training and sporting days are sometimes part of the BA-degrees of normal students as well. In the regional community especially the University of Twente and Saxion help in organizing sporting events, such as the yearly FBK Games in Hengelo (athletics).

5.2.4 Student unions

In the city centre of Enschede especially the student associations and Saxion make a valuable contribution to the cultural development of the region. Student unions like Audentis, Taste, AEGEE and Alpha are housed in the *Pakkerij*, in which they organize their weekly (in)formal meetings (for members only). Although the cultural role of these clubs is not always recognized in the regional society, fact is that their members contribute to the creative and diverse climate of the cities in Twente.

This is clear especially during the Introduction Days of the higher education institutions at the end of the summer. The cities of Enschede and Hengelo are filled with prospective students, who take part in the leisure activities organized by the student unions. At Saxion's *City Campus*, students can watch cultural performances in the Harry Bannink Theatre and use a wide range of sport facilities. Regional artists can exhibit their work in the main entrance hall of the campus.

5.2.5 Conservatorium

The *Conservatorium* (Conservatoire), which is part of Saxion as well, is strongly embedded in Twente's classical and popular music scene. It closely cooperates with the *Nationale Reisopera*

(National Travelling Opera), *Orkest van het* Oosten (The Netherlands Symphony Orchestra), the *pop collective ATAK*, the *Enschedese Muziekschool* (School of Music) and the cultural Podium Twente. The Conservatoire also houses a school where children from the region with extraordinary musical talent can take extra lessons (*Talentenklas Oost-Nederland*). The Conservatoire has an important public role as well: amateur musicians can make use of the academy's training rooms and citizens are invited to enjoy weekly lunch and examination concerts.

5.2.6 Architectural contribution

The cultural role of the regional higher education institutions is not limited to their facilities and events. The fact is that the buildings in which the institutions are housed mostly reflect original and modern architectural concepts. The UT, for example, is the only Dutch university with a campus, i.e. an extensive park-like area with a spatial separation between the functions of living, working and recreation. The campus is designed after functionalist principles and some of its buildings (e.g. Cubicus, Faculty Club and AKI building) count among Twente's best-known architectural highlights. Similarly, the ITC building and that of Saxion are known for their particular, nature-like architecture. In short, a tour through Twente's higher education landscape is an art and architectural tour at the same time.

5.3 The higher education institutions and environmental sustainability

5.3.1 Best practices to address environmental issues of concern to the regional community

All of the higher education institutions in Twente take into account the environment in carrying out their activities. Without exception, the facility departments of the institutions separate waste products and stimulate an environmentally conscious attitude among students and employees. Within its premises Edith Stein, for example, has an educational yard with special concern for the environment. In turn, the ITC building has been constructed as an energy-saving accommodation. The City Campus of Saxion – a recycled former hospital – has rooms that can be used for several functions and is strategically located near public transport facilities to discourage the use of cars. Moreover, on its building Saxion has a visible symbol reflecting environmental consciousness: that is the 'Turby', a vertical windmill to generate energy. Likewise, the green Drienerlo Campus, where the UT and the AKI are located, is designed as a low-traffic zone. Additionally, by means of attractive schemes and contracts with local bike shops, employees in the regional higher education system are stimulated to go to their work by bicycle more often. On its campus, the University of Twente has a Working Group on Development Techniques (WOT), which tries to raise ecological interest, especially when it comes to development issues. The WOT is a knowledge centre for small-scale applications of sustainable energy and hand pumps for developing countries. The WOT is run by volunteers.

5.3.2 Joint initiatives to demonstrate environmental sustainability possibilities for the region

Besides practical attention to the environment, the UT and Saxion show a theoretical interest in ecological issues. The *Centrum voor Schone Technologie en Milieubeleid* (Centre for Clean Technology and Environmental Policy – CSTM) conducts applied environmental research for third parties like (regional) companies and governments. The courses the CSTM offers are policy-oriented and focus on the governance of sustainable development, environmental quality and eco-technology. Saxion also recognized the importance of sustainability. At the end of the 1990s, Saxion started a unique study program for sustainable Energy production and marketing. Later, Saxion established special *lectoraten* (lectureships) and *kenniskringen* (knowledge circles) in Sustainable Energy Provision and Sustainable Development of the Everyday Environment. The participants in these expert groups provide expertise support to regional stakeholders and in the regional media when it comes to environmental sustainability possibilities. For the rest, there are no joint initiatives yet in the ecological domain.

5.4 Conclusion

All in all, the individual higher education institutions in Twente do make a positive contribution to the social, cultural and environmental development of the region in which they are based. Especially in the cultural domain, the UT, Saxion and the AKI offer a variety of infrastructural facilities, programmes and services, thus filling a regional gap indeed. At the same time, it must be said that the collaboration among the regional higher education institutions and with other stakeholders in the region stays behind what might be possible and feasible. Until now, there are only a few examples of joint initiative between Twente's HEIs in social, cultural and environmental development. As a matter of fact, only the Knowledge Institute Urban Society KISS, two municipal platforms (VOKT and PEST), the tART Foundation and the Vrijhof are initiatives with more than one regional knowledge institute participating.

In establishing links with other regional stakeholders for social and cultural purposes (e.g. business, local government and social partners) Saxion (the Conservatoire included) and the AKI have been the most active actors. KISS, Fast Forward, HBO Job Service are examples of such collaboration in the social domain; in the cultural field, the Conservatoire and the AKI have close societal connections. However, joint initiatives between the institutions and the regional community to demonstrate regional environmental sustainability possibilities are largely lacking. These considerations lead to a rather ambivalent SWOT analysis in terms of the social, cultural and environmental spin-off of the higher education system in the region of Twente. On the one hand, Twente's higher education system has a clear strength (i.e. a wide range of regional cultural facilities) which offers opportunities in today's society in which the 'creative class' is becoming more and more important. On the other hand, the present regional higher education system is still rather weak when it comes to social and environmental links with the regional community, which may cause threats. After all, there is a growing need for knowledge institutes to finance themselves with third-party funds coming from (regional) stakeholders and to attract students from the regional community. However, there are also opportunities: the HEIs can make use of their infrastructure (cultural infrastructure, lectureships, partnerships) to support the 'creative class' and become more deeply involved with the region. There are also possibilities for joint initiatives to demonstrate environmental consciousness in the region.

Opportunities	**Threats**
1. wide range of regional cultural facilities to support development of the 'creative class' 2. (further) regional engagement via lectureships and knowledge circles *3.* build upon successful partnerships aimed at social services provision in the region like *FastForward* and *HBO Job Service* 4. joint initiatives to demonstrate environmental sustainability possibilities for the region	1. weak social and environmental links with the regional community, which may cause threats because of the growing need for knowledge institutes to finance themselves with third-party funds coming from (regional) stakeholders 2. lack of visibility of HEIs in the region, which might ultimately reduce student numbers
Strengths	**Weaknesses**
1. positive contribution to the social, cultural and environmental development of the region 2. facilitating structures on social issues like *Wetenschapswinkel*, *Kennis Instituut Stedelijke Samenleving* and *Henk Pronk Identiteitscentrum* 3. offering infrastructural facilities, programmes and services in cultural domain	1. collaboration among HEIs and with other stakeholders in the region lags behind 2. only KISS, VOKT and PEST, tART Foundation and the Vrijhof are initiatives with more than one regional knowledge institute participating 3. joint initiatives between HEIs and regional community to demonstrate

4. established links of Saxion, AKI and Conservatoire with other regional stakeholders for social and cultural purposes	regional environmental sustainability possibilities are largely lacking

References

Bakker, H. and P. Timmerman (2004), *Architecture & Art: A Walking Tour on Campus*, UT: Enschede.

Florida, R. (2002), *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life*, Basic Books: New York

Academie voor Beeldende Kunst en Vormgeving (2005), *AKI Enschede: Studiejaar 2005/2006*, AKI: Enschede

Buursink, J. (2002), Regionale impact universiteiten overschat, *Geografie, 11 (2)*, pp. 36-39

Gemeente Enschede (2004), *Actieprogramma Hoger Opgeleiden*, Cluster Economische Zaken: Enschede

Hogeschool Edith Stein/Onderwijscentrum Twente (2005), *Educatieve dienstverlening: Cursusaanbod 2005-2006*, HES/OCT: Hengelo

Saxion Hogescholen (2004), *Jaarbericht 2003*, Saxion, Enschede/Deventer

Schenke, W., R. Singeling and J. Slik (2004), Bewoners participeren bij herinrichting Roombeek, *Geografie*, 13 (3), pp. 10-14

Universiteit Twente (2001a), *Van Landgoed tot Kenniscampus*, UT: Enschede

Universiteit Twente (2001b), Vademecum: Leidraad voor de Universiteit Twente, UT: Enschede

6 CAPACITY BUILDING FOR REGIONAL COOPERATION IN TWENTE

Gert-Jan Hospers

"One of the strong points of Twente is its advanced knowledge and research infrastructure", "The region can be proud of its highly-developed higher education system", "The UT is a little Stanford, contributing to the emergence of Silicon Valley along the Dinkel"… just a few quotations that highlight the regional involvement of the HEIs in Twente. In all recent reports, views and plans on Twente the higher education institutions are mentioned as key players. As we shall see, these statements are largely true. However, there are still opportunities to intensify the engagement of the HEIs with their region.

6.1 Mechanisms to promote HEI regional involvement

6.1.1 Mechanisms

Formal institutional co-operation
The higher education institutions in Twente maintain contacts with regional stakeholders by means of partnerships, often in the form of signed agreements. Such agreements, for example, underlay the participation of the UT and Saxion in Kennis Instituut Stedelijke Samenleving (Knowledge Institute Urban Society – KISS), Career Centre Twente, Stichting Wetenschappelijke Opleidingen in Twente (Institution for Scientific Education – SWOT) and the Regionaal Platform Arbeidsmarkt Twente (Regional Platform Labour Market Twente – RPA).

Twente has a number of well-known companies and organizations that operate nationally and internationally. Together, they intend to position Twente as an area that is interesting to live and work in. This is done by means of Career Center Twente (CCT), which was founded by these companies and organizations. Saxion, SWOT and TSM are partners of CCT.

Besides this, Saxion and other stakeholders have signed collaboration agreements (see appendix H), e.g. with NIBRA (National institute for fire service and disaster management), Essent (regional energy supplier) and CARINT (regional organization for housing, welfare and care; CARe IN Twente). New agreements are in the making, such as an agreement between Syntens and Saxion to establish a business support desk at Saxion for SMEs.

Supervisory and advisory boards
The identification of regional needs by Twente's higher education institutions mainly takes place by means of supervisory and advisory boards in which regional stakeholders participate. Often, but not always, the board members come from the regional business community (e.g. firms, lawyers) and the regional government (e.g. mayors, senior civil servants). Some faculties at Saxion and Twente University – mainly in the socio-economic domain – have boards in which qualified professionals from the region indicate interesting teaching and research opportunities. Examples are Saxion's *Beroepenveldcommissie* (Professional Field of Action Committee) and its system of external examiners in legal, business and hospitality education.

TWARANT, see appendix G 18

TWARANT is a co-operative student project of ITC and the regional water authorities on earth observation techniques for regional water management.

Various MSc students will conduct a four-year research programme on how to monitor the level of ground water in the Twente area through relatively cheap mapping methods. Through such a system, the regional water authorities can anticipate low or high ground water levels. The project started this year, so there are no results at this moment.

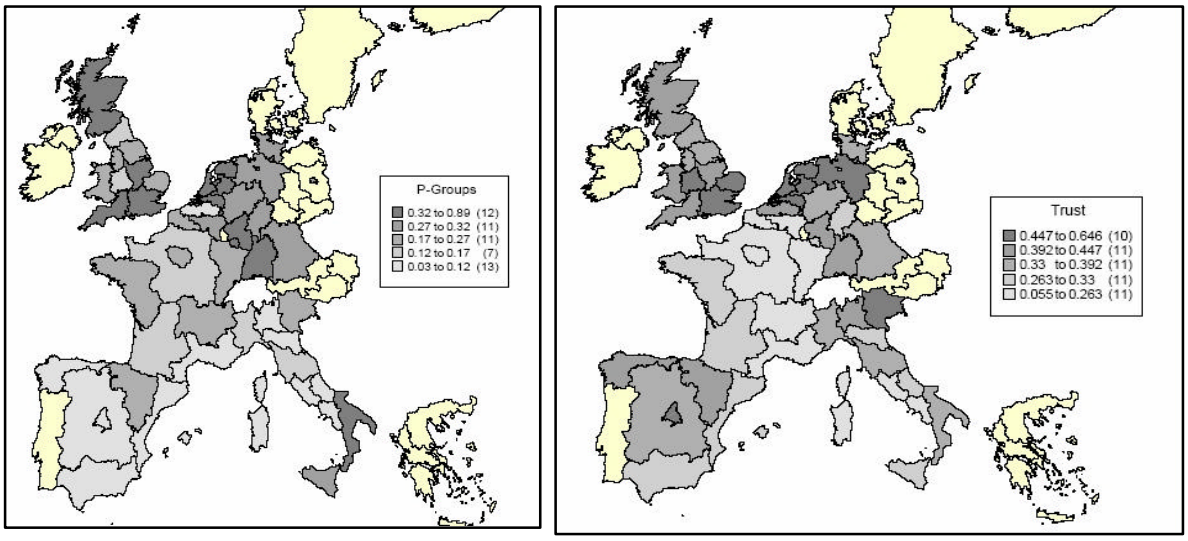
Regional innovation bodies and business incubators
To exchange expertise and to cooperate the UT is particularly engaged in regional innovation bodies and business incubators, as exemplified by *Technologiekring Twente* (Technology Circle Twente – TKT), *Innofonds* (venture capital for techno starters) and the *Bedrijfstechnologisch Centrum* (Business and Technology Centre – BTC) at Enschede's Business & Science Park. For a short time

now, both Saxion and the UT have cooperated with twelve CEOs of regional top companies in the so-called *Regionaal Innovatieplatform* (Regional Innovation Platform – RIP) with the ambition to put Twente on the map as a top technology region.

Informal networks
In addition, there are informal networks in which senior lecturers and managers from regional organizations regularly meet to discuss joint internship and graduation. This informal network landscape of Twente is dense: in fact, within Western Europe the region has the highest participation in social and business networks. 89% of the people participate in social networks, the West-European average, however, amounts to 26%. This high network denisty goes hand in hand with a high level of mutual trust in Twente. See figure 6.1 (where P-groups (Putnam-groups) refer to networks). This large stock of 'social capital' as highlighted by Putnam et al. (1993) pays off. The Business & Science Park near the UT, for example, is successfully managed by an informal network – thus saving the need for an expensive management.

> Again, East Netherlands has the highest score in trust levels of Western-Europe: in the region 65% of the people say that they trust other people in general, while the average is only 35%.

Figure 6.1 Networks and trust in Twente vis-à-vis the rest of Western Europe



Source: Beugelsdijk (2003)

6.1.2 Mapping the knowledge resources

Labour market information
Despite the regional engagement of Twente's higher education system, few audits have been undertaken to map the whole range of knowledge resources in the region. In fact, only the *Regionaal Platform Arbeidsmarkt Twente* (see above), housed at the office of the Region of Twente, takes stock of the expertise and skills of the regional population by publishing a report with the latest facts and figures on the regional labour market each year.

Projectweek, see appendix G 14

Project week is a real life simulation of technical problem solving for technical students. Companies from the region submit a specific technical problem and pay the UPE for a proper solution. Two student teams will be deployed to address each problem. The teams work in a project organisation consisting only of students. At the end of the week, each team will give a presentation of their solution to the problem. Not only is this form of action learning an energiser for students, but also companies find about 70% of the solutions more or less useful.

In 2005, five hundred students participated in thirty-five projects from thirty different companies. It was our tenth "Project week". This time, eight German companies participated -as well as a few German students.

Survey of research infrastructure

When it comes to research places and spaces and the accessibility of the research and learning infrastructure for new innovative initiatives, however, regular audits are carried out. Such audits are often required by European, national and regional governments and are used as a basis for innovation subsidies. Surveys of the research infrastructure, notably at the UT, are made by departments at the higher education institutions themselves (e.g. by the *Holding Technopolis Twente* – HTT and the *Netherlands Institute for Knowledge-Intensive Entrepreneurship* – NIKOS) or by external parties, such as private and public consultancy organizations.

The results of such surveys are also employed to highlight the key role of the higher education institutions in Twente. This was true already twenty years ago, when the *Bedrijfstechnologisch Centrum* (Business Technology Centre) was established thanks to its links with the University of Twente. Also in recent views of all relevant policy bodies (national/ provincial/ regional/local) the advanced knowledge infrastructure in Twente is cited as the engine behind the region's development. Examples of these views include the national policy document *Pieken in de Delta* (PinDa), the position paper of the regional *Regionaal Innovatieplatform*, the region's economic development programme *Regionaal-Economisch Ontwikkelings Plan Twente* (REOP) and the strategic vision of Network City Twente.

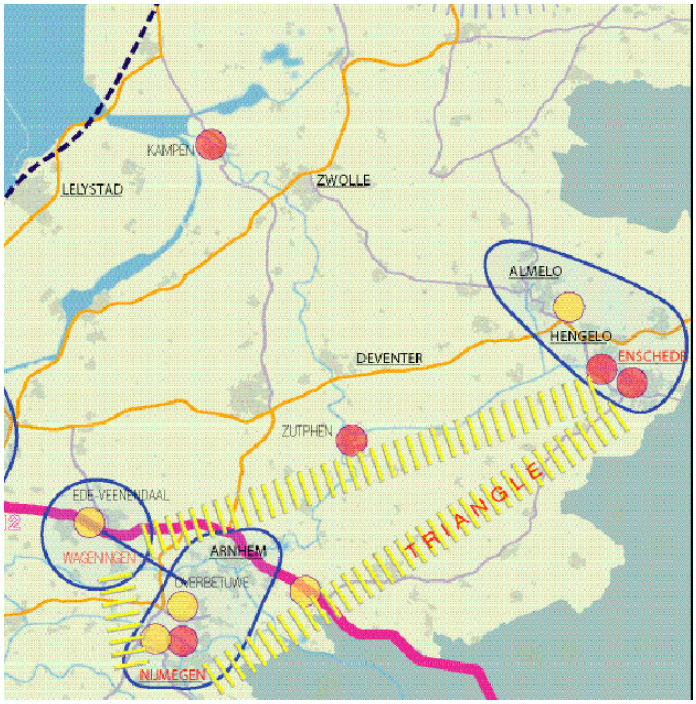
Among these, especially the recent policy document *Pieken in de Delta* is important, as it recognizes Twente as one of the five hot spots in the Netherlands in the field of innovation (See figure 6.2). The highly developed knowledge infrastructure as well as the region's high absorptive capacity for innovation subsidies are nationally seen as key assets of Twente and have played a role in the recognition of the region as a hot spot. As proof of this, the TOP programme is often mentioned, providing support to engineers that want to set up a business (see section 6.3). Another recent example illustrating the high absorptive capacity of Twente in the field of innovation is the popularity of Innovation Vouchers (free consultancy tokens) among regional SMEs.

Sciencia, see appendix 16

Sciencia Knowledge Centre GGZ is a centre for expertise in mental health in Overijssel bringing together UPEs and all mental health bodies in Overijssel, excepting those concerned with addict care and forensic psychiatry. Through a systematic approach to projects, Sciencia seeks to contribute to safeguarding the expertise and skills of mental health staff in order to improve the quality of care.

The activities of Sciencia focus upon implementation and transfer of expertise. This is achieved through organising workshops, training and education - and conducting applied research independently. Through a platform for information exchange and provision of tailor-made education programmes, the centre has been successful for three years. A Sciencia lecturer has for instance been appointed and workshops and day seminars on certain issues have been organised. Parallel to that, the conceptual 'Innovation Contingency Model' designed by the Sciencia *lector* is operated throughout the region. Thus synergetic processes are generated in the triangle of practice - research - education.

Figure 6.2: The innovation hot-spot Twente



Source: Pieken in de Delta, 2005

6.1.3 Financial resources

Funding higher education
Only a few financial resources from the region are available to support regional engagement by Twente's higher education system. Obviously, public or private organizations often outsource contract teaching, research and consultancy to adjacent knowledge institutions. Funding higher education, however, is mainly a matter of the national government; for that reason there is no structural or legally enforced regional funding mechanism.

Professorships and lecturer positions
By way of exception, private stakeholders from the region of Twente act as a sponsor for professorships and lecturer positions at the regional higher education institutions. The UT, for example, has a part-time professor in textiles technology associated with the research institute *Sport and Leisure*. Royal Ten Cate, a regional top company working in textiles technology and advanced materials, finances this specialized chair. Their formal partners, in turn, support some Schools of Saxion. Employees of these organizations provide places for internships and hold guest lectures, but they do not have financial responsibility for Saxion's activities.

Awards
Finally, a handful of firms and public bodies in Twente award annual prizes for interesting final theses or valuable community work by students in regional higher education. Examples of such regional competitions are the *Thesis Award* attributed by the Industrial Circle Twente IKT and an Euregional thesis award by regional law firms.

6.1.4 Knowledge valorization

3TU programme
For the past few years, the national government has put more emphasis on the regional function of higher education institutions. Although the knowledge institutions in Twente already have a good

reputation for being regionally engaged, new initiatives have been developed to improve the connection with the region. Within the national *3TU programme Federatieve Technische Universiteit* (Federative University of Technology), in which the technical universities of Twente, Delft and Eindhoven cooperate, the UT enhances activities in the field of knowledge valorisation, i.e. the transfer of knowledge to the market. For this purpose in 2010 a *3TU Innovation Lab* will be in operation with the task of supporting the regional business community, promoting entrepreneurship and pursuing a more active patent policy. Anticipating this lab, the UT is now extending its successful past performance in entrepreneurship promotion.

Lectoraten and kenniskringen

The results from the increasing national attention for regional engagement can also be observed at Saxion, Edith Stein and the AKI: backed with money from the Ministry of Education these institutions have been able to set up *lectoraten* and *kenniskringen* (knowledge circles) with a regional spin-off, for example in sustainable energy, educational support and art & technology. These initiatives underline the impression that there are still opportunities to enlarge the regional engagement of the Twente higher education system. In a recent 'letter of intent' of Saxion, we can read indeed that the institution wants to anchor itself in the region. In this respect, seven spearheads are formulated:

- Establishing partnerships with regional SMEs and stimulating/facilitating student entrepreneurship;
- Developing activities in industrial crossroads technologies (industrial design and health technology);
- Taking advantage of the dynamics in care and welfare, a sector in which the region has specialized;
- Focusing on tourism and town & country planning, being issues which are relevant for the region;
- Paying attention to sustainability as a cross-cutting theme for economy and ecology;
- Promoting safety as a theme requiring multidisciplinary attention at micro and macro level;
- Being recognized as an expertise centre on German-Dutch relationships (owing to intensive cross-border linkages between Saxion and Germany).

Sustainable Houses, see appendix G 17

Sustainable Houses is a research project involving practical cooperation amongst housing corporations, the university and students. The project aims at the development, demonstration and implementation of a new concept for sustainable apartment houses.

During this large project, students practice their research skills in a very realistic way. The current phase involves preparation for a demonstration project to test the viability of the concept, monitoring schemes and expertise dissemination programmes. The final phase, which begins by 2005 and ends by 2007, consists of the actual monitoring, concept fine-tuning and dissemination of expertise. As the project has only lately begun, no results can as yet be shown.

Regional dimension

Concrete activities that are undertaken under the heading of these spearheads are regular contact with and consultation of regional stakeholders, the formation of new knowledge centres and *lectoraten* with a regional spin-off and the permanent participation by the management of Saxion in regional networks. Last but not least, participation in studies like the one in hand is a measure that should contribute to a larger embeddedness of Saxion in the region. The purpose of the promotion of these spearheads is a greater contribution to economic vitality of Twente and even the East of the Netherlands. As has become clear from this letter of intent, Saxion is really trying to embed itself more deeply in the region in which it is based. Without a doubt, the recent set-up of *lectoraten* and *kenniskringen* will offer a significant contribution to this process of regional anchoring. Besides

Minor AMT, see appendix G 11

Art, media and technology (AMT) module is a specialist educational module for technical and arts-oriented students. It aims at connecting art with information science and vice versa. Technologically orientated students become aware of artistic approaches, which provide them with a wider view. Arts students are confronted with a more systematic approach and new sources of knowledge. Through working together on various projects and assignments, students also learn from each other. This specialist programme is open to students from AKI, Saxion and UT. The programme is now in its sixth year.

the *lectoraten*, there are several initiatives from the HEI's where the regional dimension is shown. These are stated as Best Practices throughout this chapter.

6.1.5 Engagement arrangements

Engagements reviews
There are structural regional processes to regularly review present engagement arrangements between the knowledge institutions and the region in which they are based. At a national level, of course, the success of these institutions in regional involvement is part of accreditation procedures. Also the earlier mentioned policy documents (e.g. *Pieken in de Delta*) are based on subsidy information and results from interviews on the regional engagement of the higher education institutions. Reviews on a regional basis encompassing the whole regional higher education landscape have not been developed recently - except for the one in hand. There are reviews on specific topics, as mentioned in 6.1.2.

DURP, see appendix G 4

The Dutch Ministry of Housing, Spatial Planning and the Environment DURP project (*Digitale Uitwisseling Ruimtelijke plannen* / digital exchange of spatial plans) allows for the exchange of digital physical plans. The ITC "DURP-base maps" project, recently initiated, investigates how the base maps of these physical plans can be designed so as to provide optimal support for the exchange and integration of physical plans. This four-year project examines the way base maps should and can be defined and generated in an Internet environment, in order to support the auditing of physical plans at all levels (municipal, provincial and national).

Provincial and local government
In case of earmarked subsidies from the provincial or local government, an 'engagement review' might take place. This does not mean that the government does not show an interest in the regional activities of the higher education system: good practices in this field are disseminated widely across the media with the UT's successful *TOP programme* (see chapter 3), ITC's DUPR-project and Saxion's *EMOTIS programme* (a cross-border, i.e. Dutch-German, project in professional education) as prominent examples. Due to the high informal network density, the channels between higher education institutions and the provincial/local government are not always formalized. Besides formal links in the form of agreements, mechanisms to coordinate the regional role of higher education institutions are informal as well. Managers, lecturers and researchers from the higher education institutions, for example, participate in social networks, business clubs and local politics and thus also have easy access to information about regional needs.

Coordination bodies
The *Beroepenveldcommissies* at Saxion mentioned above and a similar body, the *Werkveldcommissie* at Edith Stein, can also be seen as forums where regional interests in a certain field of profession are coordinated in an informal way. *Saxion Knowledge Transfer, Holding Technopolis Twente, Fast Forward* and *HBO Job Service* coordinate activities for regional engagement in a more formal way: the first two knowledge valorisation organizations try to match the available expertise at the various faculties with regional demand for knowledge, while the latter two initiatives try to facilitate the transition from education to the labour market according to regional needs. *Fast Forward*, in which Saxion cooperates with the regional development agency Oost NV and PLP Communications, offers talented graduates the opportunity of a bi-annual traineeship in well-known regional companies and institutions. Also *HBO Job Service* – a joint venture of Saxion and Randstad – tries to ease the transition from education to work, in this case by means of regional employment finding. A more specific initiative is the *Verticale Ondernemerskolom Twente* (Vertical Entrepreneurial Column Twente – VOKT) in which the city of Enschede cooperates with all types of public education in the region to realize a continual learning route from high school to academic education for pupils interested in entrepreneurship.
Fast Forward is an innovative way for the matching of high potential graduates (trainees) and companies/enterprises/municipalities. The latter are willing to contribute to the development of trainees management competences during a traineeship of eight months, the former is willing to fulfil a special task where management competences are part of the game.

6.1.6 Regional community infrastructure

Transport

For the sake of completeness, we will deal with transport here, although this issue is addressed in chapter 5 as well. Obviously, for their operations the higher education institutions in Twente make extensive use of the existing regional community infrastructure. This can be observed immediately when looking at the regional transport infrastructure: during weekdays the trains to and from the cities in Twente and the local buses are filled with students that benefit from free public transport by using their *Openbaar Vervoerkaart* (Public Transport Card – OV). Without these students, it is questionable whether Station NS Drienerlo near the university campus would have been profitable. Not only students, but also employees of Twente's higher education system are encouraged to use regional public transport. Employees from Saxion, for example, are obliged to travel by train between the locations Enschede and Deventer, while the parking space around Enschede's City Campus has been kept deliberately limited so as to provide an indirect incentive to use public transport. Also the UT, the AKI and Edith Stein have schemes stimulating their personnel to use the train and bus instead of their car.

Fast Forward, see appendix G 5

Fast Forward is an innovative way of matching high potential graduates as trainees with companies/enterprises/local authorities, which undertake in the course of eight-month apprenticeships to contribute to the development of trainee support competences whilst the trainees are prepared for a special task involving managerial competence.

During their final year of study, the students are informed about the opportunities provided by the Fast Forward Programme. Specialists from the Fast Forward office select applicants after their graduation and match the demand of companies with the capacities of the students. Over a two-year training programme, the apprentice will be trained and educated according to a tailored programme, with the emphasis on management skills and competences. During this period, the apprentice has eight-month work assignments with three different companies. In addition, s/he attends interactive workshops aimed at improving general, social and communicative skills and attitude.

This programme results in highly qualified young professionals and seems to be an answer to the regional need for innovative leadership and management. In five years of the programme's existence, 137 apprenticeships have successfully been completed with 67 different employers, thus demonstrating the high level of mutual satisfaction. A minority of three apprenticeships have failed because of a mismatch in expectations. So far 95% of former trainees has now a job in the region!

Sharing facilities

Besides the regional transport infrastructure, students and staff of the higher education institutions in Twente employ energy services and objects in the region's built environment. After a major fire in one of the university's buildings, for example, the faculty BBT was housed in a building on the Business & Science Park outside the campus. In case of major events like conferences, openings and network meetings the regional knowledge institutions sometimes make use of public buildings like museums, theatres and other urban amenities. In turn, for their day-to-day needs, people from the region have restricted access to the infrastructure of Twente's higher education system. Amateur musicians and artists can rent training rooms and enjoy concerts in the Vrijhof and Saxion's Conservatoire. Also some sports facilities and associations at the UT are open to the public, such as the open-air swimming pool and the cinder tracks. The campus and its culinary and shopping facilities are free to access as well. Meanwhile, the university's green, park-like surroundings have turned out to be a popular public place for walking and recreation. Especially Saxion is active in offering its facilities to other groups. The synagogue in Enschede, for example, has been using rooms of the Stadscampus, while police are training in its sporting facilities. Saxion also takes part in a regional glass fibre network of fast Internet exchange, thus raising the network's density and effectiveness. Other examples of facility sharing in the cultural domain are dealt with in chapter 5.

6.2 Promoting dialogue and joint marketing initiatives

6.2.1 Formal mechanisms

Regional platforms
There are a few formal mechanisms in Twente to promote communication and dialogue between the higher education institutions and relevant stakeholders in the region. At the highest executive level, regional platforms have been set up to facilitate the dialogue between key decision makers from education, business and politics in the region, like in the field of urban issues (KISS), scientific education (SWOT), the labour market (RPA), technological development (TKT), business incubation (BTC) and regional innovation (TIP) (see the section before, where we dealt with these network organizations in more detail). These and other regional forums are important, as they may play a role in setting new regional and teaching programmes.

Research advisory boards and committees
At the faculty or department level, in some cases research advisory boards and professional committees have been established in which regional stakeholders can draw attention to regional issues. Also the system of external examiners at Saxion and its earlier mentioned *Beroepenveldcommissies* can be placed in this faculty/department category of regional dialogue.

6.2.2 Informal contacts
Next, individual lecturers and researchers are often informed about regional issues in their contacts with firms and organizations offering internships to students. Thus, the majority of inter-organizational contacts on regional issues take place in an informal way. Last but not least, we should mention the important role of informal, non-business networks in promoting regional dialogue and communication. These networks, which are often hidden from view, act as a kind of regional lubricant. Making use of such networks is way of working in Twente that is a result of historical factors and that is place-specific. Remember that the area traditionally ranks among the regions in Western-Europe with the highest degree of what has been called ‘social capital’: 89% of the people in Twente are members of a social-cultural association, while the West-European average in this domain amounts to only 26%.

6.2.3 Representation in public and private bodies
Staff members of the higher education institutions are well represented in public and private bodies in the region. Depending on their position in the hierarchy, specialization in teaching or research and their willingness to engage in regional issues, they are sometimes asked to take part in advisory boards of regional firms or (semi) public bodies. On a more voluntary basis, some staff members choose to be involved in local/regional politics. It is striking, for example, to observe how many city and provincial counsellors are linked to the regional higher education institutions, be it by training (public administration) or in another way. The representation of staff members is not monitored as long as these jobs are unpaid. If the jobs are paid, then staff members should report their extra duties to their institution’s administration.

6.2.4 Joint marketing initiatives
Although the higher education institutions are not formally involved in regional marketing campaigns, they play an indirect part in it, just because Twente is often promoted as a ‘knowledge region’. In the campaign *Tijd voor Twente* (‘Time for Twente’), for instance, managers from the knowledge institutions, acted as ‘regional ambassadors’. When it comes to promoting Enschede as a student city, however, there is a clear collective educational initiative: this is the *Platform Enschede Studentenstad* (Platform Enschede Student City – PEST) that promotes Enschede as a vibrant place to study by financially supporting youth events and other city marketing projects.

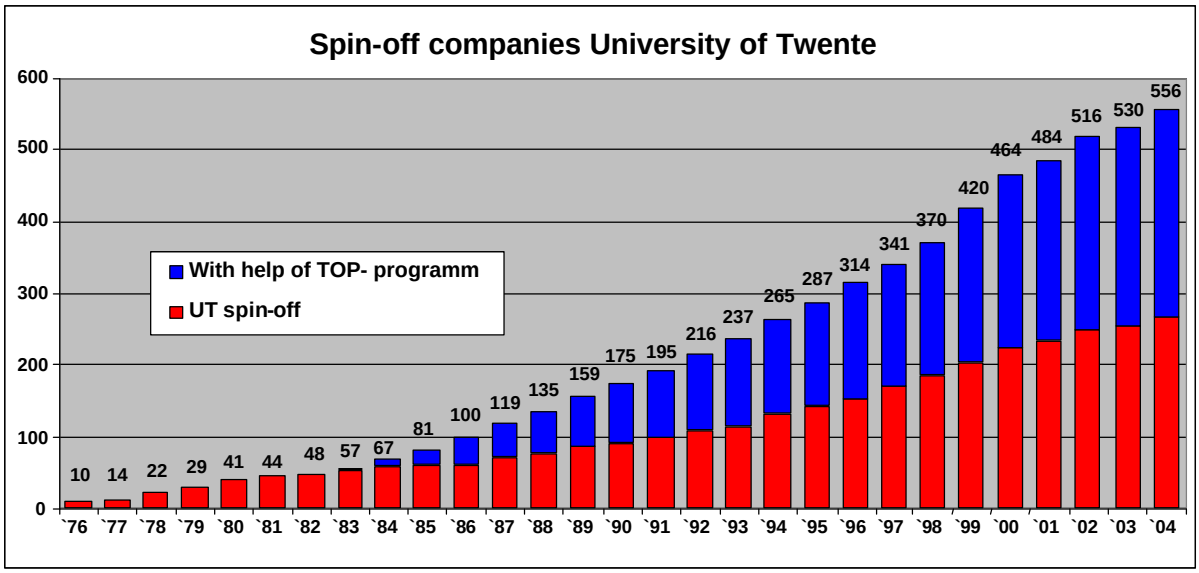
6.3 Evaluating and mapping the impact of the regional HEI system

Teaching and research programmes
When starting a new teaching or research programme, the higher education institutions in Twente regularly carry out a SWOT analysis or other studies (e.g. an image research) among regional stakeholders. At Saxion, Edith Stein and the UT this has become common practice over the years. The results of such audits, which are also used for internal quality management purposes, give insight into the regional impact of the institutions, but certainly cannot be regarded as a structural regional evaluation tool. For example, the awareness of the regional role of the higher education system is raised not so much by audits, but rather by news items in the media. Often press releases, brochures and information events are used to attract regional attention for the activities of the knowledge institutions. Examples of such special, open information meetings at Saxion abound and vary from sessions around the bachelor course in podotherapy, ICT administration and safety studies.

General evaluation studies
General evaluation studies on the economic and socio-cultural impact of the knowledge infrastructure on the region are scarce. So far, only the UT has undertaken general and specific audits on its economic role in Twente. General evaluation studies include *Florax (1987)* and *Nijboer (1997).* As the last study explicitly builds on Florax (1987) and as it is the most recent one, we briefly discuss its results here. In his report Nijboer (1997) distinguished input effects (direct effects of the university, its personnel and students), output effects (effects of departing personnel, alumni, regional knowledge and community service) and attraction effects (remaining effects such as the attraction of new companies to the university and the start-up of new firms). Nijboer notes, however, that the university's indirect employment effect in Twente may be greater, because the underlying output and attraction effects probably were underestimated due to measurement problems. Below, in figure 6.3, we can see how the TOP programme has contributed to an increasing number of academic spin-offs in the region of Twente. About half of the new firms have been set-up without the TOP programme; the other half would not have existed without this particular subsidy scheme.

> On the basis of data provided by Statistics Netherlands and the province of Overijssel Nijboer estimated that the UT had a regional impact of 3,580 full time jobs in the year 1995. This total figure was made up of two parts: direct employment of 2,300 jobs and a regional employment effect (indirect employment) of 1,280 jobs.

Figure 6.3 Numbers of Spin-off Companies at the UT



Source: Nikos, UT 2005

Specific audits
Besides this general economic evaluation study, the UT has carried out specific audits on the results of its policy to stimulate the start-up of new ventures. As discussed above, the *TOP programme* has encouraged and helped prospective entrepreneurs with sound business plans to start their own business (see chapter 3) since 1984.

6.4 Institutional capacity building for regional involvement

6.4.1 Mission statements
Except for the ITC – being an international university – and the AKI, all higher education institutions in Twente consider regional engagement of paramount importance. The AKI has indicated that it wants to be involved more in regional issues. The connection with the region should be enhanced. Cooperation with other HEIs and industry should be encouraged. In all recent strategic plans of Saxion, UT and Edith Stein this regional role is explicitly part of the mission statement. As the reader could observe in the above, a lot of activities and initiatives are set up to implement this regional mission in reality. It must be said, however, that this strategic importance of regional involvement has not been translated yet in all layers of the higher education institutions – despite the advanced communication structures (like ICT applications such as intranet) the decision makers have at their disposal.

6.4.2 Interpretation of mission statements

Leadership and management
Academic leadership and central management at the institutions have not been altered significantly to engage with region needs. Managers in the regional higher education system are attracted not for their experience with regional issues, but rather on the basis of their management qualities. The question of course is if such an alteration is needed indeed: after all, for most higher education institutions in Twente regional engagement is part of their mission statement. Moreover, given the high regional ambitions the institutions have set themselves, there are already a number of formal channels of communication between regional stakeholders and the knowledge institutions. Still, however, it is surprising that for taking regional decisions in the institutions no officer is fully responsible.

Regional focus and responsibility
The institutions do not have specific internal mechanisms, posts and offices with an explicitly regional or local focus or responsibility. There are of course exceptions to this rule: the UT's *TOP Programme* and Ten Cate-professorship, as well as Saxion's *Fast Forward* initiative being exceptions. Regional engagement rather takes place on an ad-hoc basis by means of internships, guest lectures and commissioned third-party research. To be sure, at all higher education institutions in Twente, there is room for adjunct appointments for people from the region. So far, no structural policy for that existed. The recent establishment of part-time associate professorships with a regional function (e.g. the *lectoraat KIO* (Knowledge Intensive Entrepreneurship)), the expertise centre "Technology for Health" and the involvement of the institutions in regional debates (e.g. in discussions about the *Muziekkwartier* (Music Centre) in Enschede), however, indicate that Saxion, Edith Stein and AKI have taken their regional mission more seriously.

Technology for Health, see appendix G 1

The Expertise centre Technology for Health (*Kenniscentrum Technologie voor Gezondheid*) is a cooperation between regional specialists in the fields of health technology and higher education. The objective is to stimulate and initiate research projects and educational activities in the common field of health, health care and technology. By doing so, the centre tries to solve practical clinical questions in a multidisciplinary way. This increases the awareness and understanding of the specific expertise of the cooperating partners. The centre, established in 2005, has initiated already seven research projects.

An educational module focusing on this subject will be in place by September this year.

6.5 Human & financial resources management and organization culture

Although the regional dimension is explicitly incorporated in the mission of most HEIs in Twente, this dimension is not really reflected in the human & financial resources policy and organization culture of the respective institutions.

Human resource management

There is no regional human resources policy yet: lecturers and researchers, for example, are recruited from everywhere in the country and are, for example, not obliged to move to Twente. In practice, however, it turns out that a large number of employees, especially in supporting functions, have their origins in the region of Twente.

Financial resource management

Additionally, at none of the higher education institutions in Twente, staff is trained in or rewarded for activities that have to do with regional engagement. Especially at the UT (e.g. in its social sciences departments) such community work is still seen as not academic and has connotations with parochialism. There are indications, however, that the university wants to change this attitude for budgetary reasons. While the UT could afford to be internationally oriented during the 1990s, now the university seems to become more aware of its regional function – just as in the 1980s when the economy of Twente was in a crisis and the TOP programme was established. The background of this growing regional awareness is that knowledge institutions in the Netherlands will have to finance themselves more with third-party funds coming from (regional) stakeholders. Thus, a stronger orientation to the market could imply a stronger orientation to the region as well.

6.6 Organizational culture

To be able to make this transition in organization culture, structural changes in the current financial organization within the higher education institutions might be needed. At the moment, in all of the higher education institutions in Twente regional funding streams – be it European, national or regional funds – are largely managed in an ad-hoc manner. Developing more long-term financial mechanisms and procedures for third party funding may be needed also for generating more resources for regional engagement. At the moment, regional funding streams are used in a rather incidental and bottom-up way, e.g. by individuals with an interest in the region or through personal contacts. The differences in organization culture between the commercial world and the educational world certainly contribute to the lack of interest in regionally focused research. This is visible in internships and master-thesis-trajectories, in which the expectations of the internship organization (application) and the higher education institutions (theory) still conflict on a regular basis. There are signs, however, that things will change – and are changing indeed. As a matter of fact, in the future, knowledge institutions will increasingly have to finance themselves with third-party funds coming from (regional) stakeholders. Anticipating this development, some institutions at the university (e.g. the Institute for Governance Studies) and within Saxion (e.g. the knowledge circles) invest more research capacity on issues with regional relevance.

6.7 Conclusion

The majority of higher education institutions in Twente – the UT, Saxion and Edith Stein – feel that they should play a considerable regional role. Consequently, they have explicitly put regional engagement in their strategic plans. On paper, this regional mission has worked out perfectly: the higher education institutions have declared to fill the gap that emerged after the decline of the textiles industries since the sixties. Also in the last years the regional mission has been emphasized more and more. In practice, it must be said that the regional activities of the institutions have been of paramount importance indeed. Take for example the TOP programme that generated a lot of new firms and jobs in the economy as well as the spin-off of TOP, such as the Technology Circle Twente and other networks.

At the same time, the mission of strong regional engagement is still not completely reflected in the human and financial resources policy and the organization structure and culture of the higher

education institutions in Twente. Especially the UT is trying to find a balance between being a global player on the one hand and a local stimulator on the other. Therefore, the local population cannot escape from the impression that the university is not only geographically, but also psychologically set somewhat apart from the cities in Twente. As a matter of fact, until recently, academic research on regional issues was not strongly encouraged, as it was confronted with a sense of parochialism. This applies less to the institutions for higher professional education, although recently established associate professorships with a regional function show that much can be done yet to improve regional engagement.

Perhaps one could say that Twente's higher education system is still wrestling with the 'regional engagement challenge': the knowledge institutions claim that they feel strongly about regional involvement, while in implementing this mission not many people at the organizations are in charge yet. If we can trust what we see, however, this challenge is taken up more and more. In addition to the associate professorships and knowledge circles in the region's professional universities, recent agreements between the UT with local companies (like the Grolsch brewery and Ten Cate fibres) and regional bodies (like the Regional Innovation Platform) demonstrate that there are still opportunities for intensifying regional engagement. If the higher education institutions stay on this track, we think, the popular statement that 'Twente is a knowledge region' is going to make sense even more.

References

Academie voor Beeldende Kunst en Vormgeving (2005), *AKI Enschede: Studiejaar 2005/2006*, AKI: Enschede

Beugelsdijk, S. (2003), *Culture and Regional Development*, CentER: Tilburg

Clark, B.R. (1998), *Creating Entrepreneurial Universities: Organizational Pathways of Transformation*, Pergamon: Oxford

Florax, R.J.G.M. (1987), *The University: A Regional Booster?*, Ashgate: Aldershot

Hospers, G.J. (2004), *Twente: een regio tussen trend en traditie*, Karmac: Lelystad

Nijboer, S.M. (1997), *De Universiteit Twente als motor van de Twentse economie*, Universiteit Twente: Enschede

NIKOS (2005), *NIKOS Progress Report 2001-2004*, University of Twente: Enschede

Putnam, R. (1993), *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press: Princeton.

Saxion Hogescholen (2004), *Jaarbericht 2003*, Saxion, Enschede/Deventer

Sijde, P.C. van der, and A. Ridder (1999), *Commercialising Knowledge: Examples of Entrepreneurship at the University of Twente*, Twente University Press: Enschede

Tilburg, J.J. van, and P. Hogendoorn (1997), *Het Succes van Innovatief Ondernemen*, Twente University Press: Enschede

University of Twente (2004), *Critical Mass*, University of Twente: Enschede

7 CONCLUSIONS: MOVING BEYOND THE SELF-EVALUATION

Matthijs Hammer, Wolf ter Horst, Peter van der Sijde, Irene Sijgers

7.1 Lessons to be learned from the self-evaluation process

In the previous chapters, different aspects of the impact of the Twente higher educational institutions on the region are presented. In this chapter we bring together the lessons learned. In the first part of this chapter, the stakeholders of the HEI structure are described, followed by the state of cooperation between the institutions. Then the developmental themes for the region are presented. Already here, at the start of this chapter two important issues are presented as major challenges for the region:

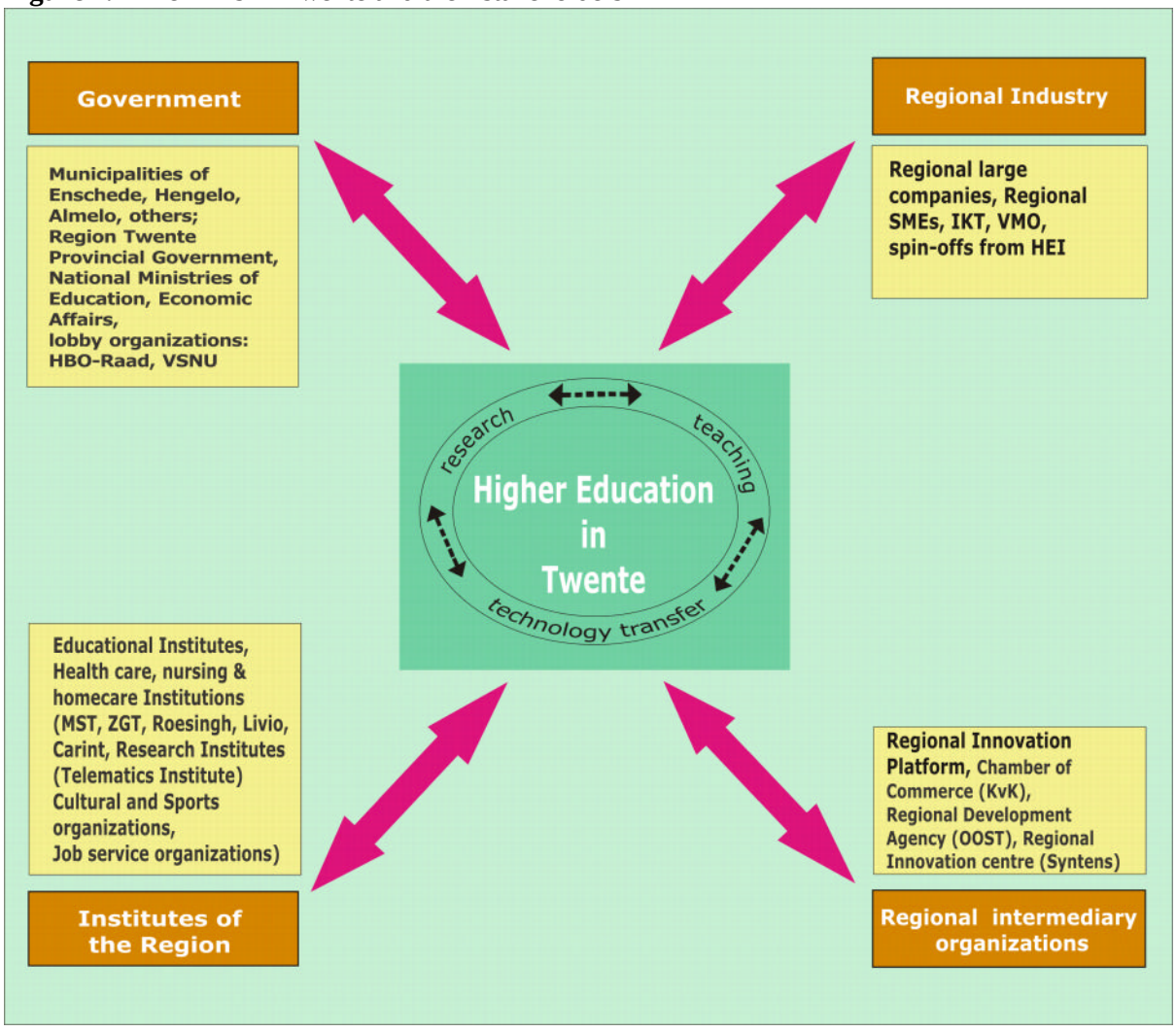
- The Twente region needs a jointly adopted view and ambition.
- Twente needs to recognize its socio-cultural context and infrastructure as an economic force.

These two challenges are incorporated in the developmental themes for the region.

7.2 Stakeholders of the HEI structure in Twente

In the previous six chapters an outline is given of the various stakeholders of the Twente HEIs and their involvement with activities that impact the region and regional development and vice versa. Although students are stakeholders in the HEI, they are not explicitly incorporated in Figure 7.1; the students are implicit stakeholders and dealt with this way in this report.

Figure 7.1 The HEIs in Twente and their stakeholders



These stakeholders together with the HEI make up the "playing field" of the higher education arena in Twente; they influence and determine the course of higher education by participating in the (different levels of) governance of the regional HEIs and stimulating and facilitating the HEIs to take particular courses of actions via lobbying for and with the institutions. Together, strategies are developed to elevate the educational level, create wealth (through the stimulation and contribution to innovation and entrepreneurship) and well-being in the region[57].

7.3 Cooperation between the HEIs in Twente

The cooperation between the HEIs in Twente took shape in the last decade of the last century. As a result of the Bachelor-Master structure in higher education, Saxion[58] and Edith Stein are cooperating closer and on a more structural basis than before with the UT and other educational institutions (schools and the National Institute for Curriculum Development; LinX is an excellent example of an integral cooperation between educational institutions – see 4.6.1) in the region. Undergraduates from Edith Stein and Saxion have (after completing a so-called pre-master programme) access to the Master studies at the UT.

TSM Business School (a foundation of the UT) cooperates with the SWOT (a foundation in which both UT and Saxion cooperate) and draw their teachers primarily from other HEIs. In the TechnoCentre Twente both Saxion and UT participate (as does the ROC van Twente). In the previous chapters many examples have been mentioned of cooperation between the HEIs in Twente; some forms of cooperation can be characterized as "projects" (of a temporary nature and for a specific purpose), while others are of a more permanent nature. Partnerships and strategic alliances with (regional) industry and institutions are formed to enhance the interaction between "theory" and "practice" (see 6.1/6.1.1. and 3.3.3.2). Also new partnerships and alliances are necessary; e.g. between the Edith Stein, Saxion and UT to be able to cope with the shortage of and drain from teachers in secondary education, managers in primary education and the "second phase" teacher trainings in Twente. (Appendix I)

Nevertheless, all HEIs in the Netherlands are fishing in (more or less) the same pond for students. This holds for the undergraduate students (a university study or a higher professional education study) as well as for the postgraduate students (a master's degree at the university or at the UPE). Agreements have been made to approach future students together. Also, since all HEIs are supposed to engage in research, this could put the higher education institutions in competition with each other – further cooperation in this area could lead to a strengthening of the Twente position in research.

The AKI is focused on art and in this area there is cooperation with other HEIs in the region. Although ITC has (on an ad-hoc basis) regional impact, its focus is primarily international.

7.4 Developmental themes for Twente

Given this first outline of the ambition of Twente, there is definitely a lot of work to be done in the region for the HEIs together with the stakeholders of the HEI structure. Since regional development is the issue, the HEI should and cannot take leadership; support and involvement, however, is necessary. The Innovation Platform Twente (IPT) has taken up a leading role in setting the agenda for Twente with respect to innovation, industry and policy. The REOP (Regional Economic Development Plan)

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[57] After a visit to Silicon Valley early 2005, stakeholders in the field of regional innovation (policy makers, universities and entrepreneurs) decided to cooperate in order to publish an annual Twente Index that should map and compare the economic development of Twente. To develop the index, the University of Twente, Saxion Universities, the Chamber of Commerce and regional development agency Oost NV immediately joined forces and carried out the task to prepare a first version. The result, Twente Index 2005, is an overview of existing quantitative and qualitative material on the economy of Twente and is an important source for policy makers and other Twente stakeholders in charge of boosting regional competitiveness. It is presented to the public in November 2005. The example shows the growing awareness in Twente that cooperation leads to synergy and does pay off economically.

[58] The cooperation between UT and Saxion received an extra impulse because at both institutions a special position was created to stimulate and implement further cooperation in the areas of bachelor-master, fundamental-applied research, flow of students, etc.

that just came into the implementation stage[59] extends this agenda setting to new entrepreneurship, industrial environment, tourism and labormarket & employment. The participation of the larger companies, the educational and research institutes in the IPT (the UT and Saxion are members it) and the support of the government (both local and provincial) gives the platform an excellent position. The platform came into existence in December 2004 and set up a process in which all stakeholders are asked to cooperate to present a Twente agenda for regional innovation (road map) to the Prime Minister of the Netherlands in December this year. Based on the outline of the ambition and the previous four chapters the following "developmental themes" are identified:

- Entrepreneurship, innovation and creativity
- Regional focal areas
- Knowledge infrastructure
- Strengthening of HEIs

7.4.1 Entrepreneurship, innovation and creativity

The challenge: For a long period the region has used the slogan "Twente where innovation is tradition" to promote itself as an entrepreneurial and innovative region. As described in Chapter 3 the many spin-off companies of the UT and Saxion contribute to the innovation through entrepreneurship (UT via the TOP programme, the institutional spin-offs, and the holding company; Saxion via spin-offs, Small Business, the virtual incubator, and S-CIO). Innovation is supported directly (cooperation with SMEs, contract research, continuous professional development) as well as indirectly (via spin-off companies). Nevertheless, Twente has companies belonging to the "old economy" as well as ones belonging to the "new economy", and an opportunity for building on this basis new ventures incorporating its creativity and resources provided (also/primarily) by the HEIs. In Chapter 5 the socio-cultural context of the region is summarized.

The challenge to strengthen its economic base by focusing on innovation and entrepreneurship and to use its creative class and its cultural potential as an economic power:

a. To strengthen companies' capacity to:
   - apply the knowledge (from the HEIs) into products, processes and services;
   - successfully market innovative products and services.
b. To organize education and research of the HEI in a demand-driven way
c. To support and spin-off companies with a growth potential

Intention & Contributions needed: The intention of the HEIs is to contribute actively to entrepreneurship and innovation in the above-mentioned way. All HEIs already have these intentions in their strategic plans and in the coming years, entrepreneurship will be strongly stimulated in the academic communities. Together with industry, stimulating incentives will be developed and implemented for both students and faculty to engage in entrepreneurship and innovation. The following three concrete action lines will be implemented:

- *Stimulation of entrepreneurship*: The HEI will stimulate entrepreneurship in the different schools and institutes. Since individuals drive entrepreneurship, the stimulation of entrepreneurship is directed towards individuals in different target groups: management, teaching and research faculty, and students. Research faculty and students are the prime target group for setting up their own business. Project and activities will be organized in the individual HEIs, preferably at joint activities and projects with companies, institutes, government and other HEIs. The management and the teaching faculty have to facilitate entrepreneurship; teaching staff has to enthuse the students and will be encouraged to participate in companies and institutes in advisory boards and management has to enthuse the schools and institutes.
- *Stimulation of innovation*: Higher education and industry, especially SME, have to work more closely together in a "one stop shop" through which companies can get access to knowledge,

[59] http://www.twenteinuitvoering.nl

equipment and laboratories and research capacity. The challenge for higher education and regional companies is to build up together a harmonized system for commercialization of knowledge. A system in which not only the knowledge of higher education, but also knowledge within companies is shared. All with one target: applying the knowledge in Twente in products, processes and services.

- *Connecting creativeness with entrepreneurship*. Successful marketing of innovative ideas and products requires knowledge and feeling for the needs of the market: of target groups, their perception of the environment and behaviour and of the way in which the market can be opened up. Connecting the creative sector with (industrial) products and services of Twente has great potential. The HEIs want to contribute to this by connecting the creative courses with the more technological ones in projects, internships, etc.

The above-mentioned tasks for the HEIs cannot be seen in isolation and ought to be activities in which the relevant (regional) stakeholders play an important role. In order to enable the HEIs to perform their self-imposed tasks, industry and government have to provide or participate in:

- *Acknowledgement and appreciation by* all stakeholders *of the role of HEI in the (regional) innovation and entrepreneurship* (or R&D) *infrastructure*. The HEIs contribute in many different manners to the innovation and entrepreneurship infrastructure and the stakeholders should acknowledge this. The HEIs perform an essential task in the regional innovation structure via their generation and transfer of knowledge, availability of their research infrastructure, equipment, laboratories and other facilities; industry and SMEs, other research organizations should also be encouraged to open up their infrastructure to the higher education institutions.
- *An active role in the HEI structures*: Industry (and government) already plays an important role in the decision-making processes in the HEIs. As the HEIs' intention is to be more regionally engaged, this is an opportunity for the stakeholders to participate in the different levels of decision-making with regard to education and research. Such involvement should lead to joint projects that are mutually beneficial.
- *Strengthening of the intermediary's role in HEI:* Both Syntens and Oost N.V. can play a more prominent role in the articulation of needs from companies in the region and in (regional) knowledge and technology transfer processes and projects.
- *Development of (financial) instruments* for the stimulation of entrepreneurship and innovation both for companies and the HEIs.

7.4.2 Regional focus

"Health & Technology": In the last 10 years many activities have been developed around this theme. Regional companies clustered in the TIMP, Twente initiative for Medical Products, which currently is a Euregional cluster of companies. IZIT – an initiative to stimulate technology in care was established recently and together with TKT they developed the "Product Factory". With Saxion Health & Care there is a so-called Best Practice Unit and to stimulate innovation in SMEs the project "Trinnovatie" was recently granted. The UT has its Biomedical Technological Institute for research, a Bachelor's and Master's programme in biomedical engineering and technical medicine as well as a business accelerator for tissue engineering. The HEIs together spin-off annually some 4 to 6 high-tech companies.

The challenge: group of SMEs can be provided leading to a contribution to sustain the innovation structure and A strong point of the Twente region is that all stakeholders have jointly selected focal areas and more focus is needed. The regional focal technology area follows the technology choices made by the UT (Microsystems/nanotechnology, biomedical technology, ICT, and mechanical engineering and process technology) and reinforces the regional industrial make-up (health/healthcare and manufacturing). The development of the region concentrates around these policy issues and themes. An opportunity for the Twente region is the further involvement of Saxion; especially via the recently established *lectoraten*, knowledge circles and knowledge circulation mechanisms, innovation

to a wider potential of the region. The Regional Innovation Platform Technology Valley will direct this process; the LinX initiative established in 1996 could serve as an example for the economic development domain in the region in the operational domain (e.g. in entrepreneurship, clustering and commercialization). The challenge for Twente is:

- To position the HEIs within the regionally chosen focus areas in such a way that they can optimally contribute to the further development
- To position the companies in the focus areas in such manners that they can on the one hand enhance their growth and on the other hand play an active role in the HEI's activities.

Intention & Contributions needed: The HEIs already contribute to the above-sketched processes; nevertheless, some elements need to be strengthened:

- *Harmonization* and further *cooperation between* the *HEIs.* As described in this report, there is already a lot of good cooperation between the HEIs in the region. The cooperation at governance levels ought to be sustained and elaborated and harmonization of activities of the HEIs should enter the discussions. Harmonization of activities for regional development should be the focus.
- *Further HEI-industry cooperation*: To stimulate entrepreneurship and especially innovation in the focus areas, the HEIs ought to improve their systems for the exploitation of knowledge both to small and larger companies, innovative and (more) traditional companies.

Obviously, the HEIs need the commitment and involvement of the stakeholders, particularly when it concerns the further cooperation between HEIs and industry. In the regional focus areas, the HEIs together with industry (small and larger companies) should be enabled to not only experiment with new structures but also to sustain proven concepts. The active involvement of the stakeholders in the self-imposed tasks and intentions is of crucial importance.

7.4.3 Knowledge infrastructure

The challenge: There is an excellent knowledge infrastructure in Twente and there is fertile soil for R&D. The HEIs are important components of this infrastructure and they supply it with human resources (researchers, professors, *lectoren,* students) and facilities (equipment, laboratories). There also is a high-speed broadband computer network and services (Trent, NDIX) available as well as specialized research and service facilities and laboratories in the region. The knowledge/science park, (technology) incubators, formal and informal venture capital funds complete the knowledge infrastructure. Twente faces two major challenges:

- *Positioning Twente* in the Netherlands, Europe and beyond as a region of excellence with a superior knowledge, social and cultural infrastructure where HEIs and industry work together in the (further) development of the region for the benefit of all.
- *Active participation of all in "bringing knowledge to market"*: It is our joint task to overcome the European knowledge paradox (excellence in knowledge production, inability to bring it to the market). Twente possesses all important ingredients.

Intentions and contributions needed: Bringing knowledge to the market and within reach of (regional) industry is an important task, not a task that can be performed without the (active) involvement of all parties. Knowledge circulation (see Chapter 3) is an important mechanism that should enable all involved to benefit from it and jointly create new knowledge. Concrete intentions are:

- *Vertical harmonization of programmes and projects in and between HEIs.* Cooperation in the professional "column" to enhance the contribution to entrepreneurship and innovation and the harmonization of the competency frameworks and the actual competencies of (graduate) students is a big challenge to deal with. A focus ought to be the usability of knowledge (in practice, in companies and societal organizations) and the competencies of the knowledge workers of the (near) future – see e.g. the IDC best practice.
- *Finding ways to encourage* the involvement of faculty and students in these processes.

The Twente knowledge infrastructure can be further improved through facility sharing. Both industry and HEIs could jointly invest in new facilities and other elements of the knowledge infrastructure, e.g.

- *Regional technological top institutes* and technology parks for the development and exploitation of knowledge in a small number of carefully selected focal areas. Such initiatives should be started jointly. The technology parks aim not only at sophisticated, knowledge intensive companies, but also at the full chain of companies that are necessary to convert an innovative idea into applied knowledge that contributes to the competitiveness of Twente's economy.
- *Cooperation and joint coordination* of the developments in and of the knowledge infrastructure (e.g. via the regional innovation platform).

7.4.4 Strengthening of HEIs

The challenge: Traditionally, HEIs are "supply" driven and follow solely their own agendas. Today, HEIs are regionally engaged to a larger or smaller degree. This implies that the HEIs, including the Twente HEIs, adopt the regional (innovation) agenda as input for their own policies. Twente faces many challenges, e.g.

- To further incorporate (within the boundaries and limitations of the legal tasks) the regional agenda into the HEI policies
- To (better) respond to regional needs.

Intentions and contributions needed: To be able to face the challenge, the HEIs have to assume new roles, next to the traditional ones, with respect to the provision and retention of human resources. The Twente HEIs intend to incorporate the agenda (and as the previous chapter indicates this already happens) *further* into the HEI policies. This will be implemented through the provision of a wide variety of degree programmes and contract and joint activities with and for companies. Many students have traineeships in regional companies and in this way contribute to elevate the innovative potential in the region. Other students also go for traineeships in companies outside the region, because companies with established reputations offer better opportunities. In addition, some students leave Twente after completing their studies causing a "brain drain" of students leaving Twente to work for companies in other parts of the Netherlands and in Europe.

A challenge for the Twente HEIs is to play, together with its stakeholders, an active role to attract and to keep potentially excellent students (educational programmes of excellent quality, special programmes for "top talent" like Fast Forward (see section 3.3.3.2) and TOP (see section 3.3.3.1) and to support the creation of excellent career opportunities in Twente. But also to create, in response to regional needs, educational programmes together that provide the students and knowledge workers in general with new and other relevant skills and competencies.

The regional stakeholders and the HEIs ought to exploit jointly the excellent location of Twente as being strategically located on the West-East corridor that runs from Amsterdam to Moscow, on the border with Germany. It can also be reached by water (*Twente Kanaal*), by rail (on the line from Amsterdam/Schiphol to Berlin) and by air (Twente Airport, Schiphol Airport (Amsterdam) and FMO (Münster/Osnabrück, just across the border in Germany). Twente is well connected with the major German economic centres (Berlin and the Ruhr area). As such, it is well positioned in Europe with an excellent infrastructure and top-class universities.

APPENDICES

Appendix A, HEI's in Twente

Acronym	Dutch name	English name	Part of	Number of staff	Number of students	Institutional type
Saxion	Saxion hogeschool Enschede	Saxion University of Professional education Enschede	Saxion	1.556	11.890	Institute of higher vocational education, multi sector
UT	Universiteit Twente	Twente University	-	2.371	6.593	University, multi sector
ES	Hogeschool Edith Stein	Twente Education Centre	-	108	1.192	Institute of higher vocational education, mono sector
AKI	AKI - ArtEZ	Visual arts and design academy	ARTEZ	94	582	Institute of higher vocational education, mono sector
TSM	TSM Business school	Twente School of Management	UT	27	530	Institute of higher vocational education, mono sector
SWOT	Stichting Wetenschappelijke opleidingen Twente	Foundation for Scientific Education Twente	Saxion, UT	2.2	241	Institute of higher vocational education, multi sector
ITC	International Institute for Geo-Information Science and Earth Observation	International Institute for Geo-Information Science and Earth Observation (ITC)	-	277	892	Institute of higher vocational education, mono sector

Data as is on the 1st of may 2005

Appendix B, Composition of the steering committee

Name	Function	Role
drs. Wim Boomkamp	Member of the Board of Saxion	Chairman
ir. Kees van Ast (since 1-10-2005) drs. Willem te Beest (until 1-9-2005)	Vice-president(s) of the Board of the University of Twente	Member
mr.dr. Eric Helder	Alderman of the City of Enschede	Member
drs Wilma van Ingen	President of the Chamber of Commerce	Member
drs. Henk Mulders	President of the Board of Edith Stein/OCT	Member
ing. Geert de Raad MBA	President of the Industrial Circle Twente	Member
drs. Richard Slotman	Management consultant Netherlands Association of Professional Education (HBO-Raad)	Member

Appendix C, Other local committees

	Function	**Role**
ir. Irene Sijgers	Senior Project manager of Saxion	Regional coordinator
ing. Matthijs Hammer M.Sc.	Researcher of Saxion	Author
Wolf ter Horst	Senior Project manager of Saxion	Author
drs. Paul Nieuwenhuis	Manager Education & Quality Care of Saxion	Author
dr. Peter van der Sijde	Senior project manager of UT Lector of Saxion	Author
dr. Ben Jongbloed	Senior research associate, CHEPS, University of Twente	Author
Mr. dr. Gert-Jan Hospers	Assistent Professor of Economics	Author
drs. Derek Jan Fikkers	Researcher, Institute of Governance Studies/ CSTM	Author
Sjoerd van Tongeren	Executive Director of the Institute for Governance Studies	Coordinator of the University of Twente
drs. Gabi Brühne	Manager team region Twente	Coordinator of Edith Stein and OCT
dr. Peter Sonderen	Director of AKI	Coordinator of AKI
Henk Brouwer	Program manager	Coordinator of SWOT and TSM
ir. Juud de Lange	Policy Support Officer	Coordinator of ITC

Appendix D, List of professional networks and societies in Twente

Name network or society		Website	Field of operation
English	**Dutch**		
Industry Circle Twente	Industriële Kring Twente (IKT)	www.ikt.nl	Active promotion of general industry and SME in Twente. More information: http://www.ikt.nl
Technology Circle Twente	Technologiekring Twente (TKT)	www.tkt.org	Active promotion of technology-intensive industry and SME in Twente. More information: http://www.tkt.org
Network city Twente	Netwerkstad Twente		An administrative cooperation between the municipal Centres of Twente. The accent is on cooperation; not on the administration.
Reinforcement industry potential Twente	Versterking Industriepotentieel Twente (VIT)	www.vitprogramma.nl	A Joint initiative to create jobs in Twente from the province of Overijssel, Chamber of Commerce, Regional Platform Labour, Labour exchange, IKT and the Region of Twente.
The Twente Programme	Het Twente Programma	-	A temporary fund to stimulate the creations of jobs in Twente
Quality Circle Twente	Kwaliteitskring Twente (KKT)	www.kwaliteitskring twente.nl	Learning and knowledge exchange society of quality-related items for the primer, secondary and tertian sectors.
Quality Foundation Twente	Stichting Kwaliteit Twente (SKT)	www.kwaliteittwente.nl	Foundation for active promotion of Quality Management
Netlab Twente	Netlab Twente	www.netlab-twente.nl	Netlab is a platform from the companies of the BTC-building (See Chapter 6) To stimulate and coordinate the R&D potentials in Twente in the field of Care and Technology.
Joint Making Industry East	Verenigde Maakindustrie Oost (VMO)	www.vmo.nl	A Branch organization of the making Industry of the East of Holland, with a big accent in Twente.
Dutch Engineers Society, Twente region	Nederlandse Ingenieursvereniging KIVI NIRIA, regio Twente	www.niria.nl	The Twente chapter of the society of Dutch Engineers
Young Management, circle Twente	Jong Management, kring Twente	www.jongmanagement.nl	An Association of entrepreneurs or managers working in market-oriented enterprises and organisations. Jong Management is divided into local, provincial and/or

Name network or society		Website	Field of operation
English	**Dutch**		
			regional circles. Each circle has an average of 40 members, and all branches of industry and occupational groups are equally represented
Contacts Young Companies	Kontact Jonge Bedrijven (KJB)	www.kjb.bl	A society of young (starting) companies in Twente.
Juniorroom Twente	Junior Kamer Twente (JKT)	www.jkt.nl	It is the Twente chapter of junior chamber international; a society of young entrepreneurs.
Dutch Society for Industry and Trade, department Twente	Nederlandse Maatschappij voor Nijverheid en Handel-Twente	www.nmnh-twente.nl	The Twente department of the oldest Dutch society for entrepreneurs.
Export society Twente	Twentse Export Sociëteit (TES)	www.e-tes.nl	Society of exporting entrepreneurs in Twente
European Transport Region Twente	European Transportregion Twente (ETT)	www.ett.nl	Society of transport entrepreneurs in Twente
Webcircle	Webkring (ondernemers innovatie)	www.webkring. innovadis.com	A foundation to stimulate the internet entrepreneurship in the east of the Netherlands.
Commerce Club Twente	Commerciële Club Twente (CCT)	www.cctwente.org	A 40-year-old society of entrepreneurs of Twente.
Regional Industrial Area Twente	Regionaal bedrijven terrein Twente (RBT)	www.rbtwente.nl	A joint fenture of the province of Overijssel and the cities of Enschede, Hengelo, Borne and Almelo to develop an industrial site for new large industries.
VR-valley Twente	VR-valley Twente	www.vr-valley.nl	VR Valley Europe focuses on starting up economically viable projects related to the development of top quality VR products in different sectors, including the supply of the required expertise and facilities.
	Mediakunstplatvorm Twente	www.enschede.nl /mediakunstplatform	The platform is an independent organization for artists for stimulation of the use of new media.
Health-Valley	Health-valley	www.health-valley.n	A network of companies, universities and knowledge institutes in the field of health in the east of the Netherlands.
Techno Centre Twente	Technocentrum Twente (TCT)	www.technocentrum-twente.nl	A centre on the cutting edge of education and practical work in several sectors of industry.
Innofood East	Innofood Oost	www.innofoodplein.nl	A foundation for promotion of interest and stimulating

Name network or society		Website	Field of operation
English	**Dutch**		
			innovation of the food sector in the east of the Netherlands
Regional Platform Labour Policy	Regionaal Platvorm Arbeidsbeleid	www.rpatwente.n	A platform for all players on the labour market in Twente, as job exchange, employer- and employee-organizations and municipalities.
	Twente Technology Valley (TTV)	www.twentetechnology valley.com	A taskforce of companies, knowledge initiates and universities to stimulate the business development of the Care and technology sectors in Twente
Twente Promotion	Twente promotie	www.tijdvoortwente.nl	A joint venture of the Region of Twente en the chamer of commerce for a joint promotion of the economy and tourism of Twente.
The Initiative for Medical Product Development	The Initiative for Medical Product development (TIMP)	-	A trans-national network of universities and companies for the development of (technical) medical products in the East of the Netherlands and the west of Germany

Appendix E, List of involved stakeholders

Stakeholder	Interview with
ABN AMRO	J. Spoorenberg
Adhesi	P. Koopman
Carint	Q.A.J. Swagerman
Essent	Ir. E.W.L. van Engelen
Euregio	Mr. J.B. Oostenbrink
First	Ir. F.J. van Dijk
City of Enschede	M.J.B. van Velzen
IKT	Ing. G. De Raad MBA
Indes	Ir. H.T.J. Janssen
ING	Mrs. Ir. W. Toering-Keen
Jarabee	C.J. van Harten
Kienhuis Hoving	Mr. F.J. van der Vaart
KvK	W. van Dalfsen
Mediant	C.J. van den Berg
MMS int.	Ir. A.J. de Weerd
MST	Mr.drs. H.G.M. ten Vergert
NIBRA	Ing. W. Papperse Ing. R. Hagen MPA
Nijkamp en Nijboer	E.J.F. Nijkamp
Oostnv	Drs. P. Dillingh
Orchestra of the East	H.G. Mannak
PriceWaterhouseCoopers	H.J.P. Hekman RA
Province of Overijssel	Mrs. J.J. van der Zee C. van der Sande
Randstad	J. van der Meulen MBA
Regio Twente	R. Alberti
Roessingh	Prof. dr. M. IJzerman
RTV Oost	Mrs. C. de Hoog
Syntens	Ir. P.J.J.A. Wolters
Telematica Institute	Prof.dr.ir. C.A. Vissers Dr. H. van der Lugt
Ten Cate advanced technology	A.W.J. Moerman
Thales	A. Hummel
TNO Textile	Drs. A.H. Luiken
Trebbe Bouw	Ing. H.C.J. Trebbe
Urenco	Ir. P.G.T. de Jong
Woongroep Twente	F.A. Goossen
Woonplaats	J. Oppeneer MBA PM

Appendix F, Table of terms

Term	Description
Euregio	The name EUREGIO stands for European region. It is used to refer geographically to a section of the Dutch-German border area covering parts of the Dutch provinces Gelderland, Overijssel, and Drenthe as well as parts of the German federal states Nordrhein-Westfalen and Niedersachsen. The region spans some 13,000 km² with about 3.2 million inhabitants.
Kenniskring	A group of teachers and (one or more) *lectors*, discussing and evaluating the relevant new knowledge for the scope of the *lectoraat*. Members of the *kenniskring* also executing applied research, involving students.
Lector	A senior person with excellent knowledge and a broad network with the stakeholders on the specified topic of the *lectoraat*. A *lector* is leading the applied research on this field.
Lectoraat	The whole of *kenniskring* and *lectors*.
Praktijkhoogleraar	A practice professor, sponsored from the industry.

Appendix G, List of Best Practices

Name Best Practice	Appendix number	Chapter
Expertise Centre Technology for Health	G 1	6
AKI festival	G 2	5
Small Business Growth Programme (management)	G 3	4
DURP:	G 4	6
Fast Forward	G 5	4
IDC	G 6	3
KISS	G 7	5
Lev'l; Vouchers in demand driven higher education	G 8	3
LinX	G 9	4
Master Class MBA	G 10	4
Minor Arts, Media and Technology	G 11	6
Educating at School	G 12	4
Project Denekamp	G 13	6
Project week	G 14	6
Bachelor Programme SB&RM	G 15	4
Sciencia, knowledge centre GGZ	G 16	6
Sustainable houses	G 17	6
TWARANT	G 18	6
Advice and consultancy	G 19	3
TOP	G 20	3
IEBD	G 21	4
MTF (Mesa+ Technology Foundry)	G 22	3
NDIX	G 23	3
Tissue Engineering	G 24	3
Student Union	G 25	3

Appendix G 1, Best Practice Expertise Centre Technology for Health

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Monica Buijinck e-mail: m.j.buijinck@saxion.nl Institution: Saxion
Source to the practice:	Own experience as member of Platform Z&T.
Name of institution that apply practice:	Saxion
Contact person for practice:	Name: Frans Pol, Peter van Dam e-mail: f.g.m.pol@saxion.nl, p.l.a.vandam@saxion.nl Institution: Saxion
Date of submission:	20 May 2005
Title for Practice:	Expertise Centre Technology for Health.
Key words:	Development of Research projects and higher education in the (new) field of Technology in Health, in co-operation with Health Care Institutions like the Roessingh.
Thematic focus of practice:	Spin-offs, interaction with industry, training
Short description of practice:	Research projects in the field of Health technology are initiated with different institutions in Twente. Five lectors in the field of Health and Technology combine their expertise and stimulate students to do research in this field. Bachelor students of Saxion Hogescholen can educate themselves by the minor '*Technologie in Zorg*'. A programme of 30 ECTS, in which students develop their competence in this field. Starting September 2005.
Context of use of practice and actors involved:	Board and directors of Health and Technical Academies of Saxion Co-operation with the Roessingh, MST and UT.
Results and benefits of practice:	Several research projects have been started: 7 in total. The minor 'Technology in Zorg' will start in September 2005.
Key success factors:	The most important factor in our opinion is the cooperation by the various domains. Trying to solve practical clinical questions in a multidisciplinary way increases the knowledge and understanding of the specific expertise of the cooperating partners .
Transferability of practice:	Yes, both research projects and minor are transferable to institutions that educate in the field of Health and Technology.
Reference material:	For the research projects: preliminary results of project are published as internal papers. Manuscripts for peer-reviewed journals are in preparation For the Minor: see the Saxion Intranet: '*Minoren'* and 'Under development' for outside Institutions.

Appendix G 2, Best Practice AKI Festival

Fact sheet for the description of Best Practices	
Practice reported by:	Name: P. Sonderen e-mail: P.Sonderen@artez.nl Institution: AKI
Source to the practice:	Reports by coordinator and own experience.
Name of institution that apply practice:	AKI
Contact person for practice:	Name: Elvira van Eijl e-mail: e.vaneijl@ArtEZ.nl Institution: AKI
Date of submission:	15 May 2005
Title for practice:	AKI-festival Studium Generale
Key words:	Interaction; art and public
Thematic focus of practice:	Other: putting art into society.
Short description of practice:	Putting a large festival tent in the middle of the Enschede and moving all students, tutors and staff out of the Academy building for a whole week. Stimulating bachelor students to involve in daily practice, by attending workshops in empty shops and other spare rooms in public space. In addition, well-known artists, writers, poets, and others gave public lectures. Music and other performances.
Context of use of practice and actors involved:	Municipal authorities, real-estate brokers, festival agency, guest lecturers, guest speakers, lecturers, theoretical department.
Results and benefits of practice:	There are no figures, but the average attendance to the different workshops (27) was 300 students. Plenary sessions were open to the general public that could come in freely.
Key success factors:	Confrontation of bachelor students with the direct demands of society. Organizing competences; artistic competences; sell ability in the AKI-shop.
Transferability of practice:	Not directly. We have moved all the staff of the Academy to the centre of the city (in a huge tent). All tutors and other members worked together to make the festival s a success. 27 Workshops in empty shops etc.
Reference material:	Folders and invitations, internet: www.akifestival.nl

Appendix G 3, Best Practice Small Business Growth Programme

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Astrid Beijer e-mail: a.b.g.m.beijer@tsm.utwente.nl Institution: TSM Business School
Source to the practice:	Interview with key actors
Name of institution that apply practice:	TSM
Contact person for practice	Name: Gert Steenhagen / Annette Weegerink e-mail: j.m.weegerink@tsm.utwente.nl Institution: TSM
Date of submission:	15 June 2005
Title for practice:	The "Small Business Growth Programme" (Management)
Key words:	SME – Entrepreneurship – Business Administration – Family Business – Regional Network - Strategy
Thematic focus of practice:	Training, other: SME business development.
Short description of practice:	The "Small Business Growth Programme" is an entrepreneurship / business-administration course for directors, business unit managers and (family) successors in the SME sector. The business of the participant is central. Focus lies on business disciplines and/or personal management skills in reference to day-to-day problems: strategy, marketing, finance, innovation, personnel - and organisational theories. Participants are asked to write and implement a business plan. Every participant is being assisted in this by an (experienced and technically-oriented) business administration student of the University or University of Professional Education. For example, the student would help and/or execute individual projects such as customer analyses, research of competitive market, financial queries, HRM-regulations etc. There is a beneficial interaction between participant and student: the participant uses the theoretical knowledge of the student (access to knowledge of University) and the student obtains practical access to the SME (SME fieldwork). The programme is offered by TSM Business School twice a year. The group size varies from 14-16 participants, consists of 5 two-day seminars over a period of 6 months. Group 33 recently started.
Context of use of practice and actors involved:	Participants have at least a few years managerial experience and are mostly from the Twente region. The programme stimulates access to and use of the local network. Participants regard this (spin-off) aspect of the programme as very important and they actively invest in this local network, even long after the programme has finished. Lecturers in this programme show a broad entrepreneurial experience. The assisting students in turn get a chance to work in the SME field. Practical assignments are mostly carried out in large firms. This programme offers an excellent chance for students to access SMEs.
Results and benefits of practice:	Participants' surveys (2) show an improvement in customer relations, more know-how / confidence concerning financial matters/risks, better use and understanding of HRM. Result for the participant is twofold: a positive result for their own business and growth in personal leadership skills. Lasting spin-off benefits of local network. The benefits for the student (and lecturers of University / UPE) are not to be neglected: an excellent chance of interaction is offered as the student works directly with SME-managers.
Key success factors:	The immediate day-to-day application/practicality of the knowledge offered. Overall focus on own business: the production and implementation of a business plan.
Transferability of practice:	The programme is transferable to other institutions. Requirements are: Alliance with University / UPE: access to experienced students and lecturers with entrepreneurial experience/background.
Reference material:	Brochure available, internet: www.tsm.nl

Appendix G 4, Best Practice DURP

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Jantien Stoter e-mail: stoter@itc.nl Institution: ITC
Source to the practice:	Own experience (as project leader)
Names of institutions that apply practice:	Province of Overijssel, Municipalities of Enschede and surrounding area, Ministry of Housing, Environmental Planning and of the Environment.
Contact person for practice:	Name: Jantien Stoter
Date of submission:	01 March 2005
Title for practice:	DURP-Base maps; Generation and use of base maps for integrated querying of digital physical development plans.
Key words:	Improving Information Infrastructure, Internet techniques
Thematic focus of practice:	Other: Improved communication between governmental bodies and citizens.
Short description of practice:	(DURP= *Digitale Uitwisseling Ruimtelijke Plannen*: Digital Exchange of Environmental Plans). A four-year project that examines the way base maps should be defined and generated in an Internet environment in order to support the querying of physical plans at all levels (municipality, province and national). The National Mapping Agency and the Land Registry Office provide the base maps.
Context of use of practice and actors involved:	Actors involved: *Planners*: Province of Overijssel, Municipalities of Enschede and surrounding area, Ministry of Housing, Environmental Planning and the Environment *Researchers:* ITC, TU Delft, Wageningen University *Technique developers*: engineering companies *Requesters of plans:* citizens and professionals Framework: dissemination of physical plans via the Internet
Results and benefits of practice:	2 PhD students, project has just started and will show potentials and yield prototypes.
Key success factors:	Fundamental participation by both planners and plan-requesters.
Transferability of practice:	The good results of this project can be shared with other provinces and municipalities; the experience of this project can be used in the new law on planning. In addition, other provinces and municipalities can learn from our experiences
Reference material:	Not yet available.

Appendix G 5, Best Practice Fast Forward

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Wolf ter Horst e-mail: w.terhorst@saxion.nl Institution: Saxion
Source to the practice:	Own experience as manager responsible for the outcome and results of the best practice.
Name of institution that apply practice:	Saxion
Contact person for practice:	Name: Diny Ellens, Office manager e-mail: e.d.ellens@saxion.nl Institution: Saxion
Date of submission:	01 March 2005
Title for practice:	Fast Forward
Key words:	Management development programme for high-potentials among Saxion graduates. Regional need for innovative business leadership and management.
Thematic focus of practice:	Interaction with industry
Short description of practice:	A two-year Saxion graduate training programme for high-potentials with the intrinsic drive to become a manager. Structure: 3 periods of 8 months each with different companies, public communities, service organisations, etc. Additional training and interactive workshops to improve the general, social, communicative and management skills and attitude of the trainees. Competence-based selection, training, coaching, assessment, evaluation, examination and performance review. Frequent meeting of mentor, coach and trainee for monitoring trainee's development at management level. Discriminative procedures for fine-tuning strength /weakness, opportunities/threats in trainee's individual development.
Context of use of practice and actors involved:	Tough programme, therefore high admission requirements, Low costs for business partners, Professional support from HEI (Fast Forward office) Frequent evaluation of progress in product (what) and process (how)
Results and benefits of practice:	Status April 1, 2005: 137 traineeships 135 successful 2 failed 67 companies involved.
Key success factors:	Mutual confidence and reliability. New approach in using human resources. Answer to high potentials' eagerness to improve their general (leadership) management qualities. Affordable programme for the three participants involved. Exciting, confronting and tough programme that offers new chances for selection and appointment in HRM-policy.
Transferability of practice:	No doubt transferable if the formula is copied and accepted in all its aspects.
Reference material:	Information/documentation brochure, telephone: +31 534871520, Internet: www.saxion.nl/fastforward

Appendix G 6, Best Practice IDC

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Tonny Grimberg e-mail: tonny.grimberg@idcentre.nl Institution: Industrial Design Centre
Source to the practice:	Own experience as project manager for the operational activities of the IDC
Names of institutions that apply practice:	UT Saxion
Contact person for practice:	Name: Tonny Grimberg
Date of submission:	01 June 2005
Title for practice:	Industrial Design Centre
Key words:	Product innovation - Industrial Design - Knowledge transfer - Student projects - Professional coaching
Thematic focus of practice:	Interaction with industry
Short description of practice:	With the help of students the domain of Industrial Design is stimulated through IDC-projects while at the same time companies are supported. If necessary and desired, a professional coach can be provided during the project in a certain domain through the IDC. Starting point for an IDC-project with students is the request by the company. The IDC will, in consultation with the educational institute concerned, look for the proper study, phase of the education and for the student best suited for the project. When entering into the project the Industrial Design Centre will pay attention to a clear formulation of the innovation request and a good match between that request and the students concerned in order to guarantee an optimal result for the company and the student. IDC offers special facilities, available within the IDC network, to companies with product innovation projects. Examples are fast-prototyping, user test facilities, and problem-solving methods.
Context of use of practice and actors involved:	Active interactions between educational institutes (with students), professional design agencies (with designers) and (industrial) companies. Focus on product innovation and industrial design. Combine, increase and apply knowledge and creativity to improve regional economic structure. Participants: 2 educational institutes 5 professional design offices 60 companies 5 regional / national organisations 15 designers and a number of students
Results and benefits of practice:	From February 2003 to June 2005 almost 120 student-projects, 15 partner-projects and 15 facility-projects were realised. Also, 13 Design meetings were organised and participation / organisation of 15 Events. In addition, more than 50 contacts between companies were initiated.
Key success factors:	Understanding of the needs for product innovation in SME companies. Introduction and understanding of the benefits of industrial design in product innovation. Low entrance by use of students. Optional use of professionals in projects to assure project results and to provide knowledge transfer.
Transferability of practice:	The IDC initiative is transferable, but cooperation is required between educational institutes and professional design offices, while companies are prepared to contribute fees for the innovation support services.
Reference material:	Information/documentation brochure, Design meeting Reports and internet: www.idcentre.nl

Appendix G 7, Best Practice KISS

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Wilbert Rodenhuis e-mail: w.k.f.rodenhuis@saxion.nl Institution: Saxion
Source to the practice:	Internet: www.kiss-oost.nl
Names of institutions that apply practice:	Saxion UT Hogeschool Windesheim Municipalities of Enschede, Hengelo, Almelo, Deventer and Zwolle. Province of Overijssel Police departments of Twente and Ijsselland Housing corporations in Twente and Overijssel Private companies
Contact person for practice:	Name: prof. dr. S.A.H. Denters e-mail: s.a.h.denters@utwente.nl Institution: UT
Date of submission:	01 March 2005
Title for practice:	KISS (Knowledge Institute for Urban Society and Development/ *KennisInstituut Stedelijke Samenleving*)
Key words:	Knowledge mobilisation Regional cooperation
Thematic focus of practice:	Interaction with industry, policy development, other: policy execution
Short description of practice:	The KISS knowledge centre aims at the mobilisation and distribution of knowledge of urban society and development. It focuses mainly on the topics: social integration/ safety/ regional cooperation and development. Its modus operandi consists mainly of the organisation of symposia, workshops on these topics with scholars and practitioners who share knowledge and experiences. In addition to this research
Context of use of practice and actors involved:	KISS is an association of the five large cities in Overijssel, the Province of Overijssel, the institutes for higher education (university and universities of professional education), the housing corporations, police organisations etc. It is a regional (provincial) initiative. Its members form a network in which they share information.
Results and benefits of practice:	Results: the KISS bureau has been operational for 3 years. Saxion is one of its members and is represented in the board. Results are described in an annual report. Clearly, benefits for Saxion and the region exist. The sharing of knowledge and practical experience help the practitioners in the field in policy development and execution as well as the Saxion staff in developing topical and realistic educational programs.
Key success factors:	Key factors: 1. Willingness to share experiences (not only the success stories!) 2. Willingness to invest in common programs
Transferability of practice:	It is all about transfer of knowledge and experience.
Reference material:	Internet: www.kiss-oost.nl

Appendix G 8, Best Practice Lev'l

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Theodor van der Velde e-mail: Theodor@levl.nl Institution: Stichting LEV'L
Source to the practice:	Research, experience in various experiments, literature.
Names of institutions that apply practice:	10 Universities of Professional Education (including Saxion) MKB Nederland HBO-Raad 2 student unions Ministry of Economic Affairs Ministry of Education, Science and Culture
Contact person for practice:	Name: Theodor van der Velde
Date of submission:	10 May 2005
Title for practice:	Lev'l; Vouchers in demand-driven higher education.
Key words:	Curriculum design in context of SMEs by students and entrepreneurs, design judged by exam committee. Ownership of design of learning, learning capacity development, human diversity and partnership.
Thematic focus of practice:	Spin-offs, interaction with industry, policy development, other: redesign curriculum, assessment and organisation of education.
Short description of practice:	Student's personal development plans needed in SME as drive for innovation make SMEs more competitive. The connection between higher education and SMEs is improving dramatically. More state-of-the-art, rapidly changing knowledge enters the higher education system through this redesign.
Context of use of practice and actors involved:	The experiment took place in the context of politics (economy and education), SMEs, 10 universities and students, teachers, researchers and the unions of higher education and SMEs (HBO-Raad en MKB Nederland).
Results and benefits of practice:	2500 students and the same number of SME-companies participated in this big experiment. Changes in the higher education law and way of financing the higher education system is the result; the lines of business of the SMEs financed a part of the changes, the 10 Universities of Professional Education changed their strategy from supply- to demand-driven education. Several start-ups were initiated, as a context in which the competences needed for the diploma were developed.
Key success factors:	Trust and partnership in all the layers of the system, from politics to student union and a process-oriented project management.
Transferability of practice:	See "Context" and "Results".
Reference material:	Books, research reports, a start-through organisation LEV'L, training programmes, a huge network, articles, new experiments, internet: www.levl.nl.

Appendix G 9, Best Practice LinX

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Roel van Asselt e-mail: r.vanasselt@saxion.nl Institution: Saxion
Source to the practice:	Own experience
Names of institutions that apply practice:	Forty schools of secondary and pre-university education Two institutions of senior secondary vocational education Five Universities of Professional Education One University
Contact person for practice:	Name: Roel van Asselt en Cees Terlouw e-mail: r.vanasselt@saxion.nl en c.terlouw@utwente.nl Institution: Saxion and UT
Date of submission:	29 May 2005
Title for practice:	LinX, connexion in education
Key words:	Platform for regional policy directed to shared study and professional careers.
Thematic focus of practice:	Spin-offs, policy development, training, other.
Short description of practice:	A shared enterprise of all schools in the Twente region directed to the study career of young adults, especially in the field of throughput from secondary to tertiary education. The Platform was established in 1996 to exchange information about all developments, possibilities, conditions and problems connected to a good connexion and throughput of education and optimisation of the study career. LinX controls and supervises all desired and existing projects and activities related to study-careers, and creates school conditions for them.
Context of use of practice and actors involved:	The directors and members of the board of the institutions listed gather under LinX to communicate, to interchange and to tune the activities mentioned. The turbulence in developments in secondary and tertiary education forces us to communicate and to arrange and re-arrange the learning-pathways and study-career activities in and between secondary and tertiary schools. Conferences for teachers, project-leaders, managers and career coaches are organised; projects are evaluated and new plans are developed. Plans for a so-called inter-institute (the LinX-College) to give structure to all activities for students, teachers and managers were recently approved.
Results and benefits of practice:	- Each year more than 400 pupils follow study-career programs in the institutes of higher education. - Almost every course in secondary vocational education has an integrated pathway to higher professional education. - Master classes in a few disciplines and help in secondary studies (problem solving) - Study results of first-year courses in tertiary education are reported back to study coaches in secondary schools - Every year about 40 'problem'-pupils study in secondary and tertiary schools at the same time, with great study-results. - There is good knowledge and understanding among managers and teachers about the possibilities in Each other's institutes; the problem of a good connexion is a shared problem with a shared ownership. - Great national acknowledgement and example, which is very helpful in gaining financial supports in big projects that run these days.
Key success factors:	- Trust in each other - Clear, broad aims and shared ownership - Inspired managers and coordinators - The possibility to discus problems at all school levels - Budget

Transferability of practice:	After the success of what we call LinX East (Twente region) LinX West was born in the Deventer region. Recently a copy of the structure was created in the Zwolle region as LinX North. It appeared that the structure and the conditional facts mentioned in 12 were transferable.
Reference material:	The magazine Info.LinX an internet: www.linx.nl

Appendix G 10, Best Practice Masterclass MBA

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Astrid Beijer e-mail: a.b.g.m.beijer@tsm.utwente.nl Institution: TSM Business School
Source to the practice:	Interview with key actor.
Name of institution that apply practice:	SWOT
Contact person for practice:	Name: Dick Wijnveen e-mail: info@swot.nl d.wijnveen@wagnergroup.nl Institution: SWOT
Date of submission:	20 June 2005
Title for practice:	Masterclass and MBA Career Centre Twente
Key words:	High potentials – business development – entrepreneurship - MBA
Thematic focus of practice:	Training.
Short description of practice:	Master class and MBA Career Centre Twente Master class consists of two parts: (1) a two-year Master class programme which offers the participant a multidisciplinary approach covering 12 business disciplines (12 modules of 5 consecutive day sessions). The study load is 500 hours per annum. (2) After the successful completion of the Masterclass the participant may enter the Executive MBA-year of Career Centre Twente. The study load is 835 hours. The second part also entails a study trip. Only employees from local firms or living within a radius of 50 km of Twente can participate in the programme. The maximum group size is 20 participants. The classes are being held at the location of participating firms. Targets of the Master class are: - Further development of management skills of highly educated managers with a broad management profile (knowledge, attitude and skills) - Network development between employer-employee: especially stimulation of growth potential of employee(s) - Active building-up of network in Twente including access to/insight into several (local) organisations. - Understanding of business processes and functioning of different organisations (business/government/service industries). Emphasis lies on overall knowledge/experience transfer between participants of various local organisations. The programme has been is accredited by the Dutch Validation Council.
Context of use of practice and actors involved:	Participant is a high potential employed in local organisation with an academic or UPE background and with a minimum of 5 years' experience. The lecturers involved have an academic and/or entrepreneurial background.
Results and benefits of practice:	After the programme the participant will be able to: - Identify and deal with strategic management issues: participant is able to analyse, assess and implement change in own organisation - Manage self, teams and organisations.
Key success factors:	The emphasis on participation of local organisation: immediate benefits of a strong and lasting local network.
Transferability of practice:	The programme content is transferable. The requirements are access to high potentials working in various local organisations.
Reference material:	Brochure and internet: www.swot.nl

Appendix G 11, Best Practice Minor AMT

Fact sheet for the description of Best Practices	
Practice reported by:	Name: P. Sonderen e-mail:P.Sonderen@artez.nl Institution: AKI
Source to the practice:	Website and interviews with actors
Names of institutions that apply practice:	AKI UT Saxion
Contact person for practice	Name: Pieter Baan Müller, Wouter Hooijmans e-mail: w.hooijmans@aki.nl Institution: AKI
Date of submission:	23 May 2005
Title for practice:	Minor ‘ Kunst, Media en Technologie’ (Art, Media and Technology; AMT)
Key words:	Art, media, technology, information design, media technology.
Thematic focus of practice:	Other: connecting art with information science and vice versa.
Short description of practice:	In this minor, students of AKI, Twente University and Saxion, are confronted with different approaches to art and technology. They can choose media art, visual communication or game design.
Context of use of practice and actors involved:	This minor is a successful cooperation of two AKI departments (Visual Communication and Media Art) with the Department of Information Technology of Twente University and Saxion. Goal is connecting science with art.
Results and benefits of practice:	See website for artistic results (videos etcetera)
Key success factors:	Technologically oriented students become aware of artistic approaches that give them a broader view. Art students are confronted with a more systematic approach and new sources of knowledge.
Transferability of practice:	This minor can only be transferred when HEI’s of Arts, Media and Technology cooperate and the travel time is acceptable.
Reference material:	Internet: wwwhome.cs.utwente.nl/~kmtminor/KMT-2003/ and www.a1.nl/scholen/aki/info/minor/

Appendix G 12, Best Practice Educating at School

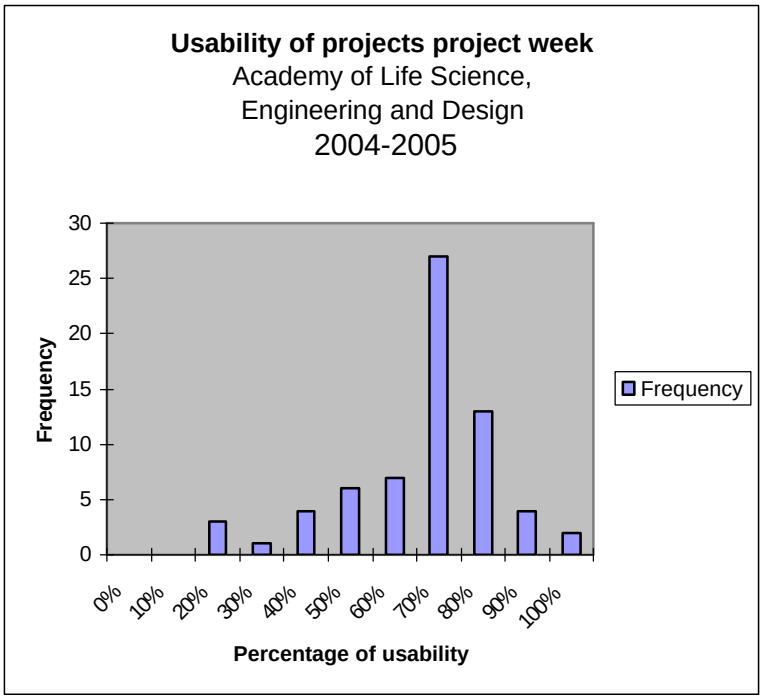
Fact sheet for the description of Best Practices	
Practice reported by:	Name: Ria Glaser e-mail: glaser@edith.nl Institution: Edith Stein
Source to the practice:	Skif and Interactum, educational institutions and own experience.
Names of institutions that apply practice:	Edith Stein / OCT Schools of primary education in Twente
Contact person for practice:	Name: Ria Glaser
Date of submission:	01 May 2005
Title for practice:	*Opleiden in de school* (Educating at School)
Key words:	Primary school stands central in the educational infrastructure. Educating students from the training-school, combination of theory and practice. A learning- and working-culture within the training-schools. Shared responsibility of schools for the education of students. Creating links between teacher-training college, professional development of students and primary-school teachers and school development.
Thematic focus of practice:	Training and learning.
Short description of practice:	"Educating at School" is a four-year curriculum that can be completed in three years (by 'A'-level students, students with a propaedeutic exam of a university of professional education and 'GCSE'-level students with an average score of 7.3 or higher) where the core of the education lies with the training-school (the primary school). Educating students with the internship as a starting point will allow for a better combination of theory and practice. As a consequence, the students are not only in the training school to practise but also to master theories. One may speak of a learning-working culture within the training schools. The shared responsibility of schools for the education leads on the one hand to qualitatively good learning-working places in the school and on the other hand to activities within the education that more than ever before are aimed at every-day school practice. Through discussions with fellow-students, trainers and coaches the student works on developing his own expertise. It is all about an adaptive, constructive vision on education and learning. Learning has a goal (own concerns and targets per student), learning is cumulative, demands a pro-active attitude, is a social process and is context-bound.
Context of use of practice and actors involved:	Students and primary schools are pre-selected, motivation and a large degree of self-control with the student is mandatory. Trainers in the primary schools must have been trained as internal trainers. This yields positive learning experiences to both parties (university of professional education and primary schools / boards of primary schools).
Results and benefits of practice:	Increase in the number of primary schools wishing to join this project from 4 to 9 schools. School boards are keen to join. Of the first group of students 60% graduated in 3 years, 30% in 4 years and 10% stopped (as contrasted to 30% in regular curriculum)
Key success factors:	Own responsibility for study lies with student. Shared responsibility for the education with primary schools. Working on developing own school by coaching the students.
Transferability of practice:	Certainly transferable to any other education of a university of professional education. Using professional practice in education can much more easily be achieved in this way.
Reference material:	Brochure and internet: www.edith.nl

Appendix G 13, Best Practice Project Denekamp

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Ria Glaser e-mail: glaser@edith.nl Institution: Edith Stein
Source to the practice:	Own experiences, experience in cooperating with school boards in the project 'Educating at School'.
Names of institutions that apply practice:	Edith Stein / OCT Schools of primary education and secondary education.
Contact person for practice:	Name: Ria Glaser
Date of submission:	1 September 2005
Title for practice:	Project Denekamp
Key words:	Improving the position of students at teacher-training college on the employment market in schools with vacancies in the higher forms of primary schools and the lower forms of secondary education. Increasing the knowledge of characteristics of pupils in the 10-to-14 year-old age group. Achieve higher affinity with higher-form pupils among students. Contribute to further optimisation for linking primary and secondary education. For secondary education also possibility to develop into a training school. Increase attractiveness of education for students and promote contacts of teacher-training college with secondary education.
Thematic focus of practice:	Training and education.
Short description of practice	Students of education (teacher-training college) carry out part of their graduating phase at the location Denekamp of the TCC (Twents Carmel College). Students combine this with a traineeship with one of the primary schools at Denekamp (schools supplying pupils to the TCC). Within this project the concept '*Educating at School*' is adhered to as much as possible.
Context of use of practice and actors involved:	There is a list of criteria students wishing to join must meet. The trainer in the school has been educated as an internal trainer.
Results and benefits of practice:	Great enthusiasm among all participants so far. At the end of their education students opt for research related to this traineeship. More schools for secondary education have indicated a willingness to join. It obviously yields a positive image.
Key success factors:	As opportunities have already been mentioned: quality impulse for the team (TCC). For the teacher training college chance of specialisation for students. For students it produces more knowledge of and insight into the characteristics of pupils in the age group from 10 to 14 years. Positive effect on pupils in secondary education for the profession of teacher. Optimisation of link primary education – secondary education for participating schools. For the school boards the project may give input for the IPB- policy.
Transferability of practice:	Certainly transferable to other secondary schools.
Reference material:	A project plan is available.

Appendix G 14, Best Practice Project week

Fact sheet for the description of Best Practices	
Practice reported by:	Name: ir. T.J.G. Papa e-mail: t.j.g.papa@saxion.nl Institution: Saxion
Source to the practice:	Own experience.
Names of institutions that apply practice:	Saxion Euregio Several Dutch and German companies in the Euregio, Pictorius Berufskolleg in Coesfeld (Germany) participated as well, on a small scale
Contact person for practice:	Name: ir. T.J.G. Papa
Date of submission:	10 May 2005
Title for practice:	Project Week
Key words:	Several technical projects are carried out for several companies within one week. Students are project members and some are project leader as well. Working in multidisciplinary teams. The project is carried out every year, for one week only.
Thematic focus of practice:	Spin-offs, interaction with industry.
Short description of practice:	Every year we send a mailing to about 200 companies, of which about 30 will participate, which means that they have a project for us. The companies provide the financial means. They get 2 student teams working on the project for one week. In this week there are no lessons. The teams consist of students from different years and from different studies (Mechanical Engineering, Physics, Design). A student who is close to graduation will be the project leader. Teachers are present in the background; they can be consulted for specific technical problems. At the end (Friday) there are presentations, and the companies (who are invited that day) receive a report. There is also a competition: the 3 best groups will give their presentation for the whole group. Company's say that about 70% of the solutions is useful for them.
Context of use of practice and actors involved:	All activities concentrated in one week. Project leaders have to do some preparatory work. All participants have to be well informed. You need a strong team that knows all ins and outs; they have to be present at any time to give support. Enthusiasm of all participants (students as well as teachers and companies). You need many contacts in the region to get enough projects. It takes quite a lot of time to organize everything.
Results and benefits of practice:	We get paid for the projects. We have some figures to illustrate how satisfied the companies were. In 2005, 500 students participated of whom 4 from Curacao and 11 from Germany. We did 35 projects for 30 different companies, of which 25% were German companies. All teachers of the participating studies were involved, about 20 persons.
Key success factors:	Motivation of the students increases. New contacts, new projects. It gives a positive impulse to the Academy of Life Science Engineering and Design.
Transferability of practice:	Yes, is it transferable. But you need many contacts to get enough projects. It is recommended that you obtain assistance from us the first time you organize such a project week yourself.
Reference material:	Internet: www.stadscampus.hen.nl/it/


Usability of projects project week
Academy of Life Science,
Engineering and Design
2004-2005
Frequency
30
25
20
15
10
5
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percentage of usability
Frequency

Appendix G 15, Best Practice Bachelor's Programme Small Business & Retail Management

Fact sheet for the description of Best Practices	
Practice reported by:	Name: drs. Jos H.A. Brunninkhuis e-mail: j.h.a.brunninkhuis@saxion.nl Institute: Saxion
Source to the practice:	Own experience as responsible manager for the outcome and results of the best practice.
Name of institution that apply practice:	Saxion
Contact person for practice:	Name: drs. Petra M.J. Manders e-mail: p.m.j.manders@saxion.nl Institute: Saxion
Date of submission:	01 May 2005
Title for practice:	Bachelor's Programme Small Business & Retail Management.
Key words:	Four-year bachelor's education, which is fully competence-, based and practice-orientated; it is aimed at training entrepreneurs and entrepreneurial managers. Entrepreneurship in all its aspects is at the core of the curriculum from day one.
Thematic focus of practice:	Spin-offs, interaction with industry, policy development, training
Short description of practice:	Small Business is a four-year bachelor's programme, aimed at teaching students entrepreneurship as well as focusing on management roles of the entrepreneur. The programme is based on entrepreneurial competences, defined in close cooperation with entrepreneurs. The method, therefore, is competence-based and practice-orientated. The problem-solving approach can be characterised as Problem-Solving Entrepreneurial Learning. The first year is organised in assignments related to enterprising activities in so-called 'student-companies'. The main goals are orientation and selection. The three following years, learning-activities are organised with a large degree of choice and freedom for the individual student. Students design their own Personal Development Plan, based on the competence to be acquired. Development is tested by a series of individual assessments and recorded in a portfolio, where students gather proof of their entrepreneurial development. Additional emphasis is placed on the international context, since the intake of German students has increased substantially since 2000.
Context of use of practice and actors involved:	Graduates find employment in all parts of trade and industry, ranging from starting their own company, through working in SME, to functioning as entrepreneurial managers in large-scale industries and / or multinationals. Therefore, the interacting framework is diverse. Actors are among others: an Advisory Council (including employers, former students, Chamber of Commerce), various professional organisations and lines of business and of industry, structural contacts with relevant preparatory vocational schools, contacts with separate SME and other companies on an incidental and structural basis. In view of the innovative concept, other Small Business & Retail Management educations, as well as political institutions can be defined as actors.
Results and benefits of practice:	Status as of 1 September 2005 450 graduated bachelors 700 students

Key success factors:	Great social relevance. Varied and challenging education for students, encouraging self-development, learning to take responsibility and developing independence. Attention is paid not only to traditional factual knowledge, but also to 'modern' entrepreneurial skills and competences (such as risk taking, building networks with costumers and suppliers, etc.). Learning by practical experience. Innovative didactic and pedagogical system, focused on the individual student, rather than on standard output.
Transferability of practice:	The practice is transferable in as far as the competence- based and practice-orientated method is concerned. The requirements would be to transfer responsibility for learning and learning processes to the individual student.
Reference material:	documentation brochure, phone +31 534871499 and internet: www.saxion.nl

***Appendix G 16, Best Practice* Sciencia**

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Henk Grimberg e-mail: h.g.m.grimberg@saxion.nl Institution: Saxion
Source to the practice:	Publications on websites of participating institutions; TVZ; magazine for nurses' nr. 4-2005; Interview and inaugural *lectoral* speech 'Evidence-based Implementation in the GGZ' by dr. R. van Linge in Deventer on 1 June 2005;
Names of institutions that apply practice:	Saxion Chr. Hogeschool Windesheim Gereformeerde Hogeschool Zwolle Adhesie Mediant Zwolse Poort RIBW Twente RIBW Zwolle RIAGG Zwolle RIAGG IJsselland
Contact person for practice:	Name: Henk Grimberg
Date of submission:	26 June 2005
Title for practice:	Sciencia Knowledge Centre GGZ
Key words:	Implementation: The knowledge process can be divided into a number of essential parts, namely spotting the problem, research, synthesis, transfer, implementation and evaluation. Especially the part 'implementation' often produces problems (not only within the world of care, incidentally) Implementation is a process-like and methodical introduction of innovations. The aim is to give innovation a structural place in the (professional) way of operating in the organisation. (H. Verburg, Trimbos Inst. 2003). Literature research shows that implementing innovations in the world of care falls short of expectations because not enough attention is paid to it, both content-wise and as far as means and planning are concerned.
Thematic focus of practice:	Spin-offs, interaction with healthcare institutions, training, other; research – development – services

Short description of practice:	In what way do we want to achieve this? Our aim is to give shape to care-related activities where exchanges of knowledge and implementation processes around a certain topic in care are central. Use should be made of practice-oriented and/or scientific knowledge that is already present. This should be implemented into daily care and, where necessary, in curricula. With this aim we are a kind of service centre for the institutions concerned in the Province of Overijssel. Research increasingly shows that there is too little attention for knowledge implementation processes. The result is that a great deal of sensible knowledge from research does not reach the working field. The idea that knowledge is only generated from research is outdated. It is not one-way traffic. It is an exchange between practice and research. It is desirable that the practical value of results from research is tested prior to wider dissemination. And, conversely, that new forms of supplying social work, which have been developed in daily practice, are tested properly through research before dissemination. Ideas and hypotheses from daily practice should also be taken as subjects of research. In this way there will be a connection because it is based an actual need among social workers. This may, among other things, stimulate the implementation of the results from research. Thirdly, at the level of institutions there is frequently a demand for additional schooling, which, however, is of such a small volume that it makes it unaffordable. Combining this at a provincial level can change this. At the level of research much is taking place as well without the transfer of results reaching fellow institutions. Exchange of knowledge from practical experience and research is therefore an important goal as is permanently gauging the needs for education and additional schooling. All this must increase the knowledge of implementation processes. In what way can one, from the beginning of one's research, focus on the starting point that the results can be used in daily practice. In what way can the results of (scientific) research be translated into daily practice? In what way can knowledge about implementation processes be incorporated into in our curriculum?
Context of use of practice and actors involved:	Within the central assignment around implementing knowledge the 'Innovation Contingency Model' is used. This model has a strong focus on situational and contextual factors of the situation where change / innovation is taking place.
Results and benefits of practice:	For the time being the results can be achieved in optimising the Sciencia-cooperation and the appointment of our own Sciencia-*lector.* In addition to this, workshops and symposia around certain themes are organized. Using the theoretical concept 'Innovation Contingency Model' developed by dr. R. van Linge.
Key success factors:	Implementation of knowledge and sharing of knowledge by means of cooperation between universities of professional education and institutions of mental health-care. Establishing platforms for exchange of knowledge. Schoolings and training.
Transferability of practice:	The core assignment of Sciencia is the transfer of (new) knowledge.
Reference material:	Inaugural *lectorale* speech by dr. R. van Linge (phone: +31 570639881, e-mail: sciencia@ggzkennistransfer.nl) and internet: www.sciencia.nl

Appendix G 17, Best Practice Sustainable Houses

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Wim Gilijamse e-mail: w.gilijamse@saxion.nl Institution: Saxion
Source to the practice:	Own experience as responsible Project Manager
Name of institution that apply practice:	Saxion
Contact person for practice:	Name: Wim Gilijamse
Date of submission:	12 May 2005
Title for practice:	Sustainable Houses; Development, demonstration and implementation of a concept for sustainable houses.
Key words:	Sustainability, renewable energy, houses.
Thematic focus of practice:	Interaction with industry
Short description of practice:	Aim of the project is the development, demonstration and implementation of a new concept for sustainable apartment houses. Criteria that the concept will have to meet are low primary energy use, good comfort, healthy indoor air quality, sustainable material use, cost neutrality. In phase one of the projects, a range of concept variations has been defined that meet these criteria. In phase two of the project, a demonstration project has been prepared in which the viability of the concept will be tested. Also prepared in this phase are monitoring and knowledge dissemination programmes. The final phase, which starts in 2005 and ends in 2007, consists of the actual monitoring, concept fine-tuning and knowledge dissemination.
Context of use of practice and actors involved:	Main partners are: - Two regional housing corporations, responsible for building the demonstration project and the actual implementation of the concept in the regular building practice. - Saxion Hogescholen, responsible for concept development, monitoring and knowledge dissemination. - A regional architects' firm, a leading company in sustainable building and responsible for an advanced ventilation system, which is part of the concept. - Regional service providers: energy engineering company, subsidy adviser, building cost adviser. - The Energy Research Centre of the Netherlands (ECN), which has developed one of the innovative technologies that will be applied: a solar combination system that supplies heat and electricity.
Results and benefits of practice:	Status May 2005: The definitions of the concept, the preparation of the monitoring and knowledge dissemination programmes have all been completed.
Key success factors:	- Meeting the project objectives, especially the cost and user-acceptance objectives. - Full implementation of project results in regular building practice. - Converting the Saxion involvement in the project into a repeatable model for effective support for innovative processes by higher education institutes.
Transferability of practice:	Confidence in transferability is high. This applies to transferability of direct project results as well as transferability of the way a higher education institute is involved in process. See key success factors above.
Reference material:	Not yet available.

Appendix G 18, Best Practice TWARANT

Fact sheet for the description of Best Practices	
Practice reported by:	Name: A. S. M. Gieske e-mail: gieske@itc.nl Institution: ITC
Source to the practice:	Own experience
Name of institution that apply practice:	International Institute for Geo-Information Science and Earth Observation
Contact person for practice:	Name: A.S.M. Gieske
Date of submission:	15 May 2005
Title for practice:	TRAWANT; Earth Observation Techniques for Regional Water Management
Key words:	
Thematic focus of practice:	Spin-offs and policy development.
Short description of practice:	The aim of this project is to study application of recently developed Earth Observation Techniques to local water management. The standard approach with regard to surface and groundwater flow problems will be compared and contrasted with a remote sensing analysis. The effects of the summer drought of 2003 will be taken as a case study. The study will be carried out by ITC PM and MSc students in co-operation with the Regge and Dinkel Water Board and Twente University. In the study, Earth Observation Techniques will be validated by ground flux measurements.
Context of use of practice and actors involved:	Tough prerequisites in quantitative remote sensing techniques, and data logging with advanced sensor technology. Data mining with low cost satellite imagery. Potential business applications for standard water resources management.
Results and benefits of practice:	Project started in 2005 and will run for 4 years. First batch of students has been selected.
Key success factors:	Improvement of understanding and communication between practitioners (Water Board) and scientists (ITC, TU)
Transferability of practice:	Procedures adopted may be transferred to other Dutch water boards, and commercial EO sector.
Reference material:	Research project WCR (Water Cycle Research) and internet: www.itc.nl

Appendix G 19, Best Practice Advice and Consultancy

Fact sheet for the description of Best Practices	
Practice reported by:	Name: Joris Vermaesen e-mail: j.vermaesen@saxion.nl Institution: Saxion
Source to the practice:	Experience as a group of young professionals to advise corporations, local, provincial and national governments and pressure groups for environmental planning and environmental studies.
Name of institution that apply practice:	Saxion
Contact person for practice:	Name: Joris Vermaesen
Date of submission:	13 May 2005
Title for practice:	Advice and Consultancy
Key words:	Environmental planning, environmental studies, research.
Thematic focus of practice:	Interaction with industry and policy development
Short description of practice:	Groups of students practise in their own simulated consultancy office how to tackle an assignment in their professional field to gain their first work experience. The subject is the transition between lessons at school and internships. It teaches the students how to operate in an actual situation (estimating relations, political environment, dealing with the formulation of the problem in a strategic way) Using a "vague" quotation the consultancy office first tries to make a quotation and subsequently they will try to carry this out properly within a total of ten weeks.
Context of use of practice and actors involved:	Companies, local, provincial and national governments, interest groups and pressure groups. Saxion warrants quality control at a basic level. If a higher quality is requested extra teacher hours will be used through transfer and the *lectoraat.* There are further possibilities to employ university students and students from secondary vocational education on the one hand and related educations of universities of professional education on the other hand.
Results and benefits of practice:	50 project groups per year. Great satisfaction among students, teachers and clients. Good preparation for internships and graduation subjects.
Key success factors:	An excellent way to solve stalemates when making plans. Good quality at a low price, certainly for volunteer organisations (interest groups, pressure groups). Professional approach of and by the student. The students' competences are actually used, such as negotiating, communicating, giving presentations, writing reports etc.) First confrontation for students to work in integral project groups where all members have their own knowledge and responsibility.
Transferability of practice:	Extremely well suited to be used in other situations. Beforehand it should be established what means and facilities would be made available.
Reference material:	Advice reports, presentations and press releases (Phone: +31-570663024)

Appendix G 20, Best Practice TOP

Fact sheet for the description of Best Practices	
Practice reported by:	Name: dr. P.C. van der Sijde e-mail: p.c.vandersijde@utwente.nl Institution: University of Twente, Nikos
Source to the practice:	Own experience, own development
Name of institution that applies practice:	Nikos, Dutch Institute for Knowledge Intensive Entrepreneurship.
Contact person for practice:	Name: dr. P.C. van der Sijde
Date of submission:	20 September 2005
Title for practice:	TOP, Temporary Entrepreneurial Positions.
Key words:	Spin-off, entrepreneurship.
Thematic focus of practice:	Spin-offs
Short description of practice:	The University of Twente started the TOP-programme in 1984 to help graduates, university staff and people from trade and business to start their own companies. In the period 1984-2003 330 persons used the programme; they have established about 270 companies. Someone who wants to use the TOP-programme must fulfil the following criteria: ?? have a concrete idea of a knowledge-intensive or technology-oriented company that can be linked to the fields of expertise of the university; ?? be available for a minimum of 40 hours a week; ?? have a business plan that meets a number of set requirements. As a rule, the future entrepreneur makes contact with one of the coordinators of the TOP-programme. In a first meeting, they check whether the business idea fits within the TOP-programme. An important criterion is the link of the company with the expertise of the university. If this is the case, it is time for a concrete business plan. This plan should be limited to the fundamentals; first it is discussed with the TOP-coordinator, thereafter with the TOP-committee. This body determines whether someone will be admitted to the programme. The committee also evaluates the progress during the year the entrepreneur takes part in the programme. After admission the entrepreneur is expected to work full-time on the company. After 6 months there is a mid-term evaluation by the TOP-committee and after 1 year the support via the TOP programme ceases; the TOP committee has one more meeting with the entrepreneur to discuss the future development of the company. During the one-year support the TOP entrepreneur receives office space and facilities, access to networks, a scientific and a business manager, and an interest- free loan (€ 12,000). The loan has to be repaid in 4 years starting in the year after leaving the TOP programme
Context of use of practice and actors involved:	The TOP programme is open to all members of the academic community and to all others who meet the requirements.
Results and benefits of practice:	About 20 persons participate in the TOP programme annually. Since 1984 some 370 individuals have received support and some 320 companies have been created. The survival rate of the companies: first-year survival rate is 99%, the 5- year survival rate is about 89%, and the survival rate of all companies since 1984 is 76% (data from 2000). On average TOP companies grow to 5 or 6 employees and on a regional level they are responsible for some 150 new jobs annually.
Key success factors:	Continuity, support in kind, loan.
Transferability of practice:	The idea is transferable; implementation depends on local circumstances. There is experience in the transfer of the idea/model to other places in Europe
Reference material:	Articles and internet: www.utwente.nl/top

Appendix G 21, Best Practice IEBD

Fact sheet for the description of Best Practices	
Practice reported by:	Name: P.C. van der Sijde e-mail: p.c.vandersijde@utwente.nl Institution: University of Twente, Nikos
Source to the practice:	Own experience, own development
Name of institution that applies practice:	Nikos, Dutch Institute for Knowledge Intensive Entrepreneurship
Contact person for practice:	Name: P.C. van der Sijde
Date of submission:	20 September 2005
Title for practice:	MSc Innovative Entrepreneurship & Business Development (IE&BD)
Key words:	Entrepreneurship, business development
Thematic focus of practice:	Training and other: Master programme
Short description of practice:	Entrepreneurship has been seen as a basis for economic growth since Schumpeter showed the importance of entrepreneurship for radical economic change. Structural re-adjustments in the economy, as Schumpeter labelled the process of creating new markets using innovations, have been set in motion by people and organisations that recognise the opportunity of the innovation earlier than others, and, consequently, create new business upon this opportunity. The recognition and assessment of opportunities, the development of business concepts and their implementation is the basic process under study. In this context, we offer a one-year, full-time Master's programme in Innovative Entrepreneurship & Business Development. The programme is closely connected to Nikos research on entrepreneurship in networks. Objective: The Innovative Entrepreneurship & Business Development Master's programme aims to provide students with: • competencies to work in an entrepreneurial context • knowledge of entrepreneurship as a scientific field • a network of innovative companies and entrepreneurs • the opportunity to develop their own enterprise • More information on the programme: see website.
Context of use of practice and actors involved:	The IE&BD is open to bachelor students with a background in Business Studies and those who have completed comparable academic studies. It is also open to graduates from UPE after completing the "pre-master" programme.
Results and benefits of practice:	The first year there were 3 students; presently in the second year there are some 15 students.
Key success factors:	Too early to judge
Transferability of practice:	The idea is transferable; cooperation with the University of Aalborg has started (mutual recognition of ECTS).
Reference material:	Internet: www.utwente.nl/nikos/teaching/masteriebd.

Appendix G 22, Best Practice MTF

Fact sheet for the description of Best Practices	
Practice reported by:	Name: S.J. van Tongeren e-mail: s.j.vantongeren@utwente.nl Institution: University of Twente, IGS
Source to the practice:	Own experience, joint development
Name of institution that applies practice:	University of Twente
Contact person for practice:	Name: Kees Eijkel e-mail: c.j.m.eijkel@tnw.utwente.nl Institution: University of Twente, MESA+
Date of submission:	20 September 2005
Title for practice:	Mesa+ Technology Foundry
Key words:	Industry, Public Private Partnership, Market development
Thematic focus of practice:	Spin-offs, interaction with industry and policy development.
Short description of practice:	MTF offers opportunities to companies that want to discover the innovative power of Microsystems and Nanotechnology. Together with its partners, the MESA+ research institute of the University of Twente, the Business and Science Park Enschede and the Regional Development Agency, MTF offers you a solid basis for your future in technology: • A cluster of leading MST companies • An excellent and innovative business environment in the economically fastest growing region in the Netherlands • The background and support of MESA+, one of the world's leading MST research institutes • A source of excellent, highly skilled personnel • State-of-the-art clean-room space and related services • Office space in an environment with relevant MST partners • Access to an impressive pool of MST equipment for research, development, production, packaging and testing at MESA+ MTF facilities are conveniently located at the MESA+ research site.
Context of use of practice and actors involved:	Since 1989 more than 25 companies have spun off out of the Mesa+ Institute of the University of Twente. These *Technostarters* are active in the area of micro systems or nano-technology. This sector of industry normally does not allow for SMEs to be active (investments exceeds budget).The law of size is broken by offering research facilities to be rented by our joint facilities for pilot production and office space near research groups.
Results and benefits of practice:	25 new companies, more than 75 jobs.
Key success factors:	Opening lab facilities to SMEs. Knowledge transfer at the coffee table
Transferability of practice:	Fully on basis of state-of-the-art facilities
Reference material:	-

Appendix G 23, Best Practice NDIX

Fact sheet for the description of Best Practices	
Practice reported by:	Name: S.J. van Tongeren e-mail: s.j.vantongeren@utwente.nl Institution: University of Twente, IGS
Source to the practice:	Own experience, joint development
Name of institutions that apply practice:	NDIX: Nederlands Duitse Internet eXchange; Trent Foundation
Contact person for practice:	Name: J. v.d. Lagemaat and Wald Been e-mail: jeroen@ndix.nl; wald.been@trent.nl; Institution: NDIX BV and Trent Foundation
Date of submission:	20 September 2005
Title for practice:	Internet eXchange / glass fibre network
Key words:	Internet, Public Partnership, Market development
Thematic focus of practice:	Spin-offs, interaction with industry and policy development.
Short description of practice:	The internet exchange serves as a marketplace for internet-based services to companies and public organisations. The Trent foundation provides a dark fibre network in Twente. Trent started as a research network connecting the University of Twente with key industry partners in Internet research providing the possibility of joint research and technological testing of network components. Soon after the first parts of the network had been taken into use, new opportunities arose – testing and developing applications. Companies now faced a new challenge: offering developed applications and services cost effectively via the internet. At the same time different public parties faced high costs for connecting themselves to the internet. Trent chose to enlarge its scope and position itself as non-profit dark fibre provider. The University of Twente, the Province of Overijssel and the city of Enschede co-started the NDIX as an exchange point at the same. The first location was opened at Virtu Secure Web-services (a spin-off of the UT)
Context of use of practice and actors involved:	Internet connectivity and broadband services were limited in the region. Price levels were at least three times as high compared to the Amsterdam area. The HEI and several public organisations joined their purchasing power by connecting to the NDIX. The NDIX was set up as a telecom- independent trading place for internet services. Trent was set up as a non-profit provider of dark fibre to and from the internet exchange. In the onset of the project mainly HEI and their public and private partners were involved.
Results and benefits of practice:	Over 45 companies, municipalities, schools and HEI are connected to the NDIX via dark fibre of Trent. Most have more than 1 location connected. The NDIX offers access points in Düsseldorf, Münster, Enschede, Almelo and Deventer. Trent is available in over 30 cities in the East of the Netherlands. Currently 15 people find employment with NDIX and Trent; in 2005 the UT spin-off Virtu ranked 6th in the top 100 of fast-growing companies in the Netherlands. Costs for Internet Infrastructure in Twente are lower than the Dutch average.
Key success factors:	Boosting initial demand by combining purchasing power; reducing risk and improving potential ROI for private investors
Transferability of practice:	Compared to the end of the 1990s the telecom market has become more competitive. Still, telecom operators are cash-cowing on old business models. New technologies as Voice over IP still make a good business case for independent connectivity
Reference material:	Internet: www.ndix.nl and www.stichtingtrent.nl

Appendix G 24, Best Practice Tissue Engineering

Fact sheet for the description of Best Practices	
Practice reported by:	Name: S.J. van Tongeren e-mail: s.j.vantongeren@utwente.nl Institution: University of Twente, IGS
Source to the practice:	Own experience, joint development
Name of institution that applies practice:	Business Accelerator Tissue Engineering
Contact person for practice:	Name: Frank Jan van der Velden e-mail: f.vandervelden@kruger-partners.nl Institution: University of Twente, BMTI
Date of submission:	20 September 2005
Title for practice:	Business Accelerator Tissue Engineering
Key words:	Business Development, Technology Transfer, Public Private Partnership, Market development
Thematic focus of practice:	Spin-offs, interaction with industry and policy development.
Short description of practice:	In 2003 the University of Twente purchased the research department of Isotis s.a. (a company in the field of tissue engineering).Thus arose within the Institute for Biomedical Research (BMTI) Europe largest research group on tissue engineering. The group was partly financed by research contracts and partly on future income (commercialization of technology). For the transfer of technology a business accelerator was set up. The goal of this accelerator was to improve the business perspectives of new products and services that became available from research. The activity is set up within a private company in public private partnership (40% UT, 60% private). Private investors buy the first right of refusal by investing in the accelerator.
Context of use of practice and actors involved:	The business accelerator is part of the ambition of Knowledge Park Twente. The city of Enschede and the province sponsored development of the accelerator. Investments companies followed. The University of Twente will start at least 3 more Business Accelerators. Key issues: - area focused on product-market combination - minimal body of relevant research in the area - availability of market (to limit time to market)
Results and benefits of practice:	6 new companies started in 18 months 2 million in investments and income
Key success factors:	Business developer that brings in product – market knowledge
Transferability of practice:	Depends on business area and relevance of research
Reference material:	Internet: www.utwente.nl/bmti

Appendix G 25, Best Practice Student Union

Fact sheet for the description of Best Practices	
Practice reported by:	Name: B. Jongbloed e-mail: b.w.a.jongbloed@utwente.nl Institution: University of Twente, CHEPS – BBT
Source to the practice:	Interview with Student Union Board member, SU website.
Name of institution that applies practice:	University of Twente
Contact person for practice	Name: Anke Huiskes e-mail: a.m.m.huiskes@union.utwente.nl Institution: Student Union, University of Twente
Date of submission:	29 August 2005
Title for practice:	Student Union
Key words:	Student activism, student entrepreneurialism, student interaction with business and society
Thematic focus of practice:	Interaction with industry; training.
Short description of practice:	The *Student Union* is the student-run umbrella organization for all the student organizations at the University of Twente. The Union is responsible for every extra-curricular activity that takes place at the university. The Student Union was founded in 1999 and offers its services to about 6000 students through its 90 affiliated student organizations. These organizations can be divided into five sectors: culture, social, sport, study, and other. The services offered include the Union Shop, the Union Plus Card, a job database, events to link up students and prospective employers, the Student Union portal, the Student Union 'rooms for rent' database and more. The Student Union manages three buildings that are solely intended for use by students: the Water Sports Complex, the *Pakkerij* and the *Bastille*. Until 2004, the University Student Enterprises (USE) was a separate foundation. In that year it became a company fully owned by the Student Union. USE is aimed at supporting students in setting up their own company. It does so by making available office space (in the Bastille building) and organizing workshops and training seminars.
Context of use of practice and actors involved:	The Student Union takes the form of a non-profit organization in order to ensure independence. The Student Union organization consists of: a Board, an Advisory Board, a Board of Trustees and a General Assembly. Affiliate organizations of the Union are represented in the general assembly. The Executive Board of the University of Twente is represented in the Union's Board of Trustees. Each year, the university contributes a budget to the Student Union. The Union's other revenues derive from students' contributions (through the sale of Union Cards) and commercial activities.
Results and benefits of practice:	Apart from its Strategic Plan, the Student Union publishes an annual report listing its activities, financial result and an overview of its main achievements over the year.
Key success factors:	Giving students the responsibilities to run their own business. Offering support (in kind as well as financial) from the University. Having a governance structure (Board of Trustees, Advisory Board, etc.) that oversees the SU activities. Giving ECTS credits and scholarships to students that are 'active' in Union's activities.
Transferability of practice:	Certainly transferable. See key success factors.
Reference material:	Folders and internet: http://www.studentunion.utwente.nl/en/

Appendix H, Partnerships and co-operation agreements of Saxion

To embed the practical aspects in the learning programmes, Saxion contract partnerships and cooperation's with regional stakeholders. The Board of Saxion contracts partnerships while cooperation's are contracted by one ore more institutes of Saxion. The scope of cooperation (for partners and cooperation's) is:

- Public Relations
- Preferred suppliers
- Personal contacts between employees.

Every year the partnerships and cooperation's are evaluated and review on their added value of both parties.

Partners of Saxion (in random order) are:

- MENZIS (healthcare insurance company)
- Price Waterhouse Coopers (Accountants)
- ABN AMRO (Bank)
- Deventer ziekenhuis (Hospital at Deventer)
- Thales (Defence industry, radars)
- Medisch Spectrum Twente (Hospital at Enschede)
- Carint (Home care company in Twente)
- Kienhuis Hoving (Solicitors, public notary)
- Gemeente Enschede (Municipality of Enschede)
- NIBRA (Dutch knowledge institute of Fire and Diaster management)
- Universiteit Twente (University of Twente)
- ROC van Twente (Intermediate vocational education at Twente)
- ROC Avantis (Intermediate vocational education at Deventer)

Appendix I, Prognoses employment educational sector

The prognosis of unoccupied jobs in the Dutch Educational sector:

Yearly unfulfillable vancancies	2003	2011
Teachers primary education	2,100	3,600
Management primary education	1,100	2,000
Leraren secondary education	6,000	10,000
Management secondary education	Nil	Nil

Source: “De toekomstige arbeidsmarkt voor leraren en managers in het primair en voortgezet onderwijs”, van het Ministerie van OCW, 2003.

The percentage of jobs in Overijssel, which are unoccupied in the educational sector.

Tension indicator Overijssel	2003	2011
Teachers primary education	2,2%	1,3%
Management primary education	4,0%	21,0%
Teachers secondary education	4,9%	20,7%
Management secondary education	1,8%	1,8%

Source: “De toekomstige arbeidsmarkt voor leraren en managers in het primair en voortgezet onderwijs”, van het Ministerie van OCW, 2003.

Appendix J, Overview of the *lectoraten* in Twente

Lectoraat / Kenniskring	**Institute**	**Name of the lector**	**Size of appointment**
Software engineering for real-time and embedded systems	Saxion	Theo de Ridder; Jandit van Doorn	0.6 0.2
Strategic Human Resource Management	Saxion	Gangolf Peters	0.5
Physiotherapy en paramedical professions	Saxion	Frits Oosterveld	1.0
Care and welfare	Saxion	Joy Notter Geralien Holsbrink	0.4 0.4
Design for all/product design	Saxion	Carien Stephan Karin van Beurden	0.4 0.4
Sustainable energy supply	Saxion	Wim Gilijamse	0.8
Sustainable development of the living space	Saxion	Theo de Bruijn	0.5
Facility Management	Saxion	Mark-Erik Nota	0.16
Knowledge development profession therapies	Saxion	Henk Smeijsters	0.1
Knowledge-innovative entrepreneurship	Saxion	Aard Groen Peter van der Sijde	0.3 0.3
Media Technology Design	Saxion	Guus Vrauwdeunt	0.5
Assessment	Saxion	Wouter Schoonman	0.6
Risk control: administration and management of security technology	Saxion	Menso Molag Wilbert Rodenhuis	0.4 0.4
Arts & technology	AKI	Prof Dr. P.J.H. Kockelkoren	0.5
E-learning	Edith Stein	Ellen van den Berg	0.5
Education innovation	Edith Stein	Jos Letschert	0.5
Total			**8.96 fte**

Overview as is on the 1st of may 2005.

Appendix K, List of educational programmes in Twente

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
Saxion					
Accountancy	Bachelor	X			Dutch
Bedrijfseconomie	Bachelor	X	X	X	Dutch
Bedrijfskundige Informatica	Bachelor	X		X	Dutch
Bestuurskunde/Overheidsmanagement	Bachelor	X	X		Dutch
Biologie en Medisch Laboratoriumonderzoek	Bachelor	X			Dutch
Bouwkunde	Bachelor	X			Dutch
Bouwtechnische Bedrijfskunde	Bachelor	X		X	Dutch
Chemie	Bachelor	X			Dutch
Chemische Technologie	Bachelor	X			Dutch
Civiele Techniek	Bachelor	X			Dutch
Commerciële Economie	Bachelor	X	X	X	Dutch
Digitaal Systeem Ontwerpen	Bachelor		X		Dutch
Docent Muziek	Bachelor	X			Dutch
Duurzame Energie	Bachelor	X		X	Dutch
Elektrotechniek	Bachelor	X	X	X	Dutch
Fiscale Economie	Bachelor	X		X	Dutch
Fysiotherapie	Bachelor	X			Dutch
Human Care & Technology	Bachelor	X			Dutch
ICT-beheer	Bachelor	X			Dutch
Industrieel Product Ontwerpen	Bachelor	X		X	Dutch
Informatica	Bachelor	X		X	Dutch
Integrale Veiligheidskunde	Bachelor	X	X		Dutch
International Business and Languages	Bachelor	X		X	Dutch
International Business and Management Studies	Bachelor	X		X	Dutch
International Business Engineering	Bachelor		X		Dutch
Kunst en Techniek	Bachelor	X		X	Dutch
Maatschappelijk Werk en Dienstverlening	Bachelor	X	X		Dutch
Management, Economie en Recht	Bachelor	X	X		Dutch
Muziek	Bachelor	X			Dutch
Muziektherapie	Bachelor	X			Dutch
Saxion Music Technology	Bachelor	X			Dutch
Verpleegkundige in de Maatschappelijke Gezondheidszorg	Bachelor		X		Dutch
Personeel en Arbeid	Bachelor	X	X		Dutch
Podotherapie	Bachelor	X			Dutch
Propedeuse Toegepaste Psychologie	Bachelor	X	X		Dutch
Saxion Popacademie	Bachelor	X			Dutch
Small Business & Retail Management	Bachelor	X	X	X	Dutch
Sociaal Juridische Dienstverlening	Bachelor	X	X		Dutch
Sociaal Pedagogische Hulpverlening	Bachelor	X	X		Dutch
(Commercieel) Technische Bedrijfskunde	Bachelor	X		X	Dutch
Technisch Systeem Management	Bachelor		X		Dutch
Technisch-Commerciële Textielkunde	Bachelor	X		X	Dutch
Technische Automatisering	Bachelor	X			Dutch
Technische Bedrijfskunde	Bachelor		X		Dutch
Technische Informatica	Bachelor	X		X	Dutch
Technische Natuurkunde	Bachelor	X		X	Dutch
Telecommunicatie & Media Techniek	Bachelor		X		Dutch
Theologie	Bachelor		X		Dutch
VaPro D/Chemische Technologie	Bachelor		X		Dutch
Vastgoed en Makelaardij	Bachelor	X			Dutch

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
Verpleegkundige (HBO-V)	Bachelor	X	X	X	Dutch
Avondopleiding Werktuigbouwkunde	Bachelor		X		Dutch
WB-Industriële Product Ontwikkeling	Bachelor	X			Dutch
Werkopleiding Ingenieur Werktuigbouwkunde	Bachelor		X	X	Dutch
Werktuigbouwkunde	Bachelor	X	X	X	Dutch
Bachelor in Physiotherapy	Bachelor	X			English
Bachelor in Civil Engineering	Bachelor	X			English
Bachelor in Electrical and Electronic Engineering	Bachelor	X			English
Bachelor in Informational Graphic Design	Bachelor	X			English
Master Advanced Nursing Practice	Master		X	X	English
Master in Business Administration	Master	X			English
Bachelor in International Business and Management Studies	Bachelor	X			English
Masters in Business Administration	Master	X			English
ITC					
Master in Geoinformatics programme	Master	X			English
Master of Science in Geoinformatics	Master	X			English
Master in Geo-information Management	Master	X			English
Master of Science in Geo-information Management	Master	X			English
Master in Urban Planning and Land Administration programme	Master	X			English
Master of Science in Urban Planning and Land Administration programme	Master	X			English
Master in Natural Resources Management programme	Master	X			English
Master of Science in Natural Resources Management programme	Master	X			English
Master in Earth Resources and Environmental Geosciences programme	Master	X			English
Master of Science in Earth Resources and Environmental Geosciences programme	Master	X			English
Master in Water Resources and Environmental Management programme	Master	X			English
Master of Science in Water Resources and Environmental Management programme	Master	X			English
PhD in Food security, water and environment	PhD	X			English
PhD in Monitoring global change	PhD	X			English
PhD in Natural disasters and environment	PhD	X			English
PhD in Strengthening civil society	PhD	X			English
PhD in Multifunctional use of space	PhD	X			English
UT					
Advanced Technology (Brede bachelor Techniek)	Bachelor	X			
BedrijfsInformatieTechnologie	Bachelor	X			NL
Bedrijfskunde	Bachelor	X			NL
Bestuurskunde	Bachelor	X			NL
Programma European Studies	Bachelor	X			NL
Biomedische Technologie	Bachelor	X			NL
Chemische Technologie	Bachelor	X			NL
Civiele Techniek (& Management)	Bachelor	X			NL
Educational Design, Management & Media (Toegepaste Onderwijskunde)	Bachelor	X	X		NL

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
Elektrotechniek	Bachelor	X			NL
Gezondheidswetenschappen	Bachelor	X			NL
Industrieel Ontwerpen	Bachelor	X			NL
Technische Informatica	Bachelor	X			NL
Psychologie	Bachelor	X			NL
Telematica	Bachelor	X			NL
Technische Bedrijfskunde	Bachelor	X			NL
Technische Geneeskunde	Bachelor	X			NL
Technische Natuurkunde	Bachelor	X			NL
Toegepaste Communicatiewetenschap	Bachelor	X			NL
Toegepaste Wiskunde	Bachelor	X			NL
Werktuigbouwkunde	Bachelor	X			NL
Applied Mathematics	Master	X			English
Applied Physics	Master	X			English
Biomedical Engineering	Master	X			English
Business Administration	Master	X			English
Business Information Technology	Master	X			English
Chemical Engineering	Master	X			English
Chinese International MBA Programme	Master	X			English
Civil Engineering and Management	Master	X			English
Communication Studies	Master	X	X		English
Computer Science	Master	X			English
Educational Science and Technology	Master	X	X		English
Electrical Engineering	Master	X			English
Environmental and Energy Management	Master	X			English
European Studies	Master	X			English
Executive MBA voor de Bouw	Master	X	X		English
Geoinformatics	Master	X			English
Health Sciences	Master	X			English
Human Media Interaction	Master	X			English
Industrial Design Engineering	Master	X			English
Industrial Engineering and Management	Master	X			English
International Executive MBA	Master	X			English
Management, Economics and Law (Post Initial)	Master	X			English
Mechanical Engineering	Master	X			English
Mechatronics	Master	X			English
Nanotechnology	Master	X			English
Philosophy of Science, Technology and Society	Master	X			English
Psychology	Master	X			English
Public Administration	Master	X			English
Public Management (Post Initial)	Master		X		English
Science Education	Master	X			English
Social Science Education	Master	X			English
Social Systems Evaluation and Survey Research	Master	X			English
Telematics	Master	X			English
TSM, SWOT					
Chinese international MBA	MBA		X		English
Public management (MPM)	MPM		X		Dutch
Environmental & Energy management (MEEM), Franeker	MBA	X			Dutch
Procurement management (Uganda)	MBA		X		Dutch
Executive MBA for construction sector	MBA		X		Dutch
International Executive MBA	MBA		X		Dutch

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
International full-time MBA	MBA	X			Dutch
Modular MBA	MBA		X		Dutch
MBA	MBA		X		Dutch
AKI					
Bachelor of Art	BFA	X			Dutch
Bachelor of Art	BFA		X		Dutch
Bachelor of Design	BDes		X		Dutch
Edith Stein					
Leraaropleiding Basisonderwijs	Bachelor	X	X	X	Dutch
Onderwijsassistent	Bachelor	X	X	X	Dutch
Non-Degree					
Saxion					
Academy Track Foundation (basismodules AMBI)	-		X		Dutch
Accountant Administratieconsolent (Post-HBO)	-		X		Dutch
Achtergrondkennis Internet	-		X		Dutch
Automatisering en Mechanisering van Bestuurlijke Informatievoorziening (AMBI)	-		X		Dutch
Automatiserings- en Besturingstechniek (Post-HBO)	-		X		Dutch
Basisopleiding Projectontwikkelaar	-		X		Dutch
Bij- en nascholing voor fysiotherapeuten	-		X		Dutch
Bij- en nascholing voor podotherapeuten	-		X		Dutch
Bio-informatica in de praktijk I + II	-		X		Dutch
Bouwprojectmanagement	-		X		Dutch
Danstherapie Charlotte Querido	-		X		Dutch
Economie & Management (voor het bank- en verzekeringswezen)	-		X		Dutch
Financial Performance Measurement	-		X		Dutch
Hoger Management	-		X		Dutch
Industriële Automatisering	-		X		Dutch
Leergang De P&O-er als adviseur bij organisatie-verandering	-		X		Dutch
Leidinggeven....een kunst?	-		X		Dutch
Management voor secretaresses & managementassistenten	-		X		Dutch
Middle Management	-		X		Dutch
Nieuwe muziek	-		X		Dutch
NIMA Communicatie-A	-		X		Dutch
NIMA-A	-		X		Dutch
NIMA-B	-		X		Dutch
Object georiënteerd programmeren in C++	-		X		Dutch
Object georiënteerd programmeren in JAVA	-		X		Dutch
Object Oriented Analysis and Design met UML	-		X		Dutch
Patient compilance	-		X		Dutch
Personeelsmanagement	-		X		Dutch
Praktijkondersteuner	-		X		Dutch
Projectmanagement in de praktijk	-		X		Dutch
SPD Bedrijfsadministratie	-		X		Dutch
Sportmanagement	-		X		Dutch
Voorbereidend Muziekvakonderwijs	-	X			Dutch

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
Vooropleiding Theaterdans	-		X		Dutch
WB-Industriële Productontwikkeling (Post-Hbo)	-	X			Dutch
ITC					
Geo-information Infrastructure and Core Data Providers	-	X			English
Applications of Remote Sensing and GIS in Earth Resources and Environmental Geoscience, Part II: Advanced	-	X			English
Geographical Information Systems for Urban Planning, Land Administration and Infrastructure Management	-	X			English
GIS and Remote Sensing for Natural Hazard and Risk Assessment	-	X			English
Aeromagnetics, Gamma-Ray-Spectrometry and Gravity: Essential Tools for Geoscience Applications	-	X			English
Remote Sensing and GIS Applications for Integrated Catchment and Water Management (ICWM)	-	X			English
Geophysical Data Acquisition, Processing and Interpretation for Groundwater and Environmental Studies	-	X			English
Groundwater Resources Monitoring, Evaluation and Modelling	-	X			English
Interactive and dynamic map visualisation with Macromedia© FlashMX©	-	X			English
Spatial Decision Support Systems and Multi-Criteria Evaluation Techniques	-	X			English
Advanced Use of Remote Sensing in Water Resource Management, Irrigation and Drainage	-	X			English
Spatial Information for Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA)	-	X			English
Development of Organisations in a Geo-information Infrastructure Environment	-	X			English
Database Handling in Earth Sciences: A Study Project through Survey Planning, Execution, Analysis and Reporting	-	X			English
Building and Publishing a National Basemap	-	X			English
Principles of Spatial Data Handling: Databases, GIS and Remote Sensing	-	X			English
GIS and Remote Sensing for Environmental Planning and Management	-	X			English
Totaal Undergraduate Diploma in Geoinformatics programme	-	X			English
Course in social security	-	X			
TSM, SWOT, UT					
Management for young engineers	-		X		Dutch
Project management	-		X		Dutch
Financial management	-		X		Dutch
Health care management	-		X		Dutch
Leadership	-		X		Dutch
Course in business administration	-		X		Dutch
Business Admin for middle managers	-		X		Dutch

Name	Degree	Form			Language
		Fulltime	Part-time	Dual	
HRM	-		X		Dutch
Business Mgt for health care	-		X		Dutch
Commercial technical account management	-		X		Dutch
Project management	-		X		Dutch
Masterclass	-		X		Dutch
Rivierenland District Water Board	-		X		Dutch
Rijn & Ijssel District Water Board	-		X		Dutch
Regional course for legal professionals	-		X		Dutch
AKI					
Orientation course			X		Dutch
Edith Stein					
Tweejarige opleiding voor schoolleider primair onderwijs (magistrum)	-		X		Dutch
Doorstroomtraject voor schoolleider primair onderwijs (magistrum)	-		X		Dutch
Kweekvijvertraject, opleiding voor toekomstig schoolleider (magistrum)	-		X		Dutch
Opleiding voor middenmanagement (magistrum)	-		X		Dutch
Basiscursus minitramp	-		X		Dutch
Bewegen op muziek	-		X		Dutch
Leergang vakbekwaam bewegings-onderwijs voor het primair onderwijs	-		X		Dutch
Leesproblemen	-		X		Dutch
Aan het werk met tussendoelen beginnende geletterdheid	-		X		Dutch
Beginnend geletterdheid binnen piramide	-		X		Dutch
Rekenen en wiskunde	-		X		Dutch
Nationale cursus rekencoördinator (NCRC)	-		X		Dutch
Gedragsproblemen	-		X		Dutch
Hoe creëer je een uitdagende leeromgeving?	-		X		Dutch
Interne opleider basisonderwijs / voortgezet onderwijs	-		X		Dutch
Cultuurcoördinator kunst- en cultuureducatie	-		X		Dutch
Filosoferen met kinderen	-		X		Dutch
Remedial teaching 1-jarige opleiding Hogeschool Edith Stein /OCT – Fontys	-		X		Dutch
Remedial teaching 2-jarige opleiding Hogeschool Edith Stein /OCT – Fontys	-		X		Dutch
Interne begeleiding 1-jarige opleiding Hogeschool Edith Stein /OCT – Fontys	-		X		Dutch
Interne begeleiding 2-jarige opleiding Hogeschool Edith Stein /OCT – Fontys	-		X		Dutch
Besturing van de computer (MS-Windows XP)	-		X		Dutch
Tekstverwerking (MS-word 2003)	-		X		Dutch
Presentaties MS-Powerpoint 2003	-		X		Dutch
Het maken van een eigen multimediaal programma m.b.v. Observer	-		X		Dutch
Het maken van (educatieve) websites	-		X		Dutch
Het maken van webspeurtochten (webquest)	-		X		Dutch

Source: Participating HEIs, 2005