

**Higher Education in Regional and City
Development**

Rotterdam, The Netherlands



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2010



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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Foreword

Universities and other higher education institutions can play a key role in human capital development and innovation systems in their cities and regions. Reviews of Higher Education in Regional and City Development are the OECD's vehicle to mobilise higher education for economic, social and cultural development of cities and regions. They analyse how the higher education system impacts local and regional development and assist in improving this impact. They examine the higher education institutions' contribution to human capital and skills development; technology transfer and business innovation; social, cultural and environmental development; and regional capacity building. The review process facilitates partnership building in regions by drawing together higher education institutions and public and private agencies to identify strategic goals and work together towards them. To know more about the OECD review process and requirements, visit Higher Education and Regions' website at www.oecd.org/edu/imhe/regionaldevelopment.

These reviews are part of a wider multi-annum work of higher education in cities and regions co-ordinated by the OECD Programme on Institutional Management of Higher Education (IMHE). In 2004-07, the OECD/IMHE conducted an extensive study with fourteen regional reviews across twelve countries. This resulted in the OECD flagship publication *Higher Education and Regions: Globally Competitive, Locally Engaged* (OECD, 2007) with recommendations to benefit both higher education institutions and national and regional governments. In 2008, the OECD/IMHE launched a second series of OECD Reviews of Higher Education in Regional and City Development to address the demand by national and regional governments for more responsive and active higher education institutions. As a result, 14 cities and regions in 11 countries underwent the OECD review process in 2008-10. The reviews are carried out by the OECD/IMHE in collaboration with international organisations and associations and other OECD programmes and directorates. This work also supports the OECD Innovation Strategy and OECD Green Growth Strategy.

This OECD review of the Rotterdam is part of the second round of OECD reviews of Higher Education in Regional and City Development.

Acknowledgements

This publication draws on interviews carried out during a week-long review visit in 8-13 November 2009, on the findings of the City of Rotterdam Self-evaluation Report and using additional information provided to the review team. The OECD Review Team had a full and intensive programme and was received openly by a wide range of stakeholders. The team had the benefit of an extensive and reflective Self-evaluation Report. The report went beyond description to postulate a number of hypotheses about regional strengths and weaknesses, which the team members were able to test.

The team wishes to express its thanks to the Regional Steering Committee, the Chair, Marco WAAS and the Regional Co-ordinator, Monique de Knegt.

This publication was co-ordinated by Richard Yelland (OECD/IMHE). The other members of the Peer Review Team were Patrick Dubarle (former OECD Secretariat), Lauritz Holm-Nielsen (University of Aarhus, Denmark); Bjørn Asheim (Lund University, Sweden); Véronique Timmerhuis (Social and Economic Council, the Netherlands)

Further details about the Review Team can be found in Annex 1 of this report. Rachel Linden supervised the publication process.

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List of Acronyms

AMU	Academic Medical Centre
AWT	Advisory Council for Science and Technology
CPB	Netherlands Bureau for Economic Policy Analysis
EUR	Erasmus University Rotterdam
GNI	Gross National Income
HAVO	The HAVO (<i>Hoger Algemeen Voortgezet Onderwijs</i> , "higher general continuing education") has five grades and is attended from age twelve to seventeen. A HAVO diploma provides access to the HBO sector of tertiary education.
HBO	<i>Hoger Beroeps Onderwijs</i> , higher professional education
HBO-Raad	HBO Council, the central body representing higher professional institutions
Hogescholen	Tertiary institutions providing higher professional education
HOOP	Higher Education and Research Plan (<i>Hoger Onderwijs en Onderzoek Plan</i>)
KNAW	Netherlands Royal Academy of Sciences (<i>Koninklijke Nederlandse Akademie van Wetenschappen</i>)
MINEZ	Ministry of Economic Affairs
MBO	MBO (<i>Middelbaar Beroeps Onderwijs</i> , literally, "middle-level vocational education") is oriented towards vocational training. Many pupils with a VMBO-diploma attend MBO. MBO lasts three to four years. After MBO, pupils can enrol in HBO or enter the job market.
NWO	The Netherlands Organisation for Scientific Research
NVAO	Netherlands-Flanders Accreditation Organisation
OCW	Ministry of Education, Culture and Science
PPP	Purchasing Power Parity
Pieken in die Delta	Programme of support aimed at strengthening the Dutch economy by targeting resources onto pockets of economic excellence.
RAAK	The Regional Action and Attention for Knowledge programme

	which aims to strengthen the relationship between UAS, regional training centres and SMEs to transfer knowledge
SME	Small- and medium-sized enterprises
TUD	Technical University of Delft
UAS	University/ies of Applied Science (<i>Hogeschool</i>)
VSNU	The Association of Universities in the Netherlands, representing the 14 Dutch research universities
VWO	<i>Voorbereidend wetenschappelijk onderwijs</i> , "preparatory scientific education") has six grades and is attended from age twelve to eighteen. A VWO diploma provides access to the WO sector of tertiary education.
VMBO	<i>Voorbereidend middelbaar beroepsonderwijs</i> , "preparatory middle-level applied education" lasts four years, from the age of twelve to sixteen. It combines vocational training with theoretical education.
WO	Research-oriented education (<i>wetenschappelijk onderwijs</i>)

Key recommendations

The principal recommendations and suggestions made to the key actors in the Rotterdam region in this report are summarised here. Each is considered in greater detail in the subsequent chapters.

- Articulate and adopt a shared story and a common strategy for the development of the region for which all the key actors can feel ownership and in which the municipality takes a clear leadership role.
- Identify the elements of a regional innovation system which is more demand led and coherent. This should include improved communications and interactions between sub-national levels of government and higher education institutions and a more explicit recognition of their role in regional development.
- Expand lifelong learning by developing programmes aimed specifically at adult learners and by encouraging their participation in existing tertiary education programmes.
- Exploit the flexibility offered by the binary system to align capacities of higher education institutions and the supply of graduates to the expectations and needs of business and industry.
- Stimulate the market for high quality education and training through targeted demand side financing initiatives.
- Review the role and impact of *lectoraten* in the region in the context of expectations of them.
- Accelerate efforts to provide education and training opportunities to first and second-generation non-Western migrant students.
- Consider the scope for developing a more systematic approach to service learning involving education institutions and the community.

- Improve co-operation and coordination between the higher education institutions – both between the two research universities and between those universities and the universities of applied science.
- Take advantage of the research and innovation potential of the universities of applied science to focus on small and medium-sized enterprises.
- Foster innovation through a limited number of clusters built on the regions inherent strengths and values – of which the port-industrial complex is only one – others could be the medical and care cluster, and the creative industries.
- Exploit the opportunities offered by the seaward shift of port activity to redevelop brownfield sites for recreational purposes.

Chapter 1: Analysis and conclusions

This chapter summarises the analysis made and conclusions reached by the OECD team which visited Rotterdam. As with other reports in this series the focus of it is on the mobilisation of higher education for economic, social and cultural development. It is not specifically to benchmark Rotterdam against a set of other cities, nor to evaluate its performance against established criteria. Rather the aim is to review what Rotterdam is trying to achieve in a regional, national and global context and to offer advice on how the city might move forward.

1.1 Only connect

The recurrent theme of our report is connection. Outside the Netherlands Rotterdam is best known for its port – once the busiest in the world, and still the busiest in Europe. This port remains the transit point for much of Northern Europe’s manufactured exports, but it has become above all a place through which the world’s manufactures enter Europe. The port of Rotterdam is a key node on one of Europe’s main arteries, making the connections that permit trade and economic activity.

This economic reality must not be lost sight of. But there is another reality – the connection between Rotterdam and its port has become increasingly tenuous. This is strikingly revealed by the aerial photographs displayed in the Port Authority building showing the site of the multimillion Euro development which will further extend the port to cater for ever larger vessels. It is 40 kilometres from the former headquarters of the Holland-America line, now itself a hotel and restaurant. The port has grown and evolved, as it must, but it has also moved a long way downstream.

Parts of the historic old harbour were converted into a place for public housing in the 1960s. More recently the districts on the south side of the river have been linked to the old heart of the city by the Erasmus bridge and are taking on a new life. Innovative restaurants, craft workshops and gyms replacing the wharves, warehouses – and whorehouses - which abounded there until a few years ago.

Development continues, and some exciting and creative use is being made of the opportunities that the freeing up of old industrial space has created. Many of these initiatives have the support of the city council and the city’s higher education institutions. Others are the fruit of private enterprise. We visited some of them and were impressed by what we saw and heard. We have described some of this later in our report.

And in between lie areas which have still to find their new vocation – it was not our remit to advise on this, but we would note that the demand for further development of offices, shops and cafes may be limited and that there may be scope for developing an urban park. The recycling of brown-field sites to provide recreational green space has been successfully undertaken in many cities and in the Randstad where space is at a premium there may be much to gain.

Beyond the economic geography are the people. Many of those who are deeply involved in the programmes and projects that we saw are a younger segment of the population, a population that is often of non-Western origin.

White or black, they do not feel the same connection to the old Rotterdam as the children of those who worked there one, two or three generations ago. They bring a different dynamic – one that is more attuned to design and the creative industries than to stevedoring and transshipment of goods.

Understanding how best to adjust to this new reality is part of a complex political and social process. Rotterdam's population has grown and changed. It is one of the few cities in Europe where the average age is decreasing. It attracts those from around the world who have suffered and are looking for a new life, and these people bring skills and talents which must be utilised. It would be naïve to pretend that this transformation has been or will be easy. It is beyond the scope of our report to address the whole range of social and political issues that it arouses. We confine our remarks to the role of higher education and the higher education institutions – which include the Technical University of Delft – and how they can further contribute to the future development of Rotterdam and its region, and to connections between all of its people.

The regional political geography is complex. Some would dispute whether the Rotterdam region is a natural demographic entity. Some subsets of the population seem to be rather confined to the region or parts thereof, and others consist of highly educated and highly mobile citizens. The city of Rotterdam itself has a highly diverse population and a challenged tax base because many affluent inhabitants have moved to neighbouring municipalities.

On the other hand, Delft is a separate city with its own aspirations, but where higher education is concerned, Delft University of Technology is clearly a major element of Rotterdam's provision, as well as being an actor on the national and international scene.

1.2 Higher education and human capital development

The Netherlands faces many of the same challenges as other European countries: a shift in focus from traditional physical capital and production factors to less tangible capital, where factors like formal education, lifelong learning, and public-private linkages are key to success. One of the biggest challenges is to ensure a sufficient supply of high skilled labour with competencies that match the needs of industry.

The regional authorities and the higher education institutions in Rotterdam and Delft are operating in a national education policy context which to some extent determines and constrains their scope for action. Chapter 2 of this report describes that context and some of the specificities

of the region. The key national issues were identified by the OECD's recent review of tertiary education in the Netherlands as:

- Strengthening the capacity of the tertiary system for enhanced responsiveness and flexibility to address European and global transformations;
- Greater efforts to integrate first and second generation non-Western migrant populations into the human capital and culture of the nation so as to encourage a more socially inclusive tertiary system;
- A binary system of tertiary education which does not give adequate scope for variation in mission, programmes and modes of delivery within its two parts;
- A relative lack of focus on the lifelong learning dimension of tertiary education.

The OECD review confirmed these insights, notably the relative weakness of lifelong learning policy, the pervasive impact of early tracking and the need to make better use of the potential of those from inhabitants with a non-Western background (see Chapter 3).

The OECD review noted that Dutch tertiary education is relatively weak in national priority setting, in the identification of emerging problems; and the long-term approach to policy. This lack of steering at system level leads to weak alignment of vocational colleges, professional higher education and research universities. Despite this, relations with – and between - the higher education institutions themselves seem to be good, but as is often the case effort is fragmented and tougher economic times may see pressure increase on unsustainable and marginal initiatives.

Provincial and city governments have little or no formal role in higher education but in so far as the region is able to do so we would recommend that it should aim to exploit the flexibility of the binary system of higher education, so as to align the capacities of the institutions and the supply of graduates with the expectations and demands of the industries and businesses which drive growth in the private sector. The public sector of employment is better served, but the higher education institutions would benefit from more direct engagement between its managers and managers in business and industry, perhaps through the supervisory boards.

By making targeted investments in human capital, including in a more coherent higher education system and in lifelong learning programmes, the region can greatly enhance its innovative potential. Moreover, a good supply of highly skilled workers will help attract and retain firms and investment to

the region. For the region of Rotterdam one option may be to stimulate the market by some targeted demand side financing initiatives and to create more incentives for firms to communicate their demand for highly skilled labour and for higher education institutions to meet these demands.

The creation of the *lectoraten* has been an important development and the time is right to review the experience. Although this will need to be done at national level, we suggest that a regionally-focused review, conducted in co-operation with the institutions would add value and would be timely. Such a review should cover whether the *lectoraten* are achieving what is expected of them, whether those expectations are the right ones, and how well they are able to resist the pressure towards academic drift which besets the higher education sector.

There is no systematic policy, nor strategy, regarding the value of service learning or co-operative education more broadly. This has been addressed in the report on the Amsterdam region, and similar considerations apply in Rotterdam. Again this is an area where there seems to us to be no barrier to action at the regional level.

In Rotterdam, the share of students enrolled in UAS (around 50%) is slightly below that in Amsterdam (55%) whereas the industrial and energy sector are more dominant in relative terms. This might suggest that more applied and less science focused research is needed in Rotterdam to meet enterprise demand. It is important that the HE system is better positioned to expand its research and development (R&D) and its relevance for local business and industry. A consolidation of the ties between UAS (universities of applied sciences, *Hogeschool*) and the research universities is required, together with the development of an HEI alliance that will cover the spectrum of research and development from high end technology to very practical and applied elements. A co-ordinated approach will be more efficient than the scattered involvement of higher education institutions in various intermediary organisations.

While acknowledging that co-operation in research exists, not only within the region but beyond, notably with Leiden, the review team considers that an intensification of the co-operation between the two research universities would help to consolidate their results, to boost multidisciplinary R&D and to capture scale effects. Even if Technical University of Delft (TUD) and Erasmus University Rotterdam (EUR) are already involved in regional co-operation schemes such as *Kennisalliantie*, Hope and B2SP, they have no common regional strategy. In devising a joint approach to regional development, the two universities might contemplate the experience of Finland where the Ministry of Education requests

universities to design common regional strategies for areas that are larger than a municipality or a county (*Maakunta*).

Increased collaboration between the two academic institutions should also be sought in the fields of research and international policy in order to increase exchange of experience and enhance the production of knowledge and scientific publications. While a merger may not be on the agenda the synergies and complementarities of these two powerful academic communities should be exploited.

Finally, although it is not our role, nor are we competent, to comment on policies for the integration of inhabitants with a non-Western background, we were inevitably made aware of some of the tensions that the growth in numbers of the non-Western minorities have engendered and the scope for making greater use of their potential. We saw some inspiring programmes but the low participation rates of non-Western minorities are of concern at national level, and although progress has been made in terms of access to tertiary education this needs to be matched by improved completion rates.

1.3 A coherent regional innovation system

Rotterdam has a strong presence of some of the world's leading multinational companies (e.g. Shell, Unilever), and it has a thriving SME sector. It boasts leading knowledge centres which count among the world's best universities (Erasmus University, with its medical centre and Rotterdam School of Management, and the Technical University of Delft). Its universities of applied science are active and innovative.

Like many metropolitan regions, however, Rotterdam has a highly fragmented innovation system, with multiple supply side projects too often financed by soft money. Although Rotterdam can be seen as doing better than many typical metropolitan regions which are characterised by 'unrelated variety', that is a diversity of sectors which do not complement each other, there is room for improvement. Rotterdam does have good foundations on which to build: dynamic science parks, and successful incubator and entrepreneurship initiatives, such as the South Rotterdam Business Centre supported by the municipality with European funding; the incubator for companies in the medical sector at Erasmus Medical Centre; and young entrepreneurs society YES! Delft. Yet there is an apparent lack of capacity to formulate and implement coherent human capital strategies that include the higher education sector as well as business and industry. Rotterdam's innovation system needs to become coherent, with its main components less driven by supply and more by demand, which will stimulate stronger articulation with higher education institutions.

Chapter 4 discusses the characteristics of two approaches to innovation: one – the science, technology and innovation (STI) approach, favoured by knowledge-intensive industries with good established links to research universities; and the other the doing, using and interacting (DUI) model which is more amenable to traditional industries, whether in small or large companies. A successful region needs to combine the strengths of both approaches. High-quality internationally-recognised research is strategically important, but it is not sufficient. There should be no conflict between pursuing international excellence in research and contributing to regional development. Spatial proximity is important but social and institutional proximity is needed too. Individuals and organisations which can cross boundaries are crucial.

The instigation and development of *lectoraten* is an important move towards addressing the needs of SMEs. Nevertheless, while there are many intermediary organisations in the Rotterdam metropolitan region, they lack organisational capabilities and their focus is often narrow and specific. The different levels of government (Municipalities; EDBR; Provinces; South Wing Randstad) have different and sometimes disjointed visions. The recourse to a clear RIS (Regional Innovation System) approach could help to remedy this deficit of articulation. It would notably provide a clearer guidance for the HEI innovation agenda. The experience of Korea in establishing a strategic umbrella within the framework of RIS committees is worth considering.

The challenge for the Rotterdam region is to develop strategies reflecting the inherent qualities and values of the region. It has to continue to exploit its global port facilities as an asset, while not overly focusing its development on the needs of the port whose centre of gravity has moved far from the city centre. For Rotterdam as a living community the restoration and reuse of obsolete port facilities is as much an opportunity as the further development of new ones.

New clusters will become highly important for the region, which has a strong research base, particularly in health, transport, technology and economy sectors, and a high quality research based higher education sector. The three key clusters are the port-industrial complex, the largest employer; the medical and care cluster based around Erasmus Medical Centre; and the creative industries including architecture; art and design; advertising and new media. This smaller, younger and less structured group of businesses and industries could benefit especially from the demographic composition of the city.

It is common to many of the regions in the OECD area, and Rotterdam is no exception, that the regional engagement of higher education needs to

be made more comprehensive and consistent. Incentives and programmes are required, supported by appropriate regional plans, platforms and advice. Such policies will generate mixed results if they are implemented in a piecemeal and compartmentalised fashion or focus on the transfer of knowledge rather than to regional competitiveness. Higher education institutions need to be helped to a position where they can better link their expertise to the strategic priorities of the region. This implies that Rotterdam's municipal and provincial governments need to work together to diagnose the territorial comparative advantages and to build a vision based on the dynamics of the regional economy. This report is a part of that process, which should help HEIs to shape their roles, and give a higher priority to regional development. Left to themselves universities will generally give low priority and investment to activities that are not R&D intensive, notably service related activities. Yet environmental management, tourism, transport services, culture, sport, and leisure, can offer avenues for HEIs to develop joint activities with the business sector and with society. Rotterdam offers many such opportunities.

Since 2004 the national agenda about regional policy has been focussed on strengthening key economic regions and in particular the south wing of the Randstad. Programmes have been implemented at the initiative of the central government and while regions have a major input into selecting the sectors to be encouraged in the area it remains that the selection by the central government is crucial to ensure that they are region specific. Pieken in De Delta (PDD) supports 11 projects focussed as far as Rotterdam is concerned on the port complex; greenhouse farming; law, peace and order; and life sciences. PDD also finances (partially) the projects of the Medical Delta Consortium (MDC) formed by EUR, TUD and Leiden University. While such initiatives are laudable, the budget remains modest (ERU 13 million for the 12 MDC projects) and more co-operation might be necessary to reach the critical mass necessary to make an international impact. South Holland still accounts for only 0.6 % of biotech patent application in the world.

Provinces are weak in the Netherlands but they are nevertheless public actors that play a role and provide money (e.g Zuid Holland in the case of Rotterdam, but also neighbouring provinces such as Noord Holland and Flevoland). Zuid Holland has developed a coherent set of instruments to facilitate cluster development and growth including spatial and infrastructural support for clusters, developing and financing innovative projects, creating networks, facilitating start-ups with incubators and accelerators and training programmes. The province supports and assists Science Port Holland and through the *clusterregeling* (agreements) it funds co-operation between businesses and knowledge institutions. It also co-

operates with neighbouring provinces within the Chances for the West programme to receive EFRO funding (European structural funds). That said, coordination between programmes gets a low priority and more focus needs to be given to the regional innovation system. A common vision for the region seems to be lacking and unclear messages are conveyed to the main HEIs in terms of research orientations and their contribution to innovation.

The interaction between the HEIs and sub-national levels of government needs to be improved. The potential of HEIs to contribute to economic growth and social development has not been sufficiently recognised by the municipality which needs to take a more strategic role and to pursue it seriously. Universities interface with the province within Kennisalliantie and Medical Delta, but meetings with lower levels of government (i.e. municipalities) meetings are rare. The aspiration to more regular discussions between academia and the municipalities, whether in Delft or Rotterdam is widely shared, but it has not materialised yet. The policy focus has been on primary and secondary education

1.4 Social, cultural and environmental development

Chapter 5 argues that the city of Rotterdam has great potential to bring together the three “T”s identified by Richard Florida as essential factors for growth and success in the knowledge economy – technology, talent and tolerance. However, Rotterdam does not yet have the scope or depth of attractive elements that will enable it to compete with for example Berlin. Therefore all the city’s actors need to pull together if progress is to be made.

The city of Rotterdam, even if it does not have its own innovation agenda, does have a number of programmes targeting university contributions to social, cultural and environmental development. Some are linked with an ambitious plan to redesign Stadhavens Rotterdam promoted by the City of Rotterdam Council and the Port of Rotterdam Authority. HEIs are stakeholders in this endeavour. The plan aims at turning the city into a showcase for water management, at exploiting Dutch expertise about flood protection system and at expanding the knowledge about climate change. Expectations from universities have nevertheless not fully materialised with regard to three main aspects of the strategy.

Rotterdam University has been active in community development in South Rotterdam and has developed some admirable activities to support community schools; while InHolland University has been developing and supporting music and art in primary schools. From the ruins of World War II Rotterdam has created a living architectural heritage that remains to be

further exploited, while the Willem de Kooning Academy has a national and international reputation for advertising and design.

1.5 Regional capacity building

The purpose of writing this report has not been to benchmark Rotterdam against a set of other cities, nor to evaluate its performance against established criteria: it sets out to review what Rotterdam is trying to achieve in a regional, national and global context and to offer advice on how the city might move forward. Chapter 6 deals with regional capacity-building: the impact of our report will depend in part on its intrinsic quality but more crucial will be local willingness and ability to take the agenda forward.

The core issues for the review are similar to those in several other regions, but the context is, as always, unique. One of the most striking features to an outsider is a polarisation of attitudes in the face of the rapid growth of the non-Dutch population. We have noted above that Rotterdam is one of the very few cities in Europe where the average age of the population is decreasing, and the willingness that we encountered to see a young and diverse population as an opportunity for growth, rather than as a problem to be addressed, is encouraging. The municipality has devoted much of its attention in recent years to combating social exclusion through a wide range of initiatives. However there is considerable scope for closer engagement with the business community and with the knowledge institutions.

A key challenge for the region is to develop cluster strategies built on inherent qualities and values. However, the determining factor should be the extent to which the chosen priority clusters – whether they are in clean technology; life and health science; water management and the delta; transportation and logistics; or the creative sector) supports the aspirations, potential and strengths of the Rotterdam region. The region needs to reinforce its efforts to articulate a “common story” which can serve as a platform for the development of cluster strategies.

The constitutional context offers some room for manoeuvre. We understand that the City of Rotterdam as an executive body, and one of the two most powerful municipalities in the country, does have the capacity to initiate and to act, within the framework provided by national legislation. Similarly at the wider regional level of Zuid Holland there is an opportunity to decide on a long term development strategy. If Rotterdam is to develop as a competitive city-region, the port will continue to be one of the most important assets, but it will not be the sole strength.

Strategic developments for the Rotterdam region also need to reflect its position in the Randstad. The diversity in the greater Randstad area should

be seen as an asset. This region has seven high quality universities and 18 higher education colleges. Such a major knowledge pool offers significant opportunities for trans-disciplinary research and development activities. This potential seems not to be unlocked partly due to lack of demand side incentives and as a consequence of fragmented organisational structures.

The territorial dimension of the third mission of the large universities and the promotion of their active engagement in regional development can be enhanced by recognising the triple helix of “Government-Industry-Academia” as a framework guiding policy for regional innovation. The ambition must be to move from the universities taking on ‘generative’ to become more engaged in “developmental” roles in order to attract young talent. In the absence of other drivers local government can and should take on the role of strategic leadership in the Triple Helix co-operation, in consultation with the other partners and actors.

It is important to take a system perspective to overcome the fragmentation of the regional innovation system and improve its connectivity by promoting better collaboration and a more efficient division of labour between the large universities, applied universities and research institutes and their respective partnering industries. Improving the research capacity of universities of applied sciences (time and money) should aim at making them better able to assist and co-operate with SMEs. Mobility schemes and technology brokers could increase the absorptive capacity of SMEs and reduce the cognitive distance between them and the HEIs. In this way the applied universities could support innovation in traditional SMEs

Fostering advanced human capital through education, research and knowledge production is the key factor in transforming the Rotterdam region into the national and global innovation cluster it aspires to be. Connecting and bringing together the strengths of the region so that all can share this aspiration will be a key to success.

Chapter 2: National education policy and the regional context

This chapter sets out information about and analysis of the Netherlands, the Dutch education system and the Rotterdam region, which was available to the review team and which will be helpful in understanding its recommendations.

This chapter summarises material from two principal sources: the 2008 OECD review of tertiary education in the Netherlands,¹ notably Chapters 2 and 10, and the self-evaluation report on Rotterdam (SER) prepared in 2009 by Gerlof Rienstra of ECORYS. Reference has also been made to the 2009 summary of the Netherlands education system available on Eurydice (Eurydice, 2009).

2.1 The Dutch context

The Netherlands is a nation of 16.4 million people (2008). With a land area of only 41 530 square kilometres it is densely populated, especially in the west of the country. The Netherlands has long been a major trading nation and is relatively wealthy: in 2008 per capita Gross National Income (GNI) was USD 43 050 in Purchasing Power Parity (PPP) terms, the tenth highest in the world when very small nations are excluded. In 2009 the GDP of the Netherlands was USD 673 billion in PPP terms, 20th in the world and the seventh largest in Europe (World Bank, 2009a).

In 2008 most of value added was in services (73.6% of GDP) followed by industry at 24.4% and agriculture at just 2.0%. High technology exports constituted 29.1% of manufacturing exports (OECD, 2009b).

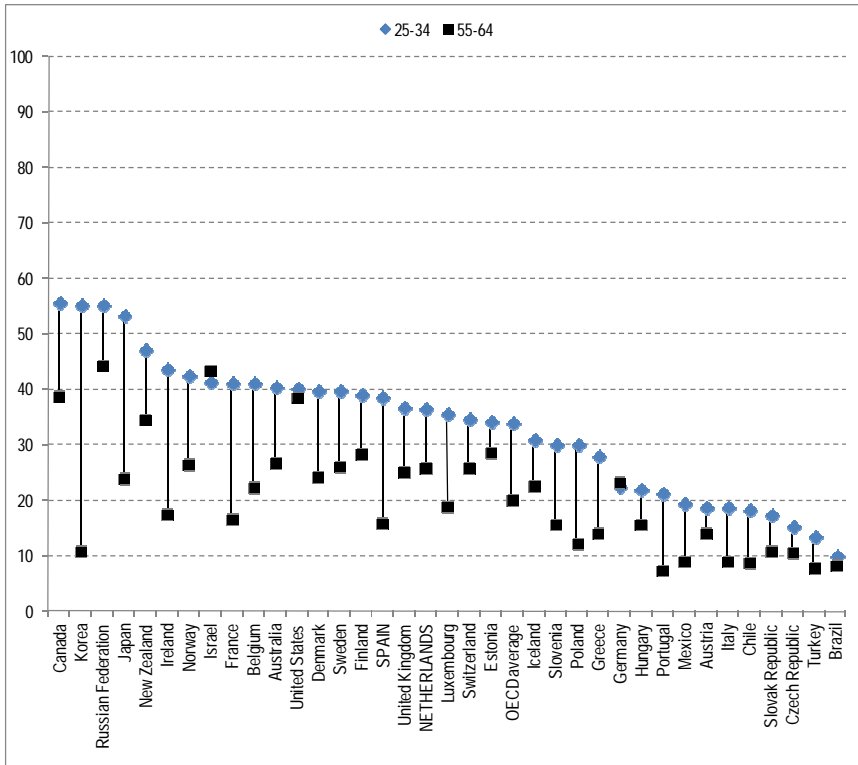
The nation is strongly networked within the global communications system, providing global advantages for the nation in both business and higher education. In 2008 there were 870 Dutch Internet users per 1 000 population compared to an average of 691 in the World Bank's high-income group of countries. There were 35 broadband users per 100 people, compared to 25 in Japan and 28 in the United Kingdom and 41 in Sweden. There were 1 250 mobile phone subscribers per 1 000 people (World Bank, 2009b, 2009c and 2009d).

As elsewhere in Europe, the population is ageing, and the main source of demographic growth and the driver of future educational expansion will be a combination of new immigrants and inhabitants with a non-Western background (this population group is on average younger and therefore more fertile). The number of inhabitants with a “non-Western” background, principally from Northern Africa and the Middle East, is 10% overall but exceeds 30% not only in Rotterdam but also in the two other large cities, Amsterdam and the Hague. In these cities 51% of the population aged 0-14 have a “non-Western” background.²

In 2007 the proportion of people aged 25-64 with tertiary qualifications was 31% compared to an OECD average of 28% (see Figure 2.2). The level of qualifications in the Netherlands was below that in a number of high-income countries including Denmark, Norway, the United States, Canada, Australia, Japan and Korea; but above the levels prevailing in Germany, France and Spain. The proportion of graduates in the 25-34 year old age group in the Netherlands (37%) is a little above the OECD average (34%). On this indicator the comparative position is stronger in the older age groups. Thus in the 45-54 year old group the Netherlands proportion is 30% compared to an OECD average of 25% (OECD, 2009a).

While the Netherlands continues to have a substantially larger share of young adults 25-34 with a long tertiary qualification than the OECD average (35% as opposed to 26%), it has only 2% of its 25-34-year old age cohort with a short tertiary qualification, as compared to the OECD average of 10%. The introduction of a two-year associate degree qualification is expected to narrow or eliminate this difference.

Figure 2.1 Population that has attained at least tertiary education (2009)



Note 1: Countries are ranked in descending order of the percentage of 25-34 year-olds who have attained at least tertiary education. The year of reference for Chile is 2002 and for the Russian Federation is 2004.

Note 2: For technical reasons, these figures use Israel's official statistics, which include data relating to the Golan Heights, East Jerusalem and Israeli settlements in the West Bank.

Source: OECD (2009), *Education at a Glance 2009: OECD Indicators*, OECD Publishing, Statlink: <http://dx.doi.org/10.1787/664024334566>

Workforce participation by women is lower than in some other OECD nations, at 55% of those aged 15-64 years, and is concentrated in part-time work, although many of these jobs occupy more than 32 hours a week. Part-time work is also increasing among men. However women continue to make advances in the professions. The balance between women and men in higher education is roughly equal. As in most OECD countries the rate of entry of young women into first degrees considerably outstrips that of young men, while men constitute the larger group in doctoral programmes at a ratio of three to two.

In the Netherlands 89.3% of 15-19-year olds are enrolled in education, which is above the OECD average of 81.5% but on par with Western Europe as a whole. Participation of the 20-29-year age group in the Netherlands (28%) is above the OECD average (24.9%). After 30 years age participation rates fall well below the OECD average, however. Just 2.7% of 30-39-year olds are enrolled in education as defined by OECD compared to 5.9% in the OECD as a whole, 13.5% in Australia and 12.9% in Sweden (OECD, 2009a). This suggests that in the Netherlands there is a relatively weak commitment to lifelong learning and professional upgrading in the award programmes that have significant labour market cachet. This problem may be embedded in social culture, in that older people do not see award programmes in tertiary education as an option, but if so the incentive structure does not encourage a change of values. If they have not enrolled prior to 30 years of age higher education students lose their eligibility for student loans and some tuition charges rise steeply. More than in many other nations, in the Netherlands higher education is seen as the preserve of the young.

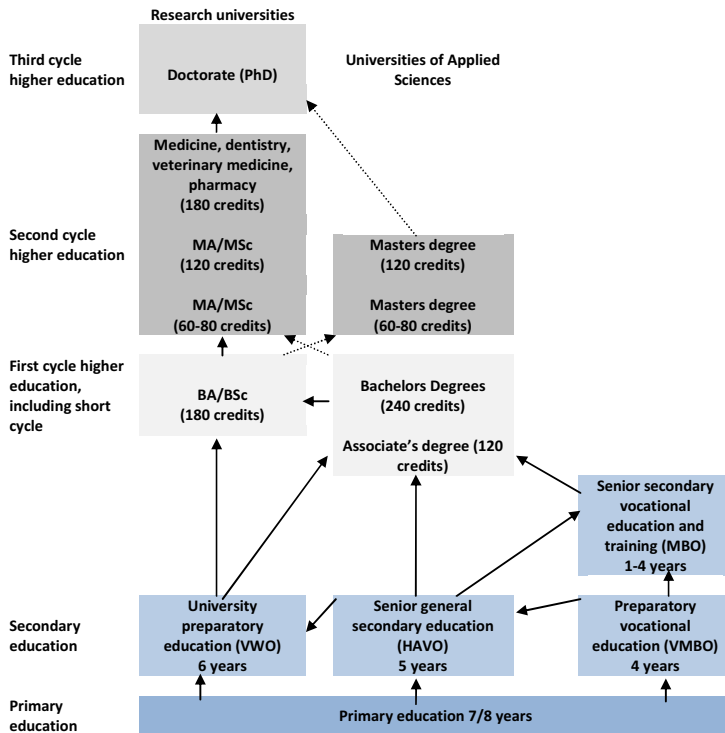
2.2 The tertiary education system: facts, figures and traditions

Higher education is based on a three-cycle degree system, consisting of Bachelor, Masters and PhD levels, in conformity with the Bologna model (see Figure 2.2). The Netherlands has moved earlier and more comprehensively than most European nations in adopting this template though the transition is incomplete (Witte, 2006).

The two principal sectors of tertiary education are the research-intensive university sector (*wetenschappelijk onderwijs* - WO) and the technical or 'professional' institutional sector (*Hoger Beroeps Onderwijs* - HBO) made up of *hogescholen* (translated as Universities of Applied Science or UAS). There are 14 research-intensive universities including the Open University; eight academic medical centres and several publicly funded research institutes affiliated with the universities. There are 41 government

funded UAS. In recent years the HBO sector has become more concentrated via mergers and some of its institutions now enrol more than 30 000 students. There is a division of labour between WOs and UAS (the ‘binary system’) in which the great majority of research functions and capacities are concentrated in the WOs. In contrast with academic staff at the research-intensive universities, few UAS staff hold doctoral degrees. On the whole UAS graduates are more specifically oriented to local labour markets and to professionally-oriented education. There is a greater emphasis on generalist preparation in WOs. Organisationally, individual academic units within the WOs on the whole enjoy greater autonomy than their UAS counterparts. There are mergers and co-operation across the binary line but it is the subject of continuing policy tensions, particularly in relation to research and the funding of Masters programmes.

Figure 2.2 Structure of the Higher Education System in The Netherlands

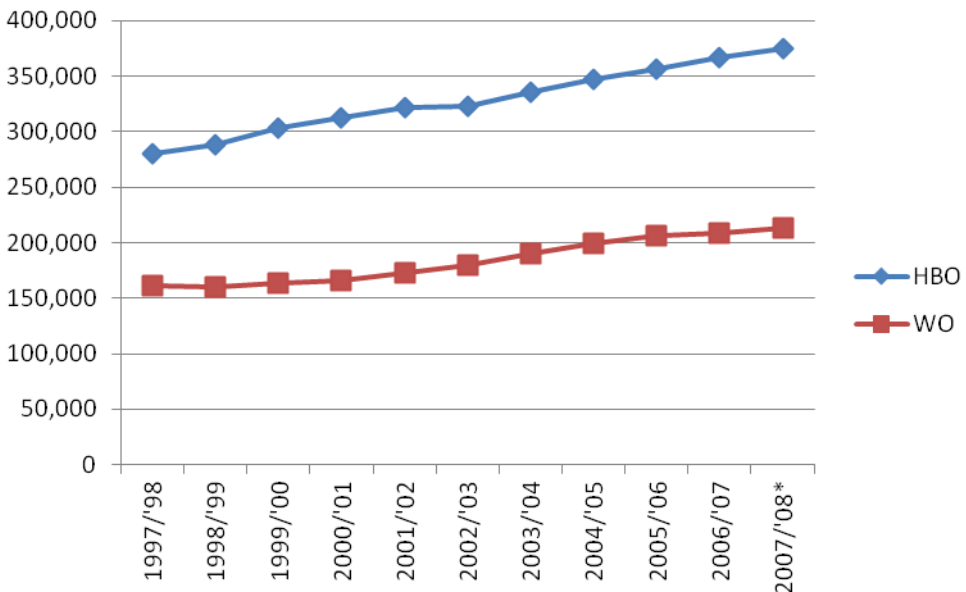


Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report, p. 34.

The total number of students in higher education in the Netherlands in 2007-8 was 548 500. Of these 219 000 students were enrolled in the research intensive universities and 384 000 in the UAS (see Figure 3.3). Although the majority of students enter HBO or WO via the HAVO/VWO approximately 30% of MBO students do enter the UAS.

Beyond the binary system are designated (*aangewezen*) institutions. The operating costs of these institutions are not directly subsidised by the state; however, students eligible for publicly funded student grants and loans may use them to meet their study costs in accredited programmes at these institutions. There are nine institutes of this type at WO level and 62 at HBO level, typically quite small, enrolling a total of 60-70 000 students. Their share of total tertiary enrolments is just over 10%, and their role in the national system is modest.

Figure 2.3 Student enrolment in the Netherlands by sector



Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report, p. 38.

There are approximately 7 500 full-time equivalent PhD students in Dutch universities and medical centres. In contrast with most other nations, being a doctoral student is a form of contract employment, normally lasting for four years and including teaching duties. A small number of PhD

students study on the basis of scholarships. Students graduate from advanced research programmes at an average age of 25 years, making them among the youngest in the OECD.

By international standards Dutch students are very well prepared for higher education. The nation is in the top group for mean levels of proficiency in the OECD Programme for International Student Assessment (PISA) tests of mathematics and literacy among 15 year olds (*e.g.* for mathematics OECD, 2009a). Overall performance is so high that even lower achieving school students in the Netherlands do quite well compared to students from other nations. Once Dutch students reach higher education they have a higher than OECD average completion rate, 71% compared to 69% (OECD, 2009a). This is a highly selected and culturally homogenous group by comparison with more open systems.

However, many secondary students are not destined for higher education. During secondary school, beginning at 12 years, students are streamed into three hierarchically ordered groups on the basis of academic potential: the VWO, the stream constituting the pathway to research intensive universities (the WOs), though some go the UAS; the HAVO which provides students for the UAS or MBO vocational training at tertiary stage; and the VMBO which prepares students solely for MBO tertiary training. In total about 60% of students enrolled in upper secondary education are in vocational programmes; and at the level of higher education about two thirds of all students are enrolled in the UAS rather than the research-intensive universities. Both the proportion of secondary students in vocational programmes, and the proportion of tertiary students in non-doctoral ‘professional universities’ (UAS) rather than the research intensive academic universities which enjoy the highest per capita funding and social status, are much higher than the OECD averages.

Students selected for the VWO stream tend to have very favourable educational and subsequent labour-market outcomes (see Table 2.1). All who qualify for entrance to the research-intensive universities are accepted; most are able to enter into their first choice programme. When applications exceed the planned number of places the universities have the choice of either expanding the enrolment beyond the planned level, or conducting a process of selection. In some faculties (*e.g.* medicine) selection is highly determined by ballot. During year 1 all students are advised on their subsequent studies. At this stage some will be excluded from further progression in their chosen programme. Thus the end of the first year is often the decisive moment when the future pathway is determined.

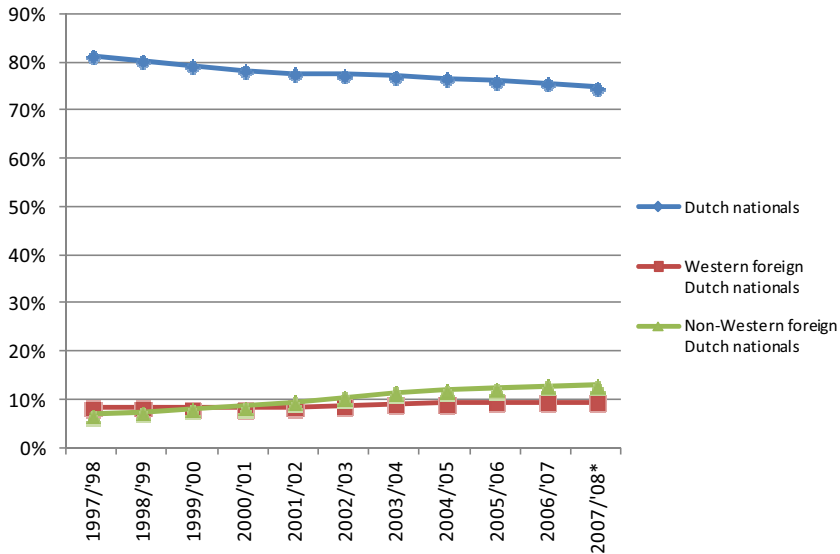
Table 2.1. Labour Market prospects by educational level

	Graduates with good or very good labour market prospects 2007 – 11 (%)		Unemployment (%)
Primary education	0	Primary education	9.2
VMBO	50	VMBO	6.5
MBO	100	HAVO/WVO	6.4
UAS	27	MBO(2&3). MBO (4)	4.6, 3.1
WO	45	UAS/WO bachelor	2.6
Total	61	WO Master, PhD	3.3

Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report. p. 44.

Nevertheless, once designated for the academic stream in secondary school, nearly all those so selected remain in it; and in that stream they are relatively well supported. At USD 79 625 cumulative expenditure per student over the duration of tertiary studies in the Netherlands is among the highest in the OECD area (OECD, 2009a, chart B1.5), and compares with an OECD average of USD 50 547 (OECD 2009a). Thus the Netherlands combines a middling level of overall spending and participation with the concentration of tertiary enrolments at degree programme level and relatively generous support for the top group of students in the research intensive universities who are better resourced than in most other countries (OECD, 2006). The student loans system is also relatively generous to those eligible for it. Tertiary education funding is further discussed in paragraph 24.

The situation is different for those streamed below VWO level while at secondary school, whether in the VMBO or HAVO streams. Arguably, the three-track structure of secondary schooling inhibits the capacity of the Netherlands to lift total participation in the research-intensive universities and UAS, and leads to reduced participation and completion among those of a non-Western background whose school students are disproportionately streamed into the VMBO group (see Figure 3.4). The OECD review in 2005 noted that with the exception of the top echelon of academic research, higher education institutions are not exposed to a high level of open competition; and if they were it is unclear how they might respond. UAS instructors are less academically trained than are those in the higher professional education sectors in Germany and Finland.

Figure 2.4 Participation in tertiary education, relative shares, by ethnic groups

Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report, p. 43.

2.3 National governance and financing patterns

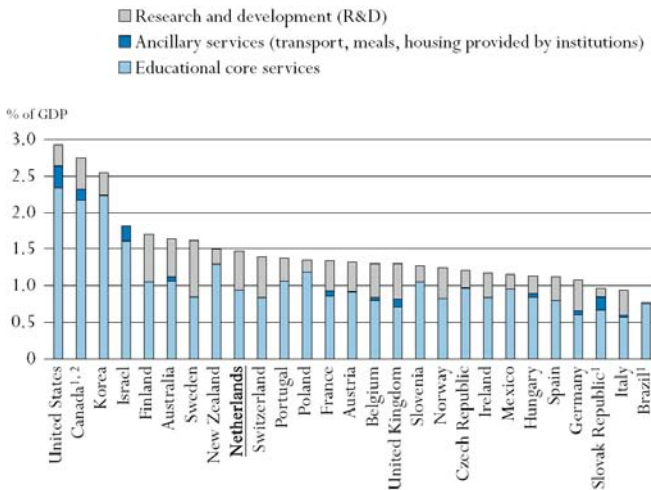
The Ministry of Education, Culture and Science (OCW) administers most government higher education programmes. Other departments also play a role, particularly in relation to research and innovation, including the Ministry of Economic Affairs. In 2006 the Netherlands spent 5.6% of GDP on education compared to the OECD country average of 6.1%. At tertiary level the comparative picture is somewhat stronger. Total financing of tertiary education at 1.5% of GDP was at the OECD average. As in other OECD countries, however, the share of this spending which came from public sources declined between 1995 and 2006 (OECD, 2009a (see Table 2.2 and Figure 2.5).

Table 2.2. Public and Private Funding for Higher Education

	Number of educational programmes	
	Public funding	Private funding
UAS	1185	657
University	967	33

Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report, p 39.

Figure 2.5. Expenditure on educational core services, R&D and ancillary services in tertiary educational institutions as a percentage of GDP



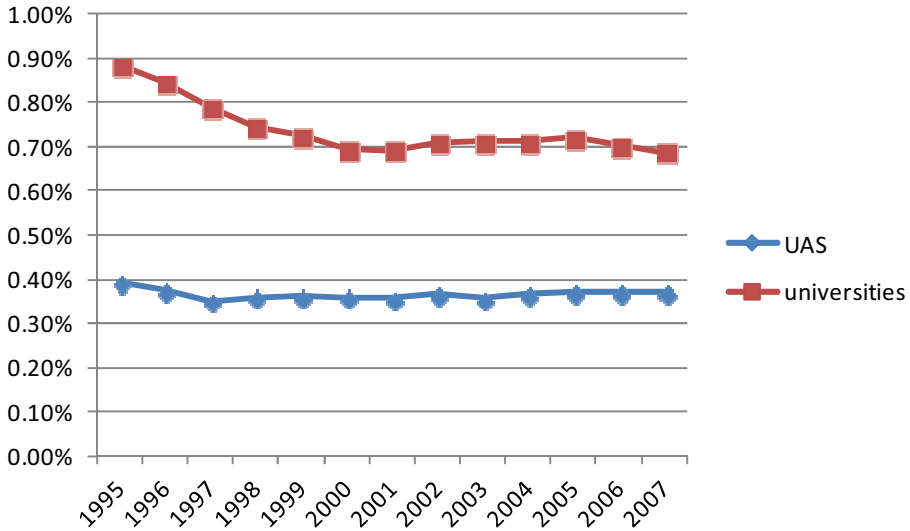
Source: Modified table based on OECD (2009), *Education at a Glance, OECD Indicators 2009*, Paris, chart B6.2.

The Netherlands remains a modest national investor in R&D given its total level of economic resources. In 2008, the government percentage of Gross Domestic Expenditure spending on R and D was 36.2% compared to the OECD average of 28.6% and the EU-27 figure of 34.1%. In contrast, industry funded 51.1% which is well below the OECD average of 63.8% and less than 55% for the EU-27. The Netherlands had 44 115 FTE

researchers in 2007, compared to 221 928 in Korea, 284 305 in Germany and 175 476 in the UK. In 2008, execution of R&D activity by the higher education sector was notably stronger at 26.5% than the OECD average of 16.8% or the EU-27 figure of 21.8%. (OECD, 2009b).

The 2008 OECD *Economic Survey* of the Netherlands (OECD, 2008) warned of the economic dangers if key challenges (inter alia, the effect of the ageing population on fiscal sustainability, the need to increase labour-market participation and to open borders so as to tap into the asset of skilled immigrant workers) were not rapidly addressed. This report also noted that productivity growth had remained sluggish which could be due to the relatively high weight of traditional industries in the economy and to insufficient innovation activity. The more recent 2010 *Survey* (OECD, 2010) noted that the Dutch economy contracted sharply during the crisis but began to recover slowly from mid-2009. Unemployment rose by less than might have been expected, partly as the labour market was more overheated prior to the crisis than realised at the time. Strict employment protection legislation and the government's continued focus on active labour market policies also played a role. In this context, it stated that the most pressing challenge for the near future is to prevent the cyclical increase in unemployment from becoming structural.

The 2007 *European Innovation Scoreboard* (European Commission/MERIT, 2007) rated the Netherlands as one of the innovation followers rather than amongst leading nations such as Denmark, Finland and Germany. The country performed well in intellectual property and in transforming innovation inputs into outputs but did less well in the areas of entrepreneurship and applications. According to the 2008 OECD Review of Tertiary Education in the Netherlands, this is dubbed the 'Dutch paradox' in policy circles and is part of a more general problem. In the Netherlands it derives in part from the industry structure: the Netherlands is primarily a service economy and there is a limited number of large scale firms requiring R&D. The 'paradox' has stimulated a broad range of policy schemes, instruments and funding incentives that are designed to stimulate innovation and sustain industry-university and public-private partnerships. (OECD, 2008). It would now seem essential to accelerate this momentum.

Figure 2.6. Public funding of universities and UAS (% of GDP)

Source: SEO Economisch Onderzoek (2009), Amsterdam, Netherlands: Self-Evaluation Report, p. 48.

As the governance of higher education in the Netherlands is predominantly a national affair it is the minister of education who ultimately is responsible for the proper functioning of the HE system. The most recent strategic agenda for higher education shows that the Dutch government aims to strengthen the autonomy of the HEIs as the executive bodies of this strategy, stating that the role of the government should be one of securing the right framework conditions to safeguard the public goals of higher education, including the quality, accessibility and efficiency of higher education.

This governance structure means that there is no formal role in higher education for other layers of government such as the provinces or the city councils. By and large the Rotterdam HEIs are autonomous organisations. They operate in a national legal framework and receive the main part of their budget directly from the Ministry of Education, Culture and Science (OCW).

The Ministry of OCW funds several programmes with regional impacts including the appointment of a growing number of lectors and knowledge circles at HEI. The RAAK Regeling (Regional Action and Attention for Knowledge Innovation) for example offers financial support to co-operation

projects in the field of knowledge development and knowledge exchange between HEI and education and training centres. The Ministry of Economic Affairs (MINEZ) also uses various instruments to subsidise research in HEI and other public and R&D institutions on the supply side as well as on the demand side (e.g. innovation vouchers).

2.4 The regional dimension in the higher education system

Dutch higher education legislation has a requirement for regional engagement but no major incentives, funding streams or monitoring of outcomes to support this requirement. The National Higher Education and Research Plan (HOOP) contains no regional dimension in the sense of a differentiated or regionally sensitive policy to meet different regional needs. There are many references to “regions” in HOOP, but what these establish is the generic importance of HEIs to their respective regional economies, and the need to make sure that they align their interests with regional stakeholders, thereby to maximise the overall regional benefit they provide.

This approach is linked to the geographical and institutional situation of the country and rooted in its history. The Netherlands is a relatively small country and in more or less every region access to higher education is adequate. Most HEIs have a history that goes back for decades if not centuries.

In the 1960s the government founded new universities in Twente and Maastricht with the specific aim of developing the region concerned. Since then the government has embarked on a policy of de-regulation of higher education. The Dutch system for higher education is nowadays characterised by a high level of autonomy for HEIs. HEIs’ have control and ownership of their campuses and finances. With lump sum budgeting they can set their own goals and a strategy to achieve them.

The national government’s role has shifted from a state control model, prescribing the activities of HEIs, to a more detached supervisory model, involving evaluation of output, including some quantitative measures. The state has no role in the content or location of new study programmes and courses. Its responsibility, when a new field of study is put forward for funding, is to check for relevance to the (national) labour market and unwanted competition with existing studies.

Quality is monitored by the Netherlands-Flanders Accreditation Organisation (NVAO). It is argued that the process of de-regulation leads to more regional involvement. According to the OECD (2008), “de-regulation of tertiary education has allowed institutions more flexibility and seems to be paying off with increased institutional co-operation and innovation.

Institutions have merged with one another; worked together to create more programmes based on student's needs; and developed better working relationships in their respective regions, according to anecdotal evidence gathered in numerous interviews with institutional administrators.”

Therefore, the extent to which a university or other institution focuses on the region depends on the individual HEI. Research by Sijgers *et al* (2005) concluded that regional considerations only played a minor role in policy-making. This role is slightly more developed for UAS, due to their function to educate professionals for the labour market. Conversely, research universities focus more on the advancement of research skills in particular.

2.5 Support for the regional mission

Although there is no explicit regional dimension in the Dutch policy framework on higher education, there are some programmes aimed at stimulating the co-operation of HEI's with other HEI's (research universities and UAS), local government and small and medium businesses. The most important of these are *Pieken in de Delta*, and Regional Action and Attention for Knowledge Innovation (*RAAK*) (see below and Box 2.1). There is also some funding destined for local educational labour markets: teacher academies and schools in areas with a significant expected shortage of teachers are stimulated to work together towards solutions for their local situation.

The Ministry of Education, Culture and Science (OCW) also supports regional missions through the *Lectoraten programme*. This is an important development within UAS and for their contacts with the region. With these *lectoraten* UAS can work on their relation with the regional labour market and the business and/or professional community. UAS are explicitly assigned to become a knowledge partner of the professional practice in a broad association. This brings UAS closer to corporate life (and local government). The principal effect of the programme has been the recruitment of a large number of applied professors with perceived relevancy to the local surroundings. These are small discretionary resources available for HEIs for regional activity. Some seed corn funding has also been provided for knowledge innovation in UAS and for innovative projects in knowledge circulation. HOOP creates an enabling environment for regional engagement without providing significant (differentiated) resources for capacity building.

For research application and third-stream innovation activities, the Ministry of Economic Affairs (MINEZ) is the main actor shaping regional

policy. MINEZ believes that a failure to innovate is seeing the Netherlands lose ground to competitor nations in Europe and beyond. Until very recently the Dutch Government has placed emphasis on meeting the Lisbon target of 3% GERD in GDP. The policy framework for innovation involves concentrating scarce resources on helping the most excellent research to be applied into innovation, and removing barriers to this commercialisation process. There are a range of instruments developed by MINEZ which provide subsidies for innovators, including those in the university sector.

The Regional Directorate of MINEZ has developed *Pieken in de Delta*, (hereafter *Pieken*) a policy to strengthen the Dutch economy based on supporting pockets of economic excellence. This strategy targets relatively limited economic development resources into key measures to strengthen the overall national economy (see also Box 2.1). HEIs are important to *Pieken*, in particularly in the east and the north, where there are relatively few other innovation stimulating institutions demonstrating research excellence.

Box 2.1 National programmes that stimulate regional co-operation

Pieken in de Delta

In 2004 the Ministry of Economic Affairs launched *Pieken in de Delta*, a policy to strengthen the national economy by focusing on specific areas with potential. In these areas there is a key role for knowledge institutions including HEIs. Priorities are business parks, major ports (Amsterdam Airport and the Rotterdam Harbour), infrastructure, innovation and urban economies.

One of the designated areas is the North Wing of the Randstad, which in this definition includes both the Amsterdam metropolitan area and the province of Utrecht. The *Pieken* programme for the North Wing focuses on the following clusters : the creative industry, tourism, innovative logistics and trade, life science (including the medical cluster) and knowledge intensive business services (MINEZ, 2004). The mission of this part of the *Pieken* agenda is to develop the North Wing of the Randstad as a top region in Europe. It creates the conditions for the business development of world class activities within the designated areas. For 2009, there is a budget of EUR 17 million to foster this aim. The Ministry of Economic Affairs finances a maximum of 50% of the public investment. The other half must come from local authorities like city councils and provinces. In the Amsterdam region, the Amsterdam Topstad initiative profits from the *Pieken in de Delta* funds.

Box 2.1 National programmes that stimulate regional co-operation (continued)

RAAK

The Regional Action and Attention for Knowledge Innovation (RAAK) is an arrangement of the Ministry of Education, Culture and Science (OCW). It intends to strengthen the relationship between UAS, regional training centres and SMEs to transfer knowledge. Approximately EUR 6-8 million is available on a yearly basis. Nowadays RAAK has been broadened to include the public sector also. The recent evaluation study of RAAK 2005-08 (SIA, 2009) shows that RAAK has been well implemented by all participants. It has contributed to the development of UAS to knowledge institutes. According to the study, UAS have significantly improved their visibility in the regional knowledge and innovation networks.

The Dutch associations for UAS and research universities, the HBO-raad and VSNU, respectively, also stimulate their members (the HEIs) to co-operate on a local level, although the final decision is left to the institution. In the Green Paper *Towards A New Organisational Agenda*, the HBO-raad voices its expectation that there will be a broad variance within institutions (HBO-raad, 2009). Some will focus on international development, while others will focus on co-operation with secondary education and companies in their region. Furthermore, the VSNU and HBO-raad along with many other organisations, such as employers organisations for multinationals and SME, signed a declaration in 2007 known as *Kennis Verzilveren* to work together on the development of exploitation of knowledge. The Ministry of OCW states in its strategic agenda for higher education, research and science policy, *Het Hoogste Goed*, that the co-operation between HEIs and corporate and societal organisations should be strengthened.

2.6 The Randstad and its sub-regions

HE systems are important drivers for regional prosperity and well being. There is a growing awareness that HEI must do more than simply educate and research. The impact they are making in the world starts at their doorstep and concerns their own city or region. To be able to play their regional role, the Higher Education Institutions must engage with others in their regions, provide opportunities for lifelong learning, collaborate with the business community to boost innovation and contribute to the development of knowledge-intensive jobs with added value to the community at large.

To optimise the initiatives taken by HEIs to enhance their regional role, it is necessary to define the region considered and its borders. Economic literature and OECD experience show that the functional region i.e. the region where people live and work, is probably the best concept to use because it aggregates most of the inhabitants capacities for generating wealth, for spending, and for networking.

This review considers the Rotterdam area as part of the *Zuidvleugel* (South Wing) of the Randstad includes The Hague. Amsterdam forms part of the *Noordvleugel*. Both the Randstad wings cover a surface that is larger than a city-region, but do not fall within the boundaries of a province and may stretch beyond its borders depending on the geographical definition used. There is no fixed definition of either wing.

While the Randstad could be considered as a multi-core or polycentric area and a kind of umbrella for the metropolitan areas of Amsterdam and Rotterdam, Randstad-wide approaches are very slow to develop since no one person or organisation within government is currently responsible for this macro-region. The Randstad remains in many respects an artificial concept. It still barely exists as functional area, even if highly skilled workers increasingly commute throughout it and it has currency as a planning tool. The role of provincial government is relatively weak whilst that of municipalities is strong. Provinces, especially North and South Holland nevertheless increasingly concentrate on activities not covered by city-regions. For higher education institutions the potential for intra-Randstad co-operation is far from being fully exploited.

2.7 Higher education in the Rotterdam region

Rotterdam is classified as a specialised pole, that is a city playing an important international role in the urban economy. To a certain degree, HEIs in this region now regard one another as competitors in the market for students and research, whereas from a regional perspective it is important that their education offerings should be complementary if optimal impact is to be achieved. There is an inherent tension between competition and collaboration but in our view there is scope for improved institutional co-operation in order to better exploit Rotterdam's position.

A number of analyses (related to regional innovation, the labour market and talent and social, cultural and environmental development) have shown that, overall, there is clear scope for improving incentives for regional co-operation. The risks appear to be outweighed by the opportunities which can be created.

2.7.1 The Rotterdam HEI system

HEIs

Erasmus University (EUR) is the most prominent within Rotterdam.³ Created 97 years ago by the business community, it is host to 23 050 students in 2008 (7.5 % of all students in Netherlands). Nevertheless, for historical reasons, it does not offer programmes in the natural sciences and concentrates its training and research activities on economics and management, medicine and health, law, culture and society. Just outside the City of Rotterdam is the other research university in the metropolitan region the Technical University of Delft (14 480 students) which has a strong and complementary focus on engineering and technology. Both of these institutions are ranked in the top 10 of Dutch universities and in the top 200 world-wide by the Academic Ranking of World Universities prepared by Shanghai Jiao Tong University.

These two prestigious research universities: Erasmus University (EUR) and the Technical University of Delft (TUD) both have a number of research institutes which vary greatly in terms of size, accreditation and the range of disciplines involved. TUD has three accredited institutes (the Interfaculty Reactor Institute IRI, the Research institute for Housing, Urban and Mobility Studies – OTB and the International Research Centre for Telecommunications – transmission and Radar – IRCTR) as well as a large number of smaller institutes. TUD also participates in three of the four top establishments recognised by the Ministry in the fields of nutrition, metals, telematics and polymers.

Erasmus University has twenty research schools accredited by the accreditation committee (ECOS) of the Royal Netherlands Academy of Arts and Sciences (KNAW) and holds the secretariat for six of these bodies. In addition, faculties have their own research centres and smaller institutes.

Rotterdam University and INHolland University are the Universities of Applied Science (UAS) within the region and host the senior lectureship posts created in UAS to stimulate practical research and to improve innovation capacity. 37 of the 400 senior lecturers working at UAS throughout the country are based in the Rotterdam area.

The mission statements of these HEIs demonstrate their respective orientations:

- *Erasmus University*: aims to cultivate talent and produce knowledge at the academic level to benefit mankind, business and society, internationally, nationally and regionally;

- *Delft University of Technology*: contributes with its unique technological infrastructure, broad knowledge base, worldwide reputation and successful alumni to sound solutions for urgent social, national and international issues;
- *Rotterdam University*: is a knowledge institute from and for the region;
- *INHolland University*: seeks to promote young talent as far as possible by putting entrepreneurship, social involvement, internationalisation and diversity high on the agenda. INHolland’s slogan is “close to the student”.

Enrolment Trends

There were 384 000 students in the UAS sector and 219 000 registered at the 14 Dutch research universities in the 2007-8 academic year. In this national context, enrolment patterns in the Rotterdam metropolitan area are set out below.

Table 2.3 UAS enrolment in the Rotterdam metropolitan area

	Rotterdam University	INHolland* University (Rotterdam area)	Total Netherlands
1998	19 025	--	288 779
1999	20 073	--	303 388
2000	20 233	7 748	312 905
2001	20 061	9 167	321 741
2002	19 554	9 613	323 144
2003	20 602	10 222	335 860
2004	21 883	10 448	346 835
2005	23 927	9 541	357 023
2006	25 994	8 848	366 856
2007	27 241	8 731	374 935
2008	28 324		383 833

Source City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report. p. 35.

* Note: In the period 2003-2006 INHolland University suffered a decrease in incoming student numbers. Since 2006 there has been a return to growth of about 2% per annum. The decrease was partly the consequence of separating the division of senior secondary vocational training (SVE) and partly due to the merger of existing institutions and the introduction of a new concept of education with a new arrangement of studies (major/minor).

Table 2.4 University enrolment in the Rotterdam metropolitan area

	2002	2003	2004	2005	2006	2007	2008
Erasmus							
Bachelor	16 079	16 894	16 586	16 586	15 870	13 703	13 569
Masters		486	1 897	2684.0	3 500	5 825	5 908
Total	16 079	17 380	18 483	19 413	19 370	19 528	19 477
TU Delft							
Bachelor	10 335	10 156	10 142	10 300	9 737	9 706	10 267
Masters	2 862	3 216	3 235	3 251	3 969	4 720	5 185
Total	13 197	13 372	13 377	13 551	13 706	14 426	15 452
Netherlands							
Bachelor	174 012	178 738	181600.0	175 732	164 919	158 091	158 691
Masters	4 541	93 46	6 488	28 704	42 240	53 383	60 327
Total	178 553	188 084	198 088	204 436	207 159	211 474	219 018

Source: City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report.*, p. 35.

The International Standing of Rotterdam Universities

The international standing of universities attracts growing attention and three different ranking systems are seen as offering some credibility in the Netherlands: the home-grown Leiden Ranking, the so-called ‘Shanghai ranking’ (the Academic Ranking of World Universities developed by the Shanghai Jiao Tong University) and the Times Higher Education (THE-QS). Each of these has its own combination of indicators and weightings, the first being based almost entirely on bibliometrics, the second including staff and alumni prizes and awards, and the last giving a significant weight to reputation and peer evaluation.

According to the Leiden ranking, 10 Dutch research universities are amongst the 40 best in Europe. Erasmus and TU Delft both figure in this list. Moreover, these two institutions both figure in the 2009 Shanghai ranking (both classified in the group covering institutions ranked between 152 and 200) and the THE-QS ranking (TUDelft at 83 and Erasmus at 108). Notwithstanding the limitations of ranking systems they have a powerful reputational effect and give some indication of global standing.

Table 2.5 Leiden Top 100 European Universities 2003 -2007

Position	University
8	Erasmus University Rotterdam
11	Technical University Delft
15	VU University Amsterdam
18	University of Amsterdam
19	Utrecht University
27	Leiden University
29	Wageningen University
30	Groningen University
31	University of Maastricht
40	Radboud University Nijmegen

Source: City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report. p 38.

Issues and Debates

In the Netherlands, *participation in tertiary education* is analysed according to three main ethnic categories: Dutch nationals, western foreign Dutch nationals and non-western foreign Dutch nationals. The rates for the third group is significantly lower than that for the first and was the subject of concern and comment in the 2007 Country Note on the Netherlands which was published as part of the wider OECD review of tertiary education.

The relative position of non-western foreign Dutch nationals at UAS and universities has improved over the last decade. Their share of the total student population increased from 7% to 13% during this period. At Rotterdam-based HEIs, the share of foreign Dutch nationals is much higher than the national average, reflecting the make-up of the city's population. Table 3.10 provides details.

Table 2.6 Number of students and share of non-western students

Institute	Number of students 2008 ¹	Percentage non-western students in 2007 ³⁺⁴
Erasmus University (inc. Erasmus MC)	23 049	8.6
TU Delft ²	4 488	9.0
Total academic institutes Delft/Rotterdam	34 269	
Rotterdam University	28 324	26.3
Codarts (UAS fine arts)	1 000	14.4
Eurocollege	220	
INHolland University	7 806	28.1
Total universities of applied sciences Delft/Rotterdam	35 149	

Notes

1 Rotterdam December 2008 ‘Spreiding van studenten wonen in Rotterdam, project Student City’.

2 TU Delft data 2007 uit ‘Kenniss in kaart 2008’.

3 HBO Raad

4 VSNU

The issue of *lifelong learning* and its importance has also been the subject of discussion and debate. Participation rates in lifelong learning in the Netherlands fall well below the OECD average – for example, 2.9% compared to 5.6% for the 30-39 age group in 2008. Explanations for this situation at the national level include a lack of encouragement for adults to study and much higher tuition costs for people over 30 years of age. Although Rotterdam has a population which is on average much younger than the Netherlands as a whole lifelong learning policies and participation rates should not be ignored.

2.8 The Rotterdam region in relation to higher education and the labour market

According to the 2007 Report of the ROA (the Research Centre for Education and the Labour Market, Maastricht University), 45% of UAS graduates and 61% of university graduates can expect good or very good job prospects. Demand is especially high for people with practice-based tertiary education (SVE and HPE/UE bachelor), while those with technical-oriented studies have the best prospects of all groups.

In Rotterdam, a third of the labour force works in technically-oriented fields such as engineering, transport and logistics. This is much higher than the national average for this type of work.

There is continued high demand for tertiary educated graduates due to the ageing of the Dutch population and to the changing structure of the national economy, and this will offer further opportunities for Rotterdam and its tertiary education system. The SWOT analysis of Rotterdam's labour market and talent development recognises that regional HEIs cover the most important knowledge areas and that clear efforts are made to offer relevant study programmes for a diverse student population. However, more sustained support is required if they are to bring optimal results.

2.9 Governance and the regulatory framework

In this regard, Rotterdam needs to position itself more effectively in relation to national trends. At the present time, the Netherlands aspires to use its tertiary education resources to help it move into a position of leadership in Europe as a knowledge-based economy. Accordingly, this objective dominates the thinking and actions of the main actors concerned: national government; advisory and consultative bodies, intermediary organisations providing funding for research; and interest groups such as employers' organisations and labour unions.

Income for HEIs comes from a mix of public and private sources. For universities, three streams can be distinguished: direct public funding; support from research councils; and private income from tuition fees, commissioned research and business contracts. The table below summarises how Rotterdam HEIs are funded:

Table 2.7 Funding of HEIs in the Rotterdam metropolitan area

	Total income	1st stream	2nd stream	3rd stream
Erasmus University*, 2008	439	241.1	17.4	180.5
TU Delft, 2008	499.1	369.3**	30.3	99.5
INHolland University, 2007***	265.9	188.5	-	77.4
Rotterdam University	200.6	177.3	-	23.3

Source: City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report, p. 44.

Notes:

* Funding of Erasmus University includes funding of Erasmus MC

** including EUR 25 million due to faculty fire

*** This contains the total funding of INHolland Netherlands, not just INHolland Rotterdam

Over the past decade, only a very slight increase in the publicly funded educational budget of universities has been recorded, despite a sharp increase in student numbers, giving a reduction in funding per student. Publicly funded research budgets for universities have also declined. As a result, it is claimed that public funding has become inadequate. This trend is accompanied by a rise in institutional autonomy (including ownership of campuses and facilities) and lump-sum funding formulas.

Current governance trends encourage competition between institutions of similar profiles while seeking to achieve complementarity between UAS and research universities. The Rotterdam SER report noted that regional HEIs with differing profiles could make significant improvements in their co-operative efforts, thereby making a collectively enhanced contribution to urban and regional development.

2.10 The regional dimension “inside” national HE policy

Although higher education policy at the national level takes little account of regional and local variation there are some mechanisms which aim to promote the regional dimension. Moreover, a policy of deregulation and autonomy means that HEIs have greater freedom to decide to what extent they emphasise their regional focus.

As far back as the 1960s, new universities (Twente and Maastricht) were founded specifically with the aim of contributing to the development of their respective regions. Today, the Netherlands places emphasis on ensuring access to tertiary/higher education in every region.. Moreover, the introduction of senior lectureships in UAS has allowed these HEIs to link

more effectively to their regional labour markets and to their corporate sectors.

A good example in Rotterdam is the Trans-urban knowledge centre of the HS Rotterdam which positions the institution both as an educational establishment and as a knowledge institute for strategic metropolitan issues such as urban innovation, infrastructure and mobility, water management, port and city affairs, and the logistics of products and services. Hence, this UAS can reach out to both the labour market and to society at large.

Other mechanisms include:

- programmes to stimulate HEI co-operation with local government and business (and notably SME) activity. Examples are: Pieken in the Delta and Regional Action and Attention for Knowledge Innovation - RAAK (see Box 2.1);
- co-operative efforts to fund structures related to the local educational labour market to assure delivery in areas where teacher shortages at primary or secondary level are common;
- action intended to encourage enhanced HEI involvement with local actors to exploit knowledge. Relevant policy documents include a 2009 Green Paper entitled Towards a New Organisational Agenda, a 2007 declaration known as Kennis Verzilveren (*i.e.* working together), and Het Hoogste Goed which is the strategic agenda of the Ministry of Education, Culture and Science (OCW) for HEI co-operation with corporate and social organisations.

Taking greater advantage of this strong foundation appears to be a challenge for tertiary/higher education in the Rotterdam area. For example, one SWOT analysis notes that alumni mobilisation is a relatively untapped resource which could yield positive results.

2.11 The regional HE system and governance

Given that higher education governance in the Netherlands is predominantly national, and that Rotterdam's HEIs – like others - are autonomous organisations which operate inside a national legal framework and are mainly funded by the Ministry of Education, there is no official role in this sector for other governmental layers such as provinces or city councils. This situation does not facilitate closer relations between HEIs and regionally-oriented bodies and a certain vacuum must be recognised in this respect.

Notes

- ¹ This report by Simon Marginson, Thomas Weko, Nicola Channon, Terttu Luukkonen and Jon Oberg is one of a series of which resulted from the OECD Thematic Reviews of Tertiary Education
- ² Subsequently in this report the term *allochtoon/onen* is used to designate Dutch residents having at least one parent born outside the Netherlands.
- ³ 15 000 employees enter the University every day.

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Chapter 3: The contribution of higher education to human capital development

This chapter focuses on human capital development: the needs of the labour market and how they are met; the flexibility and coherence of the higher education system; and measures to attract talented people to Rotterdam.

3.1 Provision of skills for the labour market

The Netherlands has an internationally recognised university system with world class research and education. Compared to many other regions in the OECD area and the rest of the Netherlands, the proportion of people with tertiary education qualifications in the Rotterdam region is generally high. However, Rotterdam lags behind compared to metropolitan areas such as London, the Flemish Diamond in Belgium and Paris. Taking into account that the area within a radius of approximately 75 km has more than twenty higher education institutions – including four universities in the top 100 of the 2009 THE-QS ranking – this indicates capacity to educate a larger proportion of the population and increase the human capital of the region.

The Rotterdam region has a very strong research-based higher education sector, which is further analysed in chapter 4. While in most aspects an advantage it also comes with a potential risk. Higher education institutions with a strong theoretical and research-led orientation can be primarily supply-driven. The risk is that universities focus on pre-established areas of excellence rather than the demands of the labour market and opportunities that flow from existing economic clusters. Nevertheless the Erasmus University of Rotterdam has decided on a strategic shift towards a city and regional focus, and steps towards serving the needs of the less favoured parts of the surrounding community are being taken. TU Delft and the universities of applied sciences are more demand oriented than average higher education institutions, although it seems that this demand may be more influenced by social concerns than the needs of business and industry. Both need to be taken into account.

Research Universities

Notwithstanding their international role, both Erasmus University Rotterdam (EUR) and Technical University of Delft (TUD) re engaged in the region and have positioned some of their teaching and research effort so as to take account of the needs of Rotterdam and its region. EUR and TUD believe that regional and international missions can be fulfilled simultaneously and are not mutually exclusive. This approach has sometimes been controversial, at least at EUR, but the regional focus has been maintained. Erasmus has notably embarked on two strategic lines:

- Targeting students resident in the Netherlands but not born there. EUR decided to attract students and young people who have migrated to the country. Many programmes for Turkish, Surinamese, Moroccan and other students have been developed.

This is in part a strategy to tackle brain drain since it is expected that these students will look for jobs in the region.

- Developing region or city relevant research. For example the Erasmus Department of Economics is contributing to the creation of a centre called ‘Smart port’ providing education, research and consultancy linked with the port’s activities. The university has also been involved in Generation R and in the Rotterdam Climate Initiative which includes a number of elements including the Rotterdam Climate and Innovation Fund (see Box 3.1). It has been in charge of many impact studies linked with the *Maasvlakte 2* programme and the westward move of the harbour. The Dutch Institute of Urbanism within Erasmus promoted the idea of the floating city which is now realised in the downtown area.

Similarly the Technical University of Delft has co-operated with the port authorities for example in the field of computer modelling and transportation analysis. Furthermore, TUD has common interest in safety and security with the city and has premises on the climate campus. Sustainability, logistics and clean energy development are important topics for research at TUD well as for the development of the city. In this sense the metropolitan area can be considered as a laboratory for research activities.

Box 3.1 Rotterdam Climate and Innovation Fund (RICF)

The RICF is an initiative under development directed by the municipality of Rotterdam and business partners. This new fund supports innovation and climate initiatives. The RICF invests in businesses and business initiatives involving the production/development of innovative products, services and technologies. These initiatives should underpin sustainability and relate to the energy and climate pillar set in Rotterdam (both port and city). The majority of these investments are to be spent in university spin-offs and start-ups. The RICF is a growth-fund aiming for a capital of EUR 18 to 20 million and will be executed in two tranches. The first tranche contains an amount that serves investments in small but high-potential innovative businesses. Immediately following up the start of tranche one, tranche two will be formed through the contribution of several private parties in co-operation with the municipality of Rotterdam. The second tranche invests in bigger start-ups and new businesses. The municipality can buy shares of start-ups and the Rabobank is able to provide capital to businesses through “soft loans”. These are loans without (or hardly any) interest. As soon as the business is successful, the municipality will sell their shares and uses this money to invest in new start-ups.

Source: City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report, Rotterdam, p. 57.

At the same time TUD and EUR have in recent years been intensifying their efforts to promote top level fundamental research, and there is no reason why this two-pronged approach should not be sustainable. In 2007 EUR opted for selective stimulation of a limited number of research groups. These groups provide internationally proven top quality research, research master's and PhD programmes that attract international talent. An incentive was provided by the granting of senior tenured positions, aimed at attracting top academics (for example the Tinbergen programme¹). Given the reduction in first stream research funding by OCW, the university is now confronted with the need to cut back in existing programmes on the one hand and on the other hand to invest in top level research in connection with the increase in so-called SOC resources (Strategic consideration component in the national budget) thus augmenting the risk of academic specialisation. Erasmus University nevertheless maintains ambitious objectives for its centenary in 2013, notably having five areas of Erasmus MC rated as among the top six in Europe (Erasmus Universiteit Rotterdam, 2008). In addition all faculties should be in the top three in the Netherlands while Erasmus MC and the Economics and Business administration should be number one in the country by that time.

Universities of Applied Science

When social demand dominates academic drift may be a challenge. It was clearly observed that research holds higher prestige than education and training. Even in universities of applied science where educational activities account for more than 95% of all activities the few more prestigious and privileged jobs are lectureships. At INHolland 1-2% of the resources are for research and 28 lecturers are engaged in 6 research centres, which focus training of students towards needs of business and supply and supervise students for project work with business partners. Box 3.2 describes some of the work experience companies within INHolland University.

Box 3.2 Work experience at INHolland

INHolland University of Applied Sciences in Rotterdam has several ‘work-experience companies’ that operate as a company for the organisation, but also for the external environment. Three examples include:

- The Legal Advice Centre is the work experience company of the School of Law which is managed by higher vocational education (UAS) law students and students of Social Legal Services who handle and settle legal issues for civilians and organisations in the four Rotterdam sub-municipalities. They do this in the form of a differentiation Minor;
- NEWb is the work experience company of the School of Communication and Media. In the second year, students are involved in this work experience company for one term. Teams of approx. 5 students are linked up with external clients: large-scale assignments suitable within the framework of the study are carried out for these clients under the supervision of lecturers. Students work 3.5 days at NEWb, which is an intensive introduction to the field of work and practice;
- The Entrepreneurial Service Centre is a work experience company of the School of Economics where intermediate and higher vocational education (MBO/UAS) students work and where UAS students and companies can go to for: work placement and graduation places, placing vacancies, offering (commercial) projects and reporting guest lecturers. The Entrepreneurial Service Centre is always looking for professionals from the business sector who will come to university to tell about their experiences in practice. This way, students are encouraged to learn about the latest developments in their field of expertise and study. At the same time, contacts are made with companies in Rotterdam area where our lecturers can go to for In-company training programmes. These are days during which a lecturer does work experience in a company or institution.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 81.

The creation of the *lectoraten* has been an important development and the time is right to review the experience. Although this will need to be done at national level, we suggest that a regionally-focused review, conducted in co-operation with the institutions would add value and would be timely. Such a review should cover whether the *lectoraten* are achieving what is expected of them, whether those expectations are the right ones, and how well they are able to resist the pressure towards academic drift which besets the higher education sector.

There is a lack of structural monitoring of labour market developments. As a result no solid tools exist for adjusting educational programmes based on hard evidence of articulated demand. Higher education institutions in the Rotterdam region could draw on experiences from other OECD countries where external stakeholders have a say in regard to institutional management and the development of study plans and content.

A certain mismatch between supply and demand of highly skilled human capital has been identified, although this is not a problem specific to Rotterdam or to the Netherlands. A surfeit of students in “softer” fields such as management, psychology rather than in the “hard science” fields of study is widely experienced. In this context it is noted that the Erasmus University is taking steps to establish a faculty of pedagogy in order to enhance the training and provision of secondary school teachers in the region.

The team noted some interesting and worthwhile programmes which aim to bring educational provision closer to the needs and expectations of society. These include service learning at Rotterdam University and the Pact op Zuid initiative. (See Box 3.3 and page 90).

Box. 3.3 Service Learning at Rotterdam School of Management

Service learning at the Rotterdam School of Management, Erasmus University started in 2003/2004 when an experiment on service learning was funded by ECHO, the Dutch centre for diversity policy. Participants in the first experiment were, next to faculty and staff, some ten local grass root organisations. The first experiment was part of a research project to investigate the possibilities of combining learning and community involvement in a different non-profit regime. Most examples of service learning can be found in communities where the government is not very active in funding universities and local non-profits, leading to a kind natural partnership between universities and local communities.

In the Dutch context the government is very active in both funding universities as non-profit organisations, so some institutional resistance was expected. The research proved that also in a context where ties between university and local community are less common and maybe less needed from the funding perspective; mutually opening up both worlds is welcomed by staff, students and most of all the community. Service learning aims at combining academic learning on a certain topic and consultancy with service. Several rounds of service learning have focused on diversity management (supporting small local grassroots in opening up), business community involvement (researching and creating partnerships between businesses and local non-profit organisations) and business management for the creative industry (consulting (non-profit) entrepreneurs and the local community on developing new creative initiatives).

Box. 3.3 Service Learning at Rotterdam School of Management (continued)

Service learning offers students the possibility of combining experiential learning with service to the community. For many students it creates a welcome hands-on experience in an environment where they really can make a difference. For the community organisations it opens a new tool for recruiting knowledge, specialist support. For the university it adds to the community profile and brings in unexpected visitors.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 78

3.2 Flexibility in and coherence of the tertiary education system

The Netherlands has a binary system of tertiary education with two types of programmes with separate access requirements and structures. The linkages between research universities and universities of applied sciences are characterised by insufficient opportunities for credit transfer and progression, which is a barrier for realising the full educational potential.

There is very short geographical distance between the universities but intra regional student mobility is not impressive. Study programs seem rather inflexible and students tend to stay at their home institution and stick to the level of higher education they first enrolled in. However, for the region it is a high priority that all students get as good an education as possible. Therefore it would be beneficial to further develop the links between the institutions and forge stronger co-operation, and maybe less competition. This could lead to joint programmes and possibly to division of labour between research universities and universities of applied sciences. The universities of applied sciences, InHolland and the University of Rotterdam, may compete for students and co-operate with Erasmus University in the teaching and health sectors.

Research universities may face decreasing per student investments and would have to either develop new income streams related to research and development or in other ways consolidate activities in order to stay competitive in long term. In relation to such considerations strengthened strategic alliances with other institutions of higher education or even a

formalised structural partnership between the Erasmus University of Rotterdam and TU Delft may become relevant.

Specific attention needs to be paid to education for entrepreneurship. Entrepreneurship training is to some extent targeted at softer and service fields that target local needs. It would be advisable also to focus on areas within Rotterdam's strong health, technology and environment research base and combine these with a stronger effort on entrepreneurship, this would be likely to lead to businesses and products which would enter markets external to the Rotterdam region. The Holland Programme on Entrepreneurship (HOPE) (see Box 3.4) is a promising initiative which should be supported and extended.

Box 3.4 Holland Programme on Entrepreneurship (HOPE)

Through this programme Erasmus University Rotterdam, Delft University of Technology and Leiden University aim to develop a strong and innovative centre for entrepreneurship. The centre will embed 'learning how to do business' within the educational programmes of all three universities collectively and individually.

Within HOPE there will be a coherent programme for entrepreneurship, in which all students can take part. This programme will focus on new combinations and co-operation programmes between disciplines, studies, students and entrepreneurs, companies and researchers or tutors.

Over the next ten years the goals of HOPE are:

- Expansion and renewal of education with more challenging content, and teaching learning environment;
- Stimulation of an entrepreneurial culture at universities.

Together with partners from business and government, HOPE has developed a set of common activities for the three universities which include:

- Creating awareness of the possibilities and the importance of entrepreneurship, and entrepreneurial skills;
- Experiencing and getting a taste of entrepreneurship;
- Gaining more in-depth knowledge and skills;

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 53

Attention also needs to be paid to lifelong learning. In order for workers to stay competitive and add value to the economy they need to continuously enhance their skills. The Netherlands also faces the challenges of an ageing population, and a general enhancement of the qualifications of the existing workforce is one of the most effective ways of increasing competencies in the work force.

The Netherlands ranks among the lowest of the OECD countries when the ability of the higher education institutions to provide lifelong learning opportunities is compared. The large aging and unskilled part of the workforce in Rotterdam does not have sufficient opportunities to acquire new skills. Parallel to establishing a more inclusive system for higher education for young people it is important not to forget the generation of workers already in the labour market.

Table 3.1 Educational participation of 30+ age-group

The proportion of the population in the age range 30 and above is an indicator of the level of participation in lifelong learning		
Rank	Country	percentage
1	Finland	14,4
2	Australia	13,5
3	Sweden	12,9
4	Belgium	8,5
5	Denmark	8,1
6	Hungary	5,9
7	UK	5,7
8	Ireland	5,6
9	USA	5,5
10	Spain	4,0
11	Switzerland	3,8
12	Portugal	3,7
13	Austria	3,5
14	Italy	3,5
15	Netherlands	2,7
16	France	2,6
17	Germany	2,5

Source: Modified table based on OECD (2009), *Education at a Glance 2009: OECD Indicators*, table C1.1, OECD Publishing.

Around 50% of employees in private companies with more than 100 staff participate in lifelong learning. This proportion is less than 25% when it comes to small and medium size companies which traditionally have the largest skills deficit. Hence, significant potential exists for providing additional incentives for employees from these companies to participate in training activities.

Box 3.5 Lifelong Learning: Rotterdam University

In its strategic plan Rotterdam University has defined lifelong learning as one of its four main tasks. In the student body of the University 22% of students are age 25 and over. The University organises part-time curricula for most of the courses offered.

These are specifically targeted at students who are employed in a job relevant to their field of study. About 15% of the student body (4 300 people) is enrolled in one of these part-time study programmes. In most of the Master courses of the University enrolment is reserved for students with some years experience in the relevant field of work (mid-career masters). Apart from the regular, government funded courses leading to Bachelors and Masters degrees, Rotterdam University organises privately funded courses leading to specialist Masters degrees (with national accreditation) and also shorter post-initial study programmes, for instance in Management, Health care and Education.

Over the past years Rotterdam University has developed a practice of assessment of previously attained competence (EVC), as basis for a custom-made study programme to a Bachelor degree.

The University is now a nationally appointed centre for EVC-assessment. The University has a strong tradition in providing ‘second chance’ education to students who realise at later age that they did not achieve their full potential in their initial education career. Students over 21 can enter University on the basis of a *colloquium doctum* procedure, without meeting the regular entrance requirements. Several hundred do so each year.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 84.

The formal settings of the workplace cannot compete with research based further education conducted by academic staff from universities. This observation finds support in the self-evaluation report that states an absent sense of urgency in political circles and the business community in the region when it comes to action upon the need for further and adult education. Table 3.2 shows that the proportion of the population between

30-39 enrolled in education institutions in the Netherlands was less than 3% (2.7 %) and only 0.7 % for the age group 40+.

Table 3.2 Proportion of the population enrolled full-time and part-time in public and private learning institutions (Selected countries)

Percentage of the population enrolled full-time and part-time in public and private learning institutions				
	age range 15-19	age range 20-29	age range 30-39	age range 40 and above
Australia	82,3	33,1	13,5	5,8
Austria	79,0	21,6	3,5	0,5
Belgium	94,4	28,3	8,5	3,8
Denmark	83,3	38,2	8,1	1,5
Finland	87,9	43,0	14,4	3,4
France	85,7	19,5	2,6	N
Germany	88,1	28,7	2,5	0,1
Hungary	88,8	25,1	5,9	0,6
Ireland	89,7	20,8	5,6	0,2
Italy	80,0	21,0	3,5	0,1
Netherlands	89,3	28,0	2,7	0,7
Poland	93,1	31,0	4,3	x(8)
Portugal	77,3	20,6	3,7	0,6
Spain	80,4	21,5	4,0	1,1
Sweden	87,0	34,5	12,9	2,9
Switzerland	84,4	22,7	3,8	0,4
UK	71,4	17,3	5,7	1,7
USA	79,9	22,8	5,5	1,4

Source: Modified table based on OECD (2009), *Education at a Glance 2009: OECD Indicators*, table C1.1, OECD Publishing.

Policy initiatives must be implemented to ensure a more effective provision of lifelong learning. Examples of best practices from other countries could serve as inspiration for the Rotterdam region. In Denmark there has been an extensive increase in the supply of lifelong learning programmes in recent years, partly organised by the Danish University Extension (*Folkeuniversitetet*), which is a national organisation with regional offices that arranges research based lecture sessions in collaboration with university researchers.

- The Folkeuniversitetet in Aarhus has proven to be a great success. There is a close collaboration with the Aarhus University campus where most of the lecture sessions take place. The Folkeuniversitetet also collaborates with a number of cultural institutions in the region. It is a non-profit organisation financed partly by the state and partly by the participants. The idea is to share the knowledge of scientific theories, methods and results with the population. Everybody can attend the courses and lectures and participants are a cross section of the adult population from about age 18 to the third age.
- In Aarhus the Folkeuniversitetet offers around 600 lecture sessions and courses per year within many different scientific areas. The lecturers all have a university background, and many of them are top researchers in their field. This creates a unique link between the universities and society. The lectures take place in flexible hours during daytime, in evenings and during weekends. This allows for people with a full time day job to attend courses.
- The Folkeuniversitetet in Aarhus has experienced a rapidly increasing number of students. In 2008 there were 35 000 individual participants, more than 5 times higher than in 2000. This makes it one of the most popular cultural institutions in the region. Most students subscribed to more than one course and there were in total about 120 000 course entries.

3.3 Attracting talent

The population in Rotterdam is the youngest of any city in the Netherlands. The young population even is expected to grow younger and in addition with increasing diversity. The self evaluation report (Figure 1.4) presents a forecasted composition of the population of Rotterdam in terms of origin. More than 250 000 inhabitants of non-western origin are expected in 2025 out of a total population of 609 000 inhabitants.

This may lead to a growing educational gap between generations and ethnic groups in the population. Therefore the region could benefit from a substantial upgrading of its internal human capital, and it must ensure increasing learning opportunities particularly for its young and disadvantaged populations.

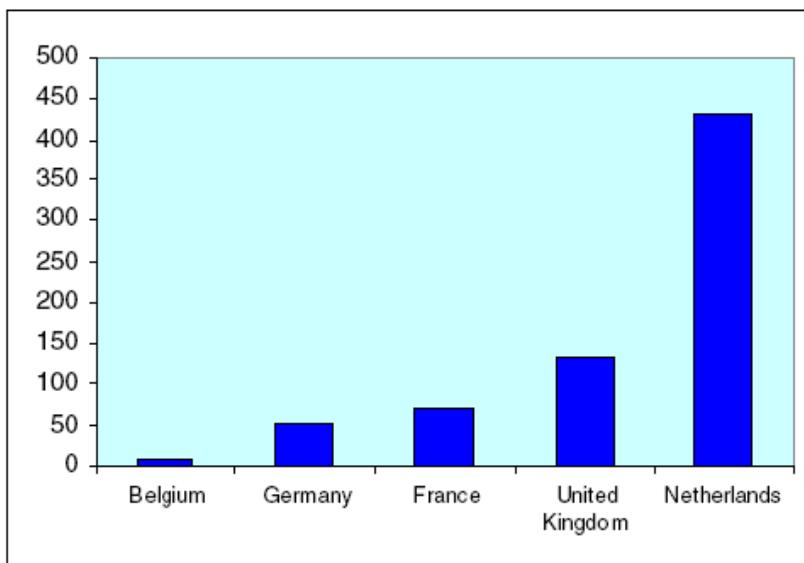
An important resource for building the region's stock of advanced human capital is the attraction of human capital from abroad. Evidence suggests that global mobility of the highly skilled is on the rise. Hence, the

Rotterdam region has a potential for attracting highly skilled labour at a relatively low cost by offering quality jobs and good living conditions.

Higher education institutions are quite successful in attracting international students, but in general the Rotterdam region is not very effective in attracting and retaining foreign knowledge workers compared to other regions.

Part of the explanation is found in the policies on immigration. Complicated rules and regulations, integration tests, and fees have a deterrent effect. Even though a de-bureaucratisation has taken place, there are still further steps to be taken. The cost of a work permit today in the Netherlands is 750 EUR for a highly skilled migrant while a self employed person and students pay approximately 430 EUR (Immigration and Naturalisation Service, 2010). OECD data suggests, that the cost of a work permit in the Netherlands is substantially higher than in neighbouring countries such as Belgium, Germany, France and the United Kingdom.(OECD, 2007).

Figure 3.1 Cost of work permits in selected OECD countries



Source: OECD (2007), *OECD Territorial Reviews: Randstad Holland, Netherlands 2007*, OECD Publishing, p. 139.

While working to dismantle barriers, the Rotterdam region could benefit from developing a branding strategy, which is based on the inherent qualities and values of the region. Moreover, the region could improve its attractiveness by developing support services that ensure a professional welcome and the integration of highly skilled migrants into the Dutch society.

Notes

- ¹ Resources were directed towards groups in economics, health econometrics, management of innovation and cognitive learning

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Chapter 4: The contribution of higher education to innovation

This chapter considers innovation in the Rotterdam region, and the institutions that contribute to it. It looks at the region's strengths and how they relate to the industrial structure of the region and it makes recommendations about how to develop a more coherent regional innovation system.

Although Dutch higher education institutions are good at generating knowledge and producing research, surveys indicate that the Dutch innovation system is underperforming by international standards and especially when compared to other Northern European countries.

Recently Deutsche Telekom Stiftung measured the innovative policy and innovative capacity of companies in the leading industrialised countries. Their survey shows that the Netherlands is significantly behind the established leaders (see Figure 4.1). It is only on the social indicator that the Netherlands is ranked in the top five countries. The Netherlands comes across as a liberal-minded and diverse country, but one where the machinery to convert ideas and knowledge into new products and processes is not working well. .

Figure 4.1 Innovative capacity of the leading industrialised nations

Place		Score
1	US	7.00
2	Switzerland	6.93
3	Sweden	6.76
4	Finland	6.26
5	Denmark	6.14
6	Canada	5.24
7	Japan	5.22
8	Netherlands	5.03
9	Germany	5.01
10	UK	4.78
11	Korea	4.47
12	France	4.25
13	Austria	4.15
14	Belgium	4.14
15	Ireland	3.77
16	Spain	1.79
17	Italy	1.00

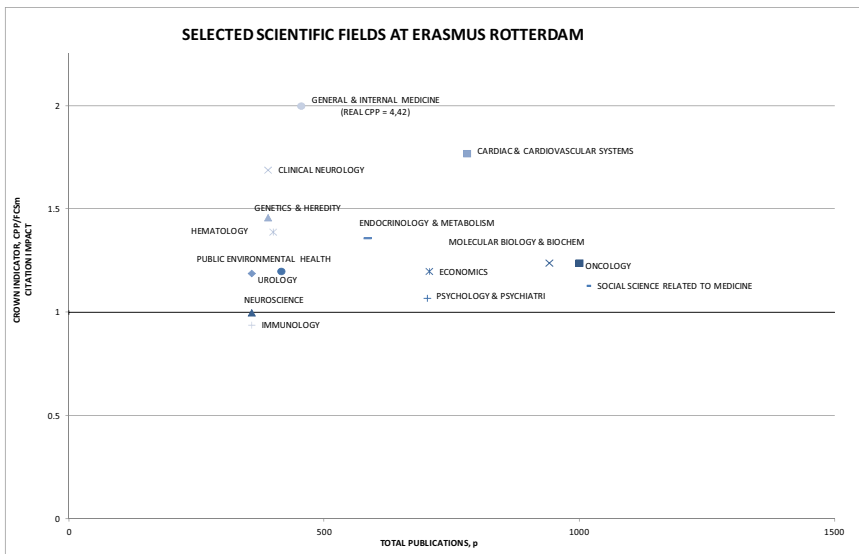
Source: Modified table based on “Innovation Indicator for Germany 2009” (Deutsche Telecom Stiftung, BDI, 2009, p. 2)

This national picture is especially true for Rotterdam. Like many metropolitan regions, Rotterdam has a fragmented innovation system (Tödtling and Trippl, 2005), with multiple supply side projects financed by soft money. There is an apparent lack of capacity to formulate and implement coherent human capital strategies that include the higher education sector as well as business and industry. Rotterdam’s innovation system needs to become coherent, with its main components being less supply- and more demand-driven, and with stronger articulation of the education sector including the higher education institutions.

4.1 The research and knowledge output of the universities

In a number of research sectors Erasmus University and Technical University of Delft are performing very well. In 2009 the Times Higher rated EUR the top European institution for research in clinical medicine, and this is confirmed by a recent bibliometric benchmarking analysis of 15 leading European universities made for Aarhus University by CWTS in Leiden..

Figure 4.2 Research impact by scientific field



Source: Bibliometric Benchmarking Analysis of the Aarhus University, 2002-2007, Centre for Science and Technology Studies (CWTS), Leiden University (August 20, 2009)

Economics is also a research intensive area at EUR with the highest number of research publications among the 15 universities in the above mentioned analysis (CWS, 2009). Other strong research areas include biology and environmental technology. TUD has a strong reputation for its R & D work in, microelectronics, nanotechnology, energy technologies, and marine technology.

The importance of these sectors is verified by statistical figures presenting the employment in Rotterdam by sector. As stated in the self evaluation report (Table 1.4) transport and communication have a high share

of the total number of employees, and more than 20% of all jobs are in the business service sector.

The major research universities, Erasmus and Delft Technical University, both have a strong research base, and the tenured staff have reasonable amounts of time allocated for research. Indeed the Technical University of Delft has a good record for the intensity of university-industry co-publications¹. However, in the universities of applied science, Rotterdam University and INHolland University, faculty are primarily employed as teachers with little or no time for research. The teaching load is much higher at the UAS than at the research universities and the UAS are not eligible for basic government research funding. The effect of this is that while the two traditional universities have the capacity to undertake internationally leading researchers in a number of areas, the UAS lack such capacity. The proportion of innovative enterprises that co-operate with HEIs and research institutes is relatively low in the Netherlands compared with other EU15 countries and this lack of capacity exacerbates the situation. However, compared to the research universities, the UAS do offer more practically-oriented programmes which contribute to the development of professional activities.

TUD is also very active in basic research. In the last five years TUD research has been reorganised around four themes: energy, environment, health and infrastructures. The aim is to be more active with multinationals - notably Akzo Nobel and Shell - through exchange of personnel and consortia building. It has reorganised its research with four spearhead groups (against 13 smaller units previously). Different fields are targeted: nanotechnology; biotechnology; industrial design; architecture; and microelectronics.

We noted in chapter 2 the place of EUR and TUD in some widely-read rankings.. Similarly the Scimago classification of research institutions based on journal production and impact places the Rotterdam universities somewhat behind Utrecht, Amsterdam (both UvA and VU), and Leiden for the volume of publications (See Table 4.1). The citation index is nevertheless quite good for EUR and its impact is substantial, while TUD underperforms compared with the technical universities of Zurich and Lausanne (Switzerland) or Technische Universität of Munchen, Aachen or Dresden (Germany)

Table 4.1 Some Dutch Universities in the Scimago international classification*

Rank	Name of University	Output	Cx	Co-operation	A	B
42	Utrecht	23031	10.48	40.51	1.08	1.71
53	Amsterdam (UvA)	20608	10.51	42.3	1.07	1.73
138	Leiden	12090	10.55	48.97	1.08	1.52
227	VU Amsterdam	8812	9.28	48.4	1.06	1.54
253	Erasmus	8172	12.24	38.55	1.1	1.91
256	TU Delft	8156	5.27	41.6	0.93	1.56
323	Eindhoven	6823	6.01	44	0.98	1.7

* Universities are ranked according to their publication output (Column 3). Cx is an indicator showing the average scientific impact of an institution's publication output in terms of citations per document. Column 5 shows the institution's output ratio that has been produced in collaboration with foreign institutions. A shows the journal average importance where an institution output is published. B reveals the ratio between the average scientific impact of an institution and the world average impact of publications of the same time frame and subject area.

Source: SCImago Institutions Rankings (SIR), 2009 World Report, SCImago Research Group, www.scimagoir.com/pdf/sir_2009_world_report.pdf, accessed 1 September 2010.

The review team considers that an intensification of the co-operation between the two research universities would help to consolidate their results, to boost multidisciplinary R&D and to capture scale effects. Even if TUD and Erasmus are already involved in a few regional co-operation schemes such as Kennisalliantie, Hope and B2SP, they have no common regional strategy. In trying to devise a joint approach to regional development, both universities might contemplate the experience of Finland where the Ministry of Education requests universities to design common regional strategies for areas that are larger than a municipality or a county (Maakunta). Increased collaboration between the two academic institutions should also be sought in the field of research and international policy in order to increase exchange of experience and enhance the production of knowledge and scientific publications. A step further to these initiatives would be to investigate the possible benefits and drawbacks of a more wide-ranging merger between the activities of these two leading academic institutions.²

Universities of applied sciences (UAS)

Any analysis of Rotterdam's higher education landscape also needs to take into account the UAS, which have a significant impact on the region

both through the sheer size of the student body (28 300 students for Rotterdam University and 7 800 for INHolland) and their R&D involvement and innovation based research.

The Universities of Applied Science provide research aimed at addressing regional issues and serving the regions purposes. In Rotterdam, INHolland covers a vast number of science and engineering fields through its six research centres. Rotterdam University has an even larger portfolio, and its research programmes reflect the institution’s “Outside in – Inside out” philosophy.

Research groups in UAS are headed by *lectoren*, professionals who have an established reputation within a specific field, most of them holding a PhD. Many of these *lectoren* combine their work in UAS with appointments elsewhere. This enables them to keep in touch with the professional practice in their respective fields. This circulation of expertise stimulates and facilitates innovation in the professional world as well as in the educational programmes. In this way research contributes in developing the competencies of future professionals. In Rotterdam, more than thirty senior *lectoren* work at HS Rotterdam, while six senior lecturers have been assigned to INHolland centers in the region (out of a total of 400 for the Netherlands as a whole).

Individual lecturers are expected to respond to the demands and needs of small businesses notably through the creation of ‘knowledge circles’ integrating SMEs with which they co-operate into the projects. Rotterdam UAS have also developed innovation lab(oratorie)s, an innovative learning environment. The idea is to build a hub where external stakeholders, internal professors and creative students meet. Connections are established with around a hundred of firms for each of these labs (See Box 4.1).

Box 4.1 Innovation labs-Rotterdam University

Innovation Labs feature projects in which third and fourth year students and lecturers from different domains collaborate in an innovative learning and working environment in order to develop new and coherent solutions to actual and persistent problems in the Rotterdam region. Such problems will have the following features:

- constant liability to change
- strong interrelationship of all parts
- no unambiguous solutions available
- the need for different points of view to define the problem.

In Innovation Labs representatives of the so-called knowledge triangle between professional practice, education and research & development are present. All Innovation Labs have a direct connection to the regional themes for Research & Development of the Rotterdam University. The projects are always commissioned by the strategic partners of the Rotterdam University.

In the Innovation Labs the students from different fields of study are challenged to contribute to the approach of the multi-disciplinary problem from the point of view of their own discipline. The contribution is always a combination of gaining more in-depth knowledge of the complex problem and of expanding their competences.

Innovation Labs are organised to provide ambitious students with extra challenges. Students who have participated successfully in a Innovation Lab project, get an additional certificate at graduation. They can also choose to go on participating in research for another period in order to get an Honours Degree, underlining their excellence in tackling complex problems.

In an Innovation Lab meetings are organized regularly to discuss the questions concerning the different lines of research. Research workers and students are requested to present their research set up and research activities. These meetings provide an inspiring learning environment which result in a strong concern among all participants for each other and the problem at hand. The Innovation Labs are also organised to provide the Rotterdam region with solutions to complex and persistent problems. Each year, or less in case of very complex problems, new projects are selected in partnership with the strategic partners. In November 2009, Rotterdam University has eleven Innovation Labs e.g. Future Mobility, Floodcontrol 2015, Transformers Rotterdam, Talent Development and Cultural Diversity.

Source: Rotterdam University of Applied Science

However the *lectoren* system (costing EUR 50 million for the entire country in 2007) provides only a weak supplement to R&D in the UAS and may be too thinly spread to be fully effective. These funds also have to cover the contribution the *lectoren* make to teaching. RAAK programme money can be used in R&D projects but is also very limited (EUR 6-8 millions in 2007 nationwide). The promotion of the *lectoren* based R&D therefore requires supplementary financial support that UAS have to find from their own resources.. In that context it is of some concern that there is little co-operation between the *lectoren* and the research universities and consequently not much possibility to leverage research from other HE institutions.

In Rotterdam, the share of students who are enrolled in UAS (around 50%) is slightly below what is achieved in Amsterdam (55%) while the industrial and energy sectors are more dominant in relative terms. This suggests that more applied and non high tech research is needed in Rotterdam to meet enterprise demand. It is therefore especially important that the HE system be better positioned to expand its R&D and its relevance for local industries. A consolidation of the ties between UAS and the two research universities is required as well as the building of an HEI alliance that will cover all aspects of research from high end of technology to very practical R&D segments. A co-ordinated approach would be more effective than the scattered involvement of HE institutions in various intermediary organisations. Many examples support this assertion (the example of the COREP consortium in Piemonte, Italy is outlined in Box 4.2).

Box 4.2 COREP - improving the universities' regional contribution in Piemonte

The emergence of COREP (Consorzio per la Ricerca e l'Educazione Permanente) as a consortium of higher education reflected early attempts to increase the regional contribution of the HE sector in the Piemonte region. Reflecting the generally low level of human capital development in the region, there were concerns amongst large regional firms that their competitiveness suffered from the lack of provision of post experience education and higher level skills. Because this was not a core university activity, it made sense to form a consortium for to create appropriate pathways allowing firms to pay for qualifications drawing on existing educational competencies.

COREP's origin lies in a long-standing collaborative project, CSI Piemonte which was created in 1977 to provide access for regional authorities to office automation expertise. In 1986, the CSI board established a specific group on research and education projects within the universities. Whereas CSI Piemonte was primarily concerned with activities relating to the information society, but this group identified more general enthusiasm in the Universities for effective collaboration in other regional activities. The availability of EU and Italian government funding for Technology transfer provided the resources to fund much of the early activity

The COREP consortium has grown to involve 11 partners including the two public universities, the technical university (politecnico) of Turin, other public sector bodies, and Telecom, FIAT and the Unione Industriale di Torino for the private sector. COREP has now taken the lead in running a broad range of projects of wider regional benefits.

Through the ECIU* (European Consortium of Innovative Universities), COREP is involved in the DIFUSE project which is also concerned with maximising universities' regional impact through technology transfer and entrepreneurship. This is comparing the practices of the regional Universities against that of comparative institutions.

* ECIU is a grouping of 11 full and three associate members bringing together European technical universities with an interest in promoting entrepreneurship. The universities are distinguished by a problem solving approach to learning and by encouraging significant interaction between students and businesses, exemplified in high levels of income from commercialisation and industrial research.

Source: COREP (Consorzio per la Ricerca e l'Educazione Permanente) www.corep.it.

4.2 Innovation and clusters

The distinction between research universities and universities of applied science is reflected in two different approaches to innovation. The STI (Science, Technology and Innovation) mode of innovation is mostly associated with science based innovations, but is also typical of applied engineering research carried out at technical universities. It therefore includes most of what is normally categorised as R&D. The DUI (Doing, Using and Interacting) mode of innovation is experience based with a much larger tacit component than found in scientific, research based knowledge, and it is mainly carried out inside companies based on highly skilled workers from technical universities and applied universities (Lorenz and Lundvall, 2006).

Rotterdam's industrial structure includes large as well as small and medium sized businesses (SME), in both knowledge based and more traditional industries. The majority of the SMEs can clearly be categorised as belonging to the traditional group, which also contains some large firms. These distinctions also relates to the two alternative modes of innovation described above. The knowledge based industries (both in small and large firms) tend to innovate in the STI mode, and have well developed contacts with the research universities, whereas the traditional industries (again both SMEs and large) on the other hand tend to innovate following the DUI mode, and lack good contacts with R&D milieus at the applied universities.

In the twentieth century Rotterdam's most important economic sector was the port, which became known as the 'Gateway to Europe'. It accounts for approximately 65 000 jobs, but more recently the Medical and Care cluster with around 32 000 jobs, and the creative cluster (around 12 500 jobs) have been given special attention in Rotterdam's employment and economic development policy.

The port-industrial complex has developed from traditional port related activities. The location of chemical and oil industries is closely connected to the port. International services and international company head offices have been located in the city, thereby expanding the cluster. The port is a laboratory for logistics, and an international research institute of logistics has been established in co-operation with Erasmus University. Today the port is a link in many global supply chains.

The chemical and petro-chemical industries which make up an important part of the port-industrial complex innovate relatively little. Moreover the majority of the SMEs active in the port are trade, transport and logistics firms, especially the ones which take care of the final transport into the hinterland, are technologically traditional firms which do not give much

priority to innovation. It is estimated that only 1-2% of the turnover of the port and industrial complex is spent on R&D, compared to between 4-5% in more high technology sectors). The port industries demonstrate many characteristics of mature industries and there is a risk that they will become rigidified. The traditionally dominant position of the port in the economy of Rotterdam may give rise to a ‘cognitive lock-in’ among planners and political decision makers which frustrates change and development.

Thus, an important challenge is to build on and exploit the strengths of the port and other major industries to develop new, future-oriented economic activities in areas such as clean technology, water management and other environmentally sustainable technologies. These should be based on the principle of related variety: that is, the new industries should build on the existing ones (and thus be related to them), but not be part of the same industrial specialisation (thus creating greater economic diversity). The port is already engaged in some limited work together with the Technical University of Delft in logistics and maritime transport technology, and with Erasmus University in port economics, maritime law and logistics.

The port also co-operates with Rotterdam University, which has established a new campus, the RDM (Research, Design and Manufacturing) campus in the old port area which used to belong to a shipbuilding company (see Box 4.3). The campus houses the Delft – Dynamo incubator, which is a partnership between Rotterdam university, YES!Delft, Rabobank et al. Rotterdam wants to develop the port into an international energy hub and an international knowledge centre for climate-change issues (see Box 4.4). This represents a transition from less innovative economic activities to new science and technology based activities according to the STI mode of innovation. These efforts need to be extended and complemented.

Box 4.3 RDM Campus - Innovation Dock

RDM Innovation Dock is part of the RDM Campus and its goal is to connect practical research and innovation & entrepreneurship. The *Applied Tech* activities provide an impulse to the innovative manufacturing industry: students realise, together with or guided by professionals from participating companies, innovative product concepts and production processes. This learning environment is meant to support and stimulate students to gain, develop, share and apply knowledge. The strong focus on innovative businesses strengthens the component of ‘entrepreneurship’ within their education. RDM Innovation Dock is a 23 000 m² former industrial space which offers room for MBO, HBO and business to meet. Attracting companies is crucial for the success of RDM Innovation Dock. Therefore, a certain degree of integration between educational institutions, offices and business accommodation is needed.

Box 4.3 RDM Campus - Innovation Dock (continued)

RDM Innovation Dock is aimed at three market areas:

- Building: sustainable on land and water;
- Moving: smart mobility and automotive technology
- Powering: energy technology and sustainable energy (including application).

The above mentioned market areas share one common factor, which is summarised in the term *sustainability*. RDM Innovation Dock may be regarded as an outcome of the Rotterdam Climate Initiative.

In their co-operation, Rotterdam University and Albeda College apply a new concept of knowledge circulation. Students and professionals work together on assignments within Knowledge Creation and Circulation teams. Within these teams new competences from education and best practices from businesses are exchanged. What characterises this approach is that knowledge circulation takes place both at horizontal and at vertical level.

Source: City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report, Rotterdam. p. 57

Box 4.4 YES! Delft

Each year, the Delft University of Technology fosters about 50 start-ups. They include young design agencies, small ICT companies, architectural firms, companies in the field of technological service provision and techno-starters: entrepreneurs who introduce a new technological product into the market. Some are supported by YES!Delft, which was formed in co-operation with the Municipality of Delft and the Ministry of Economic Affairs.

This organisation stimulates and supports these techno-starters with services such as office space, legal support and coaching by experienced entrepreneurs and offering a relevant network. The Delft University of Technology and YES!Delft, in conjunction with the Enviu Foundation in Rotterdam, have taken the initiative to set up a sustainable incubator in the Port of Rotterdam. As from September 2009, within the former RDM grounds, start-ups which focus on sustainable energy, mobility and a sustainable lifestyle have been supported.

Source: City of Rotterdam Regional Steering Committee (2009), The City of Rotterdam, The Netherlands: Self-Evaluation Report, Rotterdam. p. 80

The second important cluster in Rotterdam is the medical cluster which provides jobs to approximately 12 000 employees. This has Erasmus University Medical Centre Rotterdam (Erasmus MC) as its dominant knowledge exploration node, and is a typical example of a science-based industry following the STI mode of innovation working in close contact with medical universities and research institutes. Erasmus MC is one of the largest hospitals in Rotterdam, and a leading medical research centre in Europe. One of the strengths of the cluster with respect to the exploitation, diffusion and commercialisation of research results is that it contains high-end research, care and education. Due to its size Erasmus MC is not only important for the growth of the medical cluster but also for the economic development of the city as a whole. It maintains links with other medical research organisations (e.g. University of Leiden), the regional business community and the national as well as city governments.

The TTO at the Erasmus Medical Centre contributes significantly to innovative spin-offs in Rotterdam, and the Medical Delta programme (Box 8) is an innovative consortium of major industrial partners and leading research and development institutions from the region with the aim of pushing forward the state-of-art in health sciences and medical technology. It is recommended to analyse how the medical cluster can be further developed through new strategic partnerships.

Finally, there is an ambition to develop a creative cluster focusing on architecture and design, which will build on Rotterdam's established reputation in these areas. The city's modern architectural heritage is second to none, and this cluster also includes technical and graphic design, audio/visual and new media activities. As well as creating new jobs in the creative industries and stimulating the development of related activities, one important objective of the creative cluster is to transform the image of Rotterdam from a port city with heavy, polluting industries to a 'creative' city. The creative sector is clearly seen as a contributor to economic development. The multi-ethnic social and cultural structure in Rotterdam is a strong asset in this context (see chapter 6). The Willem de Kooning Academy at Rotterdam University stands out in relation to the creative industries, but the cluster also has relationships to both Erasmus University and the technical University of Delft. In this sector one can find innovative activities based on both the STI as well as the DUI mode of innovation, although the latter is the more frequent.

The demand for R&D by the traditional SMEs

The present low level of co-operation between innovative enterprises and HEIs constitutes a challenge for regional innovation policy, notably towards traditional SMEs. To improve co-operation there is a need for a more system-oriented and pro-active innovation-based regional policy.

According to the self-evaluation report, the traditional SMEs experience difficulties in establishing contacts with HEIs and especially with the universities and also find it difficult to formulate their knowledge needs concretely. The universities of applied science tend to be more open and better equipped to get involved with regional partners from industry, the health sector or welfare services. This is largely because their fields of study and research (engineering as well as social work, business administration, and health services) are primarily application oriented and are closer to, and thus more immediate relevant and adaptable to, the needs of industry and public institutions than the universities and research institutes. Their practice-driven approach to teaching encourages contacts but the universities of applied science have far less resources available for research.

The Dutch innovation voucher scheme which aims to stimulate interaction between small and medium-sized enterprises (SMEs) and public research institutes appears to be having some success. (Corne. Vroomen and van der Steeg, (2006) The *lectoren* programme (discussed earlier in this chapter) has improved the relations between the SMEs and the applied universities specifically. Broadly speaking a senior lecturer has four tasks: knowledge development, professionalisation of lecturers at their respective UAS, renewing education curricula and knowledge circulation from and to society³. They have boundary-spanning roles and can be viewed as ‘knowledge brokers’ between SMEs and the applied universities.

Training highly skilled workers and providing intermediate technical skills and competencies within applied areas of education and research are important in promoting interactive learning between users and producers and incremental innovations in work. These skills and competencies contribute to demand-led innovation and help develop a better platform for more traditional industry to link up with science-driven innovation where universities play the leading role (Asheim, 2010). This happens for example when a small business changes technological trajectory from tacit knowledge to one based on systematic research and development. In this way they can avoid being locked-in to a price squeezing competition with low cost countries. To do this they need to raise their absorptive capacity by hiring skilled graduates. This is often supported by mobility schemes. In the long run most firms will face problems if they rely exclusively on informal localised learning. They need to gain access to wider pools of both scientific

and engineering based knowledge on a regional, national and global scale (Asheim *et al.*, 2003).

Combining the DUI and STI mode of innovation

The potential benefits of combining the two modes of innovation make it important to reflect upon which types of R&D efforts would most benefit from support as part of a regional innovation policy. Clearly this points towards R&D which could directly be used to upgrade the more traditional and non-R&D based industry. However, such R&D should not only be focusing on the existing technological trajectory, but should also have an eye on how to transcend the dominating trajectory to avoid path dependency leading to negative lock-in situations. However, it would be even more interesting to apply a related variety perspective on how to combine R&D intensive and less intensive sectors. Generic technologies such as ITC, biotech and nanotech stand out as being of special importance to achieve a related variety based combination of the modes of innovation. Examples of this, using biotech as the generic technology, would be within green biotech, where the production of functional food requires collaboration between highly R&D intensive biotech firms in science parks with traditional dairy firms, or in white biotech where biotech input is used to upgrade and diversify products and processes in traditional metal and chemical industries.

As a general rule, when it comes to supporting emerging firms based on newly created knowledge from universities and R&D institutes through technological entrepreneurship it is of strategic importance that the knowledge created is unique and of international excellence, and that a critical mass of research exists. Moreover a successful policy of technological entrepreneurship requires competent technology transfer offices and organisations, science parks with incubators having well-established links to the relevant university departments, research centres and R&D institutes as well as a regional entrepreneurial culture. Experience has shown that if R&D resources are too thinly and evenly spread out, the positive impact disappears. Moreover, not all relevant knowledge can be provided within a region, and a related variety strategy can also be obtained by linking regional industry with universities and R&D institutes outside the region - and even internationally - in a distributed knowledge network. Experiences from Sweden and China show that only a few regions that have high quality research universities, international competitive industries as well as a pro-active regional government can support internationally competitive industries (see Box 4.5).

Box 4.5 Examples of Triple-Helix co-operation

I Scania, Southern Sweden

The ‘triple-helix’ co-operation in Scania is one of the best examples internationally demonstrating that this approach is more than just a metaphor and can be highly operative in promoting regional development through a close relationship between university, industry and regional government. Three examples can be mentioned. First, the INTERREG project initiated by Lund and Copenhagen universities to establish the Medicon Valley Academy/Alliance, which was strongly supported by Region Scania. This has resulted in Medicon Vallay today being among the 3-4 largest biotech regions in Europe when it comes to products in the pipeline, and, thus, it ranks high in the hierarchy of global bioregions. The second example is the VINNVÄXT initiative in Scania which is focused on food (functional food, convenience food, international marketing of food). VINNVÄXT is a VINNOVA (Swedish Governmental Agency for Innovation System) policy initiative of building regional innovation system with a ten year support to promote global competitive industries. The third example is an effort of promoting wireless communications and internet based services in Scania and the neighbouring county of Blekinge called ‘Mobile Heights’. Two of VINNOVA’s Industry Excellence Centres constitute the base for this effort, which is based at Lund’s university technological institute, but is also strongly supported by key industrial partners, such as Sony Ericsson, and Region Scania. VINNOVA is involved in funding the two Industry Excellence Centres over a ten years period. A successful Triple Helix co-operation requires the presence of strong and able partners, i.e. a good university, competitive industry and a proactive regional government. Scania has all these actors present in its regional innovation system. Lund University is the largest university in the Nordic countries and among the stronger in Europe, and the region has a number of international competitive industrial sectors, e.g. IT (Sony Ericsson), biotech (Medicon Valley), and the food sector as well as a proactive regional government in Scania. The main obstacles to be surmounted have to do with concrete governance challenges.

II Zhejiang University, Hangzhou, China

Zhejiang University is a top national university which was established in 1897. It is located in Hangzhou, in China’s most economically developed region (where Shanghai is also located). Hangzhou is the city-region with the highest frequency of private enterprises in China. For more than a century Zhejiang University has made crucial contributions to national and regional development. Especially in recent years, guided by the national strategy and regional demand, Zhejiang University has taken proactive measures to promote and enable regional industrial structural adjustment and economic transformation and upgrading, and great progress has been achieved.

Box 4.5 Examples of Triple-Helix co-operation (continued)

Zhejiang University implements key national projects and outputs to their local region, such as the "water pollution control and treatment", and "R&D of new drugs". In co-operation with Hangzhou city Zhejiang University has built demonstration areas in Hangzhou to speed up the process of scientific and technological research and promote the transfer of technological achievements. The university has also set up the Industrial Technology Research Institute for China's industrial economy to provide important scientific and technological support for the high-tech industry. However, low-tech industry has also been targeted. As an example, digital textile technology was developed by Zhejiang University and has been successfully implemented in more than 5 000 enterprises, which has greatly promoted the technological progress of China's textile industry. Furthermore, industrial automation technology developed by Zhejiang University has been implemented in more than 5 000 large and medium sized enterprises.

With support from local government, Zhejiang University has built strategic alliances for industrial innovation and public innovation service platforms and provides many training and educational programs for regional economic transformation and upgrading. This apparent success may be due to the fact that all stakeholders involved - university, industry and the city government - are strongly committed.

Sources: OECD (2010) Higher Education in Regional and City Development, Berlin, Germany OECD Publishing; Benneworth, *et al.* (2009): Exploring the Multiple Roles of Lund University in Strengthening the Scania Regional Innovation System: Towards Institutional Learning? *European Planning Studies*, 17/11, pp. 1645-1664; VINNOVA (2009), VINNVÅXT: A programme to get Sweden moving!, Regional growth through dynamic innovation systems, www.vinnova.se/upload/EPiStorePDF/vi-08-22.pdf, accessed 1 September 2010, and Zhejiang University.

In addition to a relatively low level of co-operation between university and industry the Rotterdam region also suffers from a relative lack of co-operation between the research universities and between those universities and the UAS. A more long-term, institutional co-operation between the institutions is required. An example of such co-operation in a region between different types of universities is a new initiative by Lund University in Southern Sweden to promote co-operation between the five universities and university colleges (which are analogous to the Dutch UAS) in order to co-ordinate education and third mission work in the region. The initiative focuses initially on engineering education, in which all the five institutions engage. Thus, instead of market failure, the rationale for policy intervention is to address system failures by reducing the interaction or connectivity

deficits which lie at the core of the regional innovation systems approach (Asheim *et al.*, 2006).

To achieve this, regional government could take a more pro-active role by adopting a platform-oriented regional policy. By this we mean an approach that transcends traditional sector borders and is appropriate for emerging fields, for example, biotechnology, which cannot be regarded as a 'sector' in the traditional way. Thus, a platform approach to biotech would involve looking at how biotech could be used to upgrade traditional sectors (e.g. food (green biotech) and traditional industries (e.g. process industries; so called white biotech) in addition to creating emergent sectors within life industries (e.g. red biotech).

The focus should be on policies which encourage firms in 'learning to innovate' and thus providing behavioural value-added (Asheim *et al.*, 2003; Asheim *et al.*, 2006). An example would be creation of a regional innovation system in which the firm receive policy support aiming at the promotion of innovations, as opposed to a reactive policy providing financial support to individual firms. The idea with an innovation system is to generate the capacity through long term and systemic co-operation between firms, universities and regional government for the stakeholders to become more innovative, that is to learn to innovate through co-operation with the other stakeholders in the system, and also with actors outside the system who are supported by it.

The platform approach to regional innovation policy is not only applicable for high-tech industries based on analytical knowledge, but can also be applied for industries drawing on different knowledge bases traditionally associated with medium and low-technology manufacturing, as well as service industries (synthetic and symbolic knowledge bases), for example travel and tourism or the creative industries. In that sense it represents a strategy for securing employment in a range of manufacturing industries and services with highly differentiated educational and skills requirements and gender profiles, and can therefore provide the structural prerequisites for reducing social inequality and promoting regional cohesion in addition to regional competitiveness. This is a very relevant perspective in the context of Rotterdam's multi ethnic structure and below-average level of educational attainment.

How to improve connectivity in a fragmented, metropolitan regional innovation system (RIS)

Notwithstanding some examples of well-functioning university-industry co-operation, the general impression is that the RIS demonstrates some of

the characteristics of a fragmented, metropolitan RIS (Tödtling and Trippl, 2005). The structural characteristics of fragmented metropolitan regions can be summarised as follows:

Metropolitan regions are normally regarded as centres of innovation with the presence of R&D organisations and universities, business services, as well as headquarters of international firms (in the case of Rotterdam, one of the two headquarters of Unilever, and the strong presence of Shell among others). As a consequence, R&D activities are usually above average. However, metropolitan regions often lack dynamic clusters of innovative firms due to the problem of fragmentation, i.e. the lack of innovative networks and interaction between universities-firms as well as among local companies. Such regions display an industrial structure characterised by so called ‘unrelated variety’, i.e. by having a diversity of sectors which do not complement each other, and, thus, do not produce knowledge spillovers. This may represent an important innovation barrier in such regions resulting in the development of new technologies and the formation of new firms often being below expectations. Rotterdam is doing better than this broad description indicates by among other things having dynamic science parks, successful incubators etc, even if the strong dominance of the port represent a potential lock-in problem.

Normally metropolitan regions have an above educational level, especially with respect to higher education: they have the largest national universities, and a well-developed network of other HEIs (thus in the case of Rotterdam there are Erasmus and Delft Technical Universities as well as the applied universities). In addition, they also house R&D institutes and departments of the large national and international companies. Thus, the challenge of the HEIs in a fragmented metropolitan region is more about increasing the impact of the presence of education and research than to increase the number of students and amount of research. For Rotterdam the main problem is the weak connectivity in the RIS, although it does also have an educational level that is below the national average.

One reason for this is that universities in metropolitan regions traditionally have focused on their national and in some cases also international roles, and ignored the role they can play in promoting regional development. This situation is also to some degree found in Rotterdam. Due to the increased focus on the third task this is slowly changing, and more and more we see that these universities no longer see any conflict between taking on their regional responsibility in addition to keeping their national and international ambitions (Benneworth *et al.*, 2009). This change in attitude is of strategic importance for achieving a well-functioning RIS in these regions (see the Korean example, Box 4.7).

Another problem has been a lack of trust and social capital among the main actors of the RIS. Universities which accord a low priority to their regional task, combined with either national multinational companies or foreign multinationals and a rather low regional government commitment have not produced the level of social capital and trust which is of paramount importance to achieve a high degree of connectivity in RIS. Thus, the spatial proximity found between actors in the RIS in metropolitan regions has not been matched with a similar social and institutional proximity, as is characteristic of smaller regions such as the industrial districts of the “Third Italy”. This might be one of the explanations of the lack of close cooperation between the key stakeholders in the Rotterdam region as pointed out in the self-evaluation report (Asheim, 2000; Boschma, 2005). The changes in attitude described above together with increased globalisation pressures have increased the awareness of the benefits of exploiting the local knowledge infrastructures more intensively, and not only relying on corporate and national and international R&D resources. The industrial structure in these regions is often more R&D intensive than in other types of regions, thus, the benefits of exploiting the knowledge exploration subsystem of the RIS can really pay off in increased competitiveness and innovativeness.

However, Rotterdam with its high share of (more traditional) SMEs will also benefit from employing skilled workers who have graduated from applied universities in more traditional firms. Finally, these regions – like Rotterdam – with a rich endowment of knowledge, research, competence and skills should exploit the possibilities of building on the ideas of related variety and diversify into new but related industries. Research has shown that the hiring of workers with related skills and competencies has a stronger impact on firms’ performance than the recruiting of workers with unrelated skills (Boschma and Frenken, 2010). These insights should also be reflected in the educational programs of the HEIs in the region. In fragmented metropolitan regions the impact of universities taking on a more developmental role, and contributing pro-actively to building and strengthening the RIS, could be considerable, and would play a major role in improving innovativeness and competitiveness in these regions. However, in taking up these challenges universities have to be supported by government and industry in a well-functioning private-public collaboration, which once again points to the importance of the City government taking a pro-active and strategic leadership role in a “triple-helix” constellation.

Box 4.6 Medical Delta, Rotterdam

Medical Delta is an alliance between the knowledge institutions of Delft, Leiden and Rotterdam and the regional business sector in the fields of medial and technical sciences and care. The objective is to establish a medical delta in the western part of the Netherlands. Medical scientists and engineers combine forces to improve the state-of-the-art in health sciences and developments of innovative medical technology.

During the past years, the knowledge institutions (academic hospitals and universities) and companies in Medical Delta shaped their alliance to form a consortium of collaborative researchers, who are often also entrepreneurs. In 2008, the directors of Medical Delta approached the city authorities with the objective to widen the scope of Medical Delta as researchers and entrepreneurs to include education and government.

A total of four workgroups have been set up for the implementation of a joint plan of action for Medical Delta. Rotterdam is the driving force behind Labour Market and Education. This part focuses on the imbalance in the Medical Delta region in terms of the future labour supply in healthcare and the demand thereof. They seek to synchronise these, both quantitatively and qualitatively, by increasing labour productivity through technical and organisational innovation.

The following secondary objectives can be derived from these principal objectives:

- Training sufficient care professionals in order to meet the future demand for care;
- Creating continuous learning curves, so that the criteria of study programmes are better aligned to the work that graduates have to carry out at care providers and companies;
- Reducing the number of vacancies that cannot be filled;
- Retaining staff working in the care sector.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam. p. 66.

Box 4.7 The Regional Innovation System and HEIs in Korea

The Korean Government some years ago endorsed the concept of regional innovation system as a basis for its innovation policy. It promoted a new type of support organisation in the 14 provinces based on the establishment of regional innovation council, activation of regional innovation network and holding of regional conventions and exhibitions and training of manpower for innovation.

A regional innovation council is an organisation which deliberates and coordinates important issues for balanced national development and also devises development plans for regional innovation. The member of the council consists of professionals representing diverse constituencies such as industries, universities and research institutions. In the case of the Busan Region the innovation council is composed of 56 representatives, with more than ten belonging to the HE sector.

Local HEIs are also contributing to the strengthening of networks through the establishment of Inno-cafes and network hubs as places for innovation diffusion through interactions and face to face meetings of regional specialists.

The third component of the strategy is to foster an atmosphere conducive to innovation throughout the region by holding Regional Innovation Conventions and Expositions. Regional Universities are involved in many activities of these innovation “festivals”.

Source: OECD (2005), OECD Territorial Reviews: Busan, Korea, OECD Publishing,

Notes

- ¹ According to a study published by the Centre for Science and Technology at Leiden University covering the years 2003-07. The report is available at www.socialsciences.leiden.edu/cwts/news/scoreboard.html
- ² The recently-created Aalto University in Finland provides an example of how complementary institutions can be brought together.
- ³ Self-evaluation report, p. 32.

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Chapter 5: The contribution of higher education to social, cultural and environmental development

This chapter is devoted to the broader issues of regional development – social, cultural and environmental. It considers Rotterdam from the perspective of its potential to attract the “creative class” and examines some of the many initiatives that are being taken to realise its potential.

Introduction

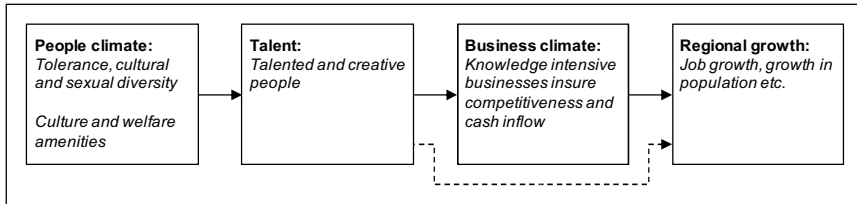
Rotterdam does not have a great abundance of the elements that Florida has argued will attract global talents to a city or a region (Florida, 2002). Berlin, by contrast, has a rich cultural scene with theatres, operas, and concert halls where world class ensembles (both Berlin's own and visiting) perform. Rotterdam is a smaller city and has competition from Amsterdam and so cannot display a similar range of cultural offers. Rotterdam is a more ethnically-diverse city than Berlin but has not perceived this as an asset. Florida argues that openness, diversity, multi-ethnicity and tolerance towards newcomers are important factors in creating a good 'people climate', which contributes to attracting talent to a city. According to Florida the attraction of talent should fertilise the ground for a competitive business climate which then attracts high tech firms bringing about economic growth. By this measure, Rotterdam has an unused potential in exploiting the ethnical and cultural diversity by promoting openness and tolerance. Some encouraging early steps in this direction, especially the within creative industries, can however be perceived.

The "creative class" approach is especially relevant for Rotterdam and is worth discussing at some length. It bases regional growth in the knowledge economy on the three cornerstones of technology, talent, and tolerance (the 3'T's). The 3'T's are seen as interconnected parameters that individually have a positive but limited influence on growth but that together have a significant synergetic effect. As Florida in his book "The rise of the creative class" (2002, p. 249) puts it, "each is a necessary but by itself insufficient condition: to attract creative people, generate innovation and stimulate economic growth, a place must have all three."

Florida acknowledged the numerous different explanations of regional growth that can be found within the fields of regional economics and economic geography. One such explanation is the human capital perspective, which argues that a high concentration of educated people propels regional growth. In addition, the creative class thesis argues that high-level human capital needs to be complemented by other factors — a broadly talented workforce and a base of economic activities — which are equally important for regional growth in a tolerant, open-minded, and diverse climate. The addition of tolerance to well-known parameters of economic growth is perhaps the most innovative part of the creative class thesis in that a focus is placed on aspects that have to do with the inclusion and well-being of people. In sum, the creative class approach focuses on three related elements: a good people climate attracts and retains creative and talented people, who, in turn, fertilise the ground for a competitive

business climate, and, finally, a good and competitive business climate brings about economic growth. Figure 5.1 presents the argument in schematic form.

Figure 5.1 Schematic line of argument of the creative class approach



Source: Asheim, B. T. and Hansen, H. K. (2009), Knowledge bases, talents and contexts: on the usefulness of the creative class approach in Sweden, *Economic Geography*, 85/4, pp. 425-442.

The tolerance parameter covers a broad range of elements that influence the milieu and atmosphere of a city. Most important, tolerance has to do with low entry barriers, such as openness toward newcomers and open-mindedness toward different cultures and different norms that may help regions compete for talent, with an assumption that open-mindedness makes it easier for newcomers and that people who deviate from the norms can be creative and innovative. Knowledge-intensive businesses move to regions with a high concentration of talents and creative workers.

Finally, one of Florida's achievements is to imprint the concept of a creative class on the minds of politicians and urban planners. Florida linked business policies with educational and cultural policies – thereby building a powerful coalition among three major areas in local, regional, and national politics. A people climate can be seen as an additional ingredient to a business climate, in that the presence of human capital and talent is essential for attracting and developing new high-technology and creative industries, exploiting Jacobian urbanisation economies, and consequently fostering the economic growth of cities. In his own analysis Florida considers Rotterdam, Amsterdam and the Hague as a single metropolitan area, but local people see the three cities as having very different characteristics. Some interviewees suggested that Rotterdam has, of the three, the greatest potential to attract the creative class by virtue of its less 'finished' character.

So how could higher education contribute in such a framework? In answering this question it is necessary to make a distinction between the direct and the indirect contributions of HE to cultural development.

Concerning the direct contribution HE first of all produces human capital which when applied in work life will contribute to such development. Following Florida's approach to the creative class, it can be divided between the creative core and the creative professionals. The creative core consists of people working with computers, architecture, arts, science and education, while the creative professionals work with management, finance and legal issues, health care and so on. HE caters for both these groups. When looking at cultural development, the focus should be on the creative industries of Rotterdam. In Rotterdam "creative" industries constitutes one of three spearheads in the municipal policy to boost economic activity in the city region. The creative cluster in Rotterdam is focused on architecture, design, and new media. The aims of the cluster to generate jobs in the "creative" industry, promote related activity based activities between creative industries and other sectors and to improve Rotterdam's image as a "creative" city and not only as a port and heavy industry city.

Co-operation between universities and applied universities, which are very relevant for the creative industries is constrained by differences in institutional culture as well as by national regulations. These structural conditions restrict the possibilities for art and technology to work together, something that is achieved in Copenhagen, for example, by establishing a dedicated IT-university. However, the creative industries have linkages to and partnerships with both Erasmus University and Delft Technical University as well as to Rotterdam University especially with respect to training and education. Rotterdam University offer for example a Masters degree in Product Development. Rotterdam municipality has converted the last silo at Maashaven into a unique multi-tenant business premises called the Creative Factory. The Creative Factory offers starting entrepreneurs coaching, and matches companies to each other and to external partners and clients (see Box 5.1).

Box 5.1 Creative Factory

The municipal service OBR has converted the last silo at Maashaven into unique multi-tenant business premises called the Creative Factory. The premises were officially opened in May 2008. Young, new entrepreneurs in the fields of media, fashion, music, design and business services rent commercial units in the Creative Factory for a period of 4 years. Thereafter, they are deemed to find space elsewhere as re-starters. The Creative Factory offers starting entrepreneurs coaching, and matches companies to each other, external clients and partners of the Creative Factory. They include Rotterdam University and the ROC Albeda College.

Box 5.1 Creative Factory (continued)

Currently it accommodates around 60 entrepreneurs. Even before the opening, the demand for space exceeded supply fourfold. Hence the Creative Factory is currently expanding through satellite branches in the surrounding districts in Rotterdam South. In addition to office space, the Creative Factory also offers space for events local initiatives can take advantage of. In 2006, Rotterdam University entered into a partnership with the Creative Factory. It offers the university students the opportunity to contribute to innovative initiatives in the city and to be introduced to entrepreneurship through a work placement company. A Rotterdam University staff member is present in the Creative Factory for a couple of days a week, acting as intermediary for questions that the entrepreneurs may have for the university and vice versa.

Starting entrepreneurs can use the knowledge of lecturers and students of all study programmes at the university. The university has a dedicated space where students working on a project, work placement or graduation project can find a workplace. For example students of the Rotterdam Business School are currently working on export plans for a number of small companies in the Creative Factory..

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 91

When referring to research of relevance for the creative industries the idea of the symbolic knowledge base, when applied in the creation of meaning and desire, as well as in the aesthetic attributes of products, producing designs, images, and symbols, and in the economic use of such forms of cultural artefacts, demonstrates its importance. A crucial share of work is dedicated to the “creation” of new ideas and images. Competition thus increasingly shifts from the “use-value” of (tangible) products to the “sign-value” of (intangible) brands. In cultural production, the input is aesthetic, rather than cognitive, in quality, and as a result, the knowledge required is often narrowly tied to a deep understanding of the habits and norms and “everyday culture” of specific social groups. Because of the cultural embeddedness of interpretations, symbolic knowledge is characterised by a distinctive tacit component and is usually highly context specific. The process of socialisation (in addition to formal education) is important not only for gaining “know-how,” but also for acquiring “know-who”, that is, knowledge of potential collaborators with complementary specialisation through informal, interpersonal (face-to-face) interaction in the professional community.

Higher education also makes an indirect contribution to cultural development through its contribution to making Rotterdam an open, diverse and tolerant city which is attractive to young, artistic and creative talents. The presence of a tolerant environment offers diversity and quasi-anonymity, which are treasured by the creative class and provide space for people who do not fit into the common norms. There are also more practical aspects, including the availability of suitable accommodation for students (see Box 5.2).

Box 5.2 Dordtselaan student accommodation

On 10 July 2009, 35 apartments of the Dordtselaan student accommodation were delivered. Dordtselaan student accommodation is an initiative between Woonstad Rotterdam, the Municipality of Rotterdam (sub-municipalities of Charlois and Feijenoord), Pact op Zuid, Rotterdam University, the INHolland University of Applied Sciences and the Erasmus University. Students of the three Rotterdam knowledge institutions can live in the apartments while having to work on (long-term) issues in the district. In exchange for their efforts of at least four hours per week (during time off or as part of work placement) they receive a discount on their rent of up to 8%. In due course, the issues are linked to the study and, in addition to rent reduction, credits can be earned. The social and economic projects the students work on will improve the quality of life in the district.

Examples of current projects include researching opportunities for entrepreneurs in Dordtselaan when the Tour de France 2010 will pass through this road, setting up a students' restaurant and starting homework guidance for local children. The second delivery of approximately 35 apartments is planned for December 2009. The aim is to have around 250 premises renovated in 2013, resulting in approximately 750 student apartments.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 92.

Increasing the opportunities for innovative thinking and for the further development of new competitive knowledge would put Rotterdam in the first division of European cities (perhaps only second to Berlin) able to attract talents from the creative class.

The Pact op Zuid (Rotterdam South Pact) is a ten-year integrated urban renovation programme which aims to compensate for the social, economic and physical infrastructure disadvantages of Rotterdam's southern districts. Pact op Zuid is a coalition between four housing associations (Vestia, Com-Wonen, Woonbron and Woonstad), three sub-municipalities (Charlois, Feijenoord and IJsselmonde), the Municipality of Rotterdam and the central

government. In 2006, these parties agreed to invest EUR 1.4 billion, in addition to regular budgets and previously planned investments.

Rotterdam South faces serious problems as the districts become less attractive to current and potential future residents. There is a tendency for residents to move out of the area as soon as they are able to do so, and their place is taken by new, relatively disadvantaged residents. As a result, unemployment rates in Rotterdam South remain high and there are other negative social-economic consequences.

The objectives of Pact op Zuid include stopping the process of selective migration, higher labour-force participation and educational attainment, reduced dropout rates in vocational education, more higher-value housing, and an increase in commercial activities and employment. Projects include large-scale developments whose scope reaches beyond Rotterdam South, for example, Stadion Park, the area around the football stadium ‘de Kuip’ which will become a showpiece for sport in Rotterdam.

All knowledge institutions contribute to the Pact op Zuid through research, work placements, project assignments and knowledge transfer. Projects include the Creative Factory described above. The impact of the programme is monitored and evaluated. One monitoring instrument is the ‘Travel Guide’ which consists of illustrations, text and statistical data on the key indicators of income, safety, property values and neighbourhood satisfaction.

Efforts can also be made to directly engage students in work that is socially useful. The Pot met Goud op Zuid programme (Box 5.3) promotes such activity and demonstrates that much can be done with relatively limited funding.

Box 5.3 Pot met Goud op Zuid

The foundation **Pot met Goud op Zuid** was formed in January 2005. Fifteen intermediate/higher (pre-) vocational education institutions (VMBO/MBO and HBO) active in Rotterdam South work together with the objective of encouraging students to become socially active by doing voluntary work. In consideration of their efforts they receive gold coins which can be exchanged for a benefit (e.g. in the form of a ticket for a home match of Feyenoord football club, an event in AHOY, indoor sporting arena or a visit to Blijdorp Zoological Garden or sports and games). The contribution of the ROC and university students consists of guiding other students and coordinating activities, ranging from homework guidance, helping the elderly, cleaning up public objects in the neighbourhood, etc.

Box 5.3 Pot met Goud op Zuid (continued)

The idea is that young people learn that doing useful deeds can also be rewarding and satisfying. Other learning elements for the students include social and coaching skills. The activities are co-ordinated from a project office with a number of fixed staff and students from the INHolland University of Applied Sciences and Rotterdam University.

This project also plays an important role in the social stages. As from 2011, secondary education students, as part of a fixed element in the curriculum, must do 72-hour work placements with a social/cultural organisation or institution, distributed across their entire school period. Rotterdam South serves as a pilot area in which 2 500 students will do a social work placement this year. Pot met Goud op Zuid acts as intermediary for these work placements, involving active visits to schools and organisations. Higher vocational education (HBO) students also adopt a class (particularly in intermediate (pre-) vocational education (VMBO) and decide together what type of social work placement they could do. The results are offered to the educational institutions and students can use this to in making a pro-active start in terms of providing a framework for their work placements.

The foundation has a budget of approximately EUR 200 000 subsidised by e.g. the Youth, Education and Society (JOS) service, Oranjefonds and municipal subsidies.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 93

The city of Rotterdam, even if it does not have its own innovation agenda, does have a number of programmes targeting university contributions to social, cultural and environmental development. Some are linked with an ambitious plan to redesign Stadhavens Rotterdam promoted by the City of Rotterdam Council and the Port of Rotterdam Authority. HEIs are stakeholders in this endeavour. The plan aims at turning the city into a showcase for water management, at exploiting Dutch expertise about flood protection system and at expanding the knowledge about climate change. Expectations from universities have nevertheless not fully materialised with regard to three main aspects of the strategy:

- Reinventing Delta Technology (sustainability). The Rotterdam Climate initiative (RCIP) is supporting this objective. Its goals are threefold: reducing greenhouse gas emission, making the city climate proof and emphasising renewable sources of energy. The

Rotterdam climate campus has recently opened on the north bank and will be host to knowledge institutions. It remains that so far pilot projects have showed relatively low visibility and not generated much value added for universities

- Establishing a centre of creativity on a disused wharf within Stadhavens. As the shipping industry is moving westward with its new deep water port stretching over a distance of 40 km, it leaves a huge area where government departments are pooling the resources with Universities, engineering firms and IT firms to develop sustainable energy technologies. RDM campus which starts operations in 2008 is the offshoot of a consortium composed of the Port Authorities, Albeda College and Rotterdam UAS. The dynamo incubator has opened last year and a number of partners have engaged some funds. Business ventures are nevertheless scarce on the campus, and venture capital has so far not been forthcoming as hoped. The financial viability of the operation remains heavily dependent on public funds.
- Exploiting soft technologies. Floating communities is an interesting concept that attracts attention from architects and businesses. Stadhavens is quickly developing into a testing ground for floating constructions like work spaces and pavilions. It is planned also to develop water plazas, green roofs and multipurpose storage facilities. Low cost technologies of flood protection are expected to emerge from these investments. This developing interface with HEI research can be further developed.

Rotterdam University has been active in community development in South Rotterdam and has developed some admirable activities to support community schools; while InHolland University has been developing and supporting music and art in primary schools. From the ruins of World War II Rotterdam has created a living architectural heritage that remains to be further exploited, while the Willem de Kooning Academy has a national and international reputation for advertising and design.

Nor should the contribution that the health sector can make be overlooked. The Generation R project (Box 5.4) serves not only Rotterdam but makes an important contribution to the understanding of child development on a wider scale.

Box 5.4 Generation R

Generation R studies the growth, health and behaviour of nearly 10 000 children growing up in Rotterdam. These children are monitored from the early stages of pregnancy until their 18th birthday. The focus is on why certain children develop to their full potential whereas others do not, and the factors that influence this development. This way Generation R makes an important contribution to the health and care for all children and their parents in and outside Rotterdam and the Netherlands. It enables policymakers to better align and gear the care to those groups who need this care most.

Generation R is unique in that information about the children and their parents is collated as early as the pregnancy stage. In addition, the composition of the study group is extraordinary, as children of practically all ethnic groups in the Netherlands are represented therein. This is important, as it becomes increasingly evident that growth, development and health between these groups show significant differences. As from 2002, during a period of three years, nearly 10 000 pregnant women consented to participation in our research. Therefore, all Generation R children have now been born and this group will be monitored until they are 18 years of age.

Generation R is a study by the Erasmus Medical Centre and Erasmus University Rotterdam in co-operation with the Netherlands Organisation for Applied Scientific Research (TNO), Rotterdam Rijnmond Municipal Health Service (GGD), Parent and Childcare, Haven Hospital, Instituut for Tropische Ziekten B.V., Ikazia Hospital, Maastad Hospital, Sint Franciscus Hospital, STAR Medical Diagnostic Centre, Leiden University Medical Centre, VU University Amsterdam, University Medical Centre Groningen and Wageningen University. All family-oriented care providers are also closely involved with Generation R (such as family doctors, specialists, early childhood health centres, pharmacies, teachers of the children involved).

During the first seven years of this study, results have been published in doctoral theses and scientific magazines. For instance, the influence of depression and smoking during pregnancy in relation to the size of the brain and later development has been established. Ethnicity too appears to be of major influence. Improved foetal growth curves have been developed (per ethnic group) which have now been accepted as new Dutch standards.

Source : City of Rotterdam Regional Steering Committee (2009), *The City of Rotterdam, The Netherlands: Self-Evaluation Report*, Rotterdam, p. 95

References

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Florida. R. C. Mellander, and T. Gulden (2009), *Global metropolis: the role of cities and metropolitan areas in the global economy*, Martin Prosperity Institute.

Chapter 6: Capacity building for regional co-operation

This chapter focuses on the capacity and willingness of regional stakeholders to engage with each other and with the higher education institutions. It considers some existing initiatives and mechanisms, the availability of information and some possible developments.

This report does not benchmark Rotterdam against a set of other cities, nor to evaluate its performance against established criteria. It reviews what Rotterdam is trying to achieve in a regional, national and global context and to offer advice on how the city might move forward. The impact of the report will depend in part on its intrinsic quality but more crucial will be local willingness to take the agenda forward.

Core Issues

The core issues for the OECD review are similar to those in several other regions, but the context is, as always, unique. One of the most striking features to an outsider is a polarisation of attitudes in the face of the rapid growth of the non-Dutch population. Rotterdam is one of the very few cities in Europe where the average age of the population is decreasing, and the willingness to see a young and diverse population as an opportunity for growth, rather than as a problem to be addressed, is encouraging. The municipality has devoted much of its attention in recent years to combating social exclusion through a wide range of initiatives. However there is considerable scope for closer engagement with the business community and with the knowledge institutions.

A key challenge for the region is to develop cluster strategies built on inherent qualities and values. However, the determining factor should be the extent to which the chosen priority clusters – whether they are in clean technology; life and health science; water management and the delta; transportation and logistics; or the creative sector supports the aspirations, potential and strengths of the Rotterdam region. The region needs to reinforce its efforts to articulate a “common story” which can serve as a platform for the development of cluster strategies.

The constitutional context offers some room for manoeuvre. We understand that the City of Rotterdam as an executive body, and one of the two most powerful municipalities in the country, does have the capacity to initiate and to act, within the framework provided by national legislation. Similarly at the wider regional level of Zuid Holland there is an opportunity to decide on a long term development strategy. If Rotterdam is to develop as a competitive city-region, the port will continue to be one of the most important assets, but it will not be the sole strength.

Strategic developments for the Rotterdam region also need to reflect its position in the Randstad. The diversity in the greater Randstad area should be seen as an asset. This region has seven high quality universities and 18 higher education colleges. Such a major knowledge pool offers significant opportunities for trans-disciplinary research and development activities. This potential seems not to be unlocked partly due to lack of demand side incentives and as a consequence of fragmented organisational structures.

The territorial dimension of the third mission of the large universities and the promotion of their active engagement in regional development can be enhanced by recognising the triple helix of “Government-Industry-Academia” as a framework guiding policy for regional innovation. The

ambition must be to move from the universities taking on “generative” to become more engaged in “developmental” roles. In the absence of other drivers local government can and should take on the role of strategic leadership in the Triple Helix co-operation, in consultation with the other partners and actors.

It is important to take a system perspective to overcome the fragmentation of the regional innovation system and improve its connectivity by promoting better collaboration and a more efficient division of labour between the large universities, applied universities and research institutes and their respective partnering industries. Improving the research capacity of universities of applied sciences (time and money) should aim at making them better able to assist and co-operate with SMEs. Mobility schemes and technology brokers could increase the absorptive capacity of SMEs and reduce the cognitive distance between them and the HEIs. In this way the applied universities could support innovation in traditional SMEs

Fostering advanced human capital through education, research and knowledge production is the key factor in transforming the Rotterdam region into the national and global innovation cluster it aspires to be. All stakeholders must share this aspiration and recognise that research, highly skilled labour, entrepreneurship and knowledge intensive industry are key factors to achieve success. Connecting and bringing together the strengths of the region so that all can share this aspiration will be a key to success.

There are cases of best practices where common interest aligns to form regional partners. An example of this is the *Science Port Holland*, a co-operation between the cities of Rotterdam and Delft. Science Port Holland brings together two municipalities, the province, two universities (Erasmus University and Technical University of Delft), the regional airport, and the Economic Development Board Rotterdam (EDBR). The aim is to align the regional interest instead of developing business parks in internal competition. This could create a move for the region towards the innovation hotspot it aspires to be. One criteria of success should be the ability to create jobs and attract advanced human capital to the region.

The region has experienced the rise of many promising innovative projects and collaborations, but has not yet seen enough of these consolidate. A potential problem with the partnership model of Science Port Holland is the lack of leadership and ownership. No obvious leadership has been appointed or planned. There is not a formal internal organisation which makes it difficult to monitor the progress and success of such a co-operation. Also, the political and democratic influence is considered low with the possible risk of losing legitimacy in the eyes of society and potential investors.

Compared to other regions, Rotterdam is less successful in aligning the strategies of the stakeholders in higher education with key players in industry. It is a main concern for the Rotterdam region that the innovation taking place does not make a larger contribution to opening new markets. Despite a considerable number of worthwhile and innovative initiatives there is a lack of a clear strategy, with shared goals and ambitions. There is a need for increased political attention in order to develop a focused innovation strategy. Policy makers and stakeholders need to agree on clearly defined strategic goals. Fragmented success stories – even if high in numbers – are not sufficient to create a sustainable innovative growth layer.

Several OECD countries have had success supporting the formation of public-private research consortia, within the context of a regional innovation system, where different players are brought together to work on a common theme. The investment is made in linkages rather than in subsidies for companies which traditionally have raised many issues regarding additionality. Moreover, evidence suggests that one of the most effective methods of knowledge transfer is the mobility of human capital between sectors. The Rotterdam region could do much more to support the insertion of highly skilled labour and young researchers into small and medium size companies with low capacity to innovation and absorb knowledge.

University/Industry Linkages

In the Netherlands the governance of higher education is basically a national affair. The most recent strategy document for higher education from the government aims at strengthening the autonomy of the HEIs. This implies that the HEIs in the Rotterdam region are autonomous organisations and that there is no official role to play for other governmental levels such as the province and the city. They receive the main part of their budget directly from the ministry of education as a lump sum, and they have full discretion over how to use it. This provides potentially larger windows of opportunities of universities to allocate economic means in accordance with the universities leaderships' strategic decisions, which might involve giving a higher priority to the third mission. This might resemble the situation of the well known private, American universities, where the leadership enjoys a high degree of discretion over the allocation of the budget. In the Nordic countries (i.e. in Sweden, Finland, and Norway), the regional commitment is promoted by making it obligatory (i.e. written into their formal regulation) for the universities in addition to carrying out teaching and research.

In their mission statements Erasmus University has the aim of benefiting “mankind, business and society internationally, nationally and regionally”, while Delft University of Technology only refers to “national and

international issues'. The SER points out that universities are more oriented towards national and international levels, while the UAS are more focused on the regional level. Especially in their education programs which focus on professional practice in the real world, the UAS have stronger local linkages than the universities. Nevertheless we have seen some examples which show a stronger local focus by the universities. Both of them have technology transfer offices and takes part in science parks and incubator initiatives. EMC has a large incubator with independent, medical companies, and TUD is involved in science parks for clean tech and for nanotech, biotech and life sciences. It is also housing the YES! Delft programme. In general, all HEIs have developed policies promoting knowledge transfers and collaboration with other stakeholders in the region. The Mayor of the City of Rotterdam has an annual meeting with the Erasmus University but not with the applied universities, and has also newly appointed a scientific and educational officer directly responsible to the Mayor.

This set of activities and initiatives is a beginning, but there remains a long way to go before the City government takes on an explicit strategic leadership in a triple-helix constellation. This review was stimulated by the Economic Development Board Rotterdam, and it is clear that this organisation has made significant contributions in its 15-year history (see Box 6.1). Given the new economic realities, and question marks over the sustainability of some existing initiatives and programmes, the need for a new and more powerful mechanism to articulate need and co-ordinate activity should be considered.

Such a body might have the capacity to act as well as to discuss and analyse and thereby catalyse the closer collaboration between higher education institutions that we have espoused, and act as a focus for national government support. Programmes like "Peaks in the Delta" strategy and the Rotterdam Zuid programme must be realigned in order to reclaim all the benefits from these efforts. Moreover it would be wise to gradually loosen the dependency on public program financing whether it be municipal, national or EU funds. These programmes tend to be supply driven and may not become sustainable on the medium term

Box 6.1 The Economic Development Board Rotterdam (EDBR)

The EDBR advises the Municipal executive on the development of the economy of Rotterdam. It comprises 35 leaders from the city's business, education, knowledge economy and cultural sectors. The board brings together expertise and networks representing all the principal economic activity in the city. The EDBR provides strategic advice, solicited and unsolicited, monitors the implementation of economic development policies, forms task forces on specific topics, and has a permanent task force to develop and update the Rotterdam Economic Vision.

The International Advisory Board Rotterdam (IAB) comprises top executives from business, government and education and meets once a year in Rotterdam. The IAB gives advice to the Municipal Executive from an international perspective. Young EDBR – the youth economic advisory council - comprises around 15 talented 18-35 year olds.

The permanent staff of EDBR is deliberately small.

Annex 1: Peer review team

Richard Yelland is Head of the Education Management and Infrastructure Division in the OECD Directorate for Education. This Division is responsible for the work of the Programme on Institutional Management in Higher Education (IMHE) and the Centre for Effective Learning Environments (CELE), formerly known as the Programme on Educational Buildings (PEB). Richard Yelland joined the OECD in 1986 from the Department of Education and Science in the United Kingdom, where he had held a range of posts in educational policy and administration since 1974. He has led IMHE since 1998. Richard Yelland has been responsible for and has contributed to a range of OECD publications on higher education and educational infrastructure. He is frequently invited to address international and national meetings on different aspects of education. He is a member of the Advisory Board of the UNESCO Centre for European Higher Education (CEPES), and of the International Advisory Network for the Leadership Foundation for Higher Education in the United Kingdom. He has contributed as an international expert to the evaluation of educational institutions and programmes in Belgium and France and in 2009 in Iceland. In 2006 he co-ordinated the review of Varmland (Sweden) in the first round of OECD reviews of higher education in regional development.

Bjørn Asheim is a major international figure in the area of Economic Geography. He holds the chair in economic geography at the Department of Social and Economic Geography at the University of Lund, having previously held the chair in human geography in the Department of Sociology and Human Geography at the University of Oslo. Professor Asheim is co-founder and deputy director of CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy), a multidisciplinary Centre of Excellence in innovation research at Lund University. He is Visiting Professor at the Department of Geography at the National University of Ireland at Maynooth. Asheim's research interests are in the areas of economic and industrial geography, and regional innovation research, where his specialisations include: regional clusters, regional innovation systems and learning regions; SMEs and innovation policy; globalisation, and the geography of the creative class. Asheim has served as

an international expert for UNCTAD, OECD and EU. He co-ordinated the EU project on "SME Policy and the Regional Dimension of Innovation" and is currently coordinating the European Science Foundation project "Constructing Regional Advantage".

Patrick Dubarle, former Principal Administrator at the OECD Public Governance and Territorial Development Directorate (GOV), has co-ordinated and contributed to a number of OECD territorial reviews at the national and regional level and has recently participated in the regional innovation reviews in Italy and Mexico. In 2004-2007 he represented GOV in the OECD project on supporting the Contribution of Higher Education Institutions to Regional Development and co-ordinated the review of the Mid-Norwegian region. Patrick Dubarle is a graduate from the French "Ecole des Mines", and holds a Master's degree in Economics from the University of Paris Sorbonne. He joined the OECD in 1978 as Administrator in the Directorate for Science Technology and Industry. He was appointed Secretary of the OECD Working Party on regional development policies in 1992, where he was responsible for country regional policy reviews and horizontal programmes. He has worked with national governments in many OECD countries and has spoken at several international conferences. He is the author of documents on high technology policies and sectoral questions including space industry, technological change, technology fusion, innovation and higher education in regional development.

Lauritz B. Holm-Nielsen has been the Rector of Aarhus University (AU) since 2005. Additionally he is Chairman of the Nordic University Association, Vice-Chairman of Universities Denmark, Board Member of the European University Association (EUA) and Euroscience. Furthermore Lauritz B. Holm-Nielsen is a member of the National Growth Forum hosted by the Danish Prime Minister and has been a member of the Prime Minister's Africa Commission, Board Member of the Danish National Research Foundation, Rector of the Danish Research Academy, Vice-Chairman of the Danish Research Commission, Chairman of the Danish Natural Science Research Council and the Danish Council for Development Research. Lauritz B. Holm-Nielsen has a degree in Botany from AU (1971) and was Dean of the Faculty of Science at AU (1976-79) before he became professor at P. Universidad Católica, Quito, Ecuador (1979-81). Lauritz B. Holm-Nielsen has spent 18 years working abroad, 12 of these at the World Bank in Washington D.C. (1993-2005) where he formulated strategies for further education, training and research, and managed the planning and implementation of higher education sector investments in a wide range of emerging countries – most recently Columbia, Chile and Mexico. He has also published many papers on higher education, science and technology,

innovation and globalisation. His latest publication (2010) concerns the mobility of talent.

Véronique C.M. Timmerhuis is Secretary-General of the Social and Economic Council (SER), the main advisory body to the Dutch government and the parliament on national and international social and economic policy. She studied Sociology (focusing on social-economic policy and economic sociology) and History (focusing on the history of industrialised societies) at Erasmus University Rotterdam. From 1989 to 1998, she worked as a researcher for IVA, the institute for policy research and advice of Tilburg University, where she gained her PhD with a thesis entitled *Research organisations in the process of change*. In 1998, she joined the Advisory Council for Science and Technology Policy (AWT) as a senior policy officer. In 2001 she was appointed as its Director, which she remained until her appointment as Secretary-General of the Social and Economic Council on 1 February 2007. In addition to her SER position, Véronique Timmerhuis is a member of the Supervisory Board of the Erasmus University Rotterdam and a member of the Advisory board of the Business Administration programme of Radboud University Nijmegen. Currently she is also a member of an Expert Group installed by the European Commission on the 3% R&D objective: progress made and post-2010 policy scenarios.

Annex 2: Review visit agenda

Sunday 8 November

Afternoon

Arrival 4 members review team

About 18.00

Informal dinner review team (RT) and regional co-ordinator (RC)

Monday 9 November

08.15 - 09.00

OECD internal meeting

09.00 - 10.30

Meeting RT, RC and core team

M. de Knegt, EDBR

G. Rienstra , Ecorys

H. Nijeboer, INHolland

R. van Loon

M. Molenkamp

P. Oskam

M. van de Ven, EUR Holding, Risbo

P. Althuis

10.30 - 11.30

Meeting with Climate Initiative, Pincoffs, Stieltjesstraat 34, Rotterdam

W.J. de Raaf, Rotterdam Climate Initiative

P. Verhoeven , Program office Climate

G.M. Whiteman, Rotterdam School of Management

J. Rotmans, Rotterdam School of Management

11.30 - 12.30

Meeting with writers Chapter 4 (talent development)

K. Zandvliet, SEOR

T. Dragt JOS

E. Jacobs City Development Corporation

M. Blomjous, TU Delft

H. de Deug, INHolland

- J. Sevenhuijsen, Hogeschool Rotterdam
M. van de Ven, EUR Holding, Risbo
H. Karaaslan, Hogeschool Rotterdam
- 13.30 - 14.30 **Meeting with EUR, working group coordination, Pincoffs, Stieltjesstraat 34, Rotterdam**
- J. van der Meer, EUR Holding, Reg. Economy, Harbour, Transport Economy
S.E. Severiens, EUR Holding, Risbo
M.J.J.M. van de Ven, EUR Holding, Risbo
- 14.30 - 16.00 **Meeting with Steering Committee, Pincoffs, Stieltjesstraat 34, Rotterdam**
- L. van den Berg
G. Dales
G. van Drielen
K. van Rooijen
M. de Knegt
F. van der Meché
T. Cieremans
M. Waas
S. van Eijck
I. Weekenborg of P. Oskam
G. Rienstra
D. Scheele
- 16.00 - 17.00 **Meeting with Medical - innovation and valorisation, Pincoffs, Stieltjesstraat 34, Rotterdam**
- G. Puppels, River Diagnostics
H. Viëtor, Skyline Diagnostics
R. Posthumus, Erasmus MC
C. Festen, Erasmus MC
M. Kok, Erasmus MC
- 17.00 - 18.00 **Meeting with J. van Nunen - EUR/harbour, Pincoffs, Stieltjesstraat 34, Rotterdam**
- J.A.E.E. van Nunen, Rotterdam School of Management
H. Ligteringen, TU Delft

Tuesday 10 November

Group 1

09.00 - 09.30

Meeting with TU Delft

M. Waas, TU Delft, 3mE
T P. Althuis, U Delft
N. van de Giesen , TU Delft, water management
H. Hellendoorn, TU Delft, 3mE

09.30 - 10.15

3mE Faculty

M. Waas, TU Delft, 3mE
B. Verkerk, Lord Mayor Delft
R. Vuijk, Alderman Delft

10.15 - 11.15

Board of Governors

J. Fokkema, Board of Governors
H. Krul, Board of Governors

11.15 - 12.15

YES!Delft,

J. Meijaard, Hope
H. Huijgens, YES!Delft

12.15 - 13.15

YES!Delft

M. Waas, TU Delft, 3mE
H. Huijgens, YES!Delft
plus starters YES!Delft

13.15 - 14.30

W. Trommels, Science Port Holland
H. de Winde, TNW Industrial Microbiology
K. Heijns, TU Delft

Group 1

Meeting with Province of South Holland

A. van Dijk, Province South Holland
N. van Buren, Kennisalliantie
D. van der Bijl, Kennisalliantie
I.T. Young, Medical Delta
R. Bitterlich Regionaal Platform , Arbeidsmarktbeleid Rijnmond
N. van Geelen, Province South Holland
M. Visscher, Province South Holland

L. Jansen, Kissz
 K. Mulder, TU Delft
 J.H. Brouwer, Province South Holland
 J. van Reenen, City of Delft

Group 2

12.00 - 13.00

Meeting with Ministry of Economic Affairs

S. van Veldhoven, Ministry of Economic Affairs
 M. van de Wende, Ministry of Economic Affairs

14.00 - 15.00

Meeting with Ministry of Economic Affairs

J. Wesseling, Ministry of Economic Affairs
 P. Wansink, Ministry of Economic Affairs
 J. Bax, Ministry of Education, Cultural Affairs and Science
 B. van den Bergh, Ministry of Education, Cultural Affairs and Science
 M. Draisma, Vrije Universiteit Amsterdam
 P. Nijkamp, Vrije Universiteit Amsterdam
 M. van der Wende, IMHE/OECD
 G. Linssen, Ministry of Economic Affairs

Wednesday 11 November*Group 1*

09.30 - 10.30

EUR/City Rotterdam - partnership agreement, Erasmus University Rotterdam

S.W.J. Lamberts, Erasmus University
 R.L. van den Bos, Erasmus University Rotterdam/IDO
 M. Donker, Chief Science Officer City of Rotterdam
 M. van Griethuysen, Erasmus University Rotterdam/OOS
 H. Zeller, City of Rotterdam
 A.J.C. de Jong, City of Rotterdam
 N. Aben, City of Rotterdam

11.00 - 12.00

Meeting with Generation R

O. de Zwart, GGD
 F. de Waard, GGD
 J.J.A.M. Schenk, Erasmus University Rotterdam
 A. Hofman, Erasmus MC

13.30 - 14.30	Meeting with Harbour, Port of Rotterdam B. Kuipers, Erasmus University Rotterdam K. Joosten, Port of Rotterdam A. Veenstra, Rotterdam School of Management
15.30 - 16.30	M. Acciaro, Erasmus University Rotterdam A.J. van Binsbergen F.J.M. de Ly, RSTrail L. Tavasszi, Erasmus University Rotterdam L. Hagdorn, TNO B. van Wee, TU Delft M. van Bracht, TNO C.J. Asselbergs, Deltalinqs H.W.J.J. de Bruijn, Port of Rotterdam P.J. Goedvolk, Argos H.N.J. Smits, Port of Rotterdam E. Hietbrink, STC N. Backx, Port of Rotterdam F. Blessing, Hogeschool Rotterdam W. Willemse, Hogeschool Rotterdam
18.00 - 20.30	Informal dinner at Kwiezien M. Waas, TU Delft S. van Dongen, Enviu M. Donker P. Linde, Koaspilots J. Laven, Stipo
Group 2 11.00 - 13.00	Board of Governors INHolland G. Dales, Board of Governors INHolland P. van den Heuvel, IN-ZICHT-IN, INHolland P. Peters, Advanced Studies & Applied Science, INHolland P.J. Esselbrugge, INHolland I. Moes, INHolland H. Nijeboer, INHolland L. Vermeulen, INHolland
13.30 - 14.30	KennisAs Alliantie

J.B. Benraad, Stadswonen
 F. Sanders, Fortis
 T. Weghorst, TCNPP
 H. Borsje, Volker Wessels Vastgoed
 B. Pluijmers, COM Wonen
 H. van den Berk, PWS Rotterdam
 P. Becht, Bouwfonds,
 R. Overdam, Kondor Wessels Ontwerfabriek
 E. Smeijers, ASR
 F. Uffen, NADC

Thursday 12 November

09.00 - 17.00

Hogeschool Rotterdam

09.00 - 11.10

M. Molenkamp, Hogeschool Rotterdam
 J. Heinerman, Hogeschool Rotterdam
 W. Willemse, Hogeschool Rotterdam
 F. Spierings, Hogeschool Rotterdam
 C. Dieleman, Hogeschool Rotterdam
 D. Blom, Pact op Zuid
 A. Kroos, Pact op Zuid
 A. van der Sijde, Woonstad Rotterdam
 L. Verbaas, Creative Factory
 L. van Loon, Creative Factory
 C. van de Heiden, NEST Ontwerp
 A. v.d. Kooi, Septool
 K. Kleine, INHolland
 E. Kramer, INHolland
 M. de Laat, INHolland
 Rob Mosert, wijkcoördinato
 2 students, wijkcoördinato

11.30 - 13.55

G. van Drielen, Hogeschool Rotterdam
 J. Tuytel, Hogeschool Rotterdam
 J. Sevenhuijsen, Hogeschool Rotterdam
 F. Blessing, Hogeschool Rotterdam
 L. Gommans, Hogeschool Rotterdam
 J. Bloks, Hogeschool Rotterdam
 B. Brandenbrug, Hogeschool Rotterdam
 G. Brouwer, Hogeschool Rotterdam
 J. Heinerman, Hogeschool Rotterdam
 M. Molenkamp, Hogeschool Rotterdam

- 14.00 - 17.00
- F. Rieck, Hogeschool Rotterdam
 - S. van Dijk, TU Delft
 - G. Brouwer, Hogeschool Rotterdam
 - H. Beekman, Stadshavens

 - E. Verwaal, Erasmus University Rotterdam
 - J. Heinerman, Hogeschool Rotterdam
 - M. Molenkamp, Hogeschool Rotterdam
- 15.00 - 16.00
- Board of Governors EUR
 - S.W.J. Lamberts, Erasmus University Rotterdam
 - H.G. Schmidt, Erasmus University Rotterdam
 - C.W. van Rooijen, Erasmus University Rotterdam
 - A. van de Pijl, Erasmus University Rotterdam

Friday 13 November 2009

- 08.30 - 12.00
- Internal meeting RT + RC, Pincoffs, Stijkkamer
- 12.30 - 14.30
- Feedback session, Erasmus University Rotterdam
 - L. van den Berg
 - G. van Drielen
 - K. van Rooijen
 - M. de Knegt
 - T. Cieremans
 - M. Waas
 - S. van Eijck
 - G. Rienstra
 - D. Scheele
 - M. Draisma
 - H. Nijeboer
 - R. van Loon
 - M. Molenkamp
 - P. Oskam
 - M. van de Ven
 - P. Althuis
 - M. Donker

Higher Education in Regional and City Development

Rotterdam, The Netherlands

Outside the Netherlands Rotterdam is best known for its port – once the busiest in the world, and still the busiest in Europe. But the docks have moved steadily downstream and the centre of Rotterdam is very different from what it was even 50 years ago.

A young and dynamic city, Rotterdam is one of the few in Europe where the average age of the population is decreasing. It is ethnically and culturally diverse and has high potential for attracting the “creative class”.

The Rotterdam region is home to two leading research universities and several other innovative higher education institutions. This report looks at how to encourage growth in the Rotterdam region, through the transfer of technology and knowledge, and through realising the potential of its people.

This publication is part of the series of OECD reviews of Higher Education in Regional and City Development. These reviews help mobilise higher education institutions for economic, social and cultural development of cities and regions. They analyse how the higher education system impacts upon regional and local development and bring together universities, other higher education institutions and public and private agencies to identify strategic goals and to work towards them.

The full text of this book is available on line via this link:

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