

Een voorstudie, uitgevoerd in het kader van het project "Vaardig Innoveren", in opdracht van InnovatieNetwerk Groene en Ruimte en Agrocluster door:

*Dr. L.C.J. Goedegebuure, Center for Higher Education Policy Studies (CHEPS),
Universiteit Twente*

De innovatieve universiteit; een internationale oriëntatie

InnovatieNetwerk Groene Ruimte en Agrocluster

Postbus 20401

2500 EK Den Haag

tel.: 070 378 56 53

internet: <http://www.agro.nl/innovatienetwerk/>

ISBN: 90 - 5059 - 131 - 0

Overname van tekstdelen is toegestaan, mits met bronvermelding.

Rapportnr. 01.3.007 (serie basisdocumenten), Den Haag, juli 2001

Voorwoord

Deze studie vormt een van de deelstudies van het project "Vaardig Innoveren". In dit project worden competenties van academici – in het bijzonder de WU-ingenieur – geanalyseerd in relatie met systeeminnovatie. Centraal daarbij staat de vraag naar de consequenties van systeeminnovatie in groene ruimte en agrocluster voor de gewenste competenties van ingenieurs en naar de eisen aan het universitaire onderwijs om de ingenieurs in dat opzicht toe te rusten.

Bij het project zijn uiteenlopende instellingen ingeschakeld die deelstudies hebben uitgevoerd. In het eindrapport "Vaardig Innoveren. Competentie-ontwikkeling ten behoeve van systeeminnovaties in het bio-domein: de rol van het onderwijs" zijn de belangrijkste resultaten uit de deelstudies opgenomen.

De deelstudie van CHEPS betreft een quick scan van "best practices" of "opvallende benaderingen" die universiteiten en/of andere hoger onderwijsinstellingen hanteren bij het vormen en opleiden in competentie op basis van transdisciplinaire en innovatieve aanpak.

Op basis van een analyse van innovatieve universiteiten (Clark, 1998) en enkele selectieve internationale voorbeelden uit de quick scan worden de volgende kenmerken van een innovatieve universiteit aangegeven: - een redelijke mate van centrale sturing; - expliciete relaties met haar omgeving; - verschillende bronnen van inkomsten; - geïnvolveerde academici en een cultuur van "ondernemendheid" door de gehele instelling heen.

Een herbezinning wordt bepleit op de mogelijkheden om hoger onderwijsinstellingen werkelijk "met gevoel" te managen en innovaties daadwerkelijk op decentraal niveau te laten beklijven

De deelstudie is tezamen met de andere deelstudies in een workshop besproken. De bevindingen uit de deelstudies en de discussie daarover vormden de input voor het eindrapport.

Dr.ir. A.P. Verkaik,

Directeur InnovatieNetwerk Groene Ruimte
en Agrocluster.

Inhoudsopgave

Voorwoord	i
1. Vooraf	1
2. Het recept volgens Clark	3
3. Innovatief onderwijs: een eerste voorzet	6
4. Innovatief onderzoek: de tweede voorzet	10
5. Tot slot: bestuur en management; de derde voorzet	12
Appendix 1: Projectvoorstel "Quick scan" ten behoeve van onderzoeksproject "Vaardig Innoveren"	13
Appendix 2: Scan of innovative institutions with high levels of co-operation with surrounding environment	15
Appendix 3: The Finnish case	25
Appendix 4: The entrepreneurial university revisited: Integrating academia and entrepreneurship	29
Overzicht deelstudies	37

1. Vooraf

Innovatieve universiteiten zijn in. Als vervolg op het spraakmakende boek van Bob Clark (1998) "Creating Entrepreneurial Universities" koos het OECD-programma "Institutional Management in Higher Education" (IMHE) "Beyond the Entrepreneurial University" als thema voor het twee-jaarlijks congres afgelopen september. Naast de gebruikelijke eerbetonen aan *éminence grise* Clark, die de keynote mocht voorlezen, en een uitgebreide PR-sessie voor de case-studies uit Clark's boek, samengebracht in het European Consortium of Innovative Universities (ECIU), kwamen de deelnemers gedurende de tweedaagse conferentie meer en meer tot de conclusie dat iedere universiteit eigenlijk wel ondernemend en innovatief is, mits je maar naar de "juiste" aspecten kijkt. Natuurlijk is dit een karikatuur van het IMHE-congres. Maar, zoals geldt voor iedere karikatuur, het bevat wel een kern van waarheid, zij het met twee gezichten. Het ene gezicht is het overdreven dwepen met begrippen als innovativiteit en ondernemerschap omdat ze blijkbaar "in" zijn en iedere zichzelf respecterende universitair bestuurder derhalve moet beargumenteren dat zijn universiteit deze kenmerken natuurlijk heeft. Want stel je voor dat dit niet zo zou zijn. Het tweede gezicht staat minder pontificaal in het spotlight, maar is daarom niet minder relevant, en verbeeldt de propositie dat iedere universiteit – als je maar goed kijkt – inderdaad ergens wel innovatief en/of ondernemend is. In dit paper ga ik voorbij aan het onderscheid tussen innovativiteit en ondernemendheid. Daar kunnen we doorwrochte verhandelingen over schrijven, maar daar gaat het nu niet om. Waar het wel om gaat zijn universiteiten die open staan voor hun omgeving, hun "stakeholders", en die hier actief vorm en inhoud aan geven. Als het eerder genoemde tweede gezicht daadwerkelijk bestaat, dan hebben we het feitelijk over een triviale kwestie. Als iedere universiteit eigenlijk in de kern van de zaak innovatief is, dan is dit *mutatis mutandis* geen onderscheidend criterium meer en is de hele discussie tamelijk zinloos. Scheiden we retoriek van realiteit, dan vallen er wellicht toch enkele saillante punten te noemen. Uitgangspunt hierbij is dat innovatief gedrag meer of minder geprononceerd naar voren kan komen. Dit is een empirische stelling die ik zal trachten te beargumenteren door enkele selectieve internationale voorbeelden. Voorbeelden afkomstig van een "quick scan" die Cheps heeft uitgevoerd ten behoeve van het project "Vaardig Innoveren" (zie appendix 1 en 2). Geen grondig wetenschappelijk onderzoek derhalve, maar impressies op basis van relatief gedegen kennis van andere hoger onderwijsystemen en instellingen. Aangrijpingspunten hierbij zijn de primaire processen onderwijs en onderzoek alsmede het bestuur/ management van universiteiten.

2. Het recept volgens Clark

In zijn analyse van innovatieve universiteiten komt Clark (1998) tot de volgende onderscheidende kenmerken die zijns inziens verklaren waarom de vijf ondernemende en innovatieve Europese universiteiten die hij voor zijn onderzoek heeft geselecteerd zich onderscheiden van “reguliere” universiteiten.

- A strengthened steering core
- An expanded developmental periphery
- A diversified funding base
- A stimulated academic heartland
- An integrated entrepreneurial culture

Vertalen we dit vrijelijk in een definitie van een innovatieve universiteit, dan resulteert dit in het volgende:

Een innovatieve universiteit onderscheidt zich door een redelijke mate van centrale sturing, door expliciete relaties met haar omgeving, door verschillende bronnen van inkomsten, door geïnvolveerde academici en door een cultuur van gehele instelling heen.

Dit ideaaltype instelling bestaat echter niet. De vijf cases in Clark's onderzoek scoren redelijk tot hoog op *enkele* van deze dimensies. Maar geen van alle voldoen ze aan het ideaal type *stricto sensu*. Hierbij moet worden bedacht dat in het betreffende onderzoek geen sprake is geweest van een a-selecte steekproef. Integendeel, het betreft relatief jonge instellingen, veelal technologisch geïntereerd, die alle een ietwat excentrieke plaats in hun nationaal hoger onderwijsstelsel innemen¹. Hiermee is zowel de sterkte als de zwakte van het onderzoek geduid. De sterkte kan worden gevonden in het empirisch gegeven dat instellingen geconfronteerd met relatief uitzonderlijke omstandigheden – geografisch excentrieke ligging, zeer sterk teruglopende bekostiging, afwijkende juridische basis – zich door een specifieke combinatie van enkele van de vijf dimensies hebben kunnen ontwikkelen tot inderdaad dynamische en innovatieve instellingen. De zwakte kant van de analyse betreft de mogelijkheid tot extrapolatie. Geldende bevindingen ook voor grote, algemene universiteiten? Voor een belangrijk deel richt de kritiek op Clark's onderzoek zich op dit aspect. En hoewel deze kritiek intuïtief aanspreekt, wil ik in deze paper beargumenteren dat er wel degelijk een kern

¹ De instellingen zijn: Warwick, UK; Twente, NL; Strathclyde, UK; Chalmers, Sweden; Joensuu, Finland.

van waarheid zit in Clark's typologie. Ik probeer dit te adstrueren door aanvullende voorbeelden uit de wijde wereld van het hoger onderwijs.

3. Innovatief onderwijs: een eerste voorzet

Bezien we de veranderingen en vernieuwingen in de aard van het onderwijsaanbod internationaal, dan lijkt de meest belangwekkende ontwikkeling te zijn de overgang van strikt disciplinair georiënteerd onderwijs naar multi- of transdisciplinair onderwijs in combinatie met meer op de praktijk gerichte werkvormen. Voor wat betreft dit laatste zijn vele varianten van probleemgestuurd onderwijs te herkennen. Als afgeleide van deze ontwikkeling valt ook een ontwikkeling waar te nemen naar minder specialistisch onderwijs en meer generalistisch – algemeen vormend met een minder voorgestructureerd curriculum. Enkele internationale voorbeelden die uit onze “quick scan” naar voren zijn gekomen illustreren deze ontwikkeling.

Een van de toonaangevende undergraduate colleges in de Verenigde Staten zijn de Clairmont Colleges in California, een groep van vijf colleges met ieder een eigen oriëntatie. Exemplarisch voor de hierboven genoemde ontwikkeling is het Harvey Mudd College dat zich richt op undergraduate ingenieursopleidingen. Centraal in deze opleiding staat een multidisciplinaire ontwerpbenadering die gestalte krijgt in zogenaamde “engineering clinics”: projecten van ongeveer zes maanden waarin een groep studenten werkt aan het oplossen van problemen aangedragen door het bedrijfsleven. Studenten van verschillende jaren werken samen, waarbij de ouderejaars de rol van projectleiders op zich nemen. Staf van de instelling fungeert als coach en “resource person” voor de teams. Per jaar worden zo'n 40 projecten uitgevoerd, waarvoor het bedrijfsleven per project \$38,000 betaalt. De effecten van deze benadering op het onderwijs kunnen als volgt worden gekarakteriseerd:

- Curriculum innovatie door feedback van projectresultaten en ervaringen van zowel studenten als opdrachtgevers.
- Sneller inzicht voor studenten in hun academische voorkeuren en sterke en zwakke kanten, hetgeen tot veranderingen in keuzegedrag leidt: 50% van de studenten kiest uiteindelijk een andere major dan die welke zij bij aanvang van de studie hebben aangegeven als preferentie.
- Een substantiële jaarlijkse bron van inkomsten voor de instelling.
- Een zeer sterke binding met het afnemend veld door het clinic-concept.

Indien dit voorbeeld gekarakteriseerd wordt in termen van Clark's typologie, dan geldt mijns inziens:

- Een relatief sterke ondersteuning door het centraal bestuur van de instelling: onomwonden wordt gesteld dat de hierboven geschetste onderwijsfilosofie het leidend motief is voor het College. Zowel intern als extern wordt dit als zodanig uitgedragen (strong central steering core).
- Een visie die gedragen wordt door de academische gemeenschap; men is overtuigd van het succes van deze benadering (stimulated academic heartland).
- Een open attitude naar de (relevante) omgeving; de instelling geeft zich nadrukkelijk rekenschap van de eisen en wensen van de relevante stakeholders (the developmental periphery).
- En als gevolg hiervan: a diversified funding base (i.e. substantiële inkomsten van buiten op basis van het clinic-concept).

Als kanttekening: ook hier geldt dat het een relatief kleine instelling betreft.

Echter, ook grote instellingen kennen een vergelijkbaar innovatieve benadering ten aanzien van het onderwijsproces. In dit verband kan, wederom als een Amerikaans voorbeeld, de University of Pennsylvania worden genoemd. Deze universiteit valt in de categorie "Ivy League" instellingen en onderscheidt zich van Harvey Mudd zowel in oriëntatie (undergraduate, maar met name ook graduate onderwijs) als in schaal (zeer groot versus relatief klein).

Specifieke kenmerken van de opleidingen in het ir. programma van Penn, die onderscheidend zijn ten opzichte van "reguliere" opleidingen, zijn:

- De grote mate van keuzevrijheid (50% electives, 25% required courses, 25% Humanities & Social Sciences).
- Sterke oriëntatie op beroepsuitoefening (pre-professional).
- Geen engineering core curriculum; studenten worden gedurende het programma gevraagd hun "career goals" onder woorden te brengen – waarom kies je voor dit programma? Advisering minimaal twee keer per jaar door stafleden.
- Veel studenten kiezen voor een dubbele major (die met een relatief geringe extra inspanning kan worden behaald).

Relateren we dit aan Clark's typologie, dan geldt ook voor de University of Pennsylvania:

- Support voor de onderwijsfilosofie door het centraal bestuur van de instelling.
- Groot draagvlak onder de academische staf voor de gekozen onderwijskundige benadering.
- Acceptatie van de gekozen benadering door het "afnemend veld": sterke interactie met het bedrijfsleven, onder meer blijkend uit een geavanceerd systeem van "career

services”: de geoptimaliseerde vorm van onze bedrijvendagen. Met andere woorden: een zeer directe relatie met de afnemers van de afgestudeerden.

Wat in beide voorbeelden opvalt is de nadruk op de relatie met het afnemend veld zonder dat de opleidingen hun academische missie verwaarlozen. Nadrukkelijk kan worden gesteld dat het geen veredelde HBO-opleidingen zijn, maar wetenschappelijke opleidingen waar competenties van de studenten vele malen centraler staan dan de inhoud van het curriculum – in onze meer traditionele terminologie de logisch sequentiële opbouw van het curriculum met volgordelijke vakken gebaseerd op de wetenschappelijke visie over wat noodzakelijk kennis is. In beide voorbeelden is een belangrijke rol weggelegd voor de keuzevrijheid van de student, voor het ontwikkelen van kennis en vaardigheden die gerelateerd zijn aan de interessegebieden van de student en die gecorroboereerd worden door acceptatie en waardering door de werkgevers. Het resultaat is een onderwijsproces dat aanspreekt, dat overduidelijk kwaliteit en relevantie heeft, en dat gedragen wordt door zowel staf als bestuur.

De voorzet: indien wij in Nederland de overgang naar een bachelor-master systeem serieus nemen en derhalve zien als een mogelijkheid voor daadwerkelijke inhoudelijke vernieuwing in plaats van de veel genoemde “knip in het programma”, dan kunnen bovenstaande voorbeelden wellicht bruikbaar zijn voor de ontwikkeling van een minder voorgestructureerd, relevanter en aansprekender curriculum, zowel voor studenten als voor de arbeidsmarkt waarvoor wij het merendeel van de studenten nog steeds opleiden. Zoals ook in de andere bijdragen aan deze discussiemiddag is aangegeven, gaat het dan veel meer om competenties van studenten en afgestudeerden, dan om de zeer specifieke vakinhoud van onderdelen van het curriculum. Dat dit een tamelijk fundamentele en feitelijk revolutionaire aanpassing en heroriëntatie van de huidige staf én veelal het bestuur vereist (zie ook verder) moge duidelijk zijn.

4. Innovatief onderzoek: de tweede voorzet

Wat geldt voor het onderwijs geldt eveneens voor het onderzoek: er zijn traditionele benaderingen en wat wij momenteel beschouwen als meer innovatieve benaderingen. Wat dit laatste betreft wordt veelal verwezen naar de transitie van “mode 1” naar “mode 2” onderzoek. Kort door de bocht geformuleerd komt dit neer op het sec bepalen van onderzoeksprioriteiten door academici (mode 1) dan wel door academici in interactie met relevante stakeholders (mode 2). Voor een meer uitgebreide conceptuele verhandeling, zie Michael Gibbons *et al.*, xxx.

Het onderscheid mode 1-2 wordt zoals gezegd veel gebruikt, maar ook bekritiseerd als oude wijn in nieuwe zakken. Ik ben zelf van mening dat dit laatste inderdaad het geval is, want de tegenstelling is te scherp om vanuit een historisch perspectief houdbaar te zijn. Dit laat echter onverlet dat de verandering die wij in het internationale onderzoekslandschap kunnen waarnemen ontegenzeggelijk belangrijk zijn en impact hebben. Met behoud van aandacht voor fundamenteel onderzoek komen vragen van relevantie en bruikbaarheid (utiliteit) meer en meer pregnant naar voren. En worden onderzoekprogramma's zowel regionaal, nationaal als supranationaal, meer en meer geformuleerd in samenspraak met voor de betreffende disciplines relevante stakeholders.

Het meest aansprekende internationale voorbeeld in dit verband is Finland. Een case die ook wel badinerend wordt geduid als de “Nokianisering” van het Finse onderzoek. Voor een meer gedetailleerde analyse verwijst in korthedshalve naar appendix 3. Kern van de zaak is echter een duidelijk centraal georchestreeerde push om hoger onderwijsinstellingen meer relevant te maken voor regionaal-economische ontwikkeling. Een succesvolle ontwikkeling die inderdaad heeft geleid tot een “expanded developmental periphery” om in Clark’s terminologie te spreken. Gedwongen door financiële schaarste én door de expliciete wens van stakeholders uit zowel de overheidssector als uit de private sector, kunnen in veel gevallen trends worden geïdentificeerd die resulteren in:

- meer bereidheid van HO-instellingen om hun onderzoeksprogrammering mede te richten op de wensen (en soms eisen) van industriële partners;
- facility-sharing;
- deeltijdaanstellingen van mensen uit het bedrijfsleven bij HO-instellingen;
- uitbreiding van stage- en afstudeermogelijkheden voor studenten; en

- door het bedrijfsleven gesponsorde promotietrajecten.

Voor zover onze (i.e. Cheps) kennis en inzichten reiken, zijn dit tamelijk universele trends die in meer of mindere mate in alle geïndustrialiseerde samenlevingen zijn te onderkennen. Waar echter nog nauwelijks sprake van is, is een ontwikkeling naar “mode 3” waarbij daadwerkelijk sprake is van integratie tussen hoger onderwijs en industrie in termen van gezamenlijke programmaontwikkeling, joint-ventures, etc. In hoeverre een dergelijke ontwikkeling wenselijk is zal nog lange tijd een punt van discussie blijven. Feit is echter dat het hoger onderwijs zich langzaam maar zeker wel veel duidelijker open stelt voor “relevant” onderzoek, maar dat tegelijkertijd ook van de kant van het bedrijfsleven een zekere reserve valt te constateren om daadwerkelijk te investeren in een hoogwaardige infrastructuur die uiteindelijk tot daadwerkelijke innovaties zou kunnen leiden.

In Clark’s typologie: de developmental periphery ontstaat meer en meer, in een aantal gevallen is ook duidelijk sprake van een sturing en ondersteuning hiervan op het centrale institutionele niveau, maar het vinden van een adequate voedingsbodem in het “academic heartland” is nog wel eens moeilijk en het commitment van de “industrial periphery” is ook niet altijd even eenduidig. Variatie voert wat dit betreft de boventoon over eenduidige trends.

5. Tot slot: bestuur en management; de derde voorzet

Een boeiend fenomeen in het hoger onderwijs is de relatie tussen het centrale bestuur en de base units waar het daadwerkelijke werk wordt verricht. Traditioneel gelden hier geheel verschillende opvattingen over welk type relatie wenselijk is. Het aloude “conservatieve” standpunt is dat het centrale bestuur er is om te zorgen dat de financiële middelen bij de academische eenheden komen, dat het gras wordt gemaaid en dat de lichten branden – de nihilistische functie. Oftewel: blijf af van de primaire processen. Een tweede standpunt is dat het centrale bestuur een faciliterende functie heeft: creëer de optimale condities opdat de primaire processen kunnen floreren, maar mijdt inhoudelijke bemoeienis (de hoger onderwijs verse van de nachtwakerstaat). Het derde standpunt is er een van gelimiteerde interventie: om een HO-instelling daadwerkelijk meer dan de som der delen te maken is een zekere mate van pro-actieve sturing wenselijk en noodzakelijk. (zie appendix 4 voor een kritische beschouwing over een HO-instelling als een stelsel van absoluut autonome eenheden).

Het gaat derhalve om de juiste mix van sturing/coördinatie vanuit het centraal instellingsniveau versus de noodzakelijke flexibiliteit en adaptief vermogen op decentraal niveau. Hier doet zich mijns inziens in toenemende mate een probleem voor. Het principe van een relatief sterk bestuur in de zin van afgewogen sturing staat in zekere zin op gespannen voet met de internationale ontwikkeling naar meer “managerialism” in het hoger onderwijs. Een ontwikkeling die enerzijds gevoed wordt door de toenemende accountability verplichtingen die veel nationale overheden aan hun hoger onderwijsinstellingen opleggen en anderzijds tot stand komt onder invloed van toenemende concurrentie en marktwerking. In een veelheid van gevallen leidt dit tot een bestuurscultuur die in meer of mindere mate een afspiegeling is van de bestuursstijl in het bedrijfsleven. Het is de vraag in hoeverre dit past bij de cultuur en structuur van hoger onderwijsinstellingen.

Mijn subjectieve inschatting is dat in toenemende mate sprake is van een spanning tussen centraal geformuleerde beleidsintenties en acceptatie en implementatie hiervan op het decentrale niveau. Wederom in termen van Clark’s typologie: het concept van het “stimulated academic heartland” klinkt aantrekkelijk en theoretisch zelfs aannemelijk, maar in de praktijk vallen vraagtekens te plaatsen bij de realisatie, de positieve case-studies die in de voorgaande paragrafen zijn genoemd daargelaten. De consequentie die hieraan verbonden kan worden is uiteindelijk een vrij grondige herbezinning op de

mogelijkheden om hoger onderwijsinstellingen daadwerkelijk “met gevoel” te managen en innovaties daadwerkelijk op decentraal niveau te laten beklijven.

Appendix 1: Projectvoorstel “Quick Scan” ten behoeve van onderzoeksproject “Vaardig Innoveren”

Doelstelling: het in kaart brengen van “best practices” of “opvallende benaderingen” die universiteiten en/of andere hoger onderwijsinstellingen, nationaal en internationaal, hanteren in hun onderwijs- en onderzoekprocessen waardoor duidelijk wordt dat zij bijdragen aan het vormen en opleiden in competenties op basis van een transdisciplinaire en innovatieve aanpak.

Werkwijze: op basis van de kennis en inzichten die bestaan binnen Cheps ten aanzien van bovengenoemde karakteristiek zal een aantal cases binnen Nederland en daarbuiten worden geselecteerd. Voor wat betreft het buitenland wordt gebruik gemaakt van de contacten die Cheps heeft in de hiervoor in aanmerking komende hoger onderwijssystemen. Voor zover onze kennis het thans toelaat, zullen ieder geval de Verenigde Staten, Finland en Noorwegen in het onderzoek worden betrokken. Het ligt in de bedoeling tussen de vijf en tien cases te selecteren – een en ander afhankelijk van de beschikbaarheid van gegevens – en voor deze cases een “quick scan” uit te voeren. Centrale vragen hierbij zullen zijn:

- Hoe valt de transdisciplinaire en innovatieve aanpak te duiden?
- Wat heeft er toe geleid binnen de instelling voor deze aanpak te kiezen?
- Wat zijn de effecten tot op heden – in hoeverre draagt de gekozen aanpak bij aan veranderende competenties bij studenten?
- Zijn succes- en/of faalfactoren te identificeren?

Gegeven de aard en omvang van het project gaat het niet om gedetailleerde analyses en diepgravende case studies. Centraal staat een schets van ontwikkelingen en mogelijke uitkomsten/effecten van universiteiten of andere hoger onderwijsinstellingen die een bepaalde vernieuwingsslag aan het maken zijn of gemaakt hebben in de richting van de “integratieve” of de “actief lerende en onderzoekende” instelling (terminologie van Leiblein, Francis & King). Dit duidt op instellingen die een daadwerkelijke interactie met hun omgeving tot stand hebben gebracht in hun primaire processen. Uiteindelijk zullen de case studies moeten leiden tot een soort van referentiekader voor mogelijke aanpakken en ontwikkelingen in de Nederlandse situatie, uitgaande van de kaders waarbinnen het project “Vaardig Innoveren” valt.

Rapportage: eind september 2000 zal de rapportage worden opgeleverd. Medio september zal overleg plaatsvinden over het concept van het rapport. De bedoeling is de rapportage zodanig vorm te geven dat het als hoofdstuk in het uiteindelijke verslag van het project "Vaardig Innoveren" kan worden opgenomen.

Appendix 2: Scan of innovative institutions with high levels of co-operation with surrounding environment

Sweden: University College Karlskrona/Ronneby

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

One of the university's main aims is to work closely together with the surrounding environment, and to contribute to the development of the area in terms of providing highly qualified graduates and (useful) research and development. To this end the institution also has close contacts with two networks which serve businesses, start-ups, etc. The surrounding area supports a lot of small companies and a business park. It appears that the university provides (contract?) teaching for businesses, etc. through these networks. The networks are also involved in start-ups and technology incubator projects.

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

According to a recent (2000) survey of the National Agency for Higher Education, the University College of K/R is one of the higher education institutions that makes the most money from providing contract undergraduate teaching. Approximately 17% of its undergraduate teaching budget come from contract teaching. (National Agency for Higher Education, 2000, English report).

research (innovative/multidisciplinary approaches, contact with industry, etc.)

The university's main emphasis is on technology, and due to the applied nature of the institution as a whole many departments have extensive contacts with industry. Approximately half of the research carried out is conducted in the form of collaborative projects with commercial organisations.

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

Stress on project teaching/learning through working on real problems. In this sense there is a connection between research and teaching, because the education stresses problem solving used in research.

What aspects can be described as innovative/multidisciplinary? (different from above?)

Some of the educational programmes stress working on practical problems. Real problems from industry are presented in laboratory work (such as in the area of computer science). This makes the education very relevant for industry.

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

What effects can be seen of this approach? Is there evidence of different competences of graduates?

The educational approach taken by many departments which stresses realistic problems means that the graduates are well prepared to enter the labour market.

Is it possible to identify factors leading to success/failure?

High rate of success of graduates finding work.

Finland: University of Oulu

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

According to the university's mission statement, "international links and co-operation with local industries and businesses form an essential and integral part of the university's teaching and research activities." The university seeks to promote distance education, and to use this as a link with the working world. The university supports a "team of educational technology" which assists with this.

research (innovative/multidisciplinary approaches, contact with industry, etc.)

In 1996 a multidisciplinary research centre was initiated in the area of information technology (Infotech Oulu). The aim was to provide special funding for long-term research, and to bring together researchers from different institutes (researchers come from the university and from the Technical Research Centre of Finland, VTT). Close

interaction exists between the centre and industry, and a large percentage of the funding comes from external sources.

In addition, the university promotes exploitation of research results from all departments. A service centre, the Research and Innovation Services, helps promote innovations, regional contacts, and external financing of research.

The Information Processing Science Department offers (undergraduate) programmes, which include extensive project work, which is carried out for the surrounding industry. In addition, the programmes are fairly flexible and allow students to shape their own educational programmes by selecting some courses among a number of alternatives.

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

The most connections exist between research training (PhD) and research. For example, Infotech Oulu (research centre) is also the co-ordinator of a research-training programme. In some departments, however, there is also some emphasis on including research elements in the lower-level degree programmes. The Department of Information Processing Science, for example, offers possibilities for students to participate in international research projects.

What aspects can be described as innovative/multidisciplinary? (different from above?)

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

The need to join forces to pull in research funding and undertake larger research projects was one of the reasons for setting up the research institutes.

What effects can be seen of this approach? Is there evidence of different competences of graduates?

According to university information, three-quarter of the students come from the two northernmost provinces of Finland, and two-thirds of the graduates eventually find jobs in this central and northern area. This shows that the university clearly has an important regional role in supplying qualified personnel to the surrounding area. In addition, it proves that the education provided is appreciated by the regional labour market.

Is it possible to identify factors leading to success/failure?

The research co-operation has led to significantly increased funding from the National Technology Agency (TEKES), and from industry.

Finland: University of Joensuu

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

Co-operation exists with the non-university sector (local AMK or polytechnic). The AMKs focus more on occupational studies. Areas of co-operation include research, teaching and services (library and information services). (Clark, 1998). Multidisciplinary centres have been set up that primarily focus on research and advanced (PhD) training. These centres may also offer field or intensive courses. In addition, these centres offer consultancy and training to local organisations. (Internet information).

research (innovative/multidisciplinary approaches, contact with industry, etc.)

In the departments of physics and forestry, more than half of the research budget started (figures from 1993 and 1995, respectively) to be collected from external sources (rather than from the basic budget) (Clark, 1998).

Faculty of forestry has large number of connections with industry and outside professional bodies, and also to two research institutes. A Forest Research Station was established in the city the same year as the study of forestry was initiated (1981)—eventually they shared facilities. In addition, a European Forestry Institute was set up (1995). (Clark, 1998).

A research institute called the Karelian Institute was set up in the 1990's. This institute is multidisciplinary and researchers from the departments of ecology, social sciences and humanities participate in multidisciplinary projects. (Internet)

In the 1990's a science park was set up (Karelian Science Park) which houses a number of very small spin-off companies. It receives funding from the city, region and the university, and is a part of a national network of institutions and a larger European network. (Clark, 1998).

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

The science faculties have received the largest amount of research funding and also produce the highest number of PhD graduates. Investments used to expand these areas have therefore also been used to increase research training. Social science and

humanities faculties have a lesser share of the research budget, and turn out a higher percentage of initial degrees. (Clark, 1998)

What aspects can be described as innovative/multidisciplinary? (different from above?)

Strength of the forestry faculty has led to social science faculties seeking to strengthen their ties to this programme through environmental studies, economic analysis and social policy.

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

The relative strength and strong development of one faculty of the university (forestry) have meant that other faculties have sought ways of linking up with this one.

What effects can be seen of this approach? Is there evidence of different competences of graduates?

In many cases the graduates of dual programmes (special programmes that combine studies in two disciplines) have an easier time finding work

Is it possible to identify factors leading to success/failure?

Concentration on a few, less expensive areas of study (such as optics in the field of physics) has led to success. In addition, the development of multidisciplinary research and training centres has enabled the attraction of considerable external funding (national and international), and has strengthened regional ties.

USA: Harvey Mudd College

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

Undergraduate teaching involves projects carried out for industry in the form of "clinics". The companies involved develop the project together with the clinic co-ordinator, and students work together to produce a product and final report. The companies pay for the projects to be undertaken. Much of the undergraduate teaching (and many of the clinic projects undertaken) are multidisciplinary in nature, as a systems approach is stressed.

research (innovative/multidisciplinary approaches, contact with industry, etc.)

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

Research is connected to teaching in particular in the clinic projects which is undertaken (see above).

What aspects can be described as innovative/multidisciplinary? (different from above?)

The multidisciplinary approach taken by Harvey Mudd College is obvious in the systems approach which is stressed throughout the curriculum. In addition, all engineering students are required to take a fairly large number of "core courses" (lasting the first year and a half of the programme) which introduce them to a number of engineering disciplines. The main innovative elements in the educational programme are the clinic courses (described above).

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

A focus on educating engineers that can work productively in groups and on complex real-life problems promoted the approach to engineering taken at Harvey Mudd College. The fact that Harvey Mudd College is a small institution competing for the top students has forced it to carefully define its educational programmes and to find ways to make its programmes distinct from those offered by competing (often-larger) institutions.

What effects can be seen of this approach? Is there evidence of different competences of graduates?

Students are taught real-life engineering skills and are introduced to real problems and the culture of the working world (particularly through the clinic courses).

Is it possible to identify factors leading to success/failure?

The focus on a systems (multidisciplinary) approach and on real-life problems makes the Harvey Mudd programme rather unique, and the institution is therefore able to compete with bigger (and more well-known) institutions for the top students.

USA: Pennsylvania University

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

The university focusses on (practical) professional education (in particular in professional fields such as social work, engineering, and business).

Some particular programmes are offered which enable students to combine studies from different fields (example the Bachelor of Arts in Sciences, which combines elements of

engineering and liberal arts programmes). In addition, the fact that most programmes have a limited number of required courses means that students are able to take classes outside of their disciplines and to complete the requirements for two different majors within one-degree programme.

Some of the research centres (for example, the Laboratory for Research on the Structure of Matter) makes a special effort in community outreach by providing educational experiences (courses, seminars, etc.) for local teachers and high school students.

research (innovative/multidisciplinary approaches, contact with industry, etc.)

Many of the university's research activities are also focussed on rather applied areas.

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

There is a connection between research and teaching in terms of the basic professional orientation of the institution as a whole. In addition, some multidisciplinary research centres also provide resources (staff and equipment) for laboratory courses (for example the Distributed Systems Laboratory) or provide regular or special summer undergraduate courses. In this way both the teaching and research functions are important elements of these centres.

What aspects can be described as innovative/multidisciplinary? (different from above?)

The most innovative aspect of teaching is that there are few requirements, and students are enabled (and encouraged) to combine courses from different disciplines within their educational programmes.

The multidisciplinary work (both teaching and research) carried out by the research centres can be described as innovative.

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

The need to compete for the best students with institutions that provide high-quality traditional approach (mono-disciplinary) programmes may have led the institution to offer more flexible, multidisciplinary degrees. In addition, the focus on professional areas of study helped the institution to develop a unique profile.

What effects can be seen of this approach? Is there evidence of different competences of graduates?

The fact that students are able to combine courses from different faculties means that they are able to prepare themselves for specialised careers. For example, students may

combine business studies/management with engineering to increase their competencies as managers.

Is it possible to identify factors leading to success/failure?

Graduates with education backgrounds combining business/management studies with engineering are in high demand on the labour market.

Norway: Norwegian School of Management (BI)

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

There is a large emphasis on interaction with the business world and on practically oriented studies. Of approximately 1,000 faculty members, 650 are part-time lecturers hired from businesses, industry, or the public sector. Particularly in the postgraduate (Master's/PhD) programmes, an international orientation and interdisciplinarity are stressed. The international MBA programme includes case-based education (based on realistic problems) in 40% of the programme, as well as a "strategy project" lasting 5 months where students work on problems together with companies. The MBA programme stresses teamwork, leadership and the development of interpersonal skills.

research (innovative/multidisciplinary approaches, contact with industry, etc.)

There is not a lot of information available about the research function or research finance of the institution.

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

The Norwegian School of Management (BI) has, over many years, incorporated many small institutions, and can be described as being a network of regional colleges. There is, however, a main campus that is the headquarters for the whole school. Most of the permanent academic staff and research activities are housed there. It can therefore be concluded that not all of the teaching (particularly at the other sites) has connections with research. There is a greater emphasis on the connection between teaching and the real world of business.

In addition, the research training function of the institution does not have a long history, as it started in 1995 with the establishment of doctoral programmes in co-operation with the University of Oslo and Copenhagen School of Economics.

What aspects can be described as innovative/multidisciplinary? (different from above?)
In 1992 the Master of Management Programmes were established in an effort to expand the institution's continuing education function. These programmes aim specifically to be useful to people working in the field.

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

Part of the reason for the practical approach is due to the fact that the institution grew out of an evening school which was a consulting company and offered courses. The roots are therefore deep in the practical world of business.

What effects can be seen of this approach? Is there evidence of different competences of graduates?

Is it possible to identify factors leading to success/failure?

Norway: Norwegian University of Science and Technology (NTNU), Trondheim

In what ways does the institution work together with surrounding environment? (teaching, research, consultancy):

teaching (innovative/multidisciplinary approaches, contact with industry, etc.)

NTNU focuses on multidisciplinary and relationships with society in both the research and teaching functions. Courses are given in entrepreneurship, and multidisciplinary programmes are offered. In addition, continuing education has been rapidly expanding—including courses that are available for private companies and governmental organisations.

research (innovative/multidisciplinary approaches, contact with industry, etc.)

NTNU has been active setting up a number of multidisciplinary research institutes and initiating a number of large multidisciplinary research projects. Many of these are funded by industry (for example, through a consortium of industrial companies in the framework of a programme called the Industrial Fund for Innovation). In addition, through several initiatives (collective organisations representing industries, etc.) the university has formalised its relationships with external organisations. Various types of support are available for spin-off and innovative/entrepreneurial initiatives (such as a business development programme in which entrepreneurs are helped with patenting and licensing, the use of laboratories and equipment, etc.).

NTNU co-operates closely with SINTEF (which is one of the largest independent contract research institutions in Europe) and with Allforsk (an independent research institution for the arts, sciences and related fields). One of the aims of these two organisations is to bridge the gap between academia and industry.

Productivity 2005 is an 8-year, multidisciplinary research project that aims to strengthen the manufacturing industry in Norway (funded by the Research Council of Norway).

To what an extent can it be said that there is interconnectedness between the research and the teaching functions?

Many of the connections between research and teaching occur at the postgraduate level. Some of the research centres have a specific focus on certain aspects of teaching (for example, the Medieval Studies Centre is involved with the instruction of researchers).

New interdisciplinary study programmes are being developed within areas of study related to four main areas of research, which have been developed within the framework of the Industrial Fund for Innovation, funded by a consortia of industrial companies.

NTNU has links with a number of national research laboratories, which are located in Trondheim.

What aspects can be described as innovative/multidisciplinary? (different from above?)

What factors (within the institution) led to the choice of an innovative/multi-discipl approach?

The institution has certainly benefited from an increase in research funding due to the openness to interdisciplinary approaches. There is evidence that this approach is gaining momentum at the institution and spreading to other areas of the institution (for example multidisciplinary educational programmes are now being developed in specific areas).

What effects can be seen of this approach? Is there evidence of different competences of graduates?

Unfortunately, no information is available on employment rates or competences of graduates.

Is it possible to identify factors leading to success/failure?

The multidisciplinary approach has enabled NTNU to attract considerably more research funding.

Appendix 3: The Finnish case

In: Jon File & Leo Goedegebuure (2000), *Thinking about the South African Higher Education Institutional Landscape*, excerpt from chapter 5: Higher Education in the Service of Society: The Structural Reforms of the Finnish Higher Education System, by Seppö Hölltä, pp. 86-88.

4. Further integration of the higher education structures to the regional development infrastructure

4.1 Higher education and industrial development

As seen earlier, higher education and academic research have been regarded as one of the main national resources in the balanced development of the country for the whole post-war period. The specific policies have varied over the decades and reflect the general political lines of thinking. Two main structural reforms have featured in Finland higher education. Decentralising the system and establishing new universities to sparsely populated provinces made the implementation of the expansion of the university system and the consequent transfer to mass higher education since the 1960s. These universities have now reached academic maturity. Another main system level structural reform, still under implementation, is the establishment of a non-university sector composed of regional AMK institutions providing vocational and professional programmes. Both reforms reflect the thinking of integrating labour market and industrial development with educational development. The very recent developments show that the decentralised educational and research infrastructure will, maybe, even tighter than ever be integrated with the other organisational components of regional development.

Government's strategy has been to build up regional, i.e. provincial, development infrastructures and environments for co-operation between three groups of agents, i.e. higher education institutions, regional government offices, and associations of municipalities. An important external reason for this reorganisation has been that Finland joined the European Union and the effective use of the structural development funding pushed different regional actors and central government to look for a new model for co-operation to exploit the new possibilities.

According to the *Finnish Governments white paper on industrial policy*, regional policy and the competitiveness of regions have become major factors in determining economic competitiveness, growth and employment trends. The rapid technology progress in

recent years and increasing specialisation of manufacturing processes have increased the benefits of geographical concentration to regional centres, the towns where the development activities were started in the 1960s. This has made urban areas, also in the regional sense, increasingly attractive sites for high-tech industries. Greater international competition and the state's tight financial position highlight the economic significance of regional growth centres as part of the balanced regional development of the country.

4.2 Organisation of regional developments in the 1990s

Fifteen *Regional Employment and Economic Development Centres* were established in 1997. They provide services to regional business, farming, and individuals. The Ministries involved are the Ministry of Trade and Industry, the Ministry of Agriculture and Forestry, and the Ministry of Labour. Before, each of the Ministries provided the services through its own regional unit.

In addition to contributing to the overall development of the regions, the specific tasks of the centres are to support and advice small and medium sized enterprises in different phases of their life-cycle, promote technological development of companies, assist them in export and internationalisation, implement regional labour policy plan and organise training and education for adults in terms of the official labour policy, and promote farming and rural industries, develop fisheries.

The centres co-operate with universities and AMK institutions, e.g. by buying adult education services for their clients. Technology research and transfer activities are an area for co-operation as well.

In the late 1980s and 1990s, technology centres were established in most university towns in Finland for the function of technology transfer. Technology centres together with universities, later also with AMK institutions, research institutes, and organisations of the business community are the main actors in the structure of a national regional development initiative known as *Finnish Centres of Expertise Programme*.

The first eight regional Centres were established in 1994 to promote a new regional development strategy based on the exploitation of scientific knowledge and research at universities. By the *Act of Regional Development 1999-2006*, government nominated 14 regional and two nation-wide networks in 1998 for the implementation of the Centre of Expertise programme co-ordinated by the Ministry of the Interior. The goal of the national programme is to improve competitiveness of different regions and to increase products, enterprises and jobs based on top technology or high expertise. Sectors of expertise comprise the major fields of technology and knowledge development, like biotechnology, electronics, information technology and

telecommunication, energy and environment technology, paper manufacturing, technology, and forestry and forest technology.

4.2.1 *Examples of the new role of universities and AMKs in regional development infrastructure*

The Carelian Science Park co-ordinates the *Centre of Expertise in Wood Technology and Forestry*. Its activities are closely connected with the Faculty of Forestry of the University of Joensuu. A close partner of the University in the same town is the North Karelia Polytechnic, which has a wood technology programme and co-operation with regional companies. Additional regional components in wood technology and forestry know how production are the European Forestry Research Institute and the Joensuu branch of State Forestry Research Institute and other universities, in particular, Lappeenranta University of Technology as a technical and business university. The purpose of the Centre of Expertise is to improve business opportunities requiring high expertise and to increase business activities related to utilisation of forests assets, high-level and profitable processing of wood raw material in wood industry as well as to environmental know-how in forestry and forest industry. Through the programme, the Centre provides resources for regional development by utilising top expertise of universities, AMKs, and research units, and operates as a catalyst for human capital required by the concerned business activities.

The North Karelia Information Society Programme (NOKIS) is a regional development programme led by the Regional Council of North Karelia and implemented in co-operation with the University of Joensuu and North Karelia Polytechnic, the cities in the regions, and the organisations representing the business society. The ideology underlying the NOKIS programme emphasises the Social Shaping of Technology, that is, the dialogue between different agents in society; private individuals, different organisations and technological developers. The main objective of the programme is to integrate the regional Information Society Strategy and Action Plan with the regional development. By uniting different regions and key actors in co-operation and by discovering the suitable joint activity arenas, the NOKIS programme is aimed at making North Karelia, still one of the least developed regions in Finland, an "Information Society Laboratory".

Another example, the urban one, is the Helsinki region, where an established company has the role of implementing the *Helsinki Region Centre of Expertise Programme*. Its immediate sphere of influence is estimated to cover over 1000 enterprises, mainly from the region of Uusimaa, a region around the capital area. In addition to the general goals, it has adopted a specific objective is to safeguard the position of the metropolitan

area in international competition and to strengthen its position as the leader of the economic growth of the country.

The fields of expertise included in the programme are adaptive micro systems, gene technology and molecular biology, cultural industry, software product business, and new media. The *Adaptive Microsystems Centre of Expertise* is located in Otaniemi Science Park on the campus area of Helsinki University of Technology, the main concentration of technology research and development in the country. This Centre promotes the development of these fields of technology, commercialisation and initiation of new enterprise activities. Examples of the activities are business development network, such as an entrepreneurship training programme, the business incubators, the seed capital investment fund and a business and innovation centre.

Appendix 4: The entrepreneurial university revisited: Integrating academia and entrepreneurship

Leo Goedegebuure & Frans van Vught²

1. Introduction

In his seminal work *Creating Entrepreneurial Universities; organisational pathways of transformation* Burton Clark presents a flattering case study of the University of Twente. Analysing its institutional development and adaptation over a fifteen year period, he concludes that 'an assertive, forward-looking self-concept, a strengthened administrative core, and a discretionary funding base had borne fruit organisationally in an extended developmental periphery and a much stimulated heartland. Academic basic units had become different from their counterpart in traditional university faculties and departments. If, at the outset, in the early 1980s the strengthened administrative core was the instigating element, 15 years later the extended periphery and the stimulated heartland had become the most important features in the changed institution. The firm ground of Twente's transformation is found in its infrastructure of entrepreneurial units.' (Clark, 1998: 59-60). It is not our intention in this paper to challenge this conclusion, on the contrary. Yet, we would like to reflect on the opportunities and problems that strong entrepreneurial units create for a university that finds itself in a turbulent environment. In doing so, we use the developments at the University of Twente over the period 1995-2000 as a case in point.

It is a fact that the university in the last decennia of the second millennium has found itself confronted with a turbulent environment. Without going into lengthy discussions on this, we point to the main trends that have emerged and that challenge higher education profoundly. First, in many countries strong governmental steering and control have given way to more market-like forms of co-ordination. Consequently, at the institutional level issues of governance, management and administration have become more important. Second, we have witnessed the emergence of the knowledge society which, next to defining knowledge as a commodity, implies that universities definitely have lost their monopoly on the production of knowledge – if ever they have had that monopoly.

² Leo Goedegebuure is executive director of Cheps and special advisor to the Executive Board, University of Twente. Frans van Vught is Rector Magnificus of the University of Twente.

Competition and coalition with knowledge producers *and* providers outside of higher education is inevitable.

Third, globalisation has entered the realm of higher education to stay. Not only as an expansion of the traditional elements of mobility and staff/student exchange, but far more importantly, through the emergence of international and even global inter-institutional networks and alliances, and the evolution of new technologies in the core business of academia.

For universities to survive and prosper in this new environment, adaptation, flexibility, quick-response-time and an outward strategic orientation appear to be essential. Conceptually, we find this engrained in Clark's vision of the entrepreneurial university. The strengthened steering core, the outward orientation through the enhanced development periphery, the diversified and discretionary funding base, and the stimulated heartland all appear to be directly relevant to an adaptive organisation in a rapidly changing environment with new stakeholders. And theoretically, the notions of decentralisation and loosely coupled organisational units are well known. Yet, it is not all-gold that glitters, for the entrepreneurial university also has its problematic side. It is to this that we first turn our attention.

2. The entrepreneurial university: the other side of the coin

In the literature on higher education organisations, a number of key features stand out. These can be summed up as: the strong authority of professional experts with the ensuing extensive involvement of academics in decision-making processes; decentralisation as a consequence of this, with the resulting extreme diffusion of decision-making power; and a clear emphasis on knowledge areas as the building blocks of the organisational structure, with fragmentation as a result.³ The problems evolving from these basic characteristics of higher education institutions also are well known: bottom-heaviness, long response-time, non-decision-making and academic isolation. Though it would be absurd to state that the modern university still has the characteristics of the ivory tower, it would not be unfair to state that a number of the more negative aspects of especially the university organisation still feature. Admittedly in some universities more than in others, but still...

Seen from this perspective, the entrepreneurial university appears as the answer to many of the problems without destroying the nature of an academic organisation, as the incorporation of full managerialism would do. But this only partly is the case. For an entrepreneurial university can become too entrepreneurial and too decentralised. In such cases, the discretionary funding base has become substantive enough to allow the base units to follow their own course of action, without reference to the overall institution. The

³ For an elaboration, see e.g. Frans van Vught (ed.), *Governmental Strategies and Innovation in Higher Education*, London: Jessica Kingsley, 1989.

base units have become self-supporting groups that act as individual entrepreneurs. From a micro-institutional perspective there is nothing wrong with this. High level work is performed in close interaction with relevant outside bodies. However, from a macro-institutional perspective, the ensuing loss of synergy can be dangerous. Cross-disciplinary innovations may be stifled, both with respect to teaching and research because individuals and research groups act predominantly within their own specialisations and interests. Distances between central and decentral units are further enlarged because of diverging interests, and ultimately the institution may move towards disintegration.

2.1 Assessing the University of Twente

It is our perception that the University of Twente in 1996 was not a disintegrated institution, but it displayed tendencies that pointed towards a strong degree of fragmentation. Decision-making was extremely decentralised, funding was strongly devolved, and overall there was a strong sense of individualism. Again, it should be noted that these characteristics *in principle* are well known and inherent to any university. However, there is a subtle difference between specialisation and over-specialisation, between decentralisation and over-decentralisation and between individualism and over-individualism. We maintain the position that in 1996 the University of Twente had become too fragmented.⁴ In particular, this was reflected in the decision-making processes and in the scattered array of academic activities, both with respect to teaching as well as research. In order to overcome the over-fragmentation and ensuing over-specialisation, the Executive Board initiated several actions.⁵ In terms of Clark's terminology, they can be captured under the headings of "strengthening the academic heartland" and "increasing the developmental periphery". We will elaborate this in the next sections of this paper.

3. Strengthening the Academic Heartland

When discussing the academic heartland of the institution, we explicitly refer to both the core academic activities *and* the interaction between academia and institutional administration. Both aspects have featured strongly in the University of Twente in the period 1997-2000. The overarching rationale behind the initiatives taken by the

⁴ For an elaboration, see *The University of Twente; In preparation for the 21th century*, self-study report prepared for the CRE-Institutional Evaluation, Enschede, 1998.

⁵ A specific feature of Dutch higher education is the existence of a triumvirate at the central institutional level, consisting of the Chairman of the Board, the Rector Magnificus and the Vice-chairman. In principle, the Executive Board functions as a collegiate body in which the three persons hold equal positions – no hierarchical structure is operative. For an elaboration, see the next section.

Executive Board was that the collectivity of the institution needed to be re-emphasised. In order to realise this, a Management Team was created to strengthen the links between academia and administration⁶, and institution-wide policies were launched in the areas of teaching and research. Within the framework of this paper, it is impossible to analyse all activities undertaken in detail. Therefore, we have chosen to illustrate the process by focussing on the creation of the Management Team and the introduction of a new, institution-wide, educational concept.

3.1 The Management Team; redefining collective decision-making

Authority within the university rests with the Executive Board, comprised of the chairman of the board, the rector magnificus, and the vice-chairman. As a broad indication of the division of tasks amongst the three members, the chairman is responsible for overall co-ordination, strategy and personnel policy, the rector for education and research, and the vice-chairman for the financial affairs, infrastructure and operational matters. The rector is elected from the university professoriate, the other two members in general are appointed from outside. The Executive Board appoints the Deans of the faculties, after having consulted the respective faculty. The dean is fully responsible for the faculty; he or she is an integral manager. The dean is accountable to the Executive Board and ultimately could be fired by the Board in the case of unsatisfactory performance.

The Executive Board and the Deans together form the Management Team (MT) of the university, an advisory body in which the major strategic issues of the university are discussed. The establishment of the Management Team can be considered the first major innovation that has taken place in 1997 with respect to the governance of the UT. The MT meets on a three to four-weekly basis. Major issues are only decided upon by the Executive Board after consultation in the MT.

The Management Team now has been operative for approximately three years. Overall, the experiences with it are positive. Many of the deans consider it a vast improvement compared to the past situation. In their opinion, the MT is a useful instrument to bring the executive level and the faculties closer together. They also applaud the Executive Board for taking the MT most serious and thus creating a true platform for discussion. In this way, great steps forward have been taken to come to a form of joint, collective decision-making that in the eyes of many is a prerequisite for effective institutional management.

3.2 Refocusing education: introducing the Major-minor concept

⁶ Inspiration for this structure was found in Strathclyde, where the University Management Group (UMG) had proved to be an enduring and effective structure.

In addition to broadening the base for institutional decision-making outlined above, a second major initiative has been the development of a new educational concept for the university: Major-minor. The basic idea behind the Major-minor structure is that a student enrolls in one of our regular programmes. In this he or she will follow a basic education of two to three years, after which the choice for a major and a minor will be made. The major will be one of our current specialisations, but will have the added value that a switch from one programme to a related other programme is possible, thus greatly increasing the flexibility of our programmes. For example, a student who has enrolled in applied physics will have the possibility to choose a major in informatics, rather than being limited in choice to the majors offered by applied physics. Of course this will not be possible for all programmes and majors, but student choice will be increased substantially. Next to the Major, the student selects a minor that is a structured programme comprising half a year of study. At the moment the UT offers some 40 Majors and 30 minors.

The rationale behind this initiative is both internal and external. Internal in the sense that we feel there is a need for broader educated graduates and that our present educational philosophy is too much geared towards specialisation. In addition, at present we under-utilise the possibilities that the university has, given the availability of both engineering and social science programmes. In the past, these have been two worlds largely apart. It has been our intention to bridge this gap through a Major-minor structure, whereby students who major in the engineering sciences are offered the opportunity to select a social science minor and vice versa. By offering the possibility for such a “paradigm shift” we believe our graduates will have an advantage over others because they have experienced the “different worlds” which in their working life they will be confronted with very regularly.

This brings us to the external argument for the Major-minor structure. We believe it gives us a unique selling point, and thus enables us to take a far more visible place in the Dutch higher education landscape than has been possible previously. The initial reactions from students, employers, the Minister and the political parties to our new educational concept all have been very positive.

3.3 An evaluation: to what extent has the Academic Heartland been strengthened?

It is our – admittedly subjective – perception that through the various institution-wide initiatives that have been set in motion over the last years, the academic heartland to an extent has been strengthened. With respect to decision-making, the Management Team has been an improvement compared to the pre-1997 situation. Yet, one has to be fair in admitting that further improvements can be made. On the part of the executive, a more

pro-active role still can – and should be – taken in the sense of using the MT more in the early stages of policy development. At present, many of the policy issues still are being prepared and discussed at length within the executive and the administrative departments before they are presented to the MT. Involvement of (committees of) the MT in the earlier stages of policy development could lead to a further – and stronger – incorporation in the UT academic community. For this to happen, however, it also is necessary that the deans themselves act more as representatives *and* part of the central collective decision-making structure of the university. From time to time we still witness the phenomenon whereby a dean supports a particular policy issue in the MT but when “back” in the wombs of the faculty distances himself from the issue – there are no female deans in Twente. Obviously, this does not strengthen the notion of comprehensive collective governance. A mitigating factor in this, of course, is the fact that the deans still have to come to terms with their new management position, both at the faculty and the central level. Despite this, as stated above the MT is perceived as a success in bringing the executive and academic levels closer together and more in interaction, thus creating a stronger sense of a university community.

The latter certainly has been the case with respect to the introduction of the Major-minor concept. Not only has the university community endorsed the institution-wide adoption of a new education concept, the consultative and bottom-up process by which it has been implemented has brought many groups of academics together that previously worked rather independently. In particular this has been the case for the development of the minor programs. More than half of the thirty-plus minor programs has been newly created “from scratch” and involved teams from different faculties. Thus, truly interdisciplinary programs have been created on the basis of innovative ideas from the faculty. Innovations that would not have been possible if the faculty had continued to operate solely on their own turf and in their own specialisations.⁷ Thus, we believe it fair to state that the introduction of the Major-minor concept indeed has strengthened the academic heartland of the University of Twente.

4. Strengthening the developmental periphery: ICT as the binding factor

As one of the key exponents of its entrepreneurial and innovative nature, the University of Twente has been one of the leading institutions in the development and dissemination of information and communication technology in the Netherlands over the past decade. Amongst others, this has resulted in the establishment of the Telematics Research Institute on campus – a joint venture between 18 industries and 5 knowledge institutes, including

⁷ For an overview of the new minor programs, see www.utwente.nl

the UT, focused on the quick transformation of fundamental research in the area of telematics to market-oriented application. In addition, the UT has its own centre of excellence in telematics and information technology (CTIT), and a vast number of spin-off companies as a result of its entrepreneurial activities. In an attempt to position itself as *the* leading university in this vastly competitive area, a number of concerted actions have been undertaken over the last four to capitalise on the UT's existing strengths. Foremost in this has been the incorporation of existing individual contacts and links with relevant industrial partners into a strong national network structure. Under the banner of the "ICT Dinner" this has brought together leading industrialists and key UT-academics. Its direct results have been a strong expansion of ICT-companies locating themselves on UT's Business & Science Park, increased joint research activities of these industries and UT-faculty, the start of new programs, including majors and minors in this area, and the establishment of the UT as a "test-bed" for innovative ICT-applications. As an example of this, from September onwards the "wireless-campus project" will be started in which staff and students will be provided with the latest generation mobile phones to test the so-called wireless application protocols (WAP-technology) developed by our industrial partners.

The focus on ICT as a binding factor not only has resulted in a strong and intensified external network, it also has had its effects on the "internal" processes at the UT. As a result of the pioneering work of our faculty of Educational Science and Technology in the area of electronic learning space, the UT has launched a program, [Campus+](#), whereby all education programs of all faculties over the next few years will be located within a uniform electronic learning space, making teaching more or less time and space independent.

Where these activities differ from the ones undertaken prior to 1996 is that it now is the university as such that participates rather than individual academics and/or faculties and research institutes. By joining forces and by generating the synergy that was more or less dormant until then, it has been possible to form a strong consortium with the leading industries that works to the advantage of both our partners and ourselves. In terms of Clark's terminology, we have strengthened our periphery by strengthening our core.

5. Conclusion

The examples provided in the previous sections are but some of the activities that have been started over the past years to re-integrate the University of Twente. The idea is *not* to centralise a strongly decentral university, for it is recognised that a decentral structure enables the base units to react and adapt to changes in our environment effectively. This

should not be lost. What has been pivotal in the changes brought about is the recognition that while maintaining a decentral and loosely coupled organisational structure, a degree of central co-ordination and stimulation is necessary to maximise synergy. Foremost, this requires close collaboration between the executive and the academic core of the institution – the strengthened heartland. As Bob Clark recently has rephrased is, collegial entrepreneurialism can be considered an essential characteristic: “... sustainable entrepreneurialism in higher education, while admitting individual expression, has to be heavily collegial of co-operative in nature.”⁸

By consciously introducing institution-wide projects in Twente, an attempt has been made to operationalise this concept. Though change always is slow in academic institutions, we believe that we see a change-taking place from a fierce individual entrepreneurial culture to one in which entrepreneurship becomes an integral feature of the academic culture of the University of Twente. A culture that is characterised by innovation and collaboration, both with partners within and outside the university. To what extent this change is lasting, remains to be seen. But the seeds have been planted. Given the fertile soil of high academic quality in combination with an entrepreneurial and innovative orientation, and with the help of careful nurturing, some wonderful flowers should bloom.

⁸ Burton R. Clark, Collegial Entrepreneurialism in Proactive Universities; Lessons from Europe, *Change*, January/February 2000: 19.

Overzicht deelstudies

1. Vaardig innoveren: de uitgewerkte probleemstelling. Een verkenning van academische competentie bij systeeminnovaties.
Auteurs: J.W.G. Geerligts en R.J.M. le Rütte
Stoas Onderzoek, Wageningen
2. Competenties voor gebiedsgerichte vernieuwing.
Auteur: C.M. Volker
Alterra, Wageningen
3. Case Agrosector; ECR-Koelvers.
Auteur: D.A.J.M. Stijnen
ATO, Wageningen
4. Competenties tussen innovatie en universiteit.
Auteur: J. Onstenk
CINOP, Den Bosch
5. De innovatieve universiteit.
Auteur: L. Goedegebuure
CHEPS-UT, Enschede