

DEVELOPING HIGHLY SKILLED WORKERS:  
REVIEW OF THE NETHERLANDS



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

## ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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## **DEVELOPING HIGHLY SKILLED WORKERS: REVIEW OF THE NETHERLANDS**

### **FOREWORD**

A major conclusion of the OECD Growth Study was that governments need more effective policies for developing human capital and realising its potential in order to increase productivity and growth. In the framework of the project on *Growth Follow-Up: Micro-Policies for Growth and Productivity*, the OECD is conducting peer reviews of member countries' policies for developing highly skilled workers. Peer reviews are also being carried out on policies for increasing access to venture capital, increasing the diffusion of information technology to business, and enhancing public/private partnerships for research and innovation.

This peer review of the Netherlands was carried out by the Committee on Industry and Business Environment (CIBE) in October 2004. The report presents recommendations for policy actions based on the strengths and weaknesses observed in the Dutch policy approach to developing highly skilled workers to fulfil future industry requirements. Once a critical mass of countries has been reviewed, a cross-country comparative synthesis report will be prepared with a view to identifying common good policy practices.

This report was prepared by Desirée van Welsum of the OECD Secretariat. It is published under the responsibility of the Secretary-General of the OECD

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## ASSESSMENT AND RECOMMENDATIONS

The Netherlands faces a challenge to increase trend growth in part through better development and use of highly skilled workers. Most forecasts point to serious shortages of skilled workers to meet industry demand and a surplus supply of workers with lesser skills and education. Growth in tertiary graduates (particularly in technical fields) is slowing, labour force participation (particularly of women) is among the lowest in the OECD, and the country is failing to attract skilled foreign workers and students. Yet the Netherlands has a high rate of public spending on vocational and higher education as well as workforce training. In a context of severe budgetary constraints, approaches are needed to increase the cost-effectiveness of government expenditures in developing a labour force with the right level and mix of skills.

New action plans (*Deltaplan Bèta/Techniek*, *Groeibrief*, *Hoger Onderwijs en Onderzoek Plan*) were put in place in 2004 to enhance the education system, labour market flexibility and immigration. The *Action Plan for Life Long Learning* will assist the lower-skilled through workforce and vocational training. Schemes have been mounted to increase the inflow of students to technical fields and the number of graduates and to build closer links between science and industry. Childcare provisions and the tax system are being reformed to increase incentives for women to work. New entrepreneurship initiatives are intended to increase the number of technology-based start-ups and entrepreneurial ventures. Barriers to immigration of skilled workers have been lowered through recent fast-track procedures. At the same time, generous tax incentives to firms for worker training have been eliminated due to a lack of results.

However, systemic rigidities may prevent these plans from achieving their goals. Wage-setting institutions contribute to an inflexible labour market and a lack of wage signals to invest in training and change jobs. More attention should be given to the relationship between the effectiveness of investments in work-related training and labour market incentives. Vocational and higher education should be made more attractive, and special actions are needed to prevent the risk of early drop-outs. Further measures are needed to increase the hours worked by skilled women and to attract foreign students. A summary of progress and recommendations concerning policies for highly skilled workers in the Netherlands is given in **Table 1**.

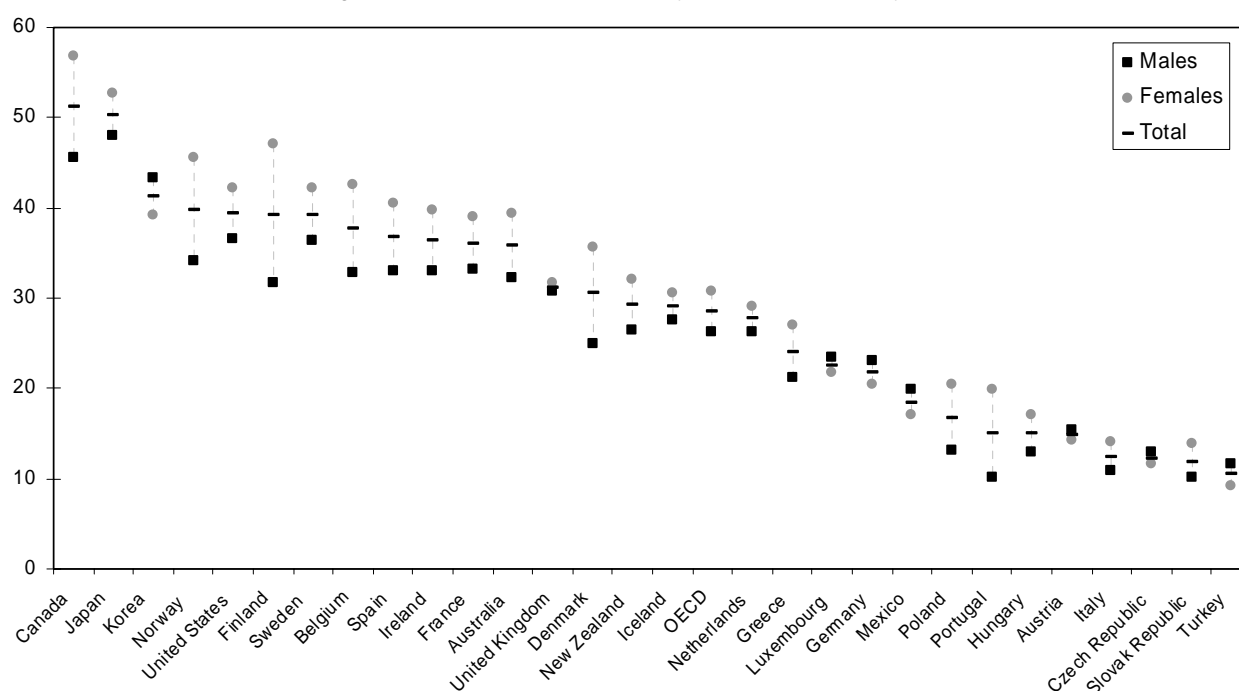
**Table 1. Progress and recommendations**

<b>Area</b>	<b>Recent/planned action</b>	<b>Recommendations</b>
<b>Monitoring supply and demand of the highly skilled</b>	General surveys by the <i>Central Planning Bureau</i> and special forecasts by the ROA.	Develop more targeted skills forecasting system together with the social partners.
<b>Measures to increase enterprise and individual training</b>	Sectoral training levies and competence accreditation system in place, while training tax incentives to firms eliminated.	Use public funds to leverage more business and individual investments in training.
<b>Measures to increase national worker mobility</b>	<i>Deltaplan</i> and <i>Jet Net</i> to enhance linkages between the public and private sectors.	Encourage greater wage differentiation between high and low skilled jobs and remove disincentives to public/private sector mobility.
<b>Measures to adjust to international worker mobility</b>	Fast-track immigration procedures for knowledge workers and programmes to attract foreign students.	Facilitate ability of foreign students to become knowledge workers and provide incentives to return of skilled expatriates.
<b>Measures to increase workforce participation by highly skilled women</b>	Tax burden on working parents decreased and childcare provisions enhanced.	Address gender-based wage gaps with the social partners and further reduce tax disincentives to full-time employment.
<b>Measures to develop human resources in science and technology</b>	<i>Innovation Council</i> to foster public/private research partnerships; <i>Deltaplan</i> to increase supply of S&T personnel.	Implement information and incentive programmes to attract students to scientific and researcher careers.

## TRENDS IN SUPPLY, DEMAND AND USE OF HIGHLY SKILLED WORKERS

The Netherlands is one of the few OECD countries with declining overall levels of tertiary graduates and very low levels of those graduating in technical fields. The percentage of 25-34-year olds with tertiary education in the Netherlands is below the OECD average, with the difference between males and females being very small (**Figure 1**). Growth in tertiary graduates was similar to the OECD trend until 1998, but then started to decline and was below the OECD average by 2001 (**Figure 2**). The life sciences, mathematics and computing account for about 5% of tertiary graduates in the Netherlands compared to over 10% for the OECD. The Netherlands also has among the smallest shares of science and engineering graduates in the OECD area.

**Figure 1. Educational attainment in OECD countries, 2002**  
(Percentage of the population of 25 to 34-year-olds with tertiary education)

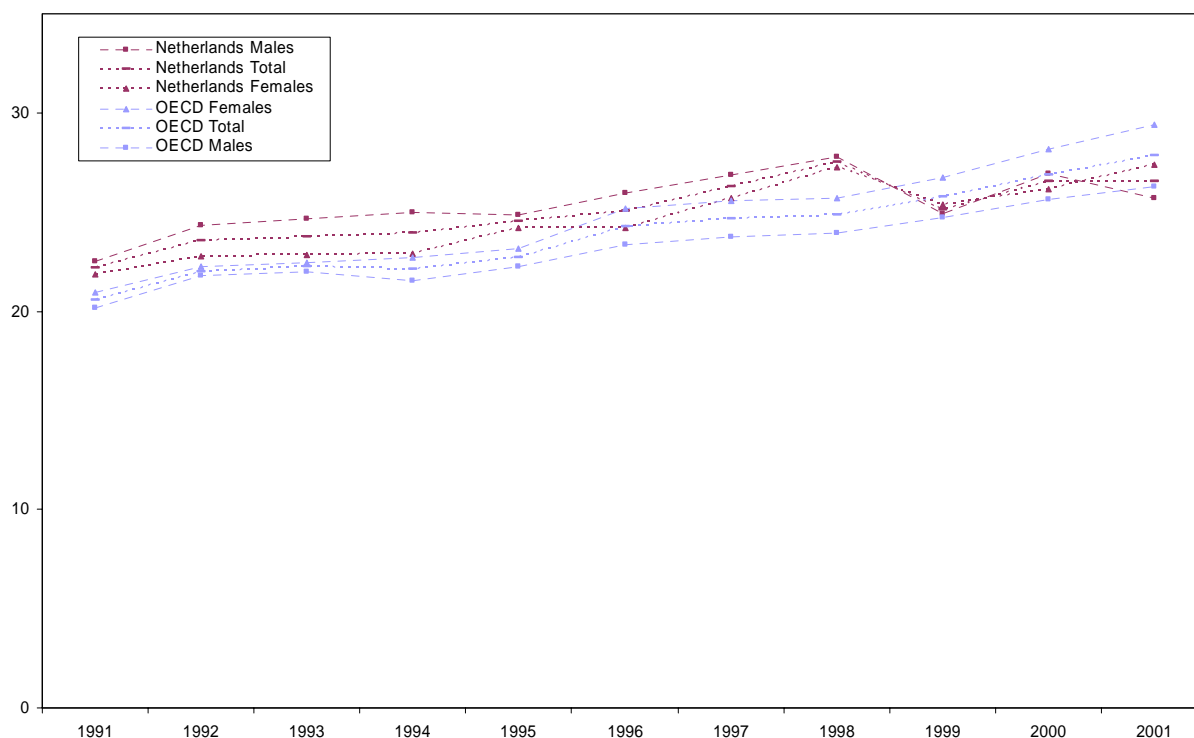


Notes: Includes tertiary type-A education, which corresponds to tertiary academic education (university), and tertiary type-B education, which corresponds to tertiary vocational education (technical/occupationally-specific programmes).  
Source: OECD (2004), *Education at a Glance*.

The Dutch higher education system not only comprises universities (WO), but also what are called higher schools (*hogescholen*) (HBO), which tend to be more vocational or technical. In July 2004, the Netherlands had over 60 vocational schools, 13 universities and the Open University of the Netherlands. The 13 universities offer some 200 programmes in a variety of disciplines, although some specialise in particular fields: 3 provide mainly technical and engineering education and 1 is specialised in agriculture. The universities are meant to prepare students for independent scientific, academic and/or professional

work, whereas the vocational schools have a more practical focus. Participation in both vocational and university education has shown a decreasing trend in recent years.

**Figure 2. Growth in tertiary education, 1991-2001**  
(Percentage of the population of 25 to 34-year-olds that has attained tertiary education)



Notes: Includes tertiary type-A education, which corresponds to tertiary academic education (university), and tertiary type-B education, which corresponds to tertiary vocational education (technical/occupationally-specific programmes).  
Source: OECD (2003), *Education at a Glance*.

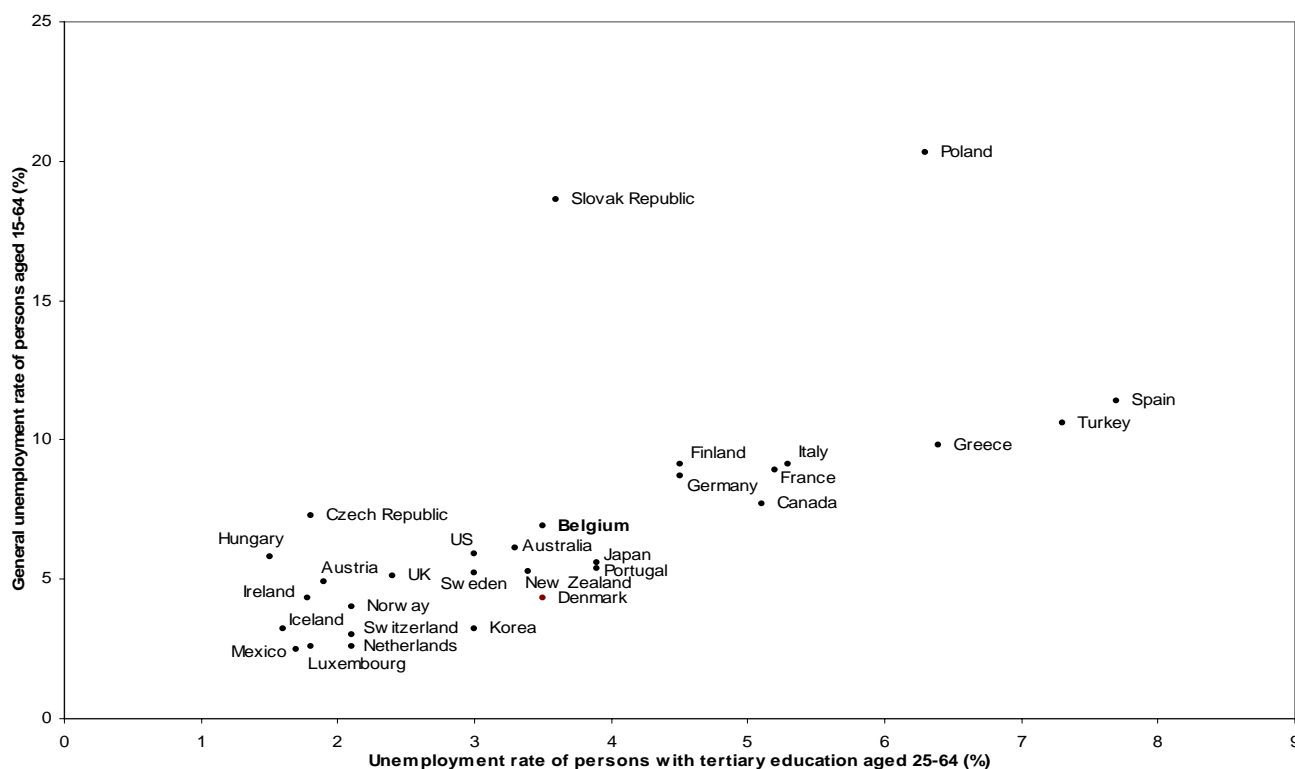
Dutch universities tend to perform well in terms of both their teaching and research outputs. However, there are some indications that their performance is merely average once adjustments are made for the quantity and costs of their inputs (Pomp *et. al.*, 2003). The private internal rate of return to tertiary education for both men and women in the Netherlands is relatively high in comparison to some European countries and Japan, but low relative to France, the United Kingdom and the United States (Blondal *et. al.*, 2002). These rates are primarily determined by earnings differentials and the cost and length of education, which is relatively long in the Netherlands, taking 5 to 6 years to earn a standard tertiary degree. However, social returns to tertiary education, which is 80% government-financed, are relatively low in the Netherlands.

In light of growing constraints on public finances, tertiary education would be more cost-effective through greater reliance on private funding. It has been recommended that a student loan system be introduced to reduce the share of public funding and increase incentives for students to select studies relevant to labour market needs (OECD, 2004b). The Ministry of Education, Culture and Science is developing a strategy to enhance the quality and relevance of higher education through stimulating more competition among educational institutions, leveraging more private funding, and implementing a student loan system.

The Netherlands has a relatively low unemployment rate, both overall and for those with tertiary education (Figure 3). Rapid technological advances and increasing use of information and communications

technology (ICT) have increased demand for skilled labour dramatically. The share of employment in the ICT sector in the Netherlands is relatively high, over 8% compared to just over 6% for the OECD (Figure 4). The Netherlands has a relatively low share of ICT manufacturing employment but ranks third in ICT services employment. Demand for information technology workers in the Dutch services sector is expected to continue its upward trend.

Figure 3. Comparative unemployment rates in OECD countries, 2002

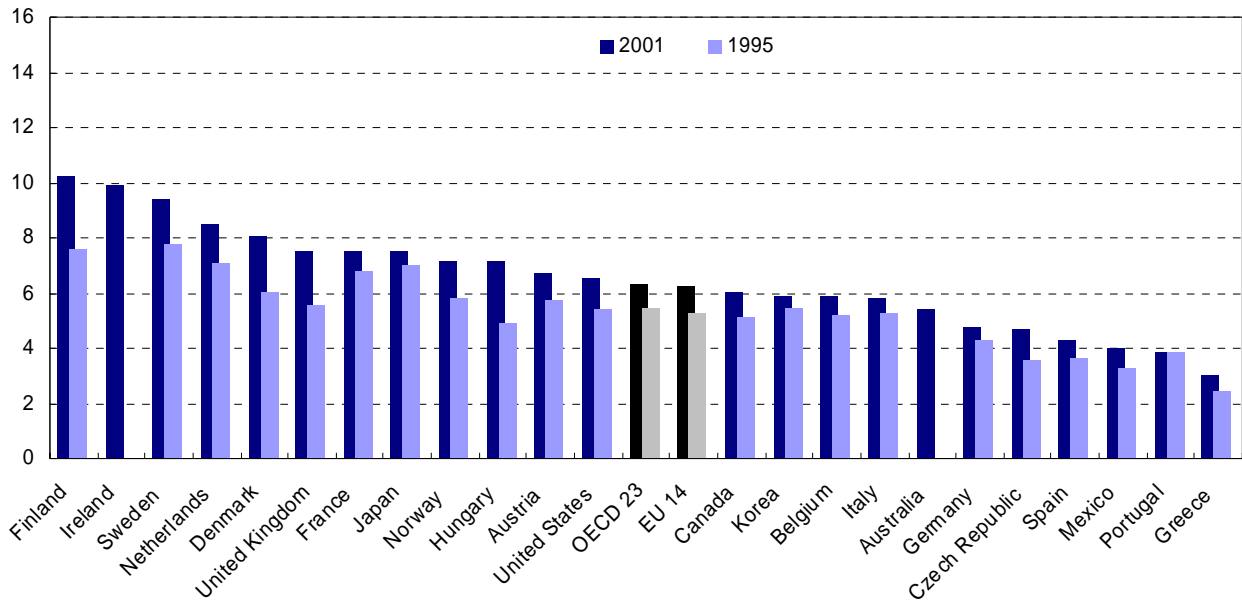


Notes: Unemployment rate of persons with tertiary education and total unemployment rate.

Source: OECD (2004), *Employment Outlook*.

However, unlike in other countries, this demand has not led to a surge in the wage premium for highly skilled workers in the Netherlands. Overall, the increase in demand for skilled workers has been more or less matched by an increasing share of skilled people in the population of working age. At the same time, many lower skilled jobs have been automated and/or digitised. With supply and demand moving in the same direction, income differentials by level of education have remained stable (CPB, 2002). Alternatively, some suggest that this relative stability of wages may be due to an efficient allocation of workers to jobs (ter Weel, 2000).

Figure 4. Contribution of ICT sector to employment, 2001



Notes: Employment in information and communications technology (ICT) sector as share of total.  
 Source: OECD (2004), *Information Technology Outlook*.

The share of highly skilled people, both males and females, has increased in the Netherlands over the past decades, even though both the level and growth rate remain below the OECD average. At the same time, the Netherlands faces the common constraint of rapid population ageing. The ambition of the Dutch government is to achieve a tertiary education participation rate of 50% and to be one of the top knowledge economies by 2010 (MESC, 2004). Achieving this goal in a context of budgetary restraint for the government will be difficult. The supply of highly skilled workers is projected not to meet demand, and there are increasing labour market mismatches with regard to needed skills. In addition, there are forecasts of a surplus supply of lower-skilled workers accompanied by very high rates of young people who drop out of school before they complete their first degree, which can lead to a greater divide between the higher and lower educated in the Netherlands. Problems in the tertiary education system and the development of science and technology workers for industry need to be addressed with more urgency.

## POLICIES FOR DEVELOPING HIGHLY SKILLED WORKERS

### Overview

In light of impending shortages of highly skilled workers, the Dutch government developed the 2004 Higher Education and Research Plan (*Hoger Onderwijs en Onderzoek Plan*) (HOOP) (MESC, 2004). This acknowledged the need to develop an integrated strategy for dealing with three main social trends: the transition towards a knowledge economy, globalisation and the international mobility of labour, and rapid population ageing. An action plan (*Deltaplan Bèta/Techniek*) was put in place as a joint project of the Ministry of Education, Culture and Science, the Ministry for Economic Affairs, and the Ministry for Social Affairs and Employment. The government has made €6 million available in 2004, increasing to a maximum of €60 million (0.012% of GDP) by 2007, for implementation. The *Deltaplan* is intended to combat some of the main causes of forecast worker shortages, including the tertiary education system, lack of interest in scientific and technical fields and the need to attract more skilled immigrants and foreign students (MESC, 2003). In addition, the Agenda for Growth (*Groeibrief*) has been formulated to address a range of growth impediments, including labour market rigidities and the overall business climate (MEA/MSAE, 2004).

### Monitoring supply and demand for highly skilled workers

In the Netherlands, labour market monitoring is carried out primarily by the Central Planning Bureau (CPB) and is thus highly centralised. The CPB is currently developing a regional labour market model which will be used for the analysis of market developments with a regional component. The CPB has also been commissioned to research the evolution of labour supply and demand in coming years, expected worker shortages, the way in which industry will cope with these, and wage developments for science and technology workers (MESC, 2003). Various private and academic research institutes also carry out labour market research, including forecasts of supply and demand for highly skilled workers.

These surveys are supplemented by studies by the Research Centre for Education and Labour Markets (*Researchcentrum voor Onderwijs en Arbeidsmarkt*) (ROA) which also publishes labour market forecasts. Recent ROA scenarios to 2008 show that the supply of highly skilled workers is expected to lag significantly behind demand (ROA, 2003). According to these scenarios, the need for highly skilled workers in the Netherlands is expected to increase on average by 4.8% per year for vocational graduates and 4.7% per year for university graduates in the period 2003-2008. Supply is projected to increase at an average annual rate of 3.7% and 3.2%, respectively, in this time period. The shortage of highly-educated labour is projected to be prolonged into the longer-term or the year 2020.

The ROA also produces forecasts of labour demand and supply by industrial sector, broad occupational categories and fields of study. Sectors with the highest incidence of hard-to-fill vacancies include industry, construction and commercial services, all extremely broad categories. The ROA has recently been commissioned to produce forecasts of medium-term developments of employment rates, replacement needs and the supply of school-leavers in the labour market. These forecasts highlight the differences in the prospects facing students from the vocational schools and universities according to field of study. Among the vocational graduates, 70% of science and technology graduates face good employment prospects compared to only 30% of economics graduates. These studies highlight the growing demand for research and technical personnel in both the public and private sector.

Given projections of severe skilled labour shortages, the Netherlands is in need of a more detailed and targeted workforce monitoring system. At present, forecasts and surveys are highly generalised or carried out on a one-off basis. Information about skilled labour shortages and professions in demand should also be more widely disseminated among prospective students and workers to influence their choice of field of study or training. The 2004 Higher Education and Research Plan (HOOP) includes proposals for enhancing the relationship between the educational system and business in order to better satisfy private sector demand for skilled workers. There should be increased interaction with the social partners in articulating future labour market skill needs.

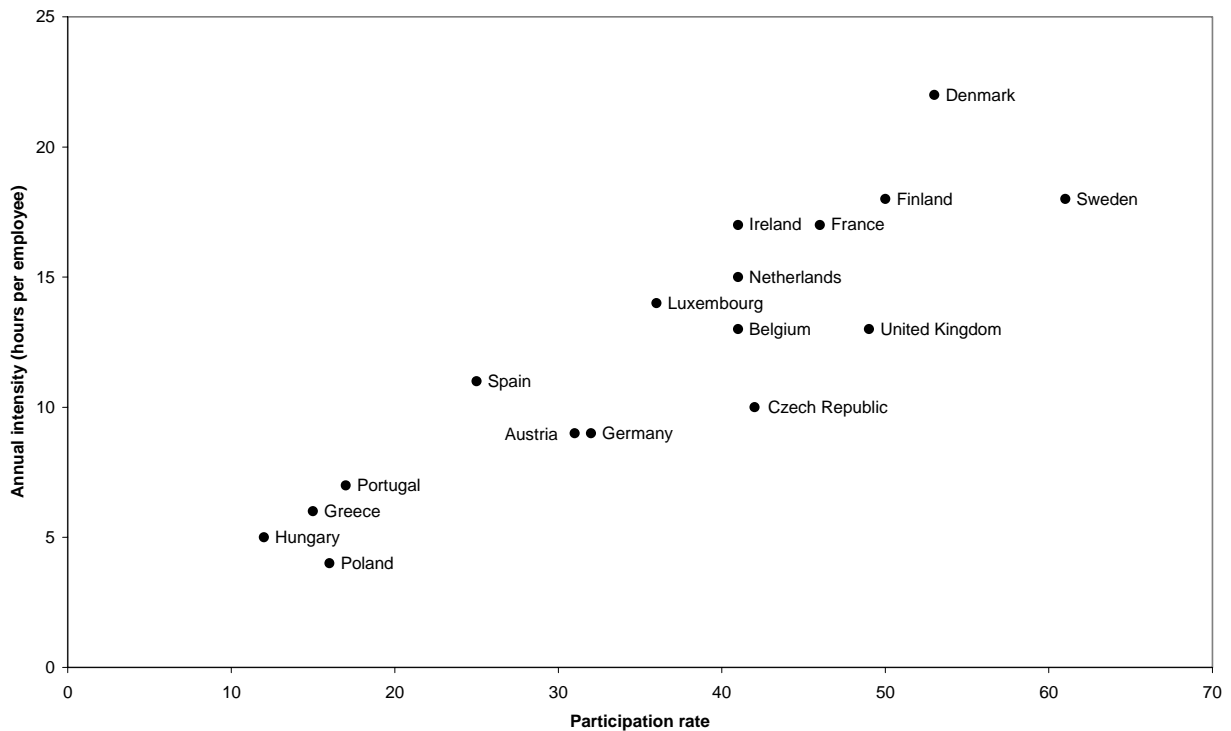
### **Increasing enterprise and individual training**

The Netherlands has relatively high rates of employee training, even though it lags behind the Nordic countries and France (**Figure 5**). However, there is some evidence that training in the Netherlands does not have comparable effects on the employment prospects of individuals. Among European countries, adult education and training are positively related to the probability of participating in the labour market except in the Netherlands. Similarly, wages tend to grow faster after training in most countries, but this training premium is relatively small (less than 1%) in the Netherlands (OECD, 2004a). Previous studies have shown that the wage differential between those who have and have not received training is low in the Netherlands (Blondal *et.al.*, 2002).

This could be due to the relatively compressed wage structure of the Dutch labour market. As a result of the co-ordinated wage bargaining system, low productivity jobs often enjoy similar wage increases to higher productivity jobs. This is despite the fact that employers can pay more than the increases agreed in collective labour agreements and that highly-educated staff are sometimes exempt from these agreements. It is possible to apply different wage increases to different jobs, such as in the case of restructuring within a company or industry, and to include flexible elements such as performance-related pay. Since 2001, wage differentials between high and low skilled workers have been increasing and, in the long run, wage levels should be a greater influence on training investments and worker mobility.

At present, the active role of the social partners helps maintain high training levels in the Netherlands. Education and training arrangements affect 97% of employees covered by collective bargaining agreements. Most training is financed through sector training funds, which require employers to invest in training (OECD, 2003). A system of sectoral training levies has been established through branch-level collective agreements. The average contribution rate for enterprises is 0.5% of the total wage bill, but this includes some considerable differences across branches. In almost all cases, workplace training is seen as an instrument for helping employees adapt to changing circumstances, such as new technologies in production processes, reorganisations and takeovers.

Figure 5. Comparative rates and intensity of worker training, 1999



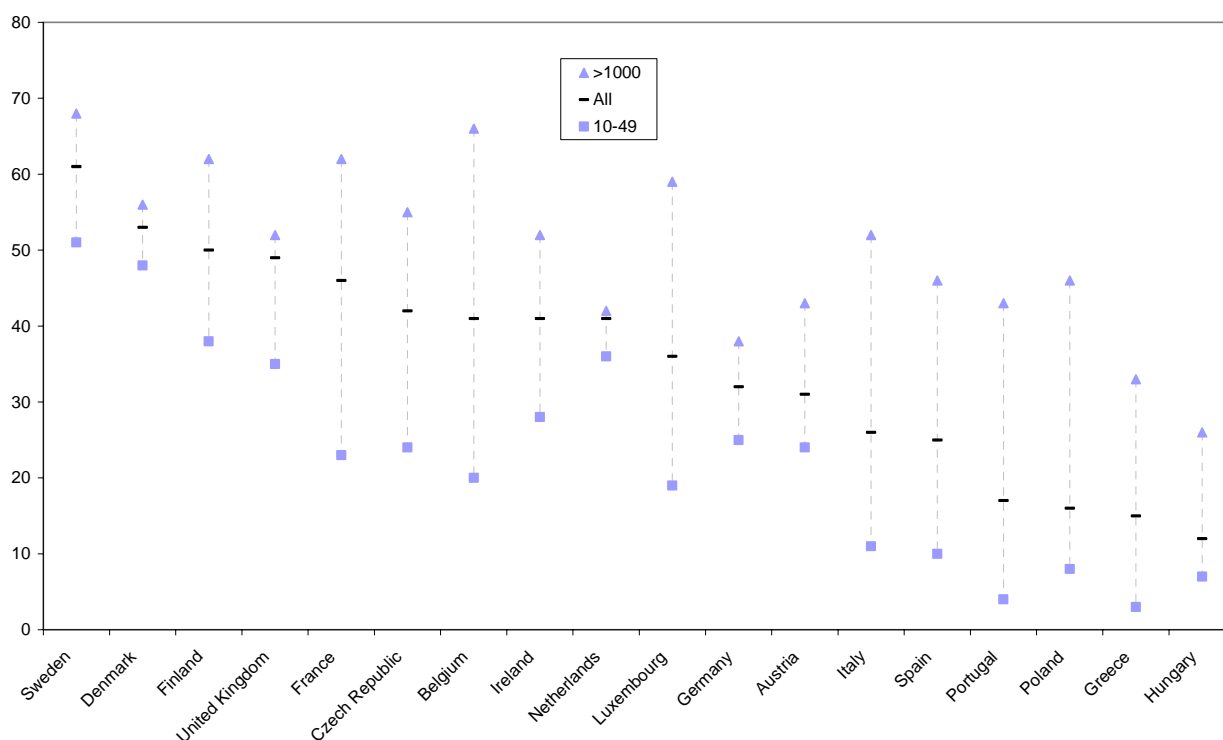
Notes: Participation rate and annual intensity of employee-sponsored continuous vocational training (CVT) in European countries.

Source: OECD (2002), *Employment Outlook*.

Special assistance is provided to smaller enterprises, and the differences in employee-sponsored training by firm size are very narrow in the Netherlands (**Figure 6**). In 1999, the training participation rate in the Netherlands in firms with 10-49 employees was 36% compared to 42% in companies with 1 000 or more employees (and 41% for all firms). Since 1998, projects involving “employability advisors” have been supported by the government to inform and convince small and medium-sized enterprises about the value of training. A new project initiated in 2002, “Benefit from People and Knowledge”, will provide 16 000 small enterprises with advice on training and other personnel matters.

**Figure 6. Worker training by firm size, 1999**

(Participation rate of employee-sponsored continuous vocational training (CVT) by firm size in European countries)



Source: OECD (2002), *Employment Outlook*.

In 2004, the Netherlands eliminated its generous tax breaks to enterprises for training their workers. From 1998, firms were allowed to deduct 120% of training costs from turnover, and an extra deduction was given to small and medium-sized enterprises. When employers trained people (aged 23 and over) who were previously unemployed, they could also deduct workers' wages as well as indirect training costs such as those that would result from supervision and changes in production plans. In addition, extra deductions were given for training costs for employees 40 years or older. However, evaluations found these tax incentives not to be cost-effective in increasing relative training rates and that the fiscal measure to stimulate training of 40-plus workers tended to have a negative effect (Leuven and Oosterbeek, 2000).

The regional training centres (ROCs) play the primary role in the provision of adult education and training. Established by the 1996 *Adult Vocational Education Act (WEB)*, the 43 ROCs offer a range of both full-time and part-time courses. The qualification structure for some 900 professional activities is jointly determined by 19 sector-specific centres, which comprise both businesses and specialised educational institutions. In practice, these centres operate on the basis of detailed descriptions of qualification profiles which, in turn, are based on competencies. This system is intended to make competencies more uniform and promote sectoral and inter-job mobility of workers. However, recent criticisms have claimed that the ROCs are too rigid and narrow in their approach to training. In 2002, the Dutch social partners advocated a more market-oriented training system or *New Way of Learning (Het nieuwe leren)*. Proposals have been made to dismantle the quasi-monopoly of the ROCs and to diversify training sources and offerings. The government has responded in part by subsidising the development of more innovative and flexible training courses to better meet the needs of industry (OECD, 2004c).

The Dutch government has also put in place a competency-based qualifications system to provide formal recognition of skills acquired through continuing vocational training and work experience. The *Accreditation of Prior Learning* (APL) scheme set up in 2001 is intended to recognise competencies beyond the national qualification structure and to promote informal learning in the workplace. The *Knowledge Centre for Accreditation of Prior Learning* (Kenniscentrum EVC), established for four years with a budget of €3.4 million, is tasked with collecting and distributing experiences with prior learning in the Netherlands and abroad together with the standardisation of procedures. The APL includes company-based applications, where firms such as Philips validate the experience of workers, including on-the-job training and individualised learning routes under the supervision of trainers.

Several initiatives have been taken to give incentives to individuals to invest in their own upskilling, including tax breaks which allow individuals to deduct training costs up to €1 500. However, there is the risk that individuals may participate in training for tax reasons rather than to enhance their work productivity. The Netherlands is also among the few OECD countries that have experimented with *Individual Learning Accounts* (ILAs), which are saving accounts for funding future learning activities and to which third parties (employers and governments) can contribute. Starting in 2001, the government co-financed 2 500 ILAs in 8 pilot projects for up to 50% of direct training costs. However, this initiative is mostly targeted to low-educated workers and, at present, its continuation seems uncertain due to disagreement between the social partners and inconclusive results (OECD, 2004c).

In 2001, the Dutch government introduced a “leave-saving scheme” where employees are allowed to set aside up to 10% of their gross annual wage in a savings account subject to favourable tax treatment in order to fund training leave. However, relatively few people have taken advantage of this opportunity. Recently, the Dutch Parliament adopted a proposal for a life-cycle scheme (*levensloopregeling*) which would include a savings plan for income compensation during leave, for example, for education and training purposes as well as for reconciliation of family and work life. But there is a danger that such a scheme may be used mainly to finance early retirement as in some other OECD countries, rather than to boost higher training activity among the workforce (OECD, 2004b).

Among OECD countries, the Netherlands has the second highest level of government expenditure on training as a share of GDP (after Denmark), but this is mostly for unemployed workers and those at risk. The government spends relatively less on training for employed workers, particularly since the elimination of generous tax deductions for enterprises. Incentives to individuals to invest in training, such as the ILA system, have thus far proven ineffective. In the future, greater wage differentiation between high and low skilled jobs should provide a clearer signal to individual investments in training. As in the case of the tertiary education system, public funding should be used to leverage more private investments in upskilling and increase the cost-effectiveness of government training investments.

### **Enhancing national worker mobility**

Worker mobility across industry sectors is relatively low in the Netherlands, owing partly to the flat wage structure. The Netherlands has experienced lower increases in wage differentials resulting from increases in demand for skilled workers than most other OECD countries. The increase in demand for skills has been met by a more efficient assignment of workers to jobs, with more highly skilled workers doing more complex jobs, rather than by increased wage premia (ter Weel, 2000). Sectoral mobility, when it also involves geographical mobility, is also hindered by factors unrelated to the training background of workers or to the flexibility of labour market institutions. For example, studies have found that employed homeowners are less likely to move or change jobs than people who rent, largely due to the nature of the housing market in the Netherlands and steep increases in housing prices (Van Leuvensteijn and Koning, 2000).

The Netherlands also exhibits low rates of worker mobility between the public and private sectors (Allaart and Voogd-Hamelink, 2001). The mobility of skilled workers between industry and government, including universities, is limited. The very large public sector, which includes education and health services, has long been criticised as inefficient and in need of greater outsourcing and privatisation of its services (OECD, 1999). Although some public sector reforms have been undertaken, they are slow to reach completion.

Reducing the administrative burden on firms would also facilitate business start-ups and growth of entrepreneurship, which tends to be in short supply. For example, a recent analysis of university and vocational graduates shows that they are increasingly likely to go into public teaching professions rather than to start their own businesses (CBS, 2004a). A recent initiative, *Action for Entrepreneurs*, is aimed at stimulating entrepreneurship partly through reducing administrative burdens (MEA, 2004a). Another scheme, *Technopartner*, intends to increase the number of start-ups from university research (MEA, 2004b). And in 2005, the *Education for Entrepreneurship* programme will be implemented to incorporate entrepreneurial attitudes in curricula and among teachers and students.

The government has mounted schemes to increase public/private links and encourage more worker movement. The *Casimir* scheme is intended to increase exchanges of researchers between industry and public research organisations. Other *Deltaplan* initiatives encourage universities and other higher education institutions to develop networks with businesses partly to enhance mobility of skilled personnel. A programme aimed at researchers supports graduates doing their PhD research in private firms and the secondment of public researchers to companies.

The Young People and Technology Network (*Jongeren en Technologie Netwerk*) (Jet-Net) aims to enhance links between education and industry. It involves co-operation between firms (e.g. Philips, Shell, Unilever, Akzo Nobel and DSM), the educational system, intermediary organisations and the Ministries for Economic Affairs and for Education, Culture and Science. Some 50 schools are currently co-operating with companies through this project, and 30 more have signed up but additional companies are needed. *Doorstroom Agenda Beroepskolom* is another attempt to increase interactions between students and business through internship and short-term transfer programmes.

In general, inter-sectoral job mobility should be enhanced by the APL system, which recognises competencies acquired outside the vocational education system, and also by broadening the qualifications imparted by the regional training centres (ROCs). A more diversified wage structure which better reflects supply and demand conditions for skilled workers will help increase their mobility. As to movement between the public and private sectors, disincentives in the form of loss of civil servant status and different pension and benefit rules should be addressed.

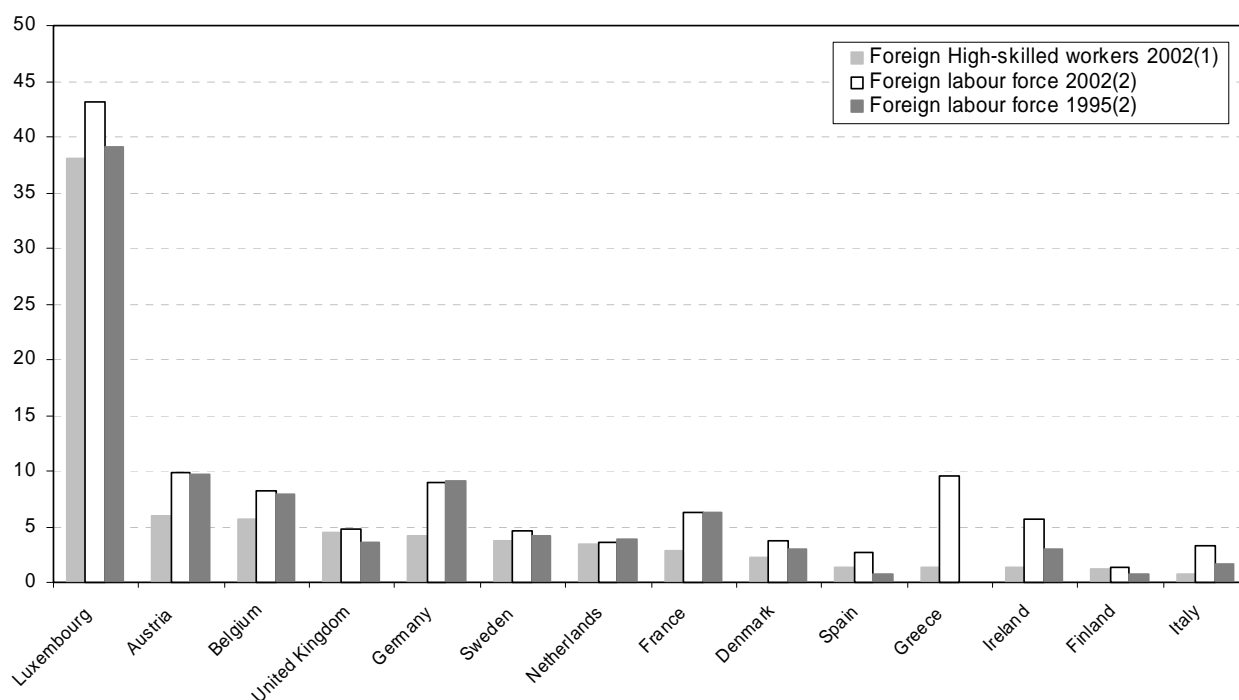
### **Adjusting to international worker mobility**

Compared to other European countries, the Netherlands has a relatively low share of foreign high-skilled workers in the labour force as well as of foreign labourers in general (**Figure 7**). However, at the urging of Dutch companies who have requested an accelerated entrance procedure for work and residence permits for highly-trained specialists, the immigration rules for “knowledge migrants” have recently been changed. Knowledge workers from non-European Union (EU) countries, defined as immigrants who have been offered a position earning an annual gross income of €45 000 or more (€32 600 for those under 30 years of age), do not need a work permit and receive a residence permit for a maximum of five years. The income criteria do not apply to persons who undertake doctoral studies at an education or research institution nor to post-doctoral and university teachers under the age of 30

The Netherlands has integration programmes for immigrants, which include mandatory language courses administered by the local authorities and available for up to 1½ years. In late 2003, the Council for Work and

Income made proposals for combining citizenship courses with work integration activities, which would assist employers in setting up language learning combined with work-related training. The Council also claimed that there is inadequate information about the results of the current language and integration courses for skilled and unskilled immigrants, which tend to be carried out differently across districts and for which the rules are confusing. A *Task Force on Citizenship* has been established to review and organise the immigrant integration process, including the development of a system for the accreditation of skills acquired abroad.

**Figure 7. Share of foreign high-skilled workers and foreign-born labour force, 2002 and 1995**  
(percentages)



Notes: (1) Share of non-national human resources in science and technology (HRST) in overall HRST employment.  
(2) Share of foreign or foreign-born labour force.

Source: OECD (2003), *Science, Technology and Industry Scoreboard* (1), and OECD (2003), *Trends in International Migration: SOPEMI 2003 Edition* (2).

The Netherlands has not been particularly successful in attracting foreign students, partly because it does not have many internationally-recognised top universities or programmes. In 1999-2000, the share of foreign students registered was 3% in the Netherlands compared to 11% in Belgium, 9% in Germany, 7% in France, 7% in Denmark and 6% in Sweden (OECD, 2001). Language remains a barrier and even though some courses are now taught in English, the number is low in comparison to neighbouring countries. The practice of charging enrolment fees at actual cost to foreign non-EU students is another factor reducing the competitiveness of Dutch higher education compared to alternative locations such as the Nordic countries. A positive step has been the conversion to a bachelor-master structure to improve the international recognition and comparability of the Dutch educational structure. This has now been implemented for nearly all of the vocational programmes and over 80% of university programmes.

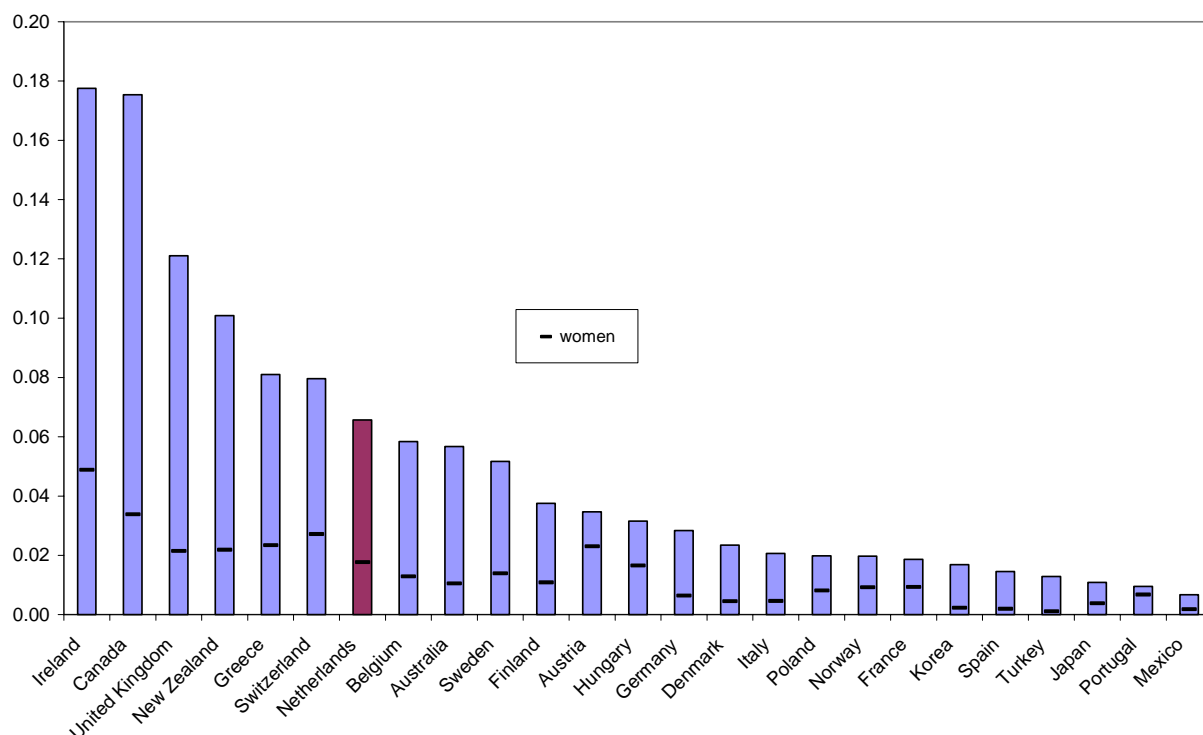
Exchange programmes and visiting academics are being encouraged. The *Dutch Education: Learning at Top level Abroad (Delta)* scholarships are intended to encourage foreign students from countries such as Indonesia, China, Taiwan and South Africa to study at Dutch higher education institutions. The *Huygens*

programme, in place from 2001/02 to 2004/5, hopes to attract outstanding foreign students to conduct research in the Netherlands for up to ten months. The Netherlands participates in European Union (EU) schemes such as PLATO, which encourages teachers to go on foreign work visits to EU member states, and EURYDICE, the information network on education in Europe. In addition, a plan for *Internationalisation of Higher Education* proposes more fellowship programmes for foreign students, greater participation in international centres of excellence and more intensive student recruitment efforts outside the Netherlands.

The *Deltaplan* includes steps to help retain foreign students. Those who have completed their higher education in the Netherlands are given a three-month period to find a position which would qualify them as knowledge workers with residence permits. During this period, however, the students must have sufficient means to cover their living expenses. There are proposals to designate foreign students as knowledge workers once they have received their degrees.

At the same time, the Netherlands is suffering a brain-drain of students to other European countries and the United States. The share of Dutch citizens with science and engineering degrees in the United States is relatively high and the Netherlands comes third among countries whose first language is not English (after Greece and Switzerland) (**Figure 8**). EU research shows that the United States is increasingly attracting European technical personnel and that around 73% of European students who obtained their PhD in the United States indicated they would like to stay there. One explanation could be that the United States, in contrast to many European countries, is seen as offering more competitive career and employment opportunities, less bureaucracy and better support for entrepreneurs (EC, 2003).

**Figure 8. High-skilled foreign workers in the United States, 1999**



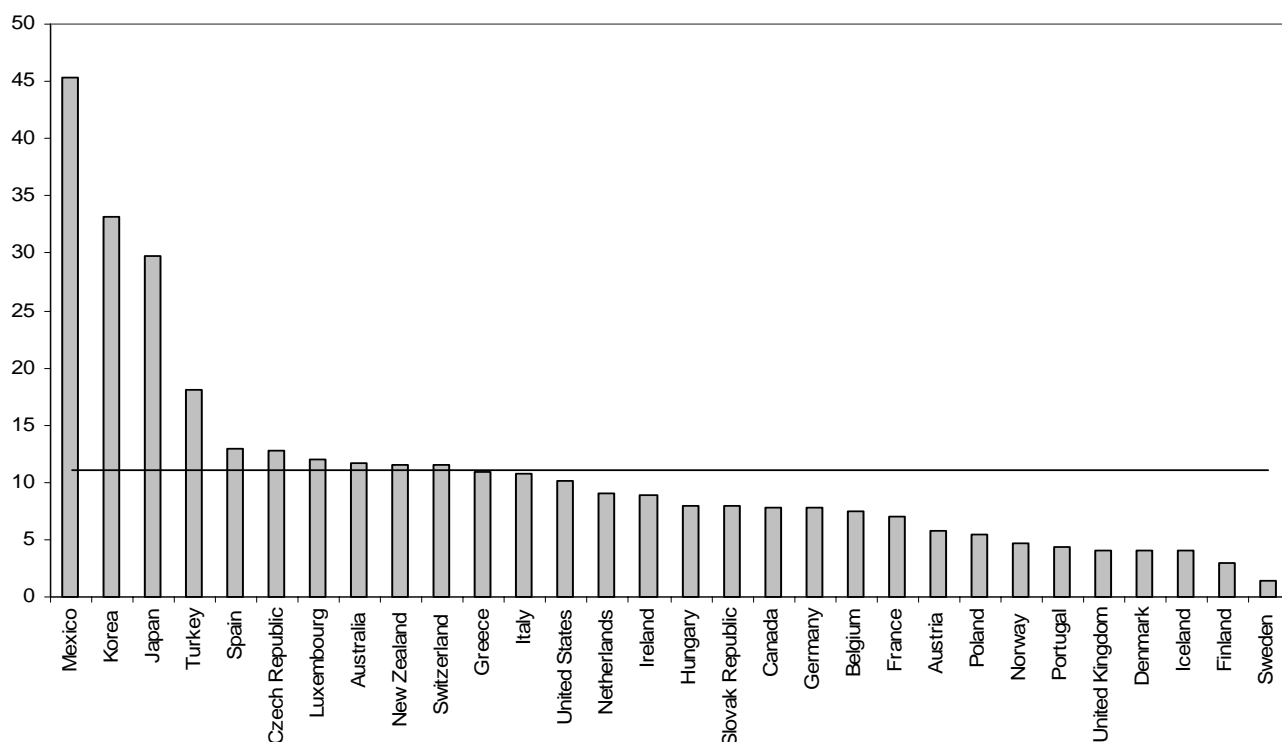
Notes: Non-US OECD citizens with science and engineering doctorates in the United States as % of source country's population.  
 Source: OECD (2003), Science, Technology and Industry Scoreboard.

In addition to these reforms to immigration procedures for knowledge workers, steps are being taken to provide information abroad on what the Dutch labour market and educational system have to offer, including facts about employment and migration laws. In view of the potential shortages of highly skilled workers, further incentives may be needed to increase the number of foreign students, including a reduction in education fees and the designation of graduates as knowledge workers with the right to residence permits. The Netherlands also needs steps to increase the repatriation of Dutch students and workers, perhaps through financial and work-related incentives.

### Increasing workforce participation by highly skilled women

Labour force participation of women in the Netherlands lags behind other OECD countries, and the share of women in part-time employment is among the highest in the OECD. This is reflected in the gender employment gap for highly-educated women which is still relatively significant among OECD countries, although it has decreased over time (**Figure 9**). Increasing the female participation rate, whose growth has once again slowed following recent reforms, and removing the barriers to longer average hours worked are among the major policy challenges (2004b).

**Figure 9. Gender employment gap for highly educated women, 2002**



Note: Percentage point difference between the employment/population ratios for men and women with tertiary education

Source: OECD (2004), *Employment Outlook*.

The Netherlands is the only one among 13 European countries where the situation of both spouses in full-time employment accounts for less than 10% of the total (**Table 2**). In 2001, 73% of women in part-time employment in the Netherlands said they did not want a full-time job, one of the highest percentages among European countries. The high share of part-time employment can be explained partly by cultural factors, with an increasing share of both men and women preferring to work part-time. Economic factors also play a role, particularly the tax system and the cost and availability of childcare. The Netherlands has relatively high tax rates for second earners, while childcare outlays are low. Public expenditure on formal

daycare and pre-primary education in 1999 in the Netherlands accounted for around 0.6% of GDP compared to, for example, 2.7% in Denmark and 1.3% in France. Finally, the number of weeks (total and paid) allowed for parental, maternity and childcare leave in the Netherlands is limited compared to other European countries (Jaumotte, 2003).

**Table 2. Employment patterns in the Netherlands, 1998**

Couples with child under 6, percentages

	Men fulltime + women fulltime	Men fulltime + women parttime	Men fulltime + women not employed	Other	Total
Actual	4.8	54.8	33.7	6.7	100
Preferred	5.6	69.9	10.7	13.8	100
Difference	0.8	15.1	-23.0	7.1	

Source: Jaumotte (2003).

Some measures have been taken in the Netherlands to stimulate female labour force participation. In 2001, the government switched to individual taxation and a general tax credit on labour income in order to offer couples a more neutral choice on how to allocate their work participation. Furthermore, the “working parents’ tax credit” was raised. The number of childcare facilities is on the increase, with the number doubling between 1998 and 2003. As prices rose, waiting times were reduced significantly in most areas. In 2005, a new bill regulating the financing and quality of childcare facilities will be in effect. The legislation is also intended to improve the functioning of the market for childcare by replacing the current system of transfers to parents and municipal childcare providers by one where working parents receive an income-related subsidy to pay for formal childcare and family-home care from private suppliers (OECD, 2004b).

But labour market incentives to participation by highly-educated women remain weak in the Netherlands owing to gender-based wage gaps. Despite some narrowing of the gap between 1998 and 2000, the wages of women in the Netherlands still lag behind those of men. The average wage gap between women and men was 15% in 2002 compared with 18% in 1998. Around a third of the gender wage gap remains after factors such as education and experience have been discounted (OSA, 2002). Labour market segregation is one factor, with women working mostly in lower-wage sectors. In general, wages tend to rise more sharply in male-dominated sectors such as manufacturing and commercial services.

In addition, the share of women employed tends to decrease with the level of education in fields such as medicine and economics. Steps are needed to increase the number of female tertiary graduates and women in scientific and technical fields in demand by industry. Comparatively few women in the Netherlands have completed tertiary education, and women account for a very small share of those enrolled in science and technology related fields of study at all education levels. Dutch men largely outweigh Dutch women in the proportion of advanced research qualifications, and Dutch women also compare poorly to women in most other countries in this regard. Ongoing programmes to increase the number of women researchers and promote them to higher university positions include *Aspasia* and *Vernieuwingsimpuls*.

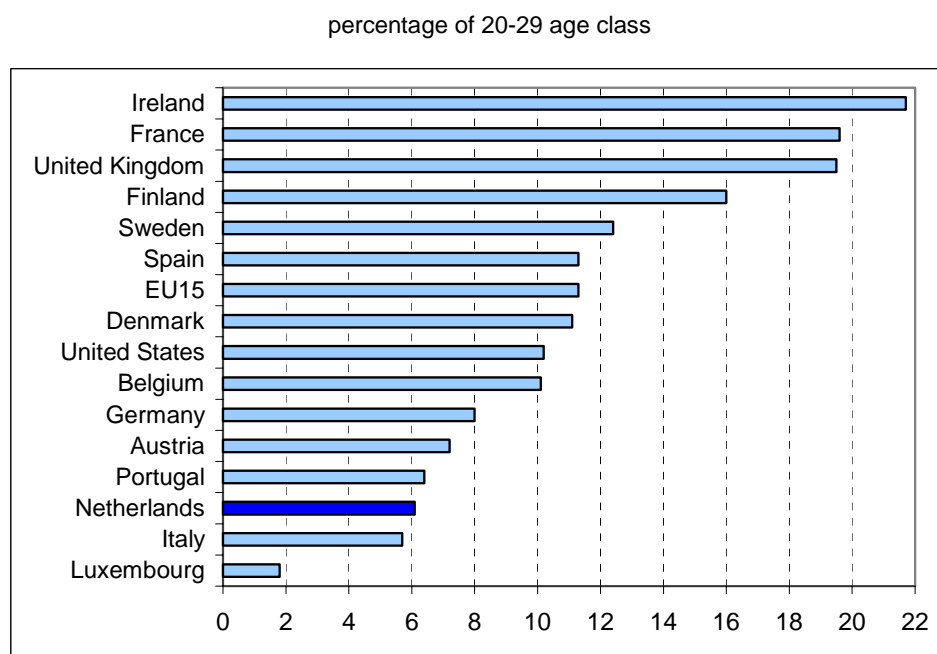
The Netherlands, more so than most OECD countries, needs to take advantage of its female skilled labour force to enhance its overall growth and productivity performance. Widespread female part-time employment has caused the Netherlands to have the lowest number of hours worked per employee among OECD countries. The government should work with the social partners to create gender neutral job evaluation systems and competency-based pay scales at sectoral level with a view to unveiling patterns of

gender pay discrimination. More extensive measures are needed to reduce the cost of childcare and improve facilities, while the tax burden could be further reduced to encourage full-time employment.

### Developing human resources in science and technology

The development of skilled science and technology workers is another challenge faced by the Netherlands. The relative lack of interest in science and technology fields of study can be felt on the Dutch labour market and in both public and private research institutes. The life sciences, mathematics, computer science and engineering together account for less than 20% of total graduates. Furthermore, the Netherlands has among the smallest shares of science and engineering graduates in the OECD (**Figure 10**). A special report issued in 2000, “*Talent for the Future, Future for Talent*”, surveyed the situation for scientific personnel within the universities and main research organisations and predicted that shortages will likely occur in all disciplines and positions.

**Figure 10. Science and engineering graduates, 2001**

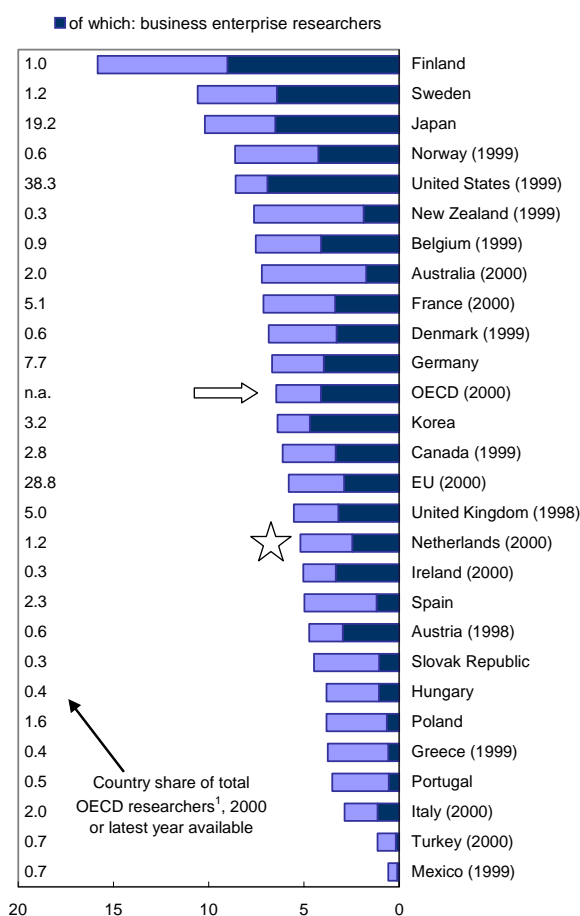


Source: EC (2003), *European Innovation Scoreboard*.

The Netherlands is characterised by relatively low levels of private sector R&D, which has led to a reduced number of researchers in the business sector (**Figure 11**). However, the private sector funds 11-12% of research in public institutions, including about 5% of university research and a larger share in the non-university research sector.

In 2004, the government created an *Innovation Council* to strengthen links between production and commercial use of knowledge and increase technology transfer from the public to the private sector, particularly to smaller firms. A budget of €800 million has been earmarked to fostering public/private research partnerships through 2010, mostly for competitive grants to universities for research projects undertaken in co-operation with industry. The 2004 Science Budget (*Wetenschapsbudget*) also has a particular focus on innovation with the goals of ncreasing the scale of research and its economic value by making it correspond more closely to what business needs.

Figure 11. Researchers per 1000 total employment



Note: Country share relates to latest available data.  
 Source: OECD (2003), *Science, Technology and Industry Scoreboard*.

One of the aims of the *Deltaplan* is to foster the development of the technology workforce, partly by increasing the stream of students into science and technology fields by 15% by 2007. There are four approaches: attractive education, attractive choices, attractive jobs, and attractive settlement. It intends to create a more attractive educational system, particularly in technology-based fields, with a greater diversity of course offerings and more links with the labour market. In addition to forming networks among higher educational institutions and companies, the *Deltaplan* aims to improve the image of science and technology occupations in the drive to attract students. Among the range of measures to draw students into science are targeted recruitment and financial incentives (MESC, 2004).

Two schemes have been put in place to increase female participation in the science and technology workforce. The *Aspasia programme* was designed to increase the number of female university lecturers and associate professors. The Dutch Research Council (NWO) provides a maximum of €1 000 per year for either a four-year PhD project or a two-year postdoctoral project and accompanying research costs. The programme has resulted in an increase of female associate professors from 8.6% (1999) to 13.7% (2002), has stimulated an increase in the number of female professors and has been continued through 2005. In addition, the *Innovational Research Incentives Scheme (Vernieuwingsimpuls)* has a special €2 million

yearly fund to support female researchers at universities. Also administered by the NWO, steps are taken to encourage more women to submit applications so as to have a success rate equal to male candidates.

The Netherlands confronts a serious challenge in increasing the supply of human resources in science and technology to meet future industry needs. The initiatives contained in the *Deltaplan* and the establishment of the *Innovation Council* are a good start. Measures are needed to attract young people to science and research and to make it more appealing and attractive from the early stages of education onwards. This includes improving the quality of scientific teaching, encouraging individual creativity and expanding the participation of women and under-represented groups. Working conditions and career opportunities for researchers should be enhanced, especially at the beginning of professional life. The rewards from scientific careers should be clarified for students to reduce job uncertainty and allow better-informed decisions.

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