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# **Land Surveyors without Borders - Double Degrees for Neighbours at a Common Market**

**Klas Ernald Borges (Sweden) and Esben Munk Sørensen (Denmark)**

**Key words:** Education, double degree, Denmark, Sweden, Øresund

## **SUMMARY**

The university programmes are basically nationally based, developed from the historical needs of specific need of a society. The Bologna process is challenging the educational market mainly at post-graduate level. The exchange of students is still limited to a reduced number of curious and ambitious persons, many with a high interest for cultural exchange – the ‘exotic dimension’. Individual careers based on double exams will always attract the excellent students, but still tiny elite of persons. The EU objective of international mobility at the labour market is restricted to those with a low cost assessment of the individual mobility at the international market. Most of us identify ourselves to our national labour market as life time dedication. Our personal and professional life might be enriched by international experience, but still directed towards our national perspective of labour market.

The corporate world has long ago abandoned the national perspective. The survival of companies is basically based on an international market. Marketing demands a solid understanding of the national characteristics of the cultural and economic behaviour of every individual society, country and people. Good and detailed market surveys are critical.

The universities provide professionals with a national perspective, based on the characteristics of the national labour market. Traditions of land law profiles in surveying programmes demand nationally based programmes. Lund University (Sweden) and Aalborg University Centre (Denmark) has embarked upon a double degree concept. The ‘exotic’ dimension is not prevailing – such students might choose other exchange programs. We try to approach the educational market to the business market. We want to provide the business market with professionals that are prepared for the existing common market of land developments. Companies understand the potential of neighbouring markets, while the public authorities still act with a strong national perspective. We want to provide the market with professionals without any doubts in working without borders. The double degree Sweden-Denmark identifies the core subjects for the land surveyors without limits of the border.

# 1. Background

## 1.1. *The double degree agreement*

A joint degree agreement was signed in December 2005 for MSc in Land Surveying and Management for students at Aalborg University (AAU) and Lund University (LTH – Faculty of Engineering). The agreement was preceded by collaboration between the two universities on pedagogical development and exchange of specialised courses.

The objective with double degree programme is to provide an opportunity for the Swedish and Danish students to broaden their MSc degree to formal and practical qualification to the two labour markets. It is also assumed that the two universities could complement each other in marketing and enrolment of new students, as well as developing complementing course curricula. The students will study courses at the “host” university in order to qualify at the labour market in both countries. This will demand more focus on basic courses in the legal and cadastral system of the other country.

The first students will start in autumn 2007, and graduating as double MSc engineers in 2009. We still don't know the forthcoming enrolment. It is likely to be a small group of 2-4 students at each university. It might become more popular, depending on the academic profiles and job opportunities.

## 1.2. *The Nordic countries and the Øresund region*

The Nordic countries have a relatively small population, of about 25 million people, headed by Sweden with 9 millions and Denmark, Norway and Finland with 5-6 million each. The area of Sweden (450,000 km<sup>2</sup>) is divided into 3.2 million properties, while Denmark has 43,000 km<sup>2</sup> (excluding the Faroe Islands and Greenland). The average of population per parcel is similar in the two countries.

The number of land surveyors is about 2,500 in Sweden and ??? in Denmark. The governmental cadastral authority is the main provider to the cadastral system in Sweden, while Denmark has a private system of chartered surveyors. This means that about ???% of the Danish land surveyors in the cadastral area are private entrepreneurs, or employed in private companies, while the cadastral authority is the dominant employer within the Swedish cadastral area.

There are other areas for Swedish and Danish land surveyors, e g, as officials at local government offices (municipalities), companies in charge of infrastructure, land development and construction companies, as well as in facility management and real estate economists.

The Øresund region is constituted by Copenhagen and other urban areas on the island Sjælland, with a population of about 2 million people; and Skåne with the main cities by the west coast, totalling a population of about 1 million people.

The link between the two areas was enforced by the completion of the Øresund Bridge in the year 2000. The integration has increased since then, and the commuting people have become more common. The bridge (constituted by a bridge, artificial island and a tunnel) is 16 km, linked at the Southern part of the main cities Copenhagen and Malmö. Commuting by train takes 35 minutes from one city centre to the other city centre. Continuing to Lund takes 15 minutes. There has been a considerable increase in Danish people moving to Malmö. An estimate indicates that about 4,700 Danish people will move to Skåne in 2006, most of them to Malmö, Lund and surrounding urban centres. There is also a considerable increase of Swedish people employed in the Copenhagen region. The Øresund region is becoming a more unified metropolitan centre.

There are some differences in salaries and housing costs between the two countries, being Sweden the less costly and with a lower salary level. This difference is also evident in the context of the public land surveyors in Sweden and private surveyors in Denmark. In a macro economic perspective, such differences have to equalize, as the threshold costs of commuting become lower.

The language barrier is also a reality. However, the difference is similar to the case Spanish-Portuguese, and with a stated interest, it does not create a major obstacle for ambitious persons.

Property developers and construction companies have long ago been involved in commercial activities in both countries in the Øresund region. There is an evident need of professionals with working knowledge in the two different national systems. The twinning idea of the land surveying educational systems is viewed as a way to contribute in the economic integration process, and to facilitate for these individuals, as well as for companies and public authorities to continue and increase the integration.

## **2. A Swedish Perspective of the agreement on Double Degree**

### ***2.1. The MSc programme at Lund University***

MSc programmes in Land Surveying and Management in the Nordic countries have an emphasis on legal, economic and engineering issues. The legal and economic areas are to some extent specific in each country. A rough description indicates that about 50 % of the course curriculum is within engineering, while the other half is divided between real estate law and economics.

The MSc programme in Land Surveying and Management at Lund University started in 1992, at the Faculty of Engineering - LTH. Previously, the Royal Institute of Technology (KTH) in Stockholm had the only MSc programme in land surveying, with an enrolment of 100 students yearly. It started in 1932, initially and during the first 30 years exclusively for the demand at the National Land Survey of Sweden, with offices in all regions of Sweden. The enrolment increased successively during the 1960-1990's from about 20 to about 100 students, but the key specialisations (excluding some diverging specialisations and the drop-out during the study period) produced only an average of 40-50 graduated land surveyors every year.

The expansion of universities and university colleges in the 1980-1990's from the 5-6 main university cities to 20-30 regional cities had an impact on the enrolment area. The previous national geographical base for enrolment of new students was by and large reduced to a regional base. After completing the MSc degree, many students remained in the region, i.e., the KTH land surveyors stayed in the Stockholm region, while Southern, Western and Northern Sweden faced a decreasing interest for the graduated KTH surveyors. The well-known Lund University assumed the responsibility to start a new MSc engineering programme in land surveying and management in 1992 (at LTH). A BSc programme in surveying was also started in 1996 in Trollhättan, 100 km North of Gothenburg, in Western Sweden. The two programmes started with a yearly enrolment of 30 students, but have increase to 60 and 45 students respectively today. Structural changes at KTH have decreased the enrolment to 30-40 land surveying students, being part of the MSc programme of Civil Engineering and Urban Management. The demand at the labour market is increasing, with an estimation of about 200 MSc land surveyors every year. The actual graduation does not even reach half of this demand.

The Land surveying and management programme at Lund University was the 7<sup>th</sup> engineering programme at the Faculty of Engineering (LTH). It started in 1961 with the classical engineering programmes in Physical, Electronical, Mechanical, Civil and Chemical Engineering. The expansion to more areas started in the 1980's (Computer Science), but the proliferation to more programmes was accentuated in the late 1990's, partly as a marketing policy towards the youngsters, but also due to the demand at the labour market. Today, there are 14 MSc engineering programmes.

The MSc programme in land surveying and management had no core scientific base at the Faculty of engineering in 1992, but at least some common interests with the programme of civil engineering, e g, in construction management, traffic and urban planning, and environmental issues. It developed in good collaboration with professionals in the region, as lecturers and associate professors. The programme was further developed in 2000 by appointment of a professor. Some senior lecturers and PhD students have been employed since then. A special scientific area is well developed by the GIS-centre, which provides a good educational competence.

The curriculum of the programme developed according to the prevailing and increasing resources. In 2001, the curriculum was changed to a more project focussed structure, with a scientific theme (in bold letters) for each of the first six semesters, as shown in Figure 1. The surveying programme at Aalborg

University was used as model, even though it was not possible to change the examination exclusively to the project work, as used in the Aalborg model. The thematic focus during the first three years creates a basis for the entire area in land surveying and management. It could easily be turned to a BSc programme, but it has not been required as being part of an integral MSc programme.

10 <sup>th</sup> semester	Thesis		
9 <sup>th</sup> semester	Additional specialised courses from 2007 (Bologna model)		
8 <sup>th</sup> semester	Real Estate Law & Planning	Real Estate Economics	Geomatics
7 <sup>th</sup> semester			
6 <sup>th</sup> semester	Real Estate Planning		
5 <sup>th</sup> semester	Real Estate Economics		
4 <sup>th</sup> semester	Cadastral Development		Math and Programming
3 <sup>rd</sup> semester	Geomatics		Math. Statistics
2 <sup>nd</sup> semester	Land and Environment		Mathematics
1 <sup>st</sup> semester	Basis: Mathematics and Real Estate Law		

Figure 1: MSc curriculum at Lund University (thematic semesters in **bold** letters)

The compulsory first three years cover all areas that a land surveyor could face in his/her professional career. It is limited to a general understanding, but broad enough to make the students aware on the different areas of knowledge that could be required in professional practise. A typical Swedish land surveyor is involved in surveying, but also working with the legal cadastral process, economic assessments of property values, and the urban planning process. A few students have a deep interest in geomatics, and we offer them an early specialisation in GIS, geodesy, statistics and databases from the third year of studies. However, the ‘mainstream’ students continue with the typical courses on real estate economics and spatial planning & cadastral procedures during the 3<sup>rd</sup> year of studies.

The first three years are the common base, with the typical Nordic emphasis on legal, economic and technical areas. The economic focus is more accentuated in Sweden than Denmark, due to the historical development of the professional practise of chartered surveyors. In our marketing towards youngsters, we highlight the three axes – law, economy and technology. It is proven to be attractive for the youngsters in their choice of university programme.

Specialisations in the 4<sup>th</sup> and 5<sup>th</sup> year are available in real estate law and urban planning, real estate economy and management, and geomatics (mainly GIS). The Bologna process has implied a change in the Swedish system from 2007, by conforminmg the MSc structure to a five years study programme, i.e., 300 ECTS (European Credit Transfer System). The current students were admitted to the MSc programme of 240 ECTS (i.e. 4.5 years), but there will be an additional option for them graduate as a 300 ECTS land surveyor. The basic BSc level (180 ECTS) is only considered as a partial phase of the MSc engineering programme. The specialisation covers the remaining 120 ECTS at advanced level, above the BSc level, including the thesis work of 30 ECTS.

The different specialisations in the 4<sup>th</sup> year are well prepared for the MSc advanced level, as defined in the Bologna process. The educational structure offers a general basis at the BSc basic level, and the specialisation during the 4<sup>th</sup> and 5<sup>th</sup> years. It is logic for the students to create their professional profile through the specialisation. The formal requirement in the new Bologna system for a Swedish MSc in engineering will be courses at advanced (MSc) level totalling at least 45 ECTS, and optional courses in specialised or general engineering subjects, as well as the thesis work.

The agreement of double exam offers an additional specialisation, in order to open the Danish labour market to the Swedish students. The labour market demands a good knowledge in basic characteristics of the Danish legal and cadastral systems. The differences between the two markets have to be part of the educational profile of the students. It means that a Swedish 'BSc-level' student lacks some areas of the Danish profile, and vice verse. We have identified these shortages, and we use approximately one of the two years (60 of 120 ECTS) to introduce the Swedish student into the Danish characteristics (and vice verse). We can shortly define the areas as real estate law for both kind of students, and more emphasis on geomatics for Swedish students in Denmark, while Danish students have to study real estate economics.

This means that we are able to use the academic capacity at each university to complement the profile for the students. We consider that we need a year to equalize the knowledge to the national characteristics of the other country. Half of the remaining year consists of specialised courses at the host university (Denmark for Swedish students), and the other half the thesis work. In this way we satisfy the formal requirement that 1.5 years of courses (90 ECTS) have to be studied at the host university, in order to get a degree from that university. The master thesis could be done in any of the two countries, or comparing some aspects between the two countries. It has to be examined at both universities.

The model is somewhat similar to exchange programmes for Swedish or Danish students studying elsewhere in Europe or other part of the world, e.g. the European TIME (Top Industrial Managers of Europe) network for double engineering degree. However, the normal exchange student stays one or two semesters at the host university, transferring the courses to the MSc degree at the home university. In many cases there is a considerable part of exotic, cultural and language training, and less as a specialisation in a specific professional area. It is still highly attractive for the students, as a part of their personal development as 'world citizens'.

The main idea of other double degree programmes, e g TIME, is to qualify the students to an international market, enabling them to work in another national context as the home country. Many of these students find their career in an internationally based environment, e g, transnational companies and international organisations. The AAU – LU double degree programme has its labour market specifically in the two countries, even though some might continue in international business.

## **2.2.    *The reasons of a double neighbouring degree***

There are various reasons to develop a double degree programme for Swedish and Danish land surveyors.

The student perspective could embrace both adventure and professional diversification. The youngsters of today are interested in working abroad. A survey of attitudes of Swedish youngsters indicates that about two thirds would like to work a couple of years abroad, and half of them (i.e. one third of the youngsters) would like to emigrate, leaving Sweden forever. Even though such attitudes might change as they become adult and start to face more realities in life, it still illustrates the strong internationalisation in the mind of young people. There is no general dissatisfaction on the standard of living in Sweden, but the curiosity to discover and live in other cultures is strong.

A double degree in Sweden and Denmark does not offer an exotic dimension, but the idea of broadening the professional profile is likely to be attractive. Some Swedish students might be more interested in the Danish labour market, while others might be interested at a general level of an extended academic profile. A courageous student shows his ambitions to face new challenges. It qualifies him/her in the competition at the labour market.

## **3. A Danish perspective on the Agreement on Double Degree**

### **3.1.    *Background***

Through the last part modern history – a little more than 100 years – there has only been one institution able to graduate surveyors on academic level. In modern terms it means to Master Level.

Up to 1974 the education programme for chartered surveyors was placed on the Agricultural University in the Capital Copenhagen. There was a long period where about 30 surveyors were graduated yearly from this university. It was enough to create and maintain a national profession of chartered surveyors organized in private companies. This profession exists on the basis of a close partnership between a governmental organisation for maintaining and developing the National Agency for Cadastre. In the historic part of the capital Copenhagen the Cadastral Administration up to now has been based on municipal administration.

In 1974 the education of chartered surveyors moved to a new University in Aalborg. It was located in an economically weak region as a part of a regional developing programme. On the basis of an overall concept of problem based learning the university has developed a strong position in graduating Bachelors, Masters and PhD. As a full range university it is based on three faculties within social science, humanistic science and the last and biggest faculty for nature and engineering science. The



university in Aalborg has today 14000 students and more than 1200 scientific faculty employees and total 2000 employees.

There is graduated about 30 chartered surveyors from Aalborg University yearly. The programme curriculum is presented in figure 2.

10 <sup>th</sup> semester	Thesis		
9 <sup>th</sup> semester	Practical project (at AAU, at a company or abroad)		
8 <sup>th</sup> semester	Land Management	Spatial Information Management	Measurement Science
7 <sup>th</sup> semester			
6 <sup>th</sup> semester	Control Surveys		
5 <sup>th</sup> semester	Land Surveying & Cadastral Management		
4 <sup>th</sup> semester	Large scale mapping		
3 <sup>rd</sup> semester	Spatial planning and land use management		
2 <sup>nd</sup> semester	Environmental Management and Geodata		
1 <sup>st</sup> semester	Basis: Mathematics and geographical information		

Figure 2: MSc curriculum at Aalborg University

### **3.2. The University in Aalborg in periphery region**

Aalborg University is located in Northern Jutland, which is a quite long distance from the capital Copenhagen. 400 km a 5 hours drive is quite a long distance from the capital. The region was industrially in 1974 based on agriculture plus related industries and traditionally industries like shipyards, cement production, and iron industries.

Today the economy is still more based on globally working companies with production based knowledge for and from the information technology related industry. The university has played a role in this industrial development and changing process transforming the region to be competitive on the global market within a long range of industrial areas.

Students at Aalborg University are mostly recruited from the regions in Jutland and mostly from the Region of Northern Jutland. Of course students are recruited from other parts of the country, but the main stream of students in general is born and grown up in the region of northern Jutland.

It is also the situation at the university programme for Chartered Surveyors. Compared to other educational programmes at the university, the School for Surveying and Planning has a small number of students totally – about 150 on Chartered Surveyors programme. But the pattern is the same like the rest of the university. There is only and relatively few students coming from the capital area and the regions around Copenhagen.

Remembering the fact that there is only one institution in Denmark the long term effect is becoming more and more visible. In the region of Northern Jutland many well educated chartered surveyors are getting their first job in the region. They get very often their first job in municipalities, in the county counties of Jutland and in the regional private industry outside the surveying community. The effect is that a big number of chartered surveying graduates develop the carrier in the regions of Jutland, establish their families and stay there for a long period of their life.

Of course some ore many chartered surveyors have left he region where they have been graduated. They have left in periods where the have been a low number of available jobs and carriers in the regions of Jutland and to really attractive and well paid job in the surveying industry and governmental bodies in the capital.

The last 30 years have developed to a situation today with an overrepresentation of chartered surveyors in the peripheral parts Denmark, which is Northern Jutland and the neighbour regions. On the other side there is a under representation of surveyors in he capital region and regions around Copenhagen.

### **3.3. *The Labour Market for Surveyors in Denmark***

This unequal access to new and well graduated surveyors has created a problem for public bodies and the surveying industry and companies. It is still more complicated and difficult to attract young graduated chartered surveyors in the Capital Region around Copenhagen. This situation has developed rapidly through the last 15-20 years.

In the last three years the building industry have had a high activity in property development and raising buildings for housing and industry. This have lead to a necessary high activity within the cadastral part of the surveying industry, where subdivisions of new parcels and registration of condominiums have raised to level not seen since the middle of the 60'ties. Especially in the growth regions around the capital of Denmark there have been a dramatically increase in the number of subdivisions and property making in general.

Totally this have lead to an actually high demand for cadastral surveyors everywhere in Denmark and in the growth region around the capital it is nearly impossible to engage young both graduates and experienced surveyors in the private sector. In the different municipalities and governmental bodies the situation is similar and it is nearly impossible to engage a chartered surveyor.

The lesson learned is that more chartered surveyors is needed and there the partnership with the Swedish Lund University is interesting to supply the Danish labour market with chartered surveyors graduated from Sweden, but prepared to work in Denmark and able to be legally accepted as Chartered Surveyors in Denmark.

To be legally accepted as a chartered surveyor in Denmark with license to do cadastral work needs a Danish graduation as Chartered Surveyor from Aalborg University and three years approved practical experience in doing professional cadastral surveying and management.

### **3.4. *The partnership about the Double Degree***

Lund University in Sweden is located only 1 hour drive from Copenhagen and the trafficable infrastructure between Lund and the capital of Denmark is optimal. From LTH is graduated about 30-40 chartered surveyors every year and it is assumed that some of these will be interested in working “on the Danish side” after graduation.

The agreement discussed above between Aalborg University and Lund University creates the opportunity for this development. If a Swedish surveying student is following specific courses to a specified level and 90 ECTS she/he can receive a degree as a Danish Chartered Surveyor and after this the labour market is open to work for a Danish license to practise as a chartered surveyor.

It is expected that this opportunity will be of use by at least some students and this will lead to careers for professional chartered surveyors.

### **3.5. *Integration of a Research Centre/Copenhagen in Aalborg University***

The Danish Government decided at October the 5<sup>th</sup>, 2006 to integrate the Danish Building Research Institute into Aalborg University. The Institute is located in the Capital Copenhagen and it is decided to develop this campus with a cadastral surveying 5 year education programme including both bachelor and master level.

This decision is taken as a part of an overall Governmental policy in Denmark to integrate Governmental Research Institutes – without educational programmes – into universities with educational programmes. The policy is to develop research fellows to be active in training students too, so the universities also can benefit from results and methods in done governmental research in their educational programmes.

## **4. A chartered surveyor for two nations in the same growth region.**

The agreement on Double Degree and the decision to start up a cadastral surveying programme in Copenhagen will lead to quite new possibilities for cross national cooperation between Aalborg University and Lund University.

It is the vision and the policy that the location of the new educational programme in Copenhagen has to effect in more students at the cadastral surveying programme. So there will also be a bigger number of Danish students which might be interested in following parts of the Swedish Surveying Programme in Lund and receive the Double Degree.

On the other side of the boarder it is expected that more Swedish students will follow 90 ECTS in Denmark and receive the Double Degree, because they can travel from Lund to Denmark only by using local trains. They only need to travel one hour to travel to Aalborg University in Copenhagen.

The detailed programming on further cooperation in the light of this agreement on Double Degree is starting at this Congress in Munich. Steps will be taken to work on marketing, staff exchange and developing web-sites for informing the students about these new opportunities.

The vision is to develop an educational programme for a “cross-national” chartered surveyors dedicated to work on both sides of the national borders in the growth region around Øresund.

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## BIOGRAPHICAL NOTES

**Klas Ernald Borges** is Senior Lecturer in Real Estate Science at Lund University. He is also Director of Studies of the MSc engineering programme in Land Surveying and Management. He was awarded Ph.D. in Real Estate Planning in 1996 with a thesis on land development processes in Portugal. He has extended experience of development projects, as consultant in the area of land development, cadastre and urban planning. His long-term working experience covers Cape Verde, Mozambique, Guinea-Bissau, Portugal and Denmark, and short-term consultancies in several developing and Eastern European countries. He has published more than 30 papers and research reports, 7 consultancy reports.

He has also published other articles and papers for a general public. He is member of the board of the Swedish Association of Chartered Surveyors.

**Esben Munk Sørensen** (b. 1955) is professor in Land Management and Geoinformation at Aalborg University. He is also Director of Research and Management at the Division for Geomatics at Department of Development and Planning. The Division have a staff of 5 full professors, 15 senior lectures and 5 PhD student and laboratories in Surveying, Photogrammetry, and Geoinformation and Mediatechnology. The division train students at the School for Surveying and Planning and The Programme for Civil Engineering in Planning and Environment. He got his Phd. in Rural Development and Spatial Planning focusing on multifunctional land consolidation in 1988. He was nominated as full research professor in 1998 at Danish Research Institute for Forest and Landscape. From 2003 he was appointed as professor at Aalborg University. He has published books, scientific articles and conference papers widely about Geoinformation (GIS), land management, land consolidation and spatial planning in the countryside. He is vicepresident of Danish Association of Chartered Surveyors.

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