

The Researchers Report 2012

Country Profile: Denmark



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1. Key data

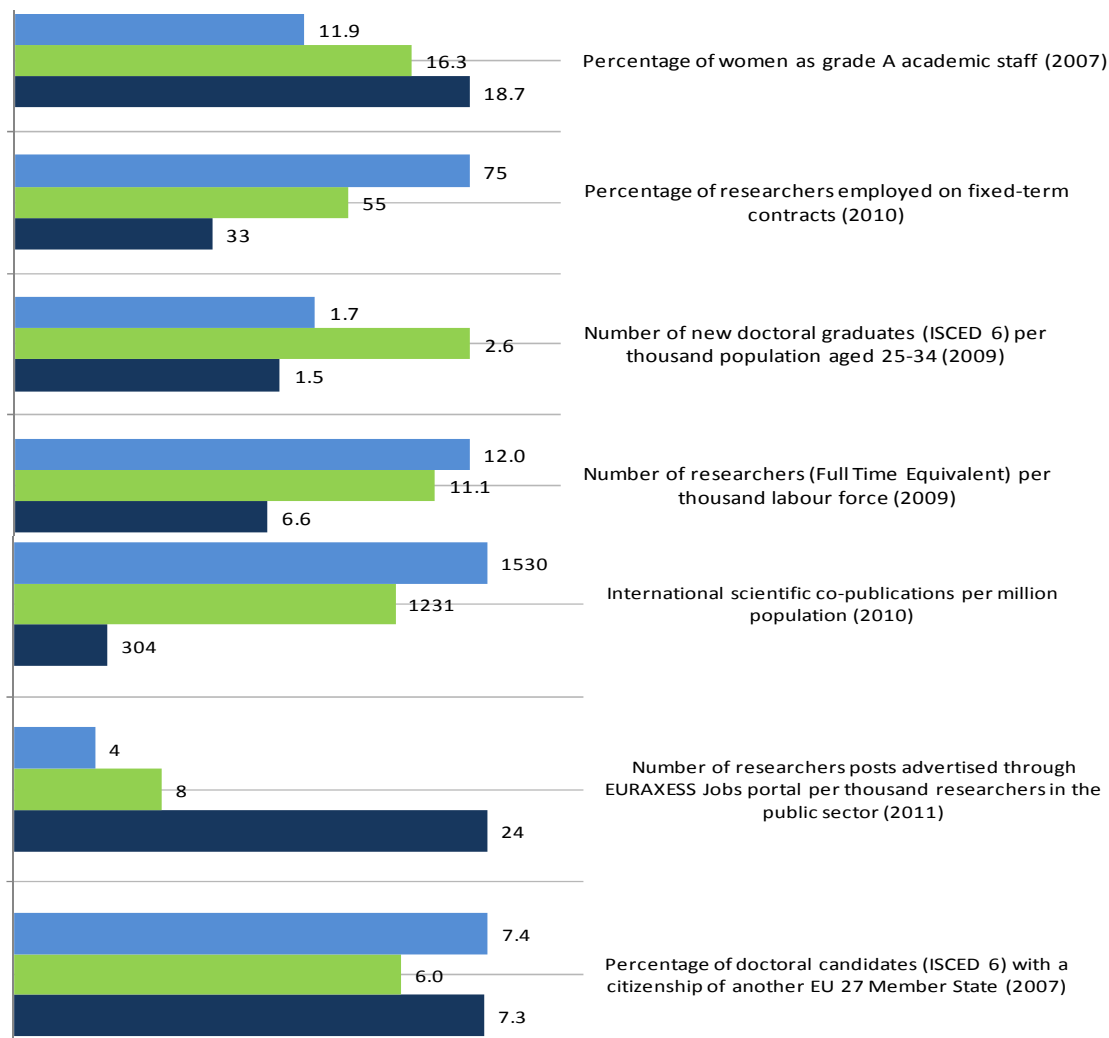
National R&D intensity target

“Denmark reached its R&D intensity target for 2010 already in 2009 with a proportion of public-private R&D intensity well in line with the Barcelona objectives of one third - two thirds. The most recent figures for Denmark on R&D intensity are 3.08% for 2010 (0.98%public + 2.1% private). “Over the period 2000-09, Denmark’s R&D intensity has increased clearly, with an average annual growth rate of 8.84% over the period 2006-09, one of the highest growth rates among the EU Member States. In view of 2020, Denmark has set a preliminary national R&D target of 3% of GDP, which is in fact already achieved. Therefore, Denmark has scope of being more ambitious in its R&D intensity target for 2020, in particular if the country has the ambition to keep its position among the world’s research and innovation leaders. Given the trend scenario presented below, Denmark has the potential to reach a level even above 3.5% by 2020. In 2009 and 2010, new innovation policy measures were introduced in Denmark targeting private R&D investment, including increased public procurement of eco-innovations, support for large demonstration facilities, the launch of the Renewal Fund and a risk capital fund.”¹

Key indicators measuring the country’s research performance

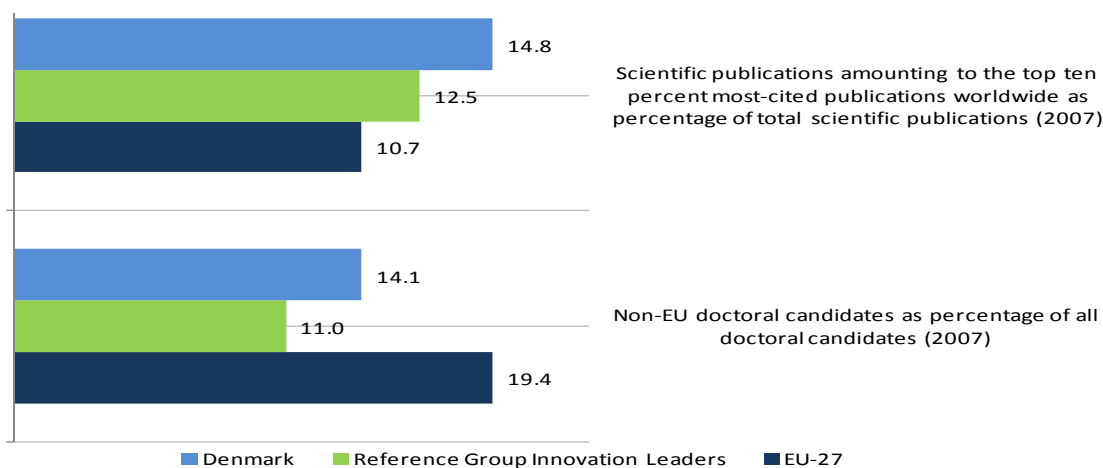
The figure below presents key indicators measuring Denmark’s research performance against a reference group and the EU-27 average².

Figure 1: Key indicators – Denmark



¹ European Commission (2011), “Innovation Union Competitiveness Report 2011”.

² The values refer to 2011 or the latest year available.



Source: Deloitte

Data: Eurostat, SHE Figures, EURAXESS Jobs Portal, Science Metrix/Scopus (Elsevier), Innovation Union Scoreboard 2010

Notes: Based on their average innovation performance across 24 indicators, Denmark, Finland, Germany and Sweden show a performance well above that of the EU-27. These countries are the Innovation leaders³.

*The number of research posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector is presented for the period January to August 2011.

Stock of researchers

The table below presents the stock of researchers by Head Count (HC) and Full Time Equivalent (FTE) and in relation to the active labour force.

Table 1: Human resources – Stock of researchers

Indicator	Denmark	EU Average
Head Count per 1 000 active labour force population (2008)	16.43	9.45
Head Count (2008)	48 442	-
FTE per 1 000 active labour force population (2009)	11.96	6.63
Full time equivalent (FTE) (2009)	35 306	-

Source: Deloitte

Data: Eurostat

2. National strategies

The Danish Government has adopted a package of measures aimed at training enough researchers to meet its R&D targets and at promoting attractive employment conditions in public research institutions. The table below presents key programmes and initiatives intended to implement the strategic objectives to train enough researchers to reach Denmark’s R&D targets, to promote attractive working conditions, and to address gender and dual career issues.

Table 2: National strategies

Measure	Description
Business Research, Development and Innovation in Denmark – Policies and Effects (2011)	This report presents the Danish research and innovation system which is covered by the Ministry of Science, Innovation and Higher Education. It also describes selected Danish innovation policy schemes and instruments, and it analyses the impact of R&D&I on the Danish private sector.
2010 Report/2011 Perspective and Action Plan (2010)	The Minister for Gender Equality prepares an annual Perspective and Action Plan. The Action Plan promotes cooperation between Universities and the sphere of science in order to motivate and increase the number of women in technical and scientific subjects. The Action Plan encourages gender balance in executive management and boards of directors, and it forces the public sector to take the lead in gender equality. Finally, the Action Plan also covers

³ European Commission (2011), “Innovation Union Scoreboard 2010”

Measure	Description
Memorandum on Job Structure for Academic Staff at Universities (2007)	measures which guarantee gender equality for men, such as parental leave. The Memorandum on Job Structure for Academic Staff at Universities describes the job structure and the contents of the job categories which may be assigned to academic staff at universities under the Ministry of Science, Innovation and Higher Education. The memorandum covers academic salaries, career prospects, employment contracts, social security coverage, maternity/paternity leave and freedom of research, as well as participation in decision-making processes.
Progress, Innovation and Cohesion: Strategy for Denmark in the Global Economy (2006)	Denmark's Progress, Innovation and Cohesion Strategy contains 350 specific initiatives in support of growth and innovation. It introduces extensive reforms in education and research. It envisages doubling the number of doctoral scholarships, including industrial scholarships by 2010 (from 2003 levels) to 2 400 annually. The Danish Parliament allocated additionally a total of EUR 0.65 billion (some DKK 4.8 billion) to gradually increase the PhD intake during the period 2005 to 2012.
The Act on Universities (2006)	The Act on Universities encourages the Ministry of Science, Innovation and Higher Education to lay down general regulations on universities' programmes, in particular, the universities' titles and the admission process. The Act contains general provisions on the general structure of programmes (e.g. Bachelor, Master and PhD) and is complemented by a number of ministerial orders ⁴ .
The Act on Gender Equality (2000/2007) and the Act on Equal Treatment of Men and Women (1978/2006)	Both Danish Acts transpose the implementation of EU's gender equality Directives ⁵ in Denmark. They include provisions on gender equality and non-discrimination related to all aspects of the labour market, the research profession included.

Source: Deloitte

3. Women in the research profession

Measures supporting women researchers in top-level positions

In 2007, the percentage of women grade A academic staff was 11.9% in Denmark compared with 16.3% among the Innovation Union reference group and an EU average of 18.7%⁶.

According to the Law on Equal Treatment of Men and Women, public committees, commissions, university boards should, if they are set up by a Minister to prepare the establishment of rules or planning of societal importance, be staffed by an equal mix of men and women. For this purpose, a 'Charter for More Women in Public and Private Sector Management' was drawn up in 2008 and signed by several Danish universities. The Charter encourages companies to inspire more women to take up management positions. The aim of the Charter is to:

- ensure that women and men have an equal opportunity to pursue management careers;
- launch specific, measurable initiatives in companies and organisations to increase the proportion of women at all levels of management;
- guarantee that the public and private sector enterprises deploy talents.

The former Minister of Science, Technology and Innovation held a roundtable discussion with representatives from Danish universities, research councils and the private sector in 2009 on how to improve the retention of talented female researchers. The Minister of Science gathered best practice examples on recruitment and retention of female talents in "Female research talents – the unused reserve of Danish research"⁷ (2009) publication. After the roundtable discussion, the Danish Agency for Universities and Internationalisation has

⁴ For example, the Ministerial Order on University Admission (Adgangsbekendtgørelsen - BEK nr. 362 af 20/05/2005), which lays down the overall conditions for admission at Bachelor and Master level, the Ministerial Order on Bachelor and Master's programmes (candidates) at Universities (Uddannelsesbekendtgørelsen - BEK nr. 338 af 06/05/2004), which describes the overall objectives for the different Bachelor and Master programmes and the Ministerial Order on University Examinations (Eksamensbekendtgørelsen - BEK nr. 867 af 19/08/2004), which lays down the overall conditions for University tests and examinations at Bachelor and Master level.

⁵ Council Directive 2000/43/EC of 29 June 2000 implementing the principle of equal treatment between persons irrespective of racial or ethnic origin, OJ 2000, L 180/22, Council Directive 2000/78/EC of 27 November 2000 establishing a legal framework for equal treatment in employment and occupation, OJ 2000, L 303/16 and Commission Directive (2000/113/EC) on the principle of equal treatment between men and women in access to and the supply of goods and services.

⁶ See Figure 1 "Key indicators – Denmark".

⁷ Available at: <http://en.fivu.dk/publications/2009/female-research-talents-the-unused-reserve-of-danish-research>

noticed an increase in the number of initiatives on equal opportunities at Danish Universities. Every second year, the Ministry for Gender Equality benchmarks the initiatives in all public institutions; the universities seem to be in a better position than two years ago.

Quotas to ensure a representative gender balance

The Danish Government will in fall 2012 propose new legislation to address the issue of gender imbalance in corporate boards. The 1 100 largest companies (both private and public) will be obliged to individually set-up realistic and ambitious targets for the underrepresented gender on boards and give an account of both the objectives and the progress made in achieving the objective. They will furthermore be obliged to promote policies for increasing qualified candidates of the underrepresented gender in the company's management levels to sustain an acceptable balance and to increase the recruitment base of candidates to company boards.

Companies must give an account in the companies' annual report of the objectives and the progress made in achieving the objectives and give an account of the policy for increasing the number of the under-represented gender in the company's management levels in general, how the policy is implemented and what progress is made. If the companies fail to do so, they may be fined. State-owned companies are obliged – regardless of size – to set up objective targets and policies for the underrepresented gender.

Maternity leave

Under the general rules on maternity leave, researchers are entitled to maternity leave and pay. The Job Structure for Academic Staff at Universities states that for assistant professors/researchers/post-doctorates, absence due to maternity leave or leave due to adoption will extend the period of employment accordingly. The Collective Agreement on Academics in the State (2008) safeguards the payment during the maternity leave.

The research funding organisations do not give extra funding for maternity/paternity leave. The institution pays the full salary to the researcher during the first weeks of his/her leave and it can then receive a refund from the municipality.

4. Open, transparent and merit-based recruitment

Recruitment system

The Danish universities individually decide on the number of faculty positions, and how to advertise and fill them the posts available. The Ministry of Finance does, however, put a limit on the number of management positions. Since 2008, as part of a move to give the Universities more autonomy in the area of science, the previous restrictions on the number of full professorships was lifted. However, there is still a cap set by the Ministry of Finance on the number of experienced full professors. This is 255 for the universities as a whole.

The common government rules on posting positions and making appointments, including requirements on the prohibition of discrimination, open recruitment and objective justifications, apply to the scientific and administrative positions. For scientific employees, the rules are supplemented by the Ministerial Order on the Appointment of Academic Staff at Universities (2008).

Under this Ministerial Order, positions at professor and associate professor level must be advertised internationally, and an assessment committee must be set up. The Ministerial Order is designed to increase international mobility as well as open competition, hence providing Danish universities with the best possible talent. The Rector appoints the chairperson and the members of the committee. The majority of the members must be external and the Universities may invite external members from abroad.

The Rector may grant an exemption from this provision in the event of special circumstances of an academic nature⁸. A non-prioritised, reasoned and written assessment of the applicants' academic qualifications is submitted to the Rector. The committee must submit its assessment within a time limit set by the Rector. In the event of differences of opinion between the members of the committee, this must be stated in the assessment.

⁸ These circumstances may happen when the university wishes to engage a foreign researcher for a limited period or if the university wishes to nominate an exceptionally-qualified candidate.

Under the Public Administration Act (1985), the applicant can always require a written explanation of the decision. The applicant has the right to appeal to the institution to which he/she has applied for a job.

Open recruitment in institutions

The table below presents information on open recruitment in higher education and public research institutions.

Table 3: Open recruitment in higher education and public research institutions

Do institutions in the country currently have policies to ...?	Yes/No	Description
– publish job vacancies on relevant national online platforms	Already in place	
– publish job vacancies on relevant Europe-wide online platforms (e.g. EURAXESS)	No	According to the Ministerial Order no 284 of 25 April 2008 on the Appointment of Academic Staff at Universities (the Appointment Order), professorships and associate professorships must be advertised internationally, except under special circumstances of an academic nature.
– publish job vacancies in English	Already in place	
– systematically establish selection panels	Already in place	According to the Appointment Order when appointing positions at professor and associate professor level, and when appointing senior advisors and when assessing employees at assistant professor level on long-term contracts in connection with the transition to a position at lector level, the Rector appoints an assessment committee consisting of a chairperson and two to four members. For the appointment of other posts, the Rector sets up an assessment committee or nominates one or more experts to conduct an academic assessment of the applicants.
– establish clear rules for the composition of selection panels (e.g. number and role of members, inclusion of foreign experts, gender balance, etc.)	No	According to the Appointment Order, the Rector appoints the chairperson and the members of the committee and stipulates a deadline by which the committee must submit its assessment. The majority of the members must be external members. The universities could for instance invite external members from abroad. The Rector may grant an exemption from this provision in the event of special circumstances of an academic nature.
– publish the composition of a selection panel (obliging the recruiting institution)	No	But the applicant receives information on who is on the selection panel.
– publish the selection criteria together with job advert	Already in place	
– regulate a minimum time period between vacancy publication and the deadline for applying	No	The Rector's decision about the appointment should normally be made no more than six months after the deadline for application (the Appointment Order).
– place the burden of proof on the employer to prove that the recruitment procedure was open and transparent	Already in place	
– offer applicants the right to receive adequate feedback	Already in place	According to the Public Administration Act, the applicant can always require a written explanation of the decision. A non-prioritised, reasoned and written assessment of the applicant's academic qualification is submitted to the Rector. In the event of differences of opinion between the members of the committee, this must be stipulated in the assessment (The Appointment Order).
– offer applicants the right to appeal	Already in place	The applicant has the right to appeal to the institution to where he/she has applied for a job.

Source: Deloitte

EURAXESS Services Network

In 2011, the number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was four in Denmark compared with eight among the Innovation Union reference group and an EU average of 24⁹.

Information about research in Denmark is not available on the EURAXESS portal. Workindenmark.dk is the official website of Denmark for international job seeking and recruitment. The website provides Danish employers and international job seekers, including researchers, with comprehensive information on recruitment in Denmark, residence, tax rules, a welcome package, “know before you go”, education and qualifications, social security and pension rights, as well as links to all relevant national authorities.

Some special pages directed at highly skilled professionals are available at workindenmark.dk¹⁰ while information on openings in publicly funded research jobs is available at job-i-staten.dk¹¹.

In the period from 1 October 2010 to 30 September 2011, 1 536 research jobs (both public and private) were published on Workindenmark.dk. Of the academic jobs published on workindenmark.dk, 25.31% were research jobs. The websites denmark.dk and borgerservice.dk also provide relevant information on social security and pension rights.

5. Education and training

Measures to attract and train people to become researchers

The Danish Universities have been seeking to double their intake of doctoral candidates and in particular the intake of PhDs in the natural, health and technical sciences in accordance with the Progress, Innovation and Cohesion Strategy for Denmark (2006). So far, the Universities have increased the intake of PhD students from 1 445 in 2005 to 2 592 in 2010. Of the total growth (in the period 2006-10), 85% was in the STEM subjects.

The Danish system of higher education aims to provide a flexible educational structure and coherent education path between the bachelor and master’s levels, and the PhD level. In close collaboration with the Ministry of Science, Innovation and Higher Education, Danish higher education institutions offer an academic profession degree (erhvervsakademiuddannelse) and try to increase the number of teachers with a PhD-degree.

The table below summarises practical measures aiming to attract and train people to become researchers.

Table 4: Human Resources – key programmes and initiatives

Measure	Description
Application of Science and Languages (2010 – ongoing)	The Danish Ministry of Children and Education co-funds a number of collaborative project groups with the participation of upper secondary school teachers, researchers and project managers from universities, museums/science centres and/or private and public companies. The groups develop individual projects and exchange knowledge in a joint project. The main objective of the Programme is for all projects to develop and try out new teaching methods for e.g. science and technology subjects. The method should involve real life examples of application of science from research centres and/or companies.
Elite Programmes at the Universities (2007-2014)¹²	Elite Programmes at the Universities was an effort on behalf of the former Government to establish “elite” programmes at master’s level so that Denmark would be in the forefront of the global economy as a leading country with high technology and competitiveness. The Danish elite programme was targeted at particularly motivated and talented students in order to foster graduates able to take on extraordinary challenges in the academic research or leading positions in the professional world. In 2008 and 2009, 34 programmes were approved as elite programmes at the Danish universities.

⁹ See Figure 1 “Key indicators – Denmark”.

¹⁰ Available at: <https://www.workindenmark.dk/Find+information/Til+arbejdstagere.aspx>

¹¹ Available at: <http://www.job-i-staten.dk/Forskning-udvikling-jobs/>

¹² The last series of programmes (2012-2014) will start in the summer of 2012. The programmes will not be prolonged after that period due to, amongst others: a) unsatisfactory participation and interest from students/universities – only ¼ of the money allocated to the programmes was used; b) the supply of elite initiatives at universities is too random: The universities have several elite programmes and initiatives, where only a few of the programmes are funded from the government initiative (and hence approved as “elite” by the government), while several elite programmes and initiatives are funded from the universities’ general resources; c) the new government wants to move away from a few “elite”-programmes and courses for a few university students, and instead focus on a broader “talent”-agenda, where all levels of higher education are included and have more autonomy to decide how they will nurse the talents.

Measure	Description
ISI 2015 Innovation, Science, Integration Programme (2009-2015)	<p>ISI 2015 Innovation, Science, Integration has been designed to meet the challenge of recruiting the necessary engineers and scientific researchers to the Danish industry in order to maintain Denmark's competitiveness. The Programme targets young ethnic minority students, since numbers show that young ethnic minority students are more likely than their Danish peers to choose specific scientific and technical subjects, e.g. engineering. The overall objective of ISI 2015 is especially to improve ethnic minority students' skills in science and to encourage them to choose an upper secondary science programme.</p> <p>Students who started in the sixth form in August 2010 at the five participating schools are the project's primary target group. This group of students will be closely monitored throughout the project, and the evaluation will focus on this group. Additionally, coming generations in the schools reap the benefits of the special effort being made now, since teachers are likely to continue to use knowledge and methods acquired through participation in ISI 2015. This way, several hundred students will benefit from the project. Thirty-seven teachers and five management teams in the participating schools are the secondary target group. They implement the project activities and ensure the sustainability of the project by anchoring the development activities in the school strategy and culture.</p>
NatPLUS (2009-2012)	<p>The NatPLUS project includes four measures for increasing students' interest and achievements in science topics:</p> <ul style="list-style-type: none"> – Extra-curricular activities focused on applied science and technology for students aged 9-11; – Stronger cooperation on science didactics between primary, lower secondary school and upper secondary school; – Development of special activities for talented students in primary and lower secondary schools (carried out by upper secondary schools); – Stronger co-operation with companies. <p>The main goal of NatPLUS is to increase the number of students choosing high-level science courses and to develop concepts that can enable knowledge transfer in order for the project results to help other schools benefit from the project. The total budget is EUR 9 million.</p>
Olympiads and Competitions (ongoing)	<p>Denmark participates in several different international Olympiads and other competitions such as Young Scientists and Young Enterprise. Prior to each competition, there is a national selection procedure and awards. The winners are qualified to international competitions. Training takes place in schools for higher education so that the contestants get acquainted with the University and the world of academic research.</p>
Science Talents Centre (2009 – ongoing)	<p>The Science Talents Initiative targets talented young students in natural science. The vision of the Programme is that all local boards of education will advance talents within natural science, through public awareness and thus, more young people will choose an education within the area of natural science. Science Talents are students (between 12 and 20), who are good at science and technology and with a potential to become the best researchers if their talent is nursed.</p> <p>Especially gifted students are granted the possibility of studying at the Science Centre and stay at the nearby Talent Hostel. Students can develop their talents and interests in science. Several hundred talented students visit the Centre each year and a large group of teachers participate in courses at the Centre.</p>
Students from a non-academic background - Når gymnasiet er en fremmed verden (2010 – ongoing)	<p>The Danish Ministry of Children and Education is co-funding a project to develop teaching in certain chosen subjects to ensure that students from a non-academic background get more out of the tuition and hence contribute to a higher completion rate.</p>
Talent Initiatives (2011 - ongoing)	<p>The Danish Ministry of Children and Education has established a group of teachers and advisers who have developed materials for exemplary teaching in all disciplines in upper secondary schools. The materials, which are developed in cooperation with researchers, will be tested at schools during the school year. The main objective of the Talent Initiatives is to ensure that young students come into contact with universities and research communities earlier in their education and be attracted to take education to a higher level.</p>
The National Centre for Science and Education (NTS Centre) (ongoing)	<p>The National Centre for Science and Education was established by the national Parliament in 2009. The NTS Centre concentrates on the interest and learning of science, technology and health in primary schools, the upper secondary education and technical colleges, as well as the problems of transition in the educational system. The purpose of the NTS Centre is to attract young people to become researchers. The primary target group of the NTS Centre consists of teachers in primary schools, the upper secondary education system and technical colleges who are mainly responsible for the relationship which children and young people build with science, technology and health.</p>

Measure	Description
The Science Centre (2009)	Especially gifted students are granted the possibility of studying at the Science Centre and stay at the nearby Talent Hostel. Students can develop their talents and interests in science and they will be challenged with special scientific experiments.

Source: Deloitte

Doctoral graduates by gender

The table below shows doctoral graduates in Denmark by gender as a ratio of the total cohort population.

Table 5: Doctoral graduates by gender

Indicator	Denmark	EU average
New doctoral graduates (ISCED 6) per 1 000 population aged 25-34 (total) (2009)	1.7	1.5
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2009)	1.5	1.4
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2009)	1.9	1.6

Source: Deloitte

Data: Eurostat

Funding of doctoral candidates

In Denmark, all doctoral candidates are funded as funding is automatic for any student admitted as a doctoral candidate. Currently, there is no data on funding mechanisms, but the Danish Agency for Universities and Internationalisation and Statistics Denmark are working on providing more detailed statistics.

Measures to increase the quality of doctoral training

The Danish PhD Programme (under the Ministerial Order on the PhD Programme at the Universities, 2007) is designed by the Ministry of Science, Innovation and Higher Education to provide young researchers with quality skills in order to contribute to a knowledge-based economy and society in Denmark. The PhD Programme is a research programme aiming at training PhD students at an international level to undertake research, development and teaching assignments in the private and public sectors, for which a broad knowledge of research is required.

All PhD programmes have to be organised within a PhD School. Each university establishes a number of PhD Schools at faculty or University level. The head of each PhD School appoints the PhD supervisor and approves the doctoral students based on the recommendations of the academic representatives on the PhD committee.

The regulation on PhD programmes changed in 2010 in order to improve the possibilities for universities to enter into mutually binding collaboration in research and education with foreign universities.

Skills agenda for researchers

In Denmark, competency development is included in all employee-employer contracts and agreed upon between the two parties. All categories of professor at Danish Universities are employed both to conduct research and teach students. Danish universities offer courses and training to researchers and part-time teaching staff, often through the Centres for Learning or Learning Labs. Courses are either related to teaching and examination of students or to the development of different types of skills, such as entrepreneurship, management of complex projects and making research accessible to students.

According to the Ministerial Order on the PhD Programme at the Universities (2007), doctoral students must gain experience in both teaching and other forms of knowledge dissemination during their PhD programme.

6. Working conditions

Measures to improve researchers' funding opportunities

As part of the Globalisation Strategy Denmark established the matching fund. The Danish Government wanted to secure even closer cooperation between private and public institutions in research. The fund makes it possible to reward universities and research institutions, which succeed in attracting new research funds from companies, foundations and private individuals by granting them a similar public extra allocation. The Danish Government allocated DKK 100 million in 2011-2012 from within the globalisation funds.

Remuneration

In Denmark, wage, salary and employment conditions are traditionally agreed between a labour organisation and an employer's organisation under collective agreements. The Minister of Finance negotiates collective agreements on behalf of public-sector employees, including universities. Researchers are considered public-sector employees and are covered by the Collective Agreement for Academics in the State (2008)¹³. As part of this process, the universities may express their wishes through the Ministry of Science, Innovation and Higher Education.

Under the new remuneration scheme "Ny løn", the collective agreements fix a basic salary. Researchers' remuneration depends on their performance and skill-set. The new remuneration scheme was launched in 1998 after agreement between the labour market parties.

Universities are free to pay permanent supplements or one-off bonuses depending on researchers' qualifications. There is no upper limit to researchers' remuneration.

Researchers' Statute

The Job Structure for Academic Staff at Universities and the Act on Universities (in particular, points 15 and 29) constitute a researcher statute by addressing: wage and employment conditions, pension scheme, maternity/paternity leave, long-term illness, social security coverage, and career prospects.

In addition, the Joint Consultative Committee is a forum for dialogue between the management bodies and the employees on future developments in the workplace, working environment, career development, etc.

'European Charter for Researchers' & 'Code of Conduct for the Recruitment of Researchers'

All Danish universities have signed the 'Charter & Code'. However, the government does not actively promote the implementation of 'Charter & Code' principles.

Autonomy of institutions

Universities are free to decide whether a researcher is employed on a temporary or on a permanent contract. Collective agreements have introduced a new salary system which also allows for differentiation in researchers' salaries.

Career development

The Job Structure for Academic Staff at Universities includes provisions for a coherent researcher career progression. The specific proportion between research and teaching activities for researchers may vary over time.

Shift from core to project-based funding

An increasing number of basic grants was made available in recent years, coupled with an increase in the access to external funds. The universities focus increasingly on career management in connection with external funding. Between 2003-2009, the share of externally-funded researchers increased by 6 percentage points from 17% to 23%. Among the university researchers, 48% are fully or partially externally-funded while 24% of the respondents have an external funding rate of 75-100%. The external funds lead to new management challenges, also in cases where the share of external funding is not significant, but where the ambition is to apply for external funds to an increasing degree. The management challenges include, for example, management of the career options for post-docs and professors with special responsibilities employed on fixed-term contracts.

Among staff funded fully or partially via external funding, 60% are employed on fixed-term contracts. The many fixed-term appointments are due to a combination of job structure, external funding and local handling of appointments vis-à-vis funding. The share of the externally funded staff who are employed longer than the expiry of the grant period varies hugely from university to university. The universities' support for the careers of these researchers in terms of employment conditions and career plans can be strengthened further. The

¹³ Ministry of Finance, (2008), *Cirkulære om overenskomst for Akademikere i staten*. Available at: <http://perst.dk/~media/Circular/2008/061-08-pdf.ashx>

future career of the individual thus depends on external grant donors. This contributes to establishing an overall image of research career paths which are unclear and uncertain for the individual. Within the framework conditions, the universities are facing the task of safeguarding career planning and support for researchers employed on fixed-term contracts and external funding¹⁴.

Social security benefits (sickness, unemployment, old-age)

Social security is not covered by the researchers' statute as they enjoy the same rights as all other employees.

All publicly-funded researchers (including employed PhD students) receive full pay when sick. This is governed by collective agreements. Universities may ask for a refund from municipalities of sums paid.

In Denmark, unemployment insurance is voluntary and researchers are not automatically insured against unemployment. Similarly to all other employees, researchers must be a member of an unemployment fund (known as an "A-kasse") in order to gain access to unemployment insurance. These are private associations that are connected with trade unions and other professional organisations.

According to the Collective Agreement for Academics in the State (2008), a pension contribution of 17.1% of the salary is compulsory, split two thirds/one third between employer and employee.

Publicly funded fellowships, stipends, grants and equivalent may provide old-age benefits depending on the specific collective agreement between the researcher and the employer.

7. Collaboration between academia and industry

The following table summarises key programmes designed to enhance the collaboration between academia and industry, and to foster doctoral training in cooperation with industry.

Table 6: Collaboration between academia and industry

Measure	Description
Clusters - Innovation Network Denmark (ongoing)	The Innovation Network Denmark is a national cluster programme as well as a competence and innovation network supported by the Danish Council for Technology and Innovation under the Ministry of Science, Technology and Innovation. The objective of the Network is to ensure that smaller enterprises participate in network projects, and that the networks help this target group to make use of other innovation policy initiatives e.g. innovation consortia, innovation vouchers, the knowledge-pilot scheme and the Industrial PhD scheme.
Danish Innovation Consortium (IC) Scheme (ongoing)	The IC scheme is a Danish subsidy scheme run by the Danish Council for Technology and Innovation under the Danish Ministry of Science, Innovation and Higher Education. It is a flexible framework for collaboration between enterprises, research institutions and non-profit advisory/knowledge dissemination parties. The aim of the IC scheme is to ensure that new knowledge is converted into competencies and services specifically aimed at enterprises, and that the knowledge acquired is widely spread to the Danish business community including, in particular, SMEs. (Annual budget: approximately EUR 16 million.)
Danish Technological Service System (GTS-net) (ongoing)	The GTS - Advanced Technology Group is a network consisting of nine individual research and technology organisations in Denmark the GTS-Institutes. The dual objective of the system is to disseminate new knowledge and technology to enterprises and public institutions in order to support innovation and development, and to deliver technological know-how to enterprises and public institutions in order to increase the innovation and competitiveness of the Danish industry and society. The network has some 3 700 employees (2010) and a total turnover of EUR 460 million.
Industrial PhD Programme (since 1970)	The Industrial PhD Programme aims to offer doctoral training in cooperation with the industry sector. It is a three-year research project and research training programme with an industrial focus conducted jointly by a private company, an industrial PhD student and a university. Universities and students of all nationalities may be accepted. The student is employed by the company and enrolled at the university. Public organisations and institutions may also apply for approval of an Industrial PhD project in cooperation with a University, as long as the project lives up to the general requirements described in the programme guidelines.

¹⁴ Evaluation Study of the Careers of Danish Researchers (2011). Available at: <http://www.fi.dk/publikationer/2011/evaluering-af-forskerkarriereveje/researchers-career-directions>

Measure	Description
	<p>The company hires the Industrial PhD for the three-year duration of the project as a full-time employee on ordinary terms for salaried employees. Salary is agreed between the student and the company, but must correspond as a minimum to the pay rate of the collective agreement for PhD students employed by the Danish state. The company receives a subsidy to cover roughly half the student's salary, and the enrolling university receives a subsidy to cover tuition fees. The Programme includes a compulsory business course so that students understand the commercial aspects of research and innovation projects.</p> <p>About 5 % of all PhDs educated in Denmark are industrial PhDs.</p>
Industrial Post-doc Programme (pilot scheme) (2011)	<p>Under this initiative by the Danish National Advanced Technology Foundation, new doctoral graduates carry out research with financial and technical support from both a university and a company. The researcher has to spend some time working in the company and some time in the university. Twelve Danish research projects have been initiated by the Danish National Advanced Technology Foundation. The selected project must focus on creating concrete results. This new scheme stimulates the interaction between universities and the private sector, including all size of companies and from all technology areas.</p> <p>It is expected that the new career opportunity at the university will lead to more national and foreign students to apply for a PhD in Denmark. The Danish National Advanced Technology Foundation contribute with DKK 13 million for all 12 research projects, which have a total budget of DKK 25 million. So far, 12 post-docs have benefitted from the Programme.</p>
Innovation Assistant (Knowledge Pilot) scheme (ongoing)	<p>The Knowledge Pilot Scheme is a Danish subsidy scheme granted by the Danish Ministry of Science, Innovation and Higher Education. The scheme aims at increasing knowledge dispersion throughout the economy by subsidising the employment of University graduates in those SMEs which do not typically make use of the resources of these individuals.</p>
Innovation Voucher Scheme (ongoing)	<p>The Innovation Voucher Scheme combines a clear set-up and smooth administration with generating synergies between business experience and academic research. It aims at inspiring SMEs to utilise the opportunities and make use of the potential knowledge of Institutions. The scheme is open to projects in all scientific fields and the administrative structure of the scheme is designed to keep bureaucracy for the project participants to a minimum.</p>

Source: Deloitte

8. Mobility and international attractiveness

In 2007, the percentage of doctoral candidates (ISCED 6) who were citizens of another EU-27 Member State was 7.4% compared with 6% among the Innovation Union reference group and an EU average of 7.3%¹⁵. In the same year, the percentage of non-EU doctoral candidates as a percentage of all doctoral candidates was 14.1% compared with 11% among the Innovation Union reference group and an EU average of 19.4%¹⁶.

Measures aimed at attracting and retaining 'leading' national, EU and third country researchers

In Denmark, the freedom of research, where research by definition is independent of the authorities and businesses, is the major attraction for foreign researchers. The table below summarises key measures aimed at attracting and retaining leading national, EU and third-country researchers to Denmark.

Table 7: Measures to attract and retain 'leading' national, EU and third country researchers

Measure	Description
Getting Settled in Denmark Programme (2011)	<p>Four International Citizen Service centres have been established in Denmark and serve as a one-stop-shop where foreigners can receive guidance and help, e.g. on how to fill out the necessary papers when arriving in Denmark, guidance on how to find a job, accommodation, schools, childcare, where to learn Danish, and on living and working conditions in general. Accompanying family members can also be assisted by the centres to settle and find a job. In addition, Danish companies can also receive guidance on recruiting employees from abroad.</p>
Globalisation Professorships (ends 31.12.2012)	<p>The globalisation professorships scheme enables the Danish Universities to offer 60 international researchers competitive salaries at international levels. The scheme runs until 31 December 2012.</p>
Grants from the Danish Council for Strategic Research (DCSR) and the	<p>Grants from the DCSR and DFF can be used to buy out and attract e.g. a post-doctoral student or leading researchers from the EU or a third country to a research project in Denmark. If a national researcher has been abroad for more than 10 years, he/she has the</p>

¹⁵ See Figure 1 "Key indicators – Denmark".

¹⁶ Ibid.

Measure	Description
Danish Council for Independent Research (DFF) (Ongoing)	right to the special 26% tax rate (See chapter 8 “Mobility and international attractiveness”.
Residence and work permits	Researchers, scientists or lecturers invited to teach or give lectures may do so without a residence or work permit, provided that the stay does not exceed three consecutive months calculated from the day of arrival in Denmark. If the researcher is a citizen of a country with a visa requirement to enter Denmark, he/she must have obtained a visa valid for the entire stay before entering Denmark. If the researcher expects to stay in Denmark for longer than three months, he/she must have a residence and work permit covering the entire period, including the first three months, and must have obtained the permit prior to arriving in Denmark.
Sapere Aude Programme (Ongoing)	The Danish Council for Independent Research (DFF) offers a comprehensive career programme for excellent research, the Sapere Aude programme. The council initiative is directed at providing encouragement for individual and talented researchers to conduct their own research programme independently and to develop international networks. The programme deals with the following career stages: post doctoral (DFF post-doc), associate professor (DFF Starting Grant) and professor (DFF Advanced Grant). Grants are between EUR 270 000 and EUR 1.3 million.
The Positive List	The Positive List is a list of the professions and fields currently experiencing a shortage of qualified professionals. Researchers under a written contract or a job offer in one of these professions enjoy easy access to the Danish labour market. The researchers should also meet the educational requirements and enjoy salary and employment conditions meeting Danish standards.
The Researcher Taxation Scheme (2011 – but similar schemes have existed since 1991)	Researchers and highly paid employees recruited abroad, able to meet a number of conditions, and not having been a Danish tax resident in the previous 10 years, can be employed at a special 26% tax rate for 60 months, but are not allowed any deductions if they enjoy this rate.
UNIK initiative (Start 2009 – 5 year duration)	The overall aim of the UNIK initiative is to promote world-class research at Danish universities. UNIK funding can be awarded for basic as well as applied research and in all thematic areas. Funding is awarded for excellent, dynamic and closely co-ordinated research frameworks involving interrelated research activities or sub-themes in a prospective field of research. Leading researchers are often in charge of the initiatives.

Source: Deloitte

Inward mobility

According to reports on mobility barriers and solutions (2008), on behalf of the National Labour Market Authority, the main obstacles are:

- involvement of many authorities in the processes;
- information from authorities is typically in Danish;
- difficulty in filling in the application forms;
- difficulties in finding accommodation;
- inadequate guidance for foreign workers;
- cultural factors;
- social integration outside the workplace.

Outbound mobility

According to Annex 5a of the Collective Agreement for Academics in the State (2008), doctoral graduates have the right to enroll at a foreign research institution during their whole PhD programme in Denmark. During this stay abroad, they are entitled to receive salary and pension benefits.

Promotion of ‘dual careers’

Four International Citizens Services Centres in Denmark help accompanying family members find a job. Danish companies are also supported by the centres to recruit and guide new employees coming from abroad (see chapter 8 “Mobility and international attractiveness”).

Accompanying spouses who are EEA citizens have the right to study for free at Danish Universities¹⁷, in cases where the husband/wife has exercised their right of free movement (under Directive 2004/38/EC on the right of citizens of the European Union and their family members to move and reside freely within the Union).

Portability of national grants

Most publicly funded innovation grants or fellowships are portable to other EU countries as long as this is also to the benefit of the Danish enterprises. The international dimension is an integral part of all funded research projects. The Danish Council for Independent Research (DFF) has signed the EUROHORCs 'Money follows researchers' Letter of Intent, enabling researchers to transfer part of their research grant from one county to another.

Access to cross-border grants

Grants from the Danish Council for Independent Research (DFF) and the Danish Council for Strategic Research (DCSR) are open to Danish, EU and third-country candidates, provided they fulfil the application criteria. One of the application criteria is the actual and potential significance of the research subject for the growth, development and welfare of Denmark, in the short and long term.

Furthermore, under Danish law (consolidated Act on the Research Advisory System), the Danish Council for Independent Research and the Danish Council for Strategic Research may, in the performance of their task of strengthening the internationalisation of Danish research, participate in international research cooperations, on conditions that this cooperation is to the benefit of the Danish research community.

The Industrial PhD scheme, the Innovation Assistant (Knowledge Pilot) scheme, the Innovation Consortia Scheme, the Innovation Voucher Scheme, the Innovation Network Denmark programme and the GTS-net are also open to non-residents.

Measures encouraging inter-sectoral mobility

The Industrial PhD-scheme (since 1971) and the Industrial post-doc scheme of the Danish National Advanced Technology Foundation (since 2011) aim at encouraging researchers to move from the public to the business sector (see chapter 7 "Collaboration between academia and industry").

¹⁷ There are also other situations where spouses can study free of charge. According to the legislation on subsidies and finance, (according under Ministerial order nr. 1373 of 10 December 2007, with later adjustments, on funding and accounts) foreign students are exempted from paying tuition fees at Danish Universities where:

1. They have residence permits of indefinite duration or temporary residence permit with a view to permanent residence in Denmark;
2. They are studying in Denmark in exchange for a Danish student taking their place at their home University according to an agreement between the Danish University and the University abroad or if the student's stay is arranged by Fulbright, Denmark's International Study Program (DIS) or Rotary Ambassadorial Scholarships;
3. They, in accordance with EU law, the EEA treaty or other international conventions and international agreements signed by Denmark, have the right to equal rights with Danish citizens;
4. They have a residence permit in Denmark under the Alien Act section 9 c as a child of a person who has been granted residence permit in Denmark due to his/her employment in Denmark (Alien Act section 9a); or
5. They are completing part of an Erasmus Mundus Master programme in Denmark and are covered by number 3.