

Researchers' Report 2013

Country Profile: Denmark



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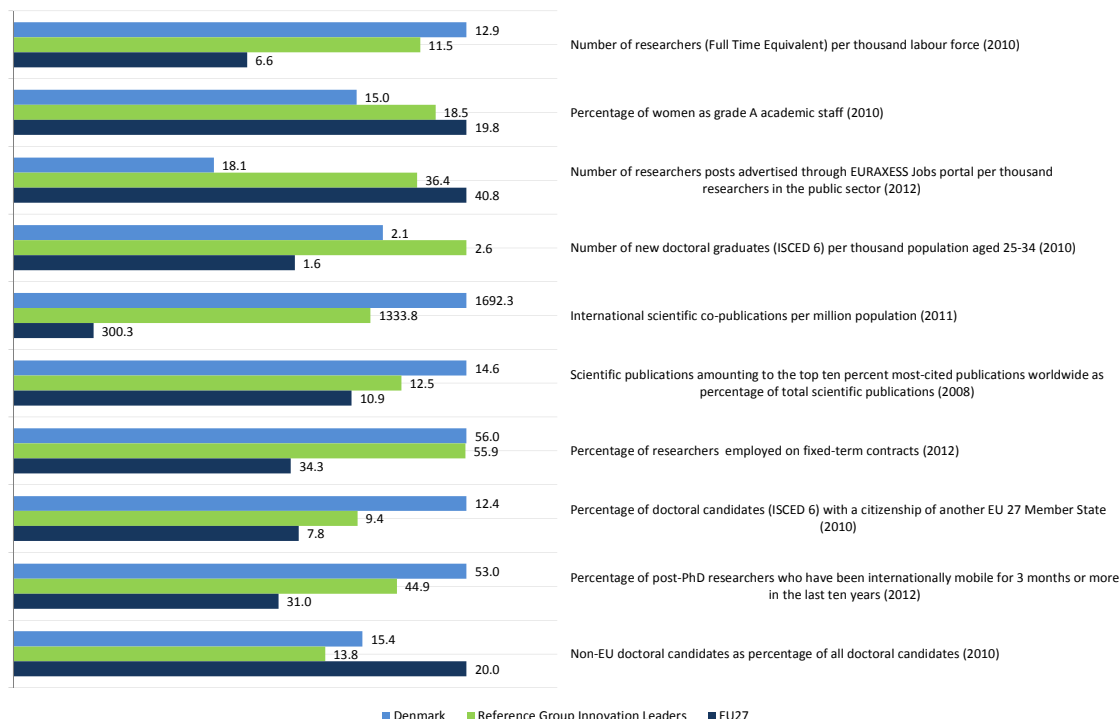
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1. Key data

Key indicators measuring the country's research performance

The figure below presents key indicators measuring Denmark's performance on aspects of an open labour market for researchers against a reference group and the EU-27 average¹.

Figure 1: Key indicators – Denmark



Source: Deloitte

Data: Eurostat, SHE Figures, EURAXESS Jobs Portal, UNESCO OECD Eurostat education survey, Innovation Union Scoreboard 2013, MORE2

Notes: Based on their average innovation performance across 25 indicators, Denmark, Finland, Germany and Sweden show a performance well above that of the EU-27. These countries are the Innovation leaders².

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/Total
Head Count per 1 000 active labour force (2010)	18.72	10.17
Head Count (2010)	54 731	2 435 487
FTE per 1 000 active labour force (2010)	12.86	6.64
Full time equivalent (FTE) (2010)	37 601	1 589 140

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.

¹ The values refer to 2012 or the latest year available

² European Commission (2013), "Innovation Union Scoreboard 2013"

Table 2: National strategies

Measure	Description
Denmark – a nation of solutions Enhanced cooperation and improved frameworks for innovation in enterprises (2012)	On 20 December 2012, the Danish Government launched a national innovation strategy³ to deliver national growth and new jobs. It supports a more goal-oriented approach for creating innovative solutions to global societal challenges and enhanced knowledge-transfer between research institutions and companies. It focuses on three areas: 1) Innovation is to be driven by societal challenges; 2) More knowledge is to be translated to value; and 3) Education is to increase the innovation capacity. The Strategy contains 27 specific initiatives, which includes: - Establish a Startup Graduate scheme: A Startup Graduate scheme will be established in connection with the innovation assistant scheme and the Industrial PhD programme. This scheme will be aimed at graduates who want to start their own company. Those involved will receive advice and financing for up to a year in connection with starting their own company. The initiative will motivate graduates to be innovative and support the establishment of new knowledge-based enterprises; - Strengthen knowledge cooperation and innovation in education through recognition and attractive career paths for researchers and educators. This can be achieved through attractive career paths for and increased recognition of researchers, educators and other employees who support more innovative students, greater knowledge turnover and closer cooperation with industry and the authorities. Frameworks for recognizing employees will ensure that researchers are recognized for a research and innovation effort in the private sector. Job structures and descriptions for all employees should change in dialogue with the institutions and the involvement of external actors; and - Strengthen the innovation and business-oriented competences of PhD students. A greater share of PhD students should be in contact with private enterprises and thereby gain innovation experience during their PhD. More PhD students finding employment in the private sector will also be supported.
More PhDs will strengthen knowledge, growth and welfare (2012)	In 2012, the Danish Government decided to continue the ambitious commitment to doctoral training. Thus the universities can continue the intake of 2 400 PhDs per year. There has been a doubling of the PhD intake between 2003 and 2010. The decision was made following an analysis, that shows that PhD students' high level of education are in demand in both the small Danish companies as the major research-intensive companies. The continued growth in PhD recruitment must take place primarily in the private sector, where a large proportion of the graduates are expected to find employment
Perspective and Action Plan (2012)	The Minister for Gender Equality prepares an annual Perspective and Action Plan. 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 measures which guarantee gender equality for men, such as parental leave.

Source: Deloitte

In addition to the national strategies outlined above, the Act on Universities (2006) 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 orders⁴. Furthermore, the Memorandum on Job Structure for Academic Staff at Universities (2007) describes

³ An English translation of the innovation strategy is available at: <http://fivu.dk/en/publications/2012/denmark-a-nation-of-solutions>

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 programmes (candidates) at Universities (*Uddannelsesbekendtgørelsen* - BEK nr. 338 af 06/05/2004), which describes the overall objectives for the different

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, maternity/paternity leave and freedom of research as well as participation in decision-making processes.

3. Women in the research profession

Measures supporting women researchers in top-level positions

In 2010, the percentage of women grade A academic staff was 15.0% in Denmark compared with 18.5% among the Innovation Union reference group and an EU average of 19.8%⁵.

The Act on Gender Equality (2000/2007) and the Act on Equal Treatment of Men and Women (1978/2006) transpose the EU's gender equality Directives⁶. They include provisions on gender equality and non-discrimination related to all aspects of the labour market, the research profession included.

According to the Law on Equal Treatment of Men and Women, public committees, commissions and 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 universities⁷. 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; and
- 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"⁸ (2009). After the roundtable discussion, the Danish Agency for Universities and Internationalisation noticed an increase in the number of initiatives on equal opportunities at Danish universities.

Every second year, the Ministry for Gender Equality benchmarks initiatives in all public institutions; the universities seem to be in a better position than two years ago. Benchmarking is a biannual exercise prescribed by the Act on Gender Equality and is compulsory for all public institutions, including ministries, regional authorities and municipalities. The latest benchmark was published in 2012.

Measures to ensure a representative gender balance

In December 2012, the Danish Government adopted two new bills to address the issue of gender imbalance on corporate boards. One bill, under the responsibility of the Ministry of Business and Growth, states that the 1 100 largest companies must each set-up realistic and ambitious targets for the underrepresented gender on boards. Furthermore, companies must promote policies to increase the proportion of the underrepresented gender at management level to sustain an acceptable balance and to increase the recruitment base of candidates to company boards. Companies should also give an account in their annual report of the objectives and the progress made in achieving the objective. If the company fails to do so, it is likely to receive a fine.

The other bill, under the responsibility of the Ministry for Gender Equality and Ecclesiastical Affairs, aims to ensure a more equitable distribution of women and men on state enterprise boards. The bill requires all state institutions and companies to set targets for the number of underrepresented gender on their boards and

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 See Figure 1 "Key indicators – Denmark"

⁶ 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

⁷ Copenhagen University, Aarhus University and Southern Denmark University

⁸ Available at: <http://en.fivu.dk/publications/2009/female-research-talents-the-unused-reserve-of-danish-research>

other collective management bodies. Furthermore, government institutions and companies with 50 or more employees must develop policies to increase the underrepresented sex at other management levels.

From 2008 to 2009, the Danish Council for Independent Research had an instrument called “Female Research Leaders”. The instrument targeted women at minimum associate professor level. In 2008, 10 female researchers received DKK 43 million (some EUR 5.8 million) funding and in 2009, 15 female research leaders received DKK 70 million (some EUR 9.4 million). Following this initiative, the Danish Council for Independent Research decided to focus on initiatives aimed at female researchers in the “Sapere Aude Programme” (see table 8).

This programme aims to strengthen talented researchers, to encourage more women to become research leaders and also to qualify Danish researchers for European elite researcher grants. The programme has been running since 2010 and will also continue in 2013. There has not yet been a systematic evaluation of the programme and its impact on women (see also chapter 8 “Mobility and international attractiveness”).

Finally, the universities have their own initiatives to promote female scientists through measures such as mentor programmes, economic incentives and career development programmes.

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 all full-time employed researchers, absence due to maternity leave or leave due to adoption extends the period of employment accordingly. The Collective Agreement on Academics in the State (2008) safeguards pay during the maternity leave.

The research funding organisations do not provide 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 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, the previous restrictions on the number of full professorships was lifted.

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 (2012).

Under this Ministerial Order, positions at professor and associate professor level must be advertised internationally, and an assessment takes place according to local rules at each university. 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 nature⁹.

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.

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.

⁹ These circumstances may occur when the university wishes to engage a foreign researcher for a limited period or if the university wishes to nominate an exceptionally qualified candidate

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	Yes	
– publish job vacancies on relevant Europe-wide online platforms (e.g. EURAXESS)	No	According to Ministerial Order no 242 of 13 March 2012 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	Yes	
– systematically establish selection panels	Yes	The Appointment Order requires the Rector when appointing researchers according to local rules to appoint an assessment committee of 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.)	Yes/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	Yes	
– 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	Yes	
– offer applicants the right to receive adequate feedback	Yes	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	Yes	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 2012, the number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was 18.1 in Denmark compared with 36.4 among the Innovation Union reference group and an EU average of 40.8¹⁰.

Information about research in Denmark is available on the EURAXESS portal www.euraxess.dk. This portal provides information about living and working conditions in Denmark and on the Danish research landscape.

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

¹⁰ See Figure 1 "Key indicators – Denmark"

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.dk¹¹ while information on openings in publicly funded research jobs is available at job-i-staten.dk¹².

In the period from 1 October 2011 to 30 September 2012, 1 067¹³ research jobs (both public and private) were published on jobnet.dk – primarily in Danish though some in English; 2 089 research jobs were published on workindenmark.dk in English. Of the academic jobs published in Danish on jobnet.dk, 18.94% 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 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, Business Academies and University Colleges offer professionally oriented higher education programmes leading to a Business Academy degree (*erhvervsakademiuddannelse*) or a Professional bachelor degree (professionsbachelor). The Danish University Colleges aim to have at least half of the teaching staff with a PhD degree by 2022.

The Danish Universities have doubled their intake of doctoral candidates: between 2003 and 2010, the universities increased the intake of PhD students from approximately 1 200 to approximately 2 600. There has been an increase in all fields, but the higher intake of PhDs has been particularly high in the natural, health and technical sciences in line with the Progress, Innovation and Cohesion Strategy for Denmark (2006). Of the total growth (in the period 2003-10), 85% was in the STEM subjects. A study of the PhD situation was carried out in 2012, which focused on the job market for PhDs, recruitment and retention of international PhD-students and increased use of flexible PhD programmes. The study was one of the bases for a decision to maintain an intake of 2 400 PhDs yearly.

The Ministry of Science, Innovation and Higher Education will secure continuous development of PhD education by following up on this study, particularly with regard to the three areas of science mentioned above. More information can be found later under “Measures to increase the quality of doctoral training – the PhD regulations”.

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, Languages and talent initiatives (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, e.g. for science and technology subjects. The method should involve real life examples of application of science from research centres and/or companies. From 2012, the Programme also includes a number of projects focusing on initiatives for talented students.
Chosen for University/University College (2011-2014)	Talented young people from a non-academic background are granted the possibility of having a mentor at a University or University College. The mentor is a higher education student, who introduces the study and student life to young people from secondary education.
Development of professionally oriented higher	The Danish Government has allocated DKK 320 million (some 42.9 million) annually over the next three years to enhance the quality of professionally oriented higher education. The initiative will be carried out by the Danish business academies and university colleges in cooperation with

¹¹ Available at: <https://www.workindenmark.dk/Find+information/Til+arbejdstagere.aspx>

¹² Available at: <http://www.job-i-staten.dk/Forskning-udvikling-jobs/>

¹³ Compared to 1 536 during 1 October 2010 -30 September 2011

Measure	Description
education (2013-2015) (	universities. It aims to enforce practice-oriented evidence-based research and development within the different professional fields, including through funding of PhD projects.
Elite Programmes at the Universities (2007-2014) ¹⁴	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 targets 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.
ISI 2015 Innovation, Science, Integration Programme (2009-2015)	ISI 2015 Innovation, Science, Integration has been designed to meet the challenge of recruiting the necessary engineers and scientific researchers to 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 to improve ethnic minority students’ skills in science and to encourage them to choose an upper secondary science programme. 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 will 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. In 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.
NatPLUS (2009-2012)	The NatPLUS project includes four measures for increasing students’ interest and achievements in science topics: – 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); and – Stronger co-operation with companies. 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.
Olympiads and Competitions (ongoing)	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 with awards. The winners go forward 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.
PhDs in educational research (2011- 2015)	With the aim of strengthening research within the field of primary and lower secondary education, the Danish Government is funding PhD projects in educational research. The PhD projects are practice-oriented and seek to strengthen the research background of the teaching methods employed in Danish schools. The projects will be carried out in cooperation between the universities and the university colleges that provide teacher education programmes. The Danish Ministry of Science, Innovation and Higher Education has appointed a PhD council to allocate the research funds. The annual budget is DKK 29 million (some EUR 3.9 million).
Science Talents (2009 – ongoing)	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

¹⁴ The last series of programmes (2012-2014) will start in the summer of 2012. The programmes will not be prolonged after that period. The reasons include: a) unsatisfactory participation and interest from students/universities – only one quarter 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 nurture the talents

Measure	Description
	and technology and with a potential to become the best researchers if their talent is nursed. 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.
Students from a non-academic background - Når gymnasiet er en fremmed verden (2010-2013)	The Danish Ministry of Children and Education is co-funding a project ('When secondary school is a foreign world') 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.
Talent initiative (2012-ongoing)	In 2012, the Danish Minister of Science, Innovation and Higher Education launched a debate on how to support and promote talented students in higher education and how to create a broader and more ambitious talent culture in Denmark. Ten concrete proposals were presented: for example how to acknowledge talented students, how all higher education institutions should offer opportunities for such students, suggestions on how to improve talented students' possibilities through more flexibility within the education system and how to nurture talent through flexible PhD programmes. This initiative draws on a broader concept of how talent should be defined. The talented student is not only the excellent academic student, but also the innovative student. There are ongoing efforts to implement the proposals ¹⁵ .
Talent Initiatives (2011 – 2012)	The Danish Ministry of Children and Education established a group of teachers and advisers who developed materials for exemplary teaching in all disciplines in upper secondary schools. The materials, which were developed in cooperation with researchers, were tested at schools during the school year. The main objective of the Talent Initiatives was 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.
The National Centre for Science and Education (NTS Centre) (ongoing)	The National Centre for Science and Education was established by Parliament in 2009. The NTS Centre concentrates on the interest in 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.

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 (2010)	2.1	1.5
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2010)	1.9	1.4
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2010)	2.3	1.6

Source: Deloitte

Data: Eurostat

Funding of doctoral candidates

In Denmark, close to all doctoral candidates are funded and employed by the universities. However, the funding of doctoral candidates is increasingly based on external funding from government or private funds and research councils, and co-funding from private firms. Data on funding is hard to collect, however. The Danish Agency for Universities and Internationalisation is working together with universities to improve data within this area.

¹⁵ More information can be found here: <http://fivu.dk/nyheder/pressemeddelelser/2012/talent-skal-udvikles-paa-alle-uddannelsesniveauer?searchterm=talent> (in Danish)

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 was amended in 2010 in order to improve the possibilities for universities to enter into mutually binding collaboration in research and education with foreign universities. It is expected that the regulation will be amended again in 2013 in order to place emphasis among other things will be on providing the best opportunities for international collaboration in PhD-education.

On 1 September 2012, a publicly available website was launched in English with short presentations of PhD courses offered at all graduate schools in Denmark (<http://phdcourses.dk/>). This website gives PhD students an overview of the total offer of PhD courses in Denmark across universities. On the home page it is possible to search for PhD courses at the different PhD schools, by subject or by geographical area.

In 2011, the Danish universities renewed the agreement of 1994 to create an open market for PhD courses. The agreement allows PhD-students at a Danish university (except one university) the opportunity to take a subject-specific course at another Danish university free of charge.

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, though their teaching obligations can be reduced or suspended for a given period. 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

Remuneration

In Denmark, wage, salary and employment conditions are traditionally agreed between a labour organisation and an employer 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)¹⁶. 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 skillset. 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.

¹⁶ Ministry of Finance, (2011), *Cirkulære om overenskomst for Akademikere i staten*. Available at: <https://www.retsinformation.dk/Forms/R0710.aspx?id=139240>

For further information, see the new country profile on remuneration of researchers from the MORE2 study (forthcoming, on the EURAXESS website).

Researchers' Statute

The Job Structure for Academic Staff at Universities, the Collective Agreement for Academics in the State and the Act on Universities (in particular, points 2, 15 and 29) constitute a researcher statute by addressing wage and employment conditions (for instance pension schemes, maternity/paternity leave and long-term illness) 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' and are to a high degree following its principles, which are perceived as normal practice within Danish research institutions.

Autonomy of institutions

Pursuant to the University Act, universities should focus on research, teaching and knowledge dissemination. This is reflected in the Job Structure for Academic Staff. Thus, the universities have the autonomy to allow for different profiles of academic staff (focus on research, focus on teaching, or another area) with the aim of attracting specific researcher profiles.

Table 6: Types of institutional autonomy

Organisational	Financial	Staffing	Academic
– Selection procedure for the executive head – Selection criteria for the executive head (within a framework) – Dismissal of the executive head – Term of office of the executive head – Selection of external members in governing bodies – Capacity to decide on academic structures – Capacity to create legal entities (some limitations)	– Length and type of public funding – Ability to keep surplus (some limitations) – Ability to borrow money (some limitations) – Ability to own buildings (some limitations)	– Capacity to decide on recruitment procedures (senior academic/senior administrative staff) – Capacity to decide on salaries (some limitation on staff) – Capacity to decide on dismissals – Capacity to decide on promotions	– Capacity to decide on overall student numbers (some limitations) – Capacity to select students (some limitations) – Capacity to introduce programmes (some limitations) – Capacity to terminate programmes – Capacity to choose the language of instruction (some limitations) – Capacity to design content of degree programmes

Source: Ministry of Science, Innovation and Higher Education

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 have been 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 and 2009, the share of externally funded researchers increased by 6 percentage points from 17% to 23%. Among the university researchers, 48% were fully or partially externally funded while 24% had an external funding rate of 75-100%. The external funds lead to new management challenges, including 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, in particular, management of the career options for post-docs.

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 beyond the expiry of the grant period varies from university to university. The universities' support for the careers of these researchers in terms of employment conditions and career plans could be strengthened further. 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 funding¹⁷. Career paths are a theme in the Ministry's supervision of universities in 2012-13¹⁸.

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.

Under 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.

Furthermore, publicly funded grants and equivalent can provide pension, 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 7: Collaboration between academia and industry

Measure	Description
Clusters - Innovation Network Denmark (ongoing)	The Innovation Network Denmark is a national network supported by the Danish Council for Technology and Innovation under the Ministry of Science, Innovation and Higher Education. The objective of the programme is to strengthen public-private interaction, and knowledge-sharing and development between knowledge institutions and companies on research and innovation. Furthermore, the Innovation Networks aim to strengthen innovation and research in Danish companies, and thereby promote knowledge-based growth in business. The Innovation Networks are also intended to contribute to the creation of environments for knowledge development and sharing between companies, research institutions and other relevant stakeholders to strengthen innovation and growth in the areas of professional growth and development potential.
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. The annual budget ranges between DKK 60-100 million (some EUR 8-13 million).
Danish Technological Service System (GTS-net) (ongoing)	The GTS institutes are "approved technological service providers". They are independent not-for-profit organisations, whose purpose is to transfer and disseminate technical know-how, new methods and knowledge to industry and society in order to create and increase development. All services are marketed on a commercial and competitive basis in Denmark and abroad. In general, GTS-net has two main functions:

¹⁷ Evaluation Study of the Careers of Danish Researchers (2011), available at: <http://www.fi.dk/publikationer/2011/evaluering-af-forskerkarriereveje/researchers-career-directions>

¹⁸ For more information, see here: <https://www.retsinformation.dk/Forms/R0710.aspx?id=139240> (available in Danish only)

Measure	Description
	1. Develop and maintain the basic technological infrastructure in Denmark: provide access to basic technological competencies, which enterprises do not have internally and which are not available on a market basis, e.g. standardisation activities, access to equipment, facilities and laboratories, testing, educational courses and other technological services; and 2. Create technological innovation and development within Danish industry: develop and transfer new technological know-how, e.g. new methods, concepts and services in order to stimulate the development of new knowledge-intensive products, services and processes in Danish enterprises and institutions.
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. 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. It inspired the European Parliament to fund the kick-start of the Marie Skłodowska-Curie European Industrial doctorates.
Industrial Post-doc Programme (pilot scheme) (2011)	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 time at the university. The project must focus on creating concrete results. This scheme stimulates the interaction between universities and the private sector, including all sizes of companies and from all technology areas. It is expected that the new career opportunity at the university will lead more national and foreign students to apply for a PhD in Denmark.
Innovation Assistant (ongoing)	The Innovation Assistant Scheme (former Knowledge Pilot Scheme) is a scheme of subsidies 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.
Innovation Voucher Scheme (ongoing)	The Innovation Voucher Scheme combines a clear set-up and smooth administration with initiating 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.

Source: Deloitte

Finally, a publication in 2011 entitled “Business Research, Development and Innovation in Denmark – Policies and Effects”¹⁹ 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 analyses the impact of R&D&I on the Danish private sector.

8. Mobility and international attractiveness

In 2010, the percentage of doctoral candidates (ISCED 6) who were citizens of another EU-27 Member State was 12.4% compared with 9.4% among the Innovation Union reference group and an EU average of 7.8%²⁰. In

¹⁹ http://en.fi.dk/publications/2011/rd-an-innovation-in-denmark/RD%20and%20Innovation%20in%20Denmark_7%20october%202011.pdf

²⁰ See Figure 1 “Key indicators – Denmark”

the same year, the percentage of non-EU doctoral candidates as a percentage of all doctoral candidates was 15.4% compared with 13.8% among the Innovation Union reference group and an EU average of 20.0%²¹.

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

Measure	Description
Circular on exemption from payment of pension contributions for certain temporary employees in the State (2012)	Foreign academic staff recruited abroad and employed on a temporary contract can request that their total pension (both employer contribution and their own contribution) be paid as part of their salary during their employment. This arrangement can only be agreed upon for a period of up to five years (six years if this is agreed between the appointing authority and the organisations mandated to negotiate).
Getting Settled in Denmark Programme (2011)	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. See also http://www.icitizen.dk/
Grants from the Danish Council for Strategic Research (DCSR) and the Danish Council for Independent Research (DFF) (Ongoing)	Grants from the DCSR and DFF can be used to buy out and attract researchers 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 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 <i>Sapere Aude</i> programme. The Council's initiative provides encouragement for individual and talented researchers to conduct their own research programme independently and to develop international networks. The programme covers 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 (ongoing)	The Positive List is a list of the professions and fields currently experiencing a shortage of qualified professionals. Researchers with 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

²¹ Ibid

Inward mobility (funding)

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; and
- Social integration outside the workplace.

Outbound mobility

According to the Ministerial Order on the PhD Programme at the Universities doctoral graduates should participate in research at a foreign research institution during their PhD programme. During this stay abroad, they are entitled to receive salary and pension benefits.

Promotion of 'dual careers'

Four International Citizens Service 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 Universities²², 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 country 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 condition that this cooperation is to the benefit of the Danish research community.

²² 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

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 all open to non-residents.