Section 1

The Danish university system from a bird's-eye view

1. Introduction

By way of introduction, this section presents an overall outline of the Danish university system. The following seven sections offer a more detailed discussion of different aspects of the state control of the Danish universities and their activities.

The Danish university system is characterised by:
- 12 widely different universities in terms of history, size, academic profile and scope.
- In 2000, 18% of a birth cohort enrolled at university and 13% completed a university education.
- In 2001, the Danish universities had nearly 110,000 students.
- Almost 10,000 researchers and teachers were employed.
- The university expenses totalled almost DKK 12bn.
- In addition to the 12 universities Denmark has 16 institutions offering tertiary educations within the sphere of culture (academies of music, drama schools, academies of fine arts, design schools, school of library and information science, etc.) and 55 non-research based institutions offering tertiary educations (23 centres for tertiary education, 11 individual institutions for medium tertiary educations, 16 vocational schools and 15 schools for short tertiary educations).

2. The Danish university system – history, geography and key figures

The 12 Danish research universities differ considerably in size, history and academic profile..[1] In Denmark there are five multi-faculty universities that conduct research and offer bachelor, master (candidatus) and PhD programmes as well as master programmes for adults within natural sciences, the humanities and social sciences etc. The five universities are: the University of Copenhagen founded in 1479, the University of Aarhus founded in 1928, the University of Southern Denmark, Roskilde University and the University of Aalborg, all of which were founded in the 1960s and 1970s. The three last-mentioned universities were founded because the increase in population combined with the general improvement in living standards and educational level led to an increased interest in university educations and demand for university graduates. Located in the four largest cities in Denmark, i.e. Copenhagen, Aarhus, Odense and Aalborg and in Roskilde, the five multi-faculty universities are spread across the country. Many university graduates are employed as teachers in the upper secondary schools, whereas teachers in the primary and secondary schools usually graduate from other institutions.

In addition, Denmark has five single-faculty universities that conduct research and offer educations targeted a few, clearly defined professions within technology, agricultural and veterinary sciences, pedagogics and pharmacy. These universities are: the Technical University of Denmark, the Royal Veterinary and Agricultural University, the Danish University of Education, the Danish University of Pharmaceutical Sciences and the IT University of Copenhagen, which was granted university status by the new University Act. With the exception of the IT University they were all originally founded between 1829 and 1892 and are located in the Copenhagen area.

Finally, the two business schools in Aarhus and Copenhagen both have two faculties in business (economics and business administration) and inlanguages for special purposes. Copenhagen Business School is about 80 years old, whereas the Aarhus School of Business dates back about 60 years. Figure 1.1 gives an overview of the geographic distribution of the institutions of tertiary education.

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[1] According to the new Act, the IT University of Copenhagen became a self-governing institution and hence the 12th university in Denmark, 1 July 2003.

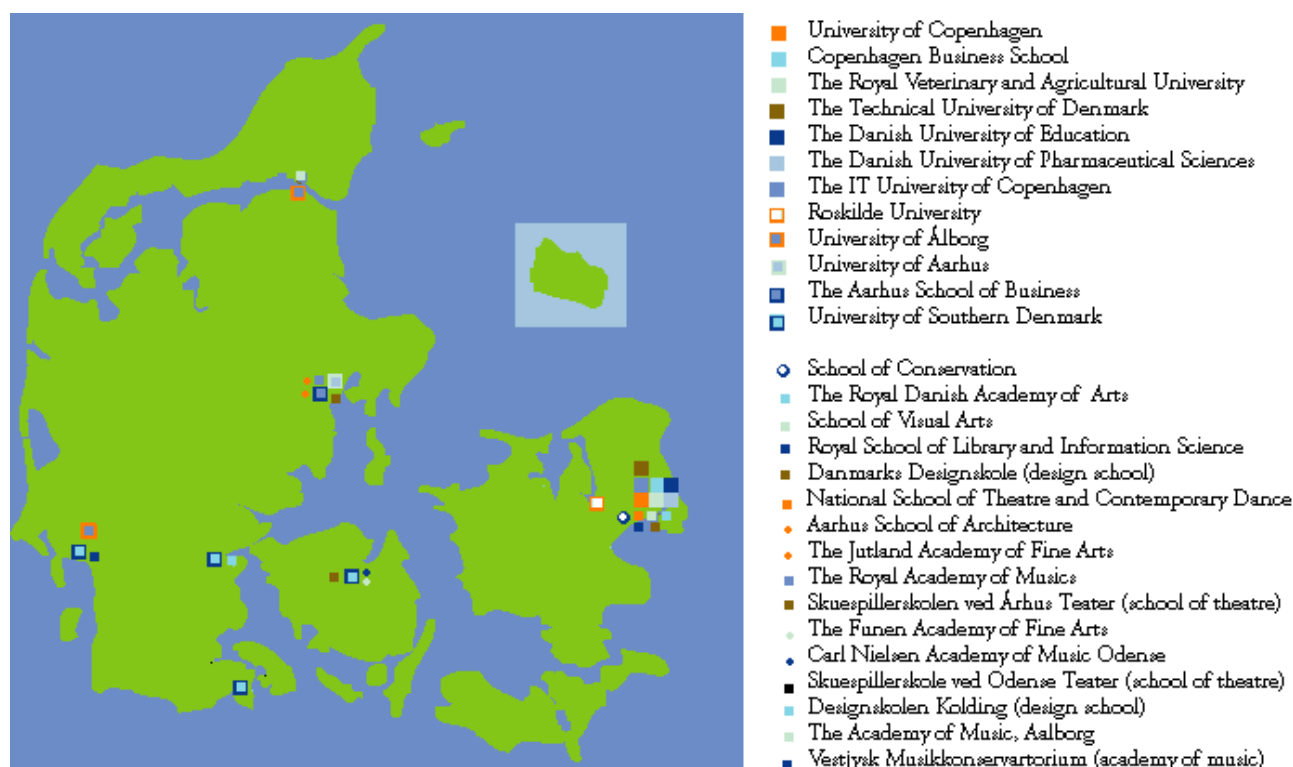*Figure 1.1 Danish higher education institutions*

Table 1.1 shows the difference in size between the universities. The table shows the number of students enrolled at each university, the annual student outcome, total expenditure and scientific staff.

Table 1.1. Key figures showing the universities' educational results and use of resources, 2001.

University	Students[1]	Annual student outcome[2]	Total expenditure, MDKK, 2001 figures	Scientific staff[3]
The University of Copenhagen	28,472	16,371	3,362	2,483
The University of Aarhus	19,436	11,356	2,026	1,776
The University of Southern Denmark	12,657	6,202	1,236	1,073
The University of Aalborg	9,261	6,859	1,169	1,095
Copenhagen School of Business (CBS)	13,445	6,221	623	622
Roskilde University	6,607	3,878	180	515
The Technical University of Denmark	6,224	3,853	1,549	1,318
The Aarhus School of Business (ASB)	6,081	2,529	268	299
The Royal Veterinary and Agricultural University	3,115	1,873	962	715
The Danish University of Pharmaceutical Sciences	1,193	827	214	202
The Danish University of Education				
The IT University of Copenhagen	686	392	84	53
Key figures	**107,179**	**60,361**	**11,672**	**10,150**

1) Source: Statistics Denmark, The figures for the two business schools and for University of Southern Denmark also includes part-time diploma students

2) Source: The universities' 2001 accounts. Exclusive of the Danish University of Education. One annual student outcome means that the number of passed exams equals one year of full-time studies.

3) Scientific staff comprises permanent and part-time employed scientific staff computed in terms of man years. The universities also employ technical and administrative staff.

The universities receive lump-sum grants in the form of direct appropriations provided for in the state budget. In 2001, the lump-sum grants to the universities were divided as follows: education (35%), research (36%), capital expenses (17%) and other expenses (12%).

2.1. The universities in a historical perspective

The University of Copenhagen (in Danish: Københavns Universitet - KU), founded in 1479, is the oldest university in Denmark. Originally, the university was a seminary for catholic priests with papal recognition, but the seminary also had faculties for medicine, law and philosophy. The year after the reformation in Denmark, 1537, the university was restored to focus on the Evangelical Lutheran theology. In 1675 the university introduced the final degrees in theology and in 1736 in law. In 1788 the faculties of medicine and philosophy also introduced final degrees. During the 1830s and the 1840s, the university expanded its buildings. The Faculty of Law has since the early 19th century included economics and other social science disciplines, which has been reflected in changing faculty names. However, since 1993 one faculty has embodied law and another social sciences. In 1850 the Faculty of Mathematics and Science was separated from the Faculty of Philosophy. About a hundred years later, from the early 1960s and onwards the number of students increased rapidly and as the university required considerably more space, several faculties and departments moved from the original campus and are now found at various locations throughout the city.

The University of Aarhus (in Danish: Aarhus Universitet - AU) is the second-oldest multi-faculty university in Denmark. The university's teaching activities began in 1928. Since 1932 the university has been government funded and since 1933 the university has been known as the University of Aarhus. Originally, the university comprised activities within the humanities. In 1933 the Faculty of Medicine saw the light of day, the name was changed to the Faculty of Health Sciences in 1992. In 1936 the Faculty of Economics and Law, later to be named the Faculty of Social Sciences (from 1959), was established. In 1942 the university established the Faculty of Theology and in 1954 the youngest faculty, the Faculty of Science. The university is located in buildings in and around the University Park, which was placed at the disposal of the university initiative in the late 1920s.

The University of Southern Denmark (in Danish: Syddansk Universitet – SDU) is the result of a merger between three institutions in 1998: the University of Odense, Southern Denmark Engineering and Business School and the University Centre of Southern Jutland. The largest of the three institutions, the University of Odense, was founded in 1966. Originally the university featured two faculties of medicine and of the humanities, respectively. Already in the early 1970s, the university cooperated with the business school department in Odense, which became a fully integrated part of the university by 1977. Later social sciences and the humanities were separated in two faculties; first with the Social Science Study Council in 1983 and then from 1989 with a separate Faculty of Social Science. Natural sciences were separated from the Faculty of Medicine already in the beginning of the 1970s. Southern Denmark Engineering and Business School was founded in 1984, while the University Centre of Southern Jutland (SUC) was founded in 1972. Until the merger SUC relied on local government subsidies and grants from foundations, research councils etc. The University of Southern Denmark has campuses in Odense, Sønderborg, Esbjerg and Kolding.

Roskilde University (in Danish: Roskilde Universitetscenter – RUC) was founded 1972 and is based on a multi-disciplinary approach and problem-focused project work. From the start the university has offered educations within the humanities, social sciences and natural sciences, all based on 2-year basic studies programmes in one of the three main areas. The university campus is situated just outside the city of Roskilde.

Aalborg University (in Danish: Aalborg Universitet – AAU) was founded in 1974 as Aalborg University Centre. The new university incorporated the existing tertiary educations offered in Aalborg in the fields of engineering, social work, business economics (a department of the Copenhagen Business School), as well as the education of chartered surveyors from the Royal Veterinary and Agricultural University in Copenhagen. Based on the existing educations as well as on educations established in connection with its founding, the university from the beginning offered a number of educations within technology, natural sciences, humanities and social sciences. Business languages were transferred from the Copenhagen Business School in 1986, and in 1995 Aalborg University

merged with the engineering college in Esbjerg. Aalborg University has always featured a multi-disciplinary approach and problem-based project work.

The Technical University of Denmark (in Danish: Danmarks Tekniske Universitet – DTU) was founded in 1829 by H.C. Ørsted as Den Polytekniske Læreanstalt (the College of Advanced Technology). H.C. Ørsted, who discovered the effect of electromagnetism, was the first principal from 1829 until his death in 1851. From 1933 to 1994 the institution was known as Danmarks Tekniske Højskole (DTH). For the first 130 years of its existence, the institution was located in the city centre of Copenhagen, but from 1962 to 1974 DTU erected new buildings and moved to Lyngby app. 13 km from the city centre. As the name suggests DTU conducts technological research and offers study programmes in engineering.

The Royal Veterinary and Agricultural University (in Danish: Den Kgl. Veterinær- og Landbohøjskole - KVL) was founded in 1856 and has its origin in a veterinary school started in 1773, the second such school established in Europe. KVL offers educations and research within veterinary science, agriculture, forestry and horticulture. Today education and research, both basic and applied, covers the entire supply chain from primary production to consumption. Topics such as food quality and safety, human nutrition and human health are important elements in KVL's profile. Scientific fields also include the molecular basis of plant, animal and food production, environmental science, natural resource economics and landscape management. The main campus in Frederiksberg, Copenhagen covers 14.5 hectares including veterinary clinics, greenhouses, and research laboratories. In addition KVL has an arboretum and 3 research farms within a radius of 20 km from the main campus.

The Danish University of Education (in Danish: Danmarks Pædagogiske Universitet – DPU) was founded in 2000 as the result of a merger between three institutions offering educational training and a library: Danmarks Lærerhøjskole, Danmarks Pædagogiske Institut, Danmarks Pædagoghøjskole and Danmarks Pædagogiske Bibliotek. Danmarks Lærerhøjskole was founded in 1856 to provide supplementary education to primary and secondary school teachers. In 1963 this institution was awarded the status of a tertiary educational institution with research. Danmarks Pædagogiske Institut was founded in 1954, while Danmarks Pædagoghøjskole was founded in 1997.

The Danish University of Pharmaceutical Sciences (in Danish: Danmarks Farmaceutiske Universitet – DFU) was founded in 1892. The university is dedicated to research and training within pharmacy and pharmaceutical sciences and to an increasing degree with a focus on pharmaceutical and biotech industry.

Copenhagen Business School (in Danish: Handelshøjskolen i København – HHK), founded in 1917, is dedicated to research and training within business (economics and business administration) and languages for special purposes.

Aarhus School of Business (in Danish: Handelshøjskolen i Århus – HHÅ), founded in 1939 is dedicated to research and training within business (economics and business administration) and languages for special purposes.

IT University of Copenhagen was established in 1999 and obtained status as university in July 2003. ITU is dedicated to teaching and research within information technology (IT) and the opportunities it offers. It is funded to undertake both theoretical research and applied research into the interaction and growing importance of information technology to society.

Danish university Nobel Prize winners

Jens Christian Skou, winner of the 1997 Nobel Prize in Chemistry
Niels K. Jerne, winner of the 1984 Nobel Prize in Medicine
Aage Bohr, winner of the 1975 Nobel Prize in Physics
Ben Mottelson, winner of the 1975 Nobel Prize in Physics
Henrik Carl Peter Dam, winner of the 1943 Nobel Prize in Medicine
Johannes Andreas Grib Fibiger, winner of the 1926 Nobel Prize in Medicine
Niels Bohr, winner of the 1922 Nobel Prize in Physics
Schack August Steenberger Krogh, winner of the 1920 Nobel Prize in Medicine
Niels Ryberg Finsen, winner of the 1903 Nobel Prize in Medicine

2.2. Demographic aspects

The primary reason why three new universities were founded in 1966, 1972 and 1974 was the rapidly increasing number of young people who, having completed a full secondary education, were qualified for admission to university combined with a wish to stimulate regional development outside the Aarhus and Copenhagen area.

There are two reasons for the large increase in the number of students admitted to the universities until 1980; 1) the demographic evolution: The large number of children born shortly after World War II completed upper secondary school and enrolled at the universities in the 1960s and 1970s; and 2) an increasing interest in taking a university education. As late as 1960 less than 4% of a cohort enrolled at university. When the general admission restrictions were introduced in 1977, this percentage had risen to about 10%. From 1977 the number of admissions declined a little so that the percentage of a cohort enrolling at university was about 8% by the late 1980s.

During the past 20 years, the number of young people per cohort has cecreased from app. 75,000 to less than 55,000, but the share of young people being admitted to university has risen to about 18%. This means that the proportion of young people enrolling at the universities has almost doubled. After 2000, the declining number of young people per cohort seems to become evident in the form of stagnation in the enrolment figures.

Table 1.2 shows the development in the number of first-time enrolled students and awarded Master's degrees. The increase was particularly pronounced after 1960. It is worth noting that the number of first-time enrolled students and Master's degrees actually fell immediately following the war.

Table 1.2 Number of first-time enrolled students and master degrees awarded for educational institutions, November 1829 to January 2000.

	Universities		The Polytechnic/ Danmarks Tekniske Højskole/ Technical University of Denmark	
Year	First-time enrolled students	No. of awarded master degrees	First-time enrolled students	No. of awarded master degrees
1829-39	179	102	10	,
1869-79	163	124	35	,
1906-07	482	240	142	78
1926-27	1,212	375	153	143
1947-48	1,744	668	330	275
1956-57	1,443	620	405	286
1966-67	5,348	942	528	329
1976-77	6,860	3,490	678	456
1986-87	8,819	4,155	1,652	810
1994-95	11,920	6,140	698	686
2000-01	14,328	5,917	849	526

3. Other tertiary educational institutions

Following the formation of a new government in November 2001, the universities were transferred from the Ministry of Education to the newly set up Ministry of Science, Technology and Innovation (STI-Ministry). During the 1990s the universities have changed several times from one jurisdiction to the other. The central idea behind establishing the Ministry of Science, Technology and Innovation is to develop close ties between universities, research institutions and the innovation taking place in the business sector and society, and to develop better and more efficient means of knowledge transfer to society, including the business sector in order to promote the fostering of a more knowledge based growth in Denmark.

In addition to the universities under the Ministry of Science, Technology and Innovation, there are also institutions of tertiary education under the Ministry of Culture and the Ministry of Education.

3.1. The jurisdiction of the Ministry of Culture

In addition to the universities there are 20 educational institutions providing tertiary education under the jurisdiction of the Ministry of Culture. The Ministry of Culture is responsible for the tertiary educations at the academies of music, architecture, and visual arts, and at the schools of design, conservation , film, drama and dance, as well as the education offered by the Royal School of Library and Information Science. These institutions are state-run or self-governing educational institutions offering educations usually lasting between four and six years.

The objective of these schools is to educate musicians, architects, designers, filmmakers, actors, librarians etc. until the highest level and to develop artistic talent and conduct research within these fields.. The educational institutions under the Ministry of Culture are also obliged to disseminate knowledge of the work methods and results within their disciplines to the wider public.

The largest educational institutions are the schools of architecture, the Royal School of Library and Information Science and the design schools where 2/3 of the students are enrolled. About ¼ of the students are enrolled in the six academies of music, and the remaining students are enrolled in various educations within film, drama, fine arts, handicrafts etc.

Contrary to most other tertiary educations, many of the potential students for the educations under the Ministry of Culture have to pass a test documenting their artistic talents prior to admission.

By tradition a far higher number of students apply than the annual admission figures allow. In 2002, 1,355 out of app. 8,300 applicants were admitted to the educations under the Ministry of Culture.

The educations under the Ministry of Culture had about 6,100 active students in 2002.

As part of a 4-year (2003-2006) political agreement on the educations under the Ministry of Culture, the number of students that can be admitted to these educations will be reduced by 100 students a year from 2003.

The intention of this agreement is to adjust the number of students admitted to the employment prospects and to the declining number of young people per cohort; and thus provide the finances to launch a series of new initiatives related to the educations under the Ministry of Culture i.a.: Implementation of the principles of the Bologna declaration, strengthening design research, increased cooperation and task sharing between the institutions, improved level of computer skills, increased focus on the employment prospects of the cultural professions, and improved continuing education.

This agreement results in classic performance contracts between the Ministry of Culture and the educational institutions.

3.2. Jurisdiction of the Ministry of Education

There are also institutions providing tertiary education under the jurisdiction of the Ministry of Education that in contrast to the universities offer short and medium tertiary educations. Both the short and medium educations and their institutional structures were reformed in the second half of the 1990s. Since 1 July 2001, 23 centres for tertiary education were set up through the merger of primarily educational institutions offering medium tertiary educations. These centres offer professional bachelor degrees within technology, commerce, information technology, pedagogics, social sciences and health sciences. The centres are to act as regional application-focused knowledge centres supported by the research agreements with the universities. They conduct innovative activities in relation to the private and the public sectors, and are to provide a close, flexible and regional link between the basic and continuing educations to

strengthen the regional development of competencies. The centres for tertiary education dedicated to engineering in particular have been active in creating innovative and entrepreneurial environments.

The Business Academies are regional co-operations between the vocational schools responsible for short tertiary educations and educations for adults within technology, commerce and information technology. A total of 16 regional business academies have been set up to handle knowledge and development functions in relation to local and regional businesses. The centres for tertiary education and the business academies within technology, commerce and information technology typically focus on a wide range of business sectors, including medium technological businesses, with whom they also cooperate.

In 2000, approximately 22,000 students were enrolled in short tertiary educations and approximately 75,000 students in medium tertiary educations.

4. The Danish system for tertiary educations

Figure 1.2 The Danish educational system
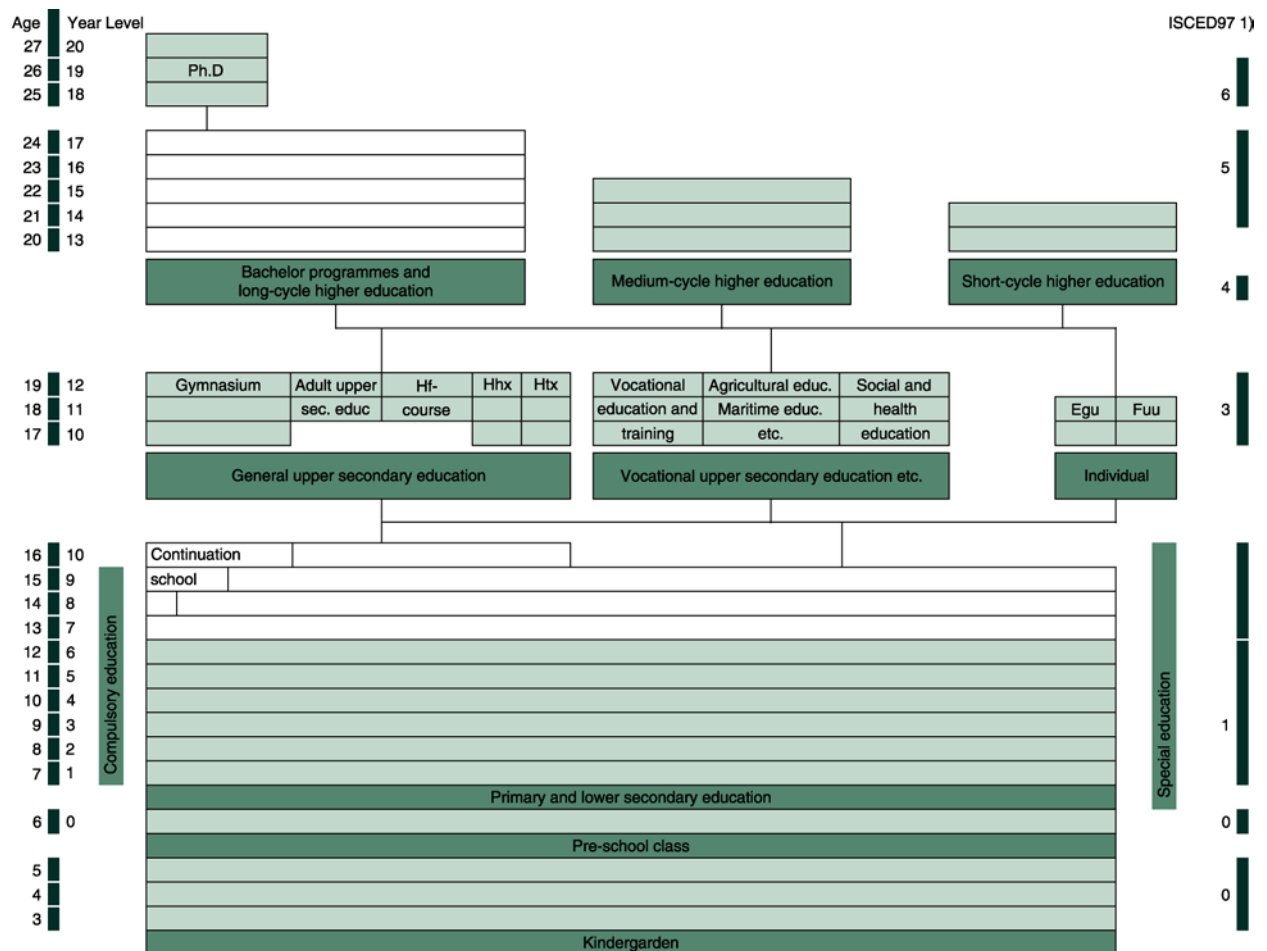
Today, the Danish tertiary educational system, see fig 1.2, has several strings and is highly differentiated comprising:

- *short tertiary educations,* which primarily arose as specialised degrees supplementing the professional youth educations so that the majority of these educations continue to target the private sector. Characteristic of the short tertiary educations is that they are development-based.

- *medium tertiary educations*, which primarily target professions found in the public sector where they arose. Characteristic of the medium tertiary educations is that they are profession and development-based and research-related.
- *long tertiary (university) educations*, which not only target specific job functions but also both the public and the private sectors. Characteristic of the long tertiary educations is that they are research-based.

The government's aim is to ensure a geographic balance in the development of the tertiary educations offered in order to link the Danish policies of research and education to the policies of innovation, commerce and employment.

Over the next few years, strong, self-governing short and medium tertiary educations of a high quality are to be established. The educations will have a high degree of practical relevance and be targeted the private sector and professional jobs. Recent legislation provides for stronger, more comprehensive legal units offering short and medium tertiary educations. In concrete terms, a number of short tertiary educations are gathered in business academies, which typically are the result of a merger between one or more business colleges and/or technical colleges. Likewise, a number of medium tertiary educations are gathered in centres of tertiary education.

With its improved academic standards and greater powers to improve the quality of the educations, this strengthened institutional framework for short and medium tertiary educations is to

- ensure an academically coherent development of the basic and continuing educations within closely linked educational areas, a development that will also open new approaches to the relevant business and professional environments.
- ensure the continued development of strong educational environments as knowledge centres in relation to regional business communities and public activities.
- ensure the continued existence of powerful educational environments outside the university sphere that can collaborate with the universities while at the same ensuring the continued development of educations with a high degree of practical relevance and targeted the private sector and professional jobs.

The universities shall contribute to enhancing the quality of non-university educations, i.e. the short and medium tertiary educations. Consequently, regarding research-related activities, the centres of tertiary education will enjoy close relations with one or more relevant universities supporting the continuous improvement in quality and academic standards of the medium tertiary educations. The educations offered by the business academies are to be based on research developments arising from collaboration between local and regional businesses and knowledge institutions such as approved technological service institutes[2], Technological Information Centres (TIC)[3], other business academies, the centres of tertiary education and the universities.

As can be understood from the educational profiles outlined above, the Danish system for tertiary educations relies on ensuring coherence between the educations offered and the competencies required. The short tertiary educations are a unique Danish phenomenon because this type of educational programme is not available in the educational systems to which Denmark usually compares itself. Sharing these educational aspects contributes to supporting the coherence, flexibility, adaptability and competitiveness of the Danish labour market; e.g. because public and private enterprises have access to a multifaceted Danish educational system with wide ranging levels of competence and types of education.

It is imperative that the sharing of these efforts are refined and that a balanced collaboration between the universities, the centres of tertiary education and the business academies is extended with a bias towards institutional and educational key competencies. On an equal footing with strategic alliances inside and

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[2] In Danish: Godkendte Teknologiske Serviceinstitutter (GTS)

[3] In Danish: Teknologisk Informations Center (TIC)

outside the tertiary educational system, *research-related* and *development-based* will become the key words.

5. The structure of the background report

The purpose of the background report is to provide a detailed outline of the Danish university system and how it relates with the other tertiary educations, public governance structures between state and universities, and the activities of the universities:

- **Section 2** discusses the governance structures between state and universities based on the University Act, the Financial Act and other key legislation and ministerial orders in relation to staffing and educational programmes. It provides an outline of the general rules of governance to be expounded by the following sections.
- **Section 3** discusses the state funding of the universities.
- **Section 4** discusses the research funding provided by the state through the system of research councils.
- **Section 5**discusses the Danish knowledge system.
- **Section 6** discusses the educational activities performed by the universities.
- **Section 7** discusses quality control of education and research.
- **Section 8** discusses the universities' interaction with society.