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## Organization of rights and responsibilities in complex 3D real property developments

*The relevance of bridging research fields*

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## **Organization of rights and responsibilities in complex 3D real property developments - the relevance of bridging research fields**

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**Keywords:** 3D property right, condominium, organization, mixed-use development

### **SUMMARY**

The condominium concept is one form of 3D property that is used in many countries around the world to organize and register 3D real property situations. Condominium property was mainly introduced in various jurisdictions to facilitate homeownership by converting residential apartment units in high-rise buildings into real property. Thus, the legal and organizational aspects of condominiums have been widely discussed in research literature but mostly outside the 3D property research domain. Publications within the 3D property research domain regarding legal and organizational aspects have been relative few in number. We propose the more traditional condominium literature to partly answer the call for more research on legal and organizational aspects within the 3D property research domain. It could provide a broader spectrum of research experiences to be incorporated into the ongoing debate within the 3D property research domain.

# Organization of rights and responsibilities in complex 3D real property developments - the relevance of bridging research fields

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## 1. INTRODUCTION

There seems to exist two different research fields that are concerned with real property situations in 3D. However, one of them is mostly concerned with the condominium concept and the legal structure and organization of property rights and restrictions between condominium unit owners (see e.g. van der Merwe, 2015). And the other is mostly concerned with the challenges of cadastral registration of 3D situations in a system only prepared for 2D registration and propose utilization of technical solutions as a way forward (see e.g. Oosterom et al. 2018). However, technical solutions may not be the only way forward to reduce transactions costs when forming 3D situations. A more context driven and conservative approach that is not proposing major changes in the existing registration system, but only requires minor adjustments in legislation. This might be a more affordable and effective short-term solution to problems addressed by real estate practitioners. In addition, this approach perhaps has the potential to become a springboard for easier implementation of technical solutions in the future.

The aim of this paper is to answer the call for more publications on legal and organizational topics concerning 3D property (see below). We present examples of literature concerning complex 3D situations found outside the 3D cadaster research domain and propose this partly as an answer. The aim is also to inspire representatives to enter the discussion on how rights and responsibilities are organized in complex 3D developments by introducing their own jurisdiction. We believe this is unique in each jurisdiction and therefore experiences perhaps are kept in national journals (and in a national language) not accessible (or to understand) by a larger international audience.

In addition, we propose a preliminary theory partly to explain why jurisdictions with a long condominium tradition hesitate to implement an independent 3D property form. In 2011 Ekbäck states: *“One important question to which there is no clear-cut answer is whether the cost of co-operation between the different three-dimensional spaces will be greater or smaller with 3D property formation than with the traditional options.”* (Ekbäck, 2011). This is an impotent question. In relation to the Danish traditional condominium system, and the method used in practice to split a 2D parcel into 3D units. Ekbäck (2011) concludes that everything seems to be working by using alternative methods such as granted rights, thus only forming use right instead of an ownership right. However, he makes this conclusion based on Sørensen (2009), but we argue that this is not entirely the correct, and today everything does not seem to be working. This raises a new question of why currently no steps are taken to move the Danish system towards a 3D property system. The last time it was discussed by the Danish cadastral authority was in 2009 (Thellufsen, 2009).

The research presented here is part of a Danish research project on 3D property design, see Madsen et al. (2021). The Danish examples are discussed and compared with Swedish examples of 3D property. The reason is that Sweden has a similar legal system and real property formation legislation, but only implemented the concept of 3D property and condominium ownership a few years ago, in contrast to Denmark, introducing the concept(s) of 3D property and condominium ownership more than half a century ago.

## **2. TRADITIONAL CONDOMINIUM AND 3D PROPERTY RESEARCH**

The literature survey is focused on two main groups of research aspect, namely the “traditional con-dominium concept” and “3D property”. We begin with a short presentation of 3D property research and condominium research and outline the general differences. Then continue to present an array of American condominium literature. Then we present the Danish 3D system and the Swedish in many ways are different then we discuss these differences, what they imply and what we can learn from it.

### **2.1 3D property research**

3D property is often referred to as real property delimited with both horizontal and vertical boundaries oppose to a traditional parcel/piece-of -land that is only delimited with vertical boundaries and therefore referred to as a 2D property Paulsson (2007). Changes in society has increased the pressure on urban land use. As a consequence, urban land is exploited vertically in the pursued of more effective land use e.g. to avoid urban sprawl. Building structures have become more complex in 3D and thus they are more complicated to register. This has for the last decades put pressure on existing cadasters that are only designed to register 2D property. To address this challenge researchers began approx. 20 years ago, began to investigate how to improve the formation of 3D property (Oosterom et al, 2018).

Paulsson and Paasch (2013) divides 3D property research publications from the years 2001-2011 into four classes: “Legal”, “Technical”, “Registration” and “Organizational”. This publication and a newly published revision (Paasch & Paulsson, 2021) show that there is a relative low number of publications on legal and organizational aspects compared with technical and registration aspects.

### **2.2 Condominium research**

Condominium property was introduced in many countries around the world in the 20<sup>th</sup> century. The reasons for implementing condominium law were primarily related to increasing housing shortage in urban areas. The condominium property form was an instrument for a more effective use of land and facilitated a third possibility for housing in addition to traditional forms of renting an apartment or buying a house (van der Merwe, 1994).

Converting an apartment building into condominium property provides for all apartments to become individual 3D real property with vertical and horizontal boundaries. Individual ownership to an apartment can be traced back to ancient Egypt, however modern condominium legislation was only introduced in Belgium in 1924. This, first generation legislation was re-

placed by second generation legislation regulating the more practical aspects of managing a common property in detail (van der Merwe 1994).

Even though, condominium legislation primarily was created to facilitate apartment ownership, other types of use are possible to included. Another way to express this is to say that, “*Condominium laws have facilitated the creation of a three-dimensional form of real estate ownership.*” (Thorson 1984). A condominium property can take on many faces including hotels, shopping center, parking garages, offices, shops etc. (see e.g., Van der Merve 2015; Madsen et al. 2021). It has been identified that an increase in diversity and mix of use creates the need for more complex organization of rights and responsibilities (se e.g. Madsen et al, 2021).

These authors experiences are that most literature regarding condominium law is related to management issues (legal and organization) and less on technical and registration aspects.

### **2.3 American condominium literature**

The condominium legislation in America was adopted from the European condominium legislation. However, the European legislation was not fit to support the North American market, so legislation was adjusted. Rohan (1978) explains that American first-generation legislation was “...*designed exclusively for use in apartment structures. These statutes were unsuitable for lateral developments, large-scale projects, and staged or sectional construction.*” (Rohan, 1978). In response to the challenges an American second-generation condominium legislation (The Uniform Condominium Act) was announced in 1978 (Rohan, 1978).

As a response to the challenges of property developers, Rohan (1978) proposes that legislation must facilitate a split of condominium developments into two categories “simple” and “complex”. The complex developments are e.g. such lateral staged developments that include more than one building where each building is constructed in one staged. Or projects including an umbrella organization; mixed-use condominiums; commercial condominiums; condominiums involving “air rights” etc. (Rohan, 1978).

There exist a large body of litterateur in the North America research domain about complex condominium development where the condominium concept is regarded not only as means for dividing a building into subdivided apartments. The condominium concept is regarded as a form of ownership rather than a subdivided apartment (Rohan & Reskin, 1965) or as Thorson (1984) describes “*Condominium laws have facilitated the creation of a three-dimensional form of real estate ownership.*” (Thorson, 1984, p. 1). For more information of different issues in the North American literature see e.g. Moriarty (1973); Rohan & Reskin (1965); Rohan (1978); Stokes (1982); Thomas (1978); Thorson (1984); Freyfogle (1987). In addition, through each publication, it is possible to trace a large number of related publications.

The publications cover a time period from 1965-1987. In this period the condominium legislation in America went from first- generation to the implementation of a second-generation. It has been more difficult to find newer publications. However, Rohan & Reskin (1965) “Real

Estate Transactions: Condominium Law and Practice–Forms” is still operational and annually updated in an online version by real estate experts.

## 2.4 The Danish 3D property legislation and practice

This section is divided into two subsections. Section 2.3.1 concerns the Danish condominium concept and section 2.3.2 concerns the practical method of splitting a 2D parcel into 3D spatial objects in a 2D cadastral registration, using a combination of a 2D parcel and granted rights to declare a use of space above or under the 2D parcel.

### 2.4.1 Danish condominium (practice)law

In 1966 the condominium concept was introduced in Danish real estate property legislation. The main reason for implementing the condominium concept was related to increasing housing shortage in urban areas (Owner Apartment Committee, 1965). However, the law applies to all type of use and the only obstacle is that a condominium unit’s boundaries must follow a delimited room in a construction building. In addition, buildings constructed before 1966 cannot be converted into condominium property. The condominium legislation consists of the condominium law and a standard by-law (Danish Parliament, 2020c) that is activated when the first condominium unit is sold. There is also a registration promulgation (Danish Parliament, 2020b) including rules for documentation etc. in addition to the declaration used to apply the cadastral authority for a building’s conversion into condominium property. For further introduction to the Danish condominium system see e.g., Madsen et al (2021).

A study of complex condominium developments (Madsen et al. 2021) has shown that the use of the Danish condominium concept has mutated. At the time when more and more complex building structures became widespread in Denmark the standard by-law was not sufficient to work on complex condominium developments. It became necessary to draw a customized by-laws and organize rights and obligations through granted rights related to the common components of the condominium property. The mutation implies a shift in the use of the condominium concept from simple to complex.

Despite of this mutation, few amendments have been incorporated in legislation. Instead, practitioners have found creative solution by “stretching” the legal frame to fit it into a complex condominium development. Some of these solutions has even become practice law. For example, the possibility to split the standard single management structure into a “two-tier” governance management structure in mixed-use developments. A Tow-tier structure is used when it is necessary to separate parts of the common property so only those units that have an actual benefit are granted the exclusive right to use and maintain that specific common facility or space. For a further introduction to the concept of condominium tow-tier governance and other management structures see van der Merwe & Paddock (2008). The Danish condominium law clearly states that the common property cannot be separated from the ownership right to the condominium unit (Danish Parliament, 2020a, §3 section 3). However, the Danish registration authorities have accepted this for many years so it has become law practice. Blok, a high court judge and expert on condominium property, states in his commentary on the Danish condominium law that *“just because it was not thought about when the law was written*

*do not mean it should not be possible to form a two-tier management structure”* (Blok, 1982 [authors translation]).

It is outside the scope of this paper to list all complex condominium situations, however for the reader to get a better understanding of what it might include we will mention two other complex condominium situations:

In some complex condominium situations, the developer has a desire to form an ownership right to part of the common property that cannot legally become a condominium unit. This is e.g. evident in case of a parking lot which cannot become a condominium unit because it has no construction walls. Instead, a granted right is formed. This has been accepted by mortgagees to provide enough security so the parking lot can be included as part of the value of that condominium unit that holds the exclusive use right.

In a complex condominium development, the developer, for financial reasons, has a desire to build in phases (also called stage development). Developers use of a “flexible condominium” used only to park building rights to finish the project when the first stage is sold. In desperate need of room with construction walls a container is sometimes placed on the building site. Or sometimes a “doghouse” (yes, an actual doghouse or shed) is built to be converted into condominium property, only to be removed when the stage development is constructed and the “doghouse” has been further subdivided into the new construction, as planned by the developer's legal advisor (usually a lawyer and/or chartered surveyor).

#### 2.4.2 Splitting a 2D parcel into 3D objects

There are no legislation only alternative solutions of forming indirect ownership in 3D outside a construction where condominium property does not apply.

In Danish real estate legislation, there is no means that directly facilitates forming a 3D property of a parcel. In a 3D situation where there is a need of horizontal boundaries only one layer can be registered in the cadaster. Other layers of the 3D situation boundaries must be formed with alternative means by declaratory rules. This usually includes an exclusive use right placed as a burden on the layer of the 3D situation that is registered in the cadaster.

When a 3D object e.g. an underground parking garage, is crossing parcel boundaries it is not possible to register as a 3D property with an ownership right. The registration of such a 3D situation is handled in practice establishing a granted right including different rights and restrictions that the parcel owner must respect.

It is the same situation if a building (or part of) is placed above e.g. a public road. However, it is not possible to declare a granted right on a public road in the Danish Land Registry so instead the build-up area above the public road is converted to a parcel. Then the owner of the building has an ownership right to the parcel and the municipality (road authority) a declared granted user right to the public road and mostly also the responsibility to maintain the road. However, in the cadaster the road ceases to exist.

## 2.5 The Swedish 3D property legislation

Despite, that many other countries in Europe implemented the condominium concept such as e.g., Denmark (van der Merwe, 1994) Sweden did not implement the condominium concept until 2009 (Paulsson, 2012). The Swedish condominium concept differs from the more traditional condominium concepts around the world because only apartments for residential use can be converted into a condominium unit.

In 2004, five years before the condominium concept was introduced the “independent 3D property unit” was introduced in the legal system (Paulsson, 2012). The independent 3D unit has certain characteristics: it must relate to a built construction or other facility; it can comprise a whole built construction or only part(s) of it; it may extend over or under several 2D parcels and if necessary, in order to guarantee financing or the construction of a facility it is possible to form a 3D property unit before constructed (Paulsson, 2012).

The Swedish system also includes a “3D property space”. This property form cannot exist within a 3D property unit but must be part of a traditional 2D property that for some reason needs a 3D delimited part of one or several traditional 2D properties. This could e.g., be in a 3D situation where an underground parking garage is extended over one or several 2D parcels.

In a complex mixed-use 3D situation, it is possible to mix the different property types. Paulsson (2013) explains how a mixed-use development can be organized using the Swedish 3D system: The top floors include residential apartments subdivided into a) condominium units. The ground floor consists of several shops included in one b) 3D property unit. The underground floor consists of a parking garage that is part of the c) “traditional 2D parcel”. However, part of the underground parking garage extends under the neighboring property so d) a “3D property space” is created (Paulsson, 2013).

### 2.5.1 Cooperation

When a building is transformed into condominium units it is decided in the cadastral procedure what parts of the property that should be private or common. If a common property is formed an owner's association is mandatory to form (Paulsson, 2012). This is very much in line with a traditional condominium system such as the Danish. However, it seems as if there is less regulation concerning the cooperation between individual 3D property units (Paulsson 2012).

## 3. DISCUSSION

The mixed-use situation in section 2.4 explained by (Paulsson, 2013) illustrates how different use in a property are separated using different property forms, namely the “independent 3D property unit”, the “condominium property”, the “3D property space” and the “traditional 2D property”. In a system with a traditional condominium system such as the Danish this 3D situation will effectively be treated by the use of a two-tier management structure when converting the development into condominium property. However, if there is part of a building con-

struction that extend over or under another 2D parcel it is not possible to secure this with full ownership. Instead, a granted right would be established to regulate rights and restriction.

In general, there seems to be many similarities between the Swedish system and the Danish. However, the Swedish 3D property system seems to be easier to understand and perhaps more capable of handling situations where complex building structures extend over or under other 2D parcels. However, in both systems there is need for organizing rights and restrictions connected to each 3D delimited property object.

Because of the more complex building structures and infrastructure under and above the ground, land administration systems have had to adapt to this new 3D situation. The way nations have dealt with this differ. In some jurisdictions an independent 3D property system has been introduced and in other jurisdictions the existing systems and legislation has been used to work around the challenges, thus avoiding the development and implementing of new more 3D ready systems.

Perhaps there is advantages using an independent 3D property unit instead of arranging rights and obligations of the common property in a traditional condominium system. However, we have not seen such a comparison in any publications. From our point of view, it seems as if combining the experiences of traditional condominium organization of rights and obligations with the benefits of registration 3D independent units could perhaps be a solution, at least to solve the 3D challenges in the Danish 3D property system. The situation simply seems to be working too well to begin considering a radical change to the Swedish model. However, minor adjustments could be done with little investment little by little not confusing the real estate market.

The complex 3D situation in condominium property in terms of choosing a sufficient management structure or using flexible condominiums must likewise exist in the Swedish 3D property system. The actual difference between the extended condominium system and the 3D property lies not in the management of the different interest between more or less independent property units, despite being organized as two-tier governance or a combination of a 3D independent property and residential condominium, they both experience the same challenges of organizing rights and responsibilities to common components of mutual interest.

In order to obtain a full understanding and to decide on pro and cons of both systems it is necessary to make a comparison. In our opinion, it is relevant to bridge research fields in order to push for a more effective system. Research regarding 3D property systems could benefit from the many years of experiences of dealing with 3D situations in general, and the condominium could benefit from learning the advantages from more market adjusted registration boundaries.

It seems as if the study shows that, from comparing Denmark and Sweden that jurisdictions with a long history of condominium legislation and real estate practitioners have gradually adopted to the more complicated cases of building structures, however in terms of infrastruc-

ture projects such as the Metro etc. not. In mixed-use cases the condominium has been sufficient, so there has not been enough reason to consider changing the system because the.

#### **4. CONCLUSION**

Complex mixed-use condominium developments include a multitude of ownership with different use. Organization of rights and responsibilities over common parts are standard procedure in the formation process so each condominium unit has its own share of the value in the common property and to common expenses etc. If the mix consist of very different use the common property usually is also very different and common components may only benefit one or a few units. Therefore, contributions to common expenses are arranged so those units with no benefit of specific common components are not obliged to contribute to that part of the common property nor to have a share of its value.

In a jurisdiction, such as the Danish, where there is a long history of practical use of the condominium owner ship concept it is normal procedure to “work around” the condominium legislations fundamental rule that states each condominium unit has a share in the hole common property. As explained, this is not financially rational, so each use type or otherwise reasoned segregation of units is isolated and the management of the common property is split into a tow-tier management structure. By doing so, the common components that cannot legally be adopted within the boundaries of a condominium unit are with other means attached to the unit as a granted right.

In a jurisdiction, such as the Swedish, where there is no tradition for using the condominium concept (it was first implemented in 2009) the rising demand for multi ownership in buildings pushed for a real property form to be implemented to facilitate delimitation of real property both vertically and horizontal (3D property). Despite that Denmark, which is neighboring country to Sweden, had a functional land registration system that to a large extend was capable of handling 3D property situations, the legislators choose use another model, the 3D independent property.

#### **5. FUTURE RESEARCH**

A case study of the Swedish system used in a complex mixed-use situation could be an important contribution to both traditional condominium and 3D property research. The existing literature on the Swedish system could benefit of more research on how the organization of rights and restrictions regarding the cooperation between different property forms are conducted and how the quality of such is measured. Especially when little is mentioned about this aspect in legislation.

It could be interesting to compare a traditional condominium system, such as the Danish with that of an individual 3D property unit system such as the Swedish system. Perhaps using both systems on the same case of a complex mixed-use 3D development. In doing this experiment it could perhaps be evident to what extend the systems differ and quantified which is the most effective and holds the lowest transaction costs.

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