

# **Public – private collaboration model in the cadastral workflow in Denmark**

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## **Key words:**

Cadastre, digital cadastre, e-Governance, history, land management

## **SUMMARY**

The structure of the Danish cadastral system is in many ways peculiar when compared to other cadastral systems in the world. The first thing you might notice is that there has been a separation in the registering of information regarding private property – the separation, which is due to historical reasons, is resulting in a register under the Danish Geodata Agency containing information about the physical location and a register in the Land Registration Court containing information about the rights and restrictions of private property.

Another characteristic of the Danish cadastral system, which this paper will focus on, is that there is a fairly clear division of the tasks in cadastral processes, a division that puts some work/responsibility in the private sector and some in the public sector. In practice, the division (that is established by law) means that the practical work is carried out by the private sector while the registration is performed by the public sector. This paper will reveal that the division has both strengths and weaknesses related to efficiency, economy and quality.

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## **1. Introduction**

Property formation in Denmark is far ahead in terms of development; new technology is used to the vast majority of workflow steps - both in data collection and in the registering of data. The same can be said regarding the exchange of information where digital processes have been introduced to ensure, that the processes is not unduly delayed. This development has taken place over the last decades in many areas of public management in Denmark and not only in the context of property formation. But when diving into the property formation, there is a subject that can lead to attention. Namely the fact, that workflow around property formation is strictly divided between the private and public sectors. The division between the two sectors means that the practical work regarding property formation (e.g. measuring and marking the boundaries of the involved properties) is carried out in the private sector while the administrative registering is handled in the public sector.

In the following chapter, the paper will give a description of the division. It will furthermore tell that the registering of information about property is divided within the public sector, leading to one public register with information about the property and one public register containing information about rights and restrictions.

A division of responsibility in the processes of property formation will inevitably lead to arguments claiming that the processes can be optimized to ensure a smoother workflow while it can be argued that the division can have its advantages. The 3rd chapter will relate to pros and cons for this way of establishing workflows around the property formation. The chapter will include an example of the challenges that may lie in the further development. The example will discuss some of the experiences gained in the project which, with other projects in the last decade, have streamlined the property formation through digitization.

The paper is to a great extent an expression of the author's own opinions acquired through personal experience and through conversations with employees on "both sides" of the parties involved - the private and the public sector. The paper should not be regarded as a political statement.

In the writing process I have had a desire to document the existence of a financial incentive for the actual division of responsibilities in the property formation in Denmark, but before the end of the writing process it has not been possible to obtain the necessary empirical data to support a conclusion on this. The financial incentives are expected described at a later occasion.

## 2. Dividing responsibilities

”Property formation” is the term for the practical and legal activities which are necessary to establish a new property or to change the boundaries between existing properties.<sup>1</sup> The regulations regarding this are to be found in the Subdivision Act<sup>2</sup> where it is stated that new property can be established by subdivision or entry in the Cadastre, and the boundaries of a property can be changed through subdivision, entry in the Cadastre, transfer of part of property, amalgamation, or rectification of boundaries. All of it requires the assistance of a licensed surveyor in a private practice and the cadastral authority, The Danish Geodata agency.

There have been licensed surveyors in Denmark the last few hundred years. The first surveyors were from the Danish military who understand mapping. Later, in 1858, an actual education was created at the Veterinary and Agricultural University in Copenhagen (now the Faculty of Science under the University of Copenhagen). In the early 70s the education was moved to the University of Aalborg, where is situated at present time.

At first surveyors were engaged to survey agricultural land to determine the quality. The aim was to raise tax revenues and therefore surveying and registering of land was needed. This need created the cadastral register – which now is managed by the Danish Geodata Agency.

Later the surveyors have had several significant roles, e.g. the implementation of major agricultural reforms in the 1780s and the following decades and the modernization of Denmark in the 19<sup>th</sup> and 20<sup>th</sup> century.

### 2.1 The licensed surveyor

There are approximately 65 practicing surveying companies in Denmark. Within these companies there are about 200 owners and 150 employed surveyors.

Licensed surveyors in private practice have an exclusive right to carry out cadastral work<sup>3</sup> which includes marking boundaries and preparation of the documents necessary for registration in the Cadastre, including procurement of the necessary authorisations pursuant to other legislation. The licensed surveyor carries out cadastral work in accordance with the regulations in the Statutory Order on cadastral work<sup>4</sup> and the associated guidelines. The licensed surveyor marks and measures new boundaries, and existing boundaries, when required, and involves the owner and neighbours where necessary. After this the licensed surveyor prepares a measurement sheet and other measurement documents, a changes map which shows the changes in the cadastral map, and a schematic report on the desired cadastral changes. Along with these documents, there can be other documentation needed, depending on the actual case.

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<sup>1</sup> Bo von Eyben et al: Fast ejendom, 2003, page 18 (Danish)

<sup>2</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=143896> (Danish)

<sup>3</sup> According to the Land Surveyor Act, <https://www.retsinformation.dk/Forms/R0710.aspx?id=146610&exp=1> (Danish)

<sup>4</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=160466> (Danish)

Before commencing field work, the licensed surveyor will have considered and possibly carried out preliminary hearings with the relevant authorities if there is doubt as to whether the desired changes can be carried out according to the relevant rules. Pursuant to the Statutory Order on control of subdivision<sup>5</sup> and the associated guidelines, the licensed surveyor must submit all matters regarding subdivision, entry in the Cadastre, transfers of part of property, amalgamation and changes in the registration of private roads on the cadastral map to the municipal council. The licensed surveyor must also issue a statement on whether there is an application to implement cadastral changes or changes in land use which are in conflict with the provisions of several acts, and if so enclose authorisations from the relevant authorities. After this, the licensed land surveyor sends the case to the Danish Geodata Agency so that the desired cadastral changes can be registered in the Cadastre.

This indicates that the licensed surveyor is performing all of the work needed before an actual registering of property formation can be done. The above mentioned is a very minimal description, as there can be many differences in the work depending on the nature of the requested service asked for (by a property owner). The essential is that the licensed surveyor has the responsibility of all of the fieldwork and to produce needed preliminary documentation before any registration. This documentation can include authorisation from the municipal council and other public authorities.



Picture 1: Private licensed surveyor in the field

## 2.2 The cadastral authorities

The Danish Geodata Agency Act<sup>6</sup> requires the Danish Geodata Agency to take charge of the cadastral and licensed surveyor service in accordance with the relevant legislation. The acts mentioned are under the auspices of the Minister for the Environment. The cadastral service is regulated by subdivision legislation. The cadastral authority must manage and maintain the Cadastre as a register of all properties and as a map reference with associated measurement documentation for property boundaries. The Cadastre register contains information about cadastral identifications, area sizes, journal numbers etc. for cadastral changes related to the

<sup>5</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=133348> (Danish)

<sup>6</sup> <https://www.retsinformation.dk/Forms/R0710.aspx?id=146562> (Danish)

individual cadastral number which together comprises a cadastral property, and information about whether the area is subject to agricultural use obligations, protected forests or protected beaches etc. The cadastral authority makes entries in the Cadastre and ensures that the cadastral change or the intended land use as informed will not lead to conflicts with the provisions of the Subdivision Act or other legislation.

The Danish Geodata Agency receives about between 6-8.000 cadastral cases a year<sup>7</sup>. If there are errors or omissions in the cases, the agency sends the cases back to the licensed surveyor for correction. When the case is as it should be, the agency approves the registration in the Cadastre and notifies the licensed surveyor and other authorities of the registration.

The Danish Geodata Agency is using an up-to-date cadastral updating and quality system (miniMAKS), which was implemented in 2008. The goal with miniMAKS was to ensure increased efficiency and improved standardised digital interplay, partly through use of MIA data (more on MIA in the following chapter), and partly by developing a general method to register and maintain items. miniMAKS has the cadastral register and cadastral map in a common database so that the register and the map are updated simultaneously. Electronic filing of the digital cadastral cases has been introduced in miniMAKS.



Danish Ministry of the Environment  
Danish Geodata Agency

Registration Categories	Early- Bird By 6/15/11	Advance Registration By 8/2/11	On-Site Registration 8/3/11 - 8/24/11
ASCECOPRI Member (Includes Members of Cooperating Organizations)	\$595	\$685	\$750
Speaker	\$595	\$685	\$750
Moderator	\$595	\$685	\$750
Non-Member	\$695	\$785	\$850
Student/Fell	\$50	\$75	\$200
Daily Registration Member	\$325	\$425	\$485
Daily Registration Non-Member	\$425	\$525	\$585
Daily Registration Speaker	\$325	\$425	\$485
Daily Registration Moderator	\$325	\$425	\$485
Short Course August 18-21 - Coastal Modeling (2 1/2 days)	\$345	\$385	\$425
Short Course: Sunday, August 21 - Regional Sediment Management (1/2 day)	\$125	\$150	\$175
Short Course: Sunday, August 21 - Sustainability (1/2 day)	\$125	\$150	\$175
Short Course: Sunday, August 21 - Coastal Structures (1/2 day)	\$125	\$150	\$175
Technical Tour: Scripps Institution of Oceanography Wednesday, August 24	\$30	\$30	\$40
Additional Ticket: Sunday, August 21 - Ice Breaker Reception	\$60	\$60	\$70
Additional Ticket: Monday, August 22 - Awards Luncheon	\$55	\$55	\$65
Additional Ticket: Tuesday, August 23 - Deli Lunch in Exhibit Hall	\$55	\$55	\$65
Additional Ticket: Tuesday, August 23 - Closing Reception	\$60	\$60	\$70

Picture 2: The Danish Geodata Agency is responsible for the cadastral register

### 2.2.1 Division within the public sector

Several countries have the registering of information of property in the same register – both records concerning the property itself and the rights and restrictions that may exist on the property. This is not the case in the Danish version of a cadastre. It is so constituted that information concerning properties physical characteristics, as mentioned above, is registered at the Danish Geodata Agency while legal information as ownership, rights, easement provisions and the like are registered in the Land Register. There is thus no direct interconnection of all information regarding property in one register. The division is historically conditioned, and therefore not indicative of a recent development in the field of registering the details of property. There has sometimes been informal consideration of a merger, but the responsibility is deeply rooted in the individual institutions, which means that a total merger of the information on property hasn't been completed. In this context it should be mentioned, that in 2015 (estimated) there will be a transfer of certain records, for example

<sup>7</sup> The number changes with the fluctuations of the market.

regarding condominiums, which now can be found in the Land Registry, to the cadastre. This is not a complete fusion of the two registers concerning real estate.

In a cadastral case a licensed surveyor have to deal with both registers – before and after implementation of a cadastral case.

The Danish land register is, like the cadastre, fully digital. This means, that the exchange of information between the licensed surveyor and the Land Registry (and between the Land Registry and the Danish Geodata Agency) is fully digital.

### **3. Pros and cons**

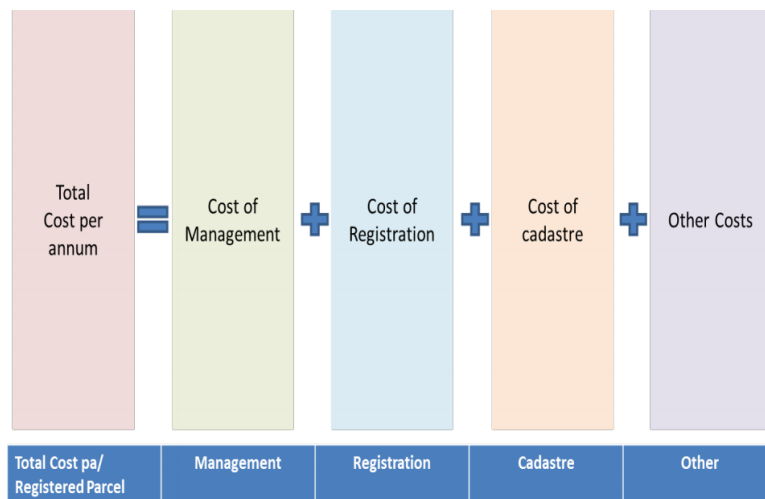
It is not an easy task to identify pros and cons in relation to the division of responsibilities between the public and private sector regarding cadastral work, when you do not observe the division from a political angle. However, it is obvious that the pros and cons should be found in, for example, economy, quality and the possibility for further development in the property formation processes. These three subjects are chosen for a further discussion in this paper. It should also be taken into consideration, if the question is directed at an already existing system (and make a decision tool for changing it) or towards a decision on how to establishment is a new solution of cadastral work.

At the same time it should be taken into consideration, that the work performed in the cadastral processes aren't static processes. More and more tasks in both the private and public sector is depending on a modern and secure access to information about property. For that reason there is a demand for constant development to secure needed information. The division of responsibilities is highly influencing the possibilities to perform the right level of development.

#### **3.1 Economy**

Previously there was a perception that the private sector had a higher level of efficiency in almost any kind of problem solution. It may well have been the fact in the past where there has been less attention to the cost-efficiency. But there is no doubt that the past several years of economic crisis has meant, that the cost-efficiency in the public sector has become more and more important. Most government budgets have come under particularly high pressure with budget cuts to follow. In the writing process of this paper, documentation has not been available to support whether a non-division of responsibilities, or the opposite, is resulting in a more cost-effective solution for conducting cadastral work.

It is my belief that the public sectors efficiency, compared to the private sector, do not differ in Denmark. When trying to give the label "pro" or "con" regarding a division of responsibilities between the public and private sectors, then I will have no hesitation in saying that the element of economy suggests that the division of responsibilities, in Denmark, should be unchanged. In this it is included that it would be extremely costly to change the existing construction.



Simplified Model to Consider Annual Cost of LAS

Picture 3: Model to consider annual cost of a land administration system<sup>8</sup>

A simple model for the composition of costs associated with cadastral work is shown in the figure above. It doesn't take the fact, that practical work in the field (or other work before the actual registration) must be performed – and these costs must in this case be put under “other costs”. It may, in this context, be necessary to create a differentiated model which in details sketches the costs in the individual workflows in the cadastral process. In different countries it can give rise to different levels of costs in the sub-processes depending on the context it must be carried out in. There will, in other words, be a need for analyzes that specifically relate to a specific context regarding to some of the other subjects mentioned above.

### 3.2 Demand for quality

An important element in cadastral work is the quality of information that can be achieved. The quality has a direct effect on the possible use of the information. In Denmark, information about private property is used in several processes in public management. Examples include the public value assessment of property (for taxation purposes), the determination of ratio of built area on a parcel, used as the basis for registration of mortgages (in the Land Register) and the like. This means that there are very strict requirements to the quality of information on property.

In Denmark there is a widespread perception that the information in the cadastre is of a very high quality. This means that application and use of the information in many contexts seems quite natural. The quality is on one hand achieved by using modern technology (it is e.g. possible to achieve high accuracy in measuring) and the registering of information undergoes a strict automatic quality control to ensure a high standard in the content of the cadastral cases.

At the same time there is also a high quality in the formal work behind the recorded information; cases have the necessary documentation, necessary authorizations and the map material has been prepared with the right amount of information. This is partly due to the fact

<sup>8</sup> Slide from WPLA workshop, Copenhagen, Denmark, 22 – 23 May 2014, Mr. CheeHai Teo, President of FIG Jakob Højgaard-Geraae 7/11

Public – private collaboration model in the cadastral workflow in Denmark (7244)

Picture 4: The Danish cadastre upholds a very high quality partly due to the seperated workprocesses



that there are qualified employees in both the private and public sectors. As mentioned above, the licensed surveyors prepare the cadastral cases digitally and submit the cadastral changes digitally to the Danish Geodata Agency. Upon receipt of the cadastral cases the agency initiates a strict control procedure to ensure that the received material has the right, high standard.



But the high quality is also due to the fact that the responsibility is divided as indicated. This division guarantees that there is a continuous control by two independent parties – one who is performing the practical work and one who performs the quality controls. This ensures that there always are more eyes on the same set of information.

These last remarks indicate that a division of responsibilities are a benefit in the cadastral process – or in any process, for that matter. But it is not given, that the division should be between the private and public sector. It just has to be done between to different institutions.

### 3.3 Ongoing development

A key element to assess when identifying the advantage/disadvantage of the division of responsibility in the cadastral processes is whether it is contributing to an ongoing development of processes in the cadastral work. Due to the wide use of cadastral data (in Denmark) there are an increasing number of demands and requests for tailored cadastral information. There is also an ongoing development on the technological front that leads to a constant change of need - and it puts pressure on the both the private and public sector to ensure the needed development.

In the 1990s the development of the application MIA (cadastral information and updating system) took place. The application was developed in cooperation between the cadastral authority, the surveyors and the organization for the municipal authorities in Denmark (Local Government, Denmark). This construction allowed that the interests of all parties were taken into account in the development.

Experiences from this development has shown that interests from the Danish Geodata Agency, the municipalities and the surveyors was different - and even among the branch of surveyors there where different interests regarding this new application. For that reason it was a big task to land the right solution that was satisfactory to the parties involved. Nevertheless, there was a common belief that the development would strengthen the cadastral work, and it could ensure uniformity in the material prepared in the cadastral cases.

This is one example from the cooperation between the public sector and the licensed surveyors in Denmark. Other examples could be described – and most of them would look the same. Maybe there are differences, but at the end these very differences makes a good basis for development covering wishes from both sides.





#### **4. Conclusion**

There are undoubtedly several opinions about whether it is a good idea to divide responsibility in a workflow between several parties. In the above, there appears to be some advantages to divide responsibility in the workflow surrounding the property formation - perhaps not economic but more in terms of ensuring quality and ongoing development.

The world has long been under financial pressure, at this means that everywhere, including in the public sector, cuts have been made and efficiency has become vital. This means that the efficiency of the private and public sector in recent years is not far from each other. There does not seem to be special financial incentives for one solution for the cadastral processes over the other.

The situation is perhaps a little different regarding quality and the possibility for development. In this situation different stakeholders in the work can inspire each other to push the quality and development in a positive direction. This has been the case in Denmark, where there now is now a fully digital process for cadastral work – and still with a very high quality in the datapool.

This does not mean that the solution, where both the private and the public sector are taking part in the tasks, necessarily is the best. But it is the author's opinion that a division of responsibility between two independent units makes a good basis for high quality results in cadastral work and a fantastic basis for further development.

## REFERENCES

Danish Geodata Agency et al, 2006, *Property formation in the Nordic countries* available at <http://eng.gst.dk/media/gst/65040/PropertyformationintheNordiccountries.pdf>

## BIOGRAPHICAL NOTES

**Mr. Jakob Højgaard-Geraae** holds a position as project manager in the Danish Geodata Agency. Højgaard-Geraae graduated with a MSc in Surveying, Planning and Development in 2002 from Aalborg University. Højgaard-Geraae afterwards worked 6 years in the private sector, in private surveying companies and in a larger consultancy company. The past 6 years Højgaard-Geraae has been working the Danish Geodata Agency as a project manager.

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