

Road Management in Denmark and Sweden: A Comparison and Analysis of Institutional Designs

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***Abstract.** Management of roads and the institutional solution chosen is dependent on a number of factors such as, regulatory tradition, and road network scale. It is likely that some solutions are more efficient than others, and this article compares and analyses Danish and Swedish institutional solutions regarding road management. The aim is to explore and briefly evaluate the systems in terms of institutional efficiency. The hypothesis is that, efficient institutions have a better ability for survival in the political processes. It is observed that the chosen solutions on national and municipal level are much alike, and therefore appear efficient. However, for common private roads, the institutional designs are very different, and seem to be based on two diametrically contrasting views on how to govern this kind of roads.*

***Keywords:** road management, institutional design, national roads, municipal roads, private roads, real property law*

1 Introduction

From an institutional perspective, road management involves many different features and dimensions. One component is the responsibility for planning, construction and management of various types of roads and streets, which may be assigned to the state, to the local authorities, to the landowners, or to some other party. When the responsibility is allocated to other subjects than the state or municipalities, the subsequent question arises regarding how the collective in charge is organized.

Another aspect concerns financing – how is the road construction financed and how is the succeeding road management (maintenance and operation) financed? Taxes, user fees and tolls are plausible alternatives, but they also have to be distributed within the accountable collective according to some principle.

Planning and construction of new roads also require that the road manager acquires the right to take possession of the land for the road project. Land

acquisition for road purposes can take different forms, such as usufruct (personal right), easement (real property right) or ownership (individual or common).

The purpose of this article is to explore and compare institutional designs for road management in Denmark and Sweden. After an investigation of existing institutional forms and variations, the differences between the countries are briefly evaluated with regard to institutional efficiency.

The broad similarities between Denmark and Sweden with respect to political, economic and social factors will ensure meaningful comparisons between specific legal sub-systems, even without considering differences at a higher or constitutional level, which the limited scope of an article does not permit. The choice of countries can also be defended on the grounds that they both represent stable and enduring systems, where legal reforms have evolved within the democratic framework. As a hypothesis one could expect efficient institutions to have a better ability for survival in the political processes (North 1990). A long lasting and permanent institutional choice may therefore indicate efficiency, or at least the absence of evident inefficiency. Consistent similarities between the national institutions would consequently imply efficiency, while clear differences rather suggest that improvements are conceivable.

2 Road management in Denmark

The responsibility for road management in Denmark is divided between the state, the municipalities and private property owners. The public roads (*offentlige veje*) are managed by the state and the municipalities. There are about 74,000 km public roads, of which about 4,000 km are national roads managed by the state, while the remaining part is municipal roads. Supposedly, Denmark has around 24,000 km common private roads (*privat fælles vej*) (2010/1 LSF 48). However, it has to be added that most municipalities only register private roads in within the built environment (from now on referred to as an *urban area*, although it is more complex than that), since it is voluntary in rural areas. Therefore, the real number is significantly higher although there is no account of it.

The institutional solution is dependent on the type of road, and further, it depends on whether a road is placed in rural or urban areas. The distinction between urban and rural is especially relevant for private roads.

2.1 National roads

National roads (*statsveje*) are regulated by the Roads Act (*Lov om offentlige veje*). The responsibility for planning, constructing and management of national roads is appointed to the Road Directorate (*Vejdirektoratet*), an agency under the Transport Ministry. Although the Road Directorate plans the new national roads, the decision on making the road is made by the Parliament by law (*Anlægslov*).

The initiating process for planning of national roads is an interaction between the Parliament and Danish Road Directorate. The Parliament decides an environmental impact assessment is to be made by the Danish Road Directorate.¹

¹ The Roads Act, Section 17a–17q.

If – or when – politically feasible, the Parliament adopts an act which states that the road is to be built.² The Danish Road Directorate then plans the road in detail. Reconstruction or improvement of road crossings etc. are made by decision of the Danish Road Directorate.

The state acquires the right to use the designated land by expropriation of ownership, following the procedures in the Act on Procedures for State Expropriations (*Lov om fremgangsmåden ved ekspropriation vedrørende fast ejendom*). The legal basis for the expropriation is, depending on the specific case, either in the Parliament's act regarding the road (*Anlægsloven*) or the Roads Act (Mølbeck, 2019). As stated in The Constitutional Act of Denmark³ (*Grundloven*) the property owner is entitled to “full compensation”, however this is the value of the land taken reduced by the advantages from the new road. It happens that the compensation is null (Mølbeck, 2019).

National roads are financed by the state, in other words tax funded. There are small exceptions to this, mainly a landowner funding his access point to a national road. Road toll is not an option on public roads. Denmark has roads with road toll, but they are private roads. An example of this is the bridge (*Storebæltsbroen*) that unites the national road crossing Funen and Zealand.

2.2 *Municipal roads*

Municipal roads (*offentlige veje*) are, as the national roads, regulated by the Roads Act (*Lov om offentlige veje*). The responsibility for planning, constructing and management is assigned to the municipality. The decision to establish, change or remove a municipal road is made by the municipality based on the Roads Act.⁴ The intended changes have to be planned, but the Roads Act does not regulate how.⁵ For convenience, this is often combined with municipal plans or detailed land use plans (VEJ 9017/2016). There are detailed procedures regarding the decision of removing a road, but not regarding new roads or changes of existing roads.⁶

The municipality obtains the right to use the land for road purposes by either buying it on negotiated terms or by expropriating the ownership. The Roads Act allows the municipality the possibility to expropriate and it determines the procedures.⁷ The property owners are compensated after the same principles as in expropriation for national roads above.

The construction of municipal roads is by default the municipality's cost⁸, which essentially means tax funded. However, the legislation provides possibilities to impose cost to property owners, to some extent. The Roads Act gives the municipality the option to impose the construction cost (excluding costs for land acquisition) to the neighboring properties (*vejbidrag*), if they are given direct

² The Roads Act, Section 12.

³ Section 73.

⁴ The Roads Act, Section 6.2.

⁵ The Roads Act, Section 18.

⁶ The Roads Act, Sections 15 and 124–127.

⁷ The Roads Act, Sections 94–122.

⁸ The Roads Act, Section 8.2.

access to the road.⁹ The Planning Act (*Lov om planlægning*) allows voluntary development agreements, which among other things can fund a municipal road.¹⁰ Further, the Roads Act can impose costs on property owners, regarding the property's access point. Maintenance of municipal roads is at large a municipal responsibility and expense.

2.3 Private roads

In a Danish context, a private road is one out of two things. It can be a private road placed on one property with one or more other properties having a right to use the road – a common private road (*privat fællesvej*). It can also be an internal road (*privat vej*), meaning it is only used by the property on which it is located. The latter are considered the owner's own responsibility, only scarcely regulated, and out of the scope of this article.

The common private roads are regulated in the Private Roads Act (*Lov om private fællesveje*), that has two set of rules. One rural set of rules and one urban set of rules. The boundary between these is a bit more complex that sketched here.¹¹

The users and owners of a common private road are different properties. This also implies that the question of land acquisition for road purposes is not about ownership, but rather about obtaining easement (real property right) or usufruct (personal right). The possibilities for obtaining these rights are, as shown below, dependent on which set of rules that applies for the specific common private road.

Common private roads in rural areas

It is the owner of the road that decides whether the road is needed, and the Private Roads Act does not include any obligation to obtain a permit.¹² The municipality can in a detailed land use plan regulate how the road must be designed etc. This option is used if the road supplies an area with road access and the area is subject to detailed land use planning. An example could be planning of windmills. Detailed land use plans are not adopted just because of the road, and only determine location and design of the road. In general, the property owners are not supported in the process. This also implies that they finance the road and distribute the cost themselves.

It is also the owner of the road that on private negotiated terms allows other properties to use the road (easements). The Private Roads Act does not provide the municipality tools to help or intervene in rural areas. If the future road is included in a detailed land use plan – as the windmill example above – the Planning Act provides a possibility to expropriate in some cases.

Rural common private roads are maintained by the parties who have the right to use the road, i.e., the land owners. According to the Private Roads Act¹³, they

⁹ The Roads Act, Sections 26–39.

¹⁰ The Planning Act, Section 21b.

¹¹ The specific determination is found in the Private Roads Act, Sections 3–4.

¹² The Private Roads Act, Section 11.

¹³ Section 13.

are obligated to do this. If they neglect their responsibility, the municipality can give the obligated properties an enforcement notice to maintain the road.¹⁴ The obligated owners are free to organize, but there is no support in the law, from the municipality, or others to do so.

Common private roads in urban areas

Within the built environment it is also the main rule that the landowner decides that he or she wants to construct a common private road.¹⁵ However, this requires a permit from the municipality, where terms on the design of the road can be set.¹⁶ The neighboring properties are given opportunity to comment on the applied road before the permit is given.

The municipality can also designate land for a road within a detailed land use plan.¹⁷ If this is chosen, and if the road does not become a municipal road, the owner will be left with no other option than to use this land for a common private road. In this way the municipality can indirectly determine that a common private road is to be made. This happens very often, since most urban development requires detailed land use planning, and planning of land use necessarily includes access. If the road is subject to detailed land use planning, the Planning Act provides means for expropriating the right to use the land for the private road and the right to use the road.

As in rural areas it is also the main rule that the road owner allows other properties to use the road (easements) on private negotiated terms. However, in urban areas the municipality can decide to give a property the right to use a common private road, and even decide that a property owner must tolerate that a part of the property is to be used as common private road.¹⁸ In the latter case the owner has to be compensated.

The main reason for differencing between rural and urban areas in the Private Roads Act – and have increased regulation in urban areas – is the level of public interest in urban areas in contrast to rural areas (LFF 2014:20). These public interests are at large secured through terms in permits, but in urban areas the municipality is given tools in the Private Roads Act that can secure that the common private road is planned, constructed and that rights to use the road are given. This secures that private disputes cannot stop the development in urban areas.

The property owners finance the road, and normally negotiate the distribution of cost themselves. However, they can petition the municipality to decide on the distribution.¹⁹ In that case the distribution principle depends on a number of factors in each specific case.

¹⁴ The Private Roads Act, Section 15.

¹⁵ The Private Roads Act, Section 26.1.

¹⁶ The Private Roads Act, Section 27.

¹⁷ The Planning Act, Section 15.2.

¹⁸ The Private Roads Act, Section 26.2.

¹⁹ The Private Roads Act, Section 42.

Common private roads in urban areas are maintained by the neighboring properties with access to the road. Just as in the rural areas, it is assumed that the obligated properties handle this themselves. If they fail to do this, the municipality can give the obligated properties an enforcement notice to maintain the road.²⁰

The property owners are free to organize, but the Private Roads Act does not provide any support on this matter. The municipality can in a detailed land use plan, determine that a property owner association must be created and that it shall maintain the private roads.²¹ However, this is a limited possibility, since a set of preconditions first must be met. Of special importance in this context is that the area has to be “new”, in the sense that the land use is transformed from one use to another. This holds true for greenfield development situations, but rules out cases where a detailed land use plan for housing is adopted for an already existing residential area (Christensen & Sørensen, 2014). Therefore, detailed land use planning cannot solve existing problems but only avoid creating new problems. It should be added that the involved property owners themselves create the association as a private association, based on the demand in the detailed land use plan.

3 Road management in Sweden

The Swedish road network is, at a general level, categorized as national roads, municipal streets and private roads. National roads are managed by the state, and amounts to 98,000 km (SOU 2001:67 p. 33). Municipal streets (42,000 km) are managed by the municipalities and are mainly concentrated to urban areas. The private road network is the largest category, with around 300,000 km managed by the property owners themselves.

Depending on the classification, different institutional solutions are applicable according to the legislation. The choice of institutional design is, in some situations, also dependent on whether the road is located within a detailed land use plan or not.

3.1 National roads

National roads (*allmänna vägar*) are regulated in the Roads Act (*Väglagen*). The responsibility for planning, construction and management of national roads is generally allocated to the Swedish Transport Administration (*Trafikverket*), a governmental agency.²² Financing of national roads is normally covered by state tax. During the last decades, however, the legislation has opened up for the possibility to charge road tolls for national roads, which still is rather uncommon (Kågeson, 2004).

The planning procedure for national roads is an extensive process where questions of location and design are concretized successively (Proposition 2011/12:118 pp. 91–98). The final output from the planning procedure is a legally

²⁰ The Private Roads Act, Sections 44–45.

²¹ The Planning Act, Section 15.2 pt. 17.

²² The Roads Act, Section 6.

binding road plan (*vägplan*), which regulates design, location, interference protections, land and property rights requirements, etc.²³ The road plan is publicly announced and should be exhibited for viewpoints. The plan is finally established by the Swedish Transport Administration, after consultations with the County Administrative Board (*länsstyrelsen*). The establishment of the plan can be appealed to the Government.²⁴

By the establishment of the road plan, the Swedish Transport Administration automatically has the right to take possession of the required land with an official usufruct right, labelled “right of way” (*vägrätt*). This is a personal right for the road manager to use the affected properties for road purposes without limitations in time.²⁵ Compensation for the “right of way” is determined by the provisions in the Expropriation Act (*Expropriationslagen*), which stipulate that the compensation must cover the loss in market value with a surplus of 25 percent.²⁶

3.2 Municipal streets

From a legal perspective, municipal streets (*kommunala gator*) are established as public spaces in detailed land use plans. A detailed land use plan (*detaljplan*) is a legally binding plan, by which the municipality can regulate the land use and the built environment in a particular area. The planning process and the plan content is governed by the stipulations in the Planning and Building Act (*Plan- och bygglagen*). The amount of regulations needed concerning land use and building development naturally varies from one case to another, but the plan must always include delimitation and use of public spaces (streets, parks, squares, etc.) and building plots (land for housing, offices, shops, industry, etc.).²⁷

The responsibility for public spaces can either be allocated to the municipality or to the private landowners. The general principle is that the municipality should be responsible, unless there are specific reasons, e.g. an area with holiday cottages located far away from nearest urban area (Proposition 2009/10:170 pp. 196–201). In normal situations with municipal responsibility for public spaces, the Planning and Building Act demands that the municipality develops and constructs the streets and other public spaces along with the completion of the building development, according to the plan.²⁸

The land needed for public spaces – under municipal responsibility – can be acquired by redemption (*inlösen*) by the municipality.²⁹ Compensation for the purchased land is determined by the provisions in the Expropriation Act, which stipulate that the compensation must cover the loss in market value with a surplus of 25 percent (according to the land use value before the plan was adopted). The procedure for the land acquisition under the Planning and Building Act takes place

²³ The Roads Act, Section 16a.

²⁴ The Roads Act, Sections 18 and 75.

²⁵ The Roads Act, Sections 30–31.

²⁶ The Roads Act, Section 55 and the Expropriation Act, Chapter 4, Section 1.

²⁷ The Planning and Building Act, Chapter 4, Section 5.

²⁸ The Planning and Building Act, Chapter 6, Section 18.

²⁹ The Planning and Building Act, Chapter 6, Section 13.

in the Land and Environment Court.³⁰ An alternative procedure – which is the most common in practice (Kalbro & Lindgren, 2018 p. 120) – is to transmit the land required by property reallocation, according to the provisions in the Real Property Formation Act (*Fastighetsbildningslagen*). Compensation provisions are independent of the choice of procedure.

According to the Planning and Building Act, the municipality has a right – but not an obligation – to charge the landowners with fees for the construction costs (including costs for land acquisition) related to public spaces. These fees can be distributed either street by street or for a larger part of the detailed land use plan. However, the distribution may not include landowners that do not receive any benefits (value increase) from the plan.³¹ In practice, many municipalities subsidize parts or all of the construction costs with municipal taxes, since the procedure for charging full fees is perceived complex, conflictual, and politically sensitive by the municipalities (SOU 1996:168).³² Moreover, the succeeding maintenance and operation can only be financed by municipal taxes.

3.3 Private roads

The concept of private roads (*enskilda vägar*) covers many different situations where the responsibility for road management rests on the private landowners. The most important distinction concerns whether the road serves several properties or is exclusively for the use by a single property, which will result in different institutional solutions.

Private roads common for more than one property unit

The need to supply a private road network for a group of properties can arise both within detailed land use plans, as well as outside of planned areas. Detailed land use plans where the responsibility for public spaces are assigned to the private landowners – e.g. holiday cottages located far away from nearest urban area – has previously been mentioned as one example of where this situation occurs. It can also happen when exit roads for two or more properties are located on the building plots in the plan, e.g. leading from the center of a building block out to the public space. The most common situation, however, is naturally where a group of properties outside of a detailed land use plan (rural areas) needs to establish a common road network or a road for connection to the national road network.

The standard solution for establishing a legal framework for private road management in these situations is to create a *joint facility*, according to the stipulations in the Joint Facilities Act (*Anläggningslagen*). A joint facility is a facility common to several property units that serves a purpose of enduring importance to them.³³ This wide definition means that joint facilities can be

³⁰ The Planning and Building Act, Chapter 15, Section 1.

³¹ The Planning and Building Act, Chapter 6, Sections 24–25.

³² In large scale developments, the costs for land acquisition and construction of streets are normally assigned to the developer, according to development agreements between the municipality and the developer (Kalbro & Lindgren, 2018 pp. 138–145).

³³ The Joint Facilities Act, Section 1.

established for many different purposes, although private roads constitute the main part; water and sewage facilities, heating installations, jetties, parking lots, garages, playgrounds etc. (Björklund & Wedman, 2004 pp. 36–38). The procedure for assessment and establishment of a joint facility is handled by the Cadastral Authority.³⁴

The costs of a joint facility are allocated according to the participation shares, allotted to the participating property units. First, the construction costs of the facility are distributed according to the “benefit” that each property derives from the facility. The term “benefit” as used here refers to the increase in the value of the property resulting from the facility. Secondly, operating and maintenance costs are to be distributed in relation to the “expected use” of the facility by the different properties.³⁵

The establishment of a joint facility is confirmed in a construction order (*anläggningsbeslut*), which among other things states: 1) The purpose, location, size and design of the joint facility; 2) Participating property units, including participation shares, and; 3) Property rights acquisition for the land/space needed for the facility.³⁶

Compensation for the space granted for the joint facility, is determined in a specific compensation order. The decisions by the Cadastral Authority can be appealed.

The construction and operation of a joint facility must comply with the construction order, mentioned above. Otherwise, the management of an established joint facility is governed by the Joint Property Management Act (*Lagen om förvaltning av samfälligheter*).

In order to ensure proper implementation of the construction order, and to secure the succeeding management, including maintenance and operation, the Joint Property Management Act provides two different forms of management: Co-owner management and association management, respectively.³⁷

In the case of co-owner management, the participating property owners must agree on all measures to be taken, which in turn presupposes a relatively small number of participants (Ekbäck, 2016). Larger joint facilities are therefore normally run by association management, in which a formal joint property management association is established, which can act as a legal person. Issues of basic management policy will then be decided by voting at general meetings with all the participating property owners. The implementation of these decisions, together with the day-to-day running of the facility, are entrusted to an executive committee.³⁸

³⁴ The Joint Facilities Act, Section 4.

³⁵ The Joint Facilities Act, Section 15.

³⁶ The Joint Facilities Act, Section 24.

³⁷ The Joint Property Management Act, Section 4.

³⁸ The Joint Property Management Act, Sections 47 and 35.

A private road for one single property

The need to supply a private road for a single property unit can also arise both within detailed land use plans, as well as outside of planned areas. In planned areas it can occur where an exit road for a single property is located on the building plots in the plan. As with common roads, the most usual situation is where the road requirement arises in rural areas, outside detailed land use plans.

The responsibility for road management and financing in these cases falls obviously merely on the single landowner in need of the road. In situations where the road needs to be located on land belonging to other property units, the need for land acquisition arises.

The standard solution for establishing a legal right to construct, use and maintain a private road on other properties is to create an easement (Julstad & Vesterlin, 2016). Easements can be created either by voluntary contracting (contracted easement) or by a procedure at the Cadastral Authority (official easement). In the latter case, the compensation is also decided by the authority. Official easements can be established either according to the provisions in the Real Property Formation Act, or according to the special stipulations regarding private roads (for single property units) in the Joint Facilities Act.

4 Cross-case analysis

Noticeable from the presentations in previous sections, is that both Denmark and Sweden have different institutional solutions dependent on the road network scale. In both countries, the institutional choice is related to whether the road network is on a national, regional, or municipal scale, as compared to a local scale (in urban or rural areas). One may also observe that all categories of roads are legally regulated in both countries, and that the legislation for most categories includes aspects such as planning, construction, maintenance, operation, financing and land acquisition.

There are several reasons for the need of legal regulations for this type of infrastructure, and good arguments for the differentiation of the institutional designs. The different classes of roads constitute linked elements, which are all parts of a larger societal transport system. For these road networks to be located and designed in a functional and efficient way, these networks have to be coordinated with other sectors of society. This is especially relevant for other types of land use planning, e.g. existing and future settlements, industry and business. Conflicts can arise with valuable nature areas or cultural heritage. Traffic safety is obviously always an important aspect.

On a basic level, this coordination can be achieved either by voluntary negotiations between the affected individuals or by some form of public decision-making (Ekbäck, 2011). In situations with a large collective of individuals, it is easily understood that a system with *voluntary negotiations* would result in very high – or even prohibitive – transaction costs (Williamson & Masten, 1995). In common terms, transaction costs can be depicted as costs for information, negotiations, contracting, and for enforcements of these contracts. Another weakness with voluntary negotiations in the road-planning context is that a road network may

create positive and negative externalities (Coase, 1960) far outside the road's location. This leads to difficulties in delimiting the group of individuals affected, who should participate in the negotiations.

It could, in those cases, be efficient to design institutions for *public decision-making* on planning and management of the road network. Public decision-making also involves information costs and organizational costs. Nevertheless, the authority can make decisions without the support of agreements, so total transaction costs for large-scale road networks may be lower. Therefore, since the different categories of road networks identified involve and influence separate groups and different numbers of individuals, it is natural that the institutional designs for assessing and balancing the needs, requirements, disturbances and costs for a project are adapted to the varying scale.

From another viewpoint, roads and streets are good examples of *natural monopolies* (Sharkey, 1982). The construction of a road requires large initial investments, while forthcoming users can establish access to the road at lower marginal costs. Since roads are characterized by these *economies of scale* (cf. Kreps, 1990 pp. 234–239), it is inefficient to have parallel facilities of the same kind, and further often imprudent in relation to land use planning. In other words, there is no room for market competition, and the owner of the road acquires a monopoly position in relation to the users of the road. To regulate this monopoly position is obviously an important rationale for this legislation.

A road can also, to a large degree, be categorized as a *collective good* (Olson, 1965), at least in the absence of congestions. Collective goods have two characteristics, they are non-rivalrous and non-excludable. Firstly, if one person use the road it does not reduce the availability of the road for other users. From an economic viewpoint it is therefore desirable to open the road for as many users as possible, since the marginal cost of each user is very low (excluding overcrowding). Secondly, it may be difficult or costly to cover the costs by charging every user when they are using the road. This second feature obviously weakens the incentives to produce the good on a voluntary basis. The function of the legislation then becomes to ensure that collective goods are still produced and managed, and to regulate the financing in order to avoid the associated free rider problem.

Once the location and design of a new or modified road has been determined, the road manager needs to acquire property rights for the road. In the situation where a particular area is required for the road, each landowner has a monopoly power over his or her own property, which can be used for opportunistic behavior (Cohen, 1991). The potential for such strategies requires an opportunity for *compulsory decisions on land acquisition* by a public authority.

Although several arguments for institutional regulation of road networks can be presented, the previous presentations also reveal the presence of a *scale component* as a significant factor for different institutional solutions.

4.1 National roads

Concerning national roads, the institutional solutions have several similarities in both countries, see Table 1. Planning, construction and management are all assigned to a state authority. Financing is essentially covered by taxes, even though Sweden has a legal option to charge road tolls.

Table 1. Comparison of institutional designs for national roads in Denmark and Sweden.

National roads	Planning, construction and management	Financing of construction	Financing of management	Property right
Denmark	State authority	Taxes	Taxes	Ownership
Sweden	State authority	Taxes	Taxes	Official usufruct

The main differences are found in the decision process to initiate a road project, and the land acquisition element. Regarding the initial decision-making process, a road project in Sweden is initiated by the Swedish Transport Administration, whereas Denmark's design is based on a parliamentary decision. Since a road project in Sweden also is dependent on budget funding from the Government, these differences should not be overstated. Land acquisition in Sweden comes automatically by the adoption of the road plan, while in Denmark land acquisition requires a separate legal proceeding. The type of property right also differs, where the road manager in Denmark has ownership rights and in Sweden a usufruct right (right of way).

However, on a general level, the obvious and distinct similarities is the most significant conception. The institutional solutions seem likewise to be in accordance with the economic principles previously presented above.

4.2 Municipal roads and streets

The similarities between the studied countries are also apparent when we turn to the municipal roads and streets, see Table 2. Not surprisingly, the municipality is responsible for planning, construction and management of municipal streets, although the Swedish system integrates street planning and detailed municipal land use planning. In practice, however, this often turns out to be the case also for Denmark. Maintenance and operation is entirely tax financed in both systems, and land acquisition is accomplished with ownership rights in a legal procedure separated from the planning component.

Table 2. Comparison of institutional designs for municipal roads/streets in Denmark and Sweden.

Municipal roads/ streets	Planning, construction and management	Financing of construction	Financing of management	Property right
Denmark	Municipality	Taxes (landowners)	Taxes	Ownership
Sweden	Municipality	Landowners (taxes)	Taxes	Ownership

According to the legislation, the main difference seems to concern financing of construction, where the Danish system has municipal taxes as the main principle, with limited possibilities for landowner fees. In Sweden, on the other hand, landowner fees is the basic principle according to the legal provisions. However, in practice, it turns out that most Swedish municipalities subsidize parts or all of the construction costs with taxes. Therefore, in reality, the legal difference levels out during the practical implementation, and the overall notion for municipal roads and streets is that the similarities overshadow the differences identified. And equally, the institutional solutions seem to be in accordance with the economic principles presented above.

4.3 Common private roads

Comparing at the level of common private roads, the discrepancies between the national institutions become more evident, see Table 3. The similarities are, in principle, limited to landowners being responsible for planning, construction, management and financing of the roads, although there are some exceptions from this main principle. In Denmark, land for private common roads can be designated in detailed land use plans. Under certain circumstances this can be instigated both in urban and rural areas. The exception for Sweden also concerns roads in detailed land use plans with private responsibility for public spaces, as well as common exit roads located on building plots in the plan. In these cases, the municipality is still responsible for the planning process in both countries, according to the national legislation on planning.

There is also a similarity in the type of property right – easement – as a basis for the concerned landowner’s road access, although the procedure for land acquisition is contrasting.

Table 3. Comparison of institutional designs for common private roads in Denmark and Sweden.

Common private roads	Planning, construction and management	Financing of construction	Financing of management	Organization of collective	Property right
Denmark	Landowners (municipality)	Landowners	Landowners, participatory shares	None	Joint easement
Sweden	Landowners (municipality)	Landowners, participatory shares	Landowners, participatory shares	Co-owner or association management	Joint easement

The differences between the two institutional systems are multiple, and comprise procedural aspects, compulsory instruments, and possibilities to organize the collective of concerned landowners.

Regarding the process, Sweden has a *regulated procedure for assessing and determining* the size, design, location, profitability, delimiting the relevant group of properties, participatory shares for cost distribution etc., conducted by

a public authority. This procedure can be initiated by an application from one single landowner. In Denmark, on the other hand, a general legal framework for assessing and arranging private road requirements is nonexistent. In urban areas, the property owners need a permit, where the public interests are assessed. Under specific circumstances in connection to detailed land use plans, the plan can determine the location of a future road and that it needs to exist in order to develop the area. This means that in most cases, the property owners in Denmark have only voluntary negotiations as their single option.

In cases where the landowners cannot reach agreements in different matters, e.g. the design and location of a road or a road network; if a property should have access to a specific road or not; issues on cost contribution; land acquisition for the road, the Swedish system opens for *compulsory assessments and decisions* based on the legal provisions in the Joint Facilities Act. In Denmark, the coercive powers are limited to a few specific situations and issues in urban areas, e.g. land acquisition. For most matters, beside case to case -based maintenance, compulsory means are absent.

For *organizing the collective of participating landowners*, the Swedish system provides two different forms of management: Co-owner management – where all property owners must agree on all decisions and measures – and association management – where management decisions are decided by majority voting at general meetings. In order to establish such a joint facility association, it is sufficient with a formal request from one of the participating property owners. The coercive possibilities to organize an association in the Danish system is restricted to a few specific detailed land use planning situations. Beyond this, Danish legislation does not provide any support for the forming of associations for private road management.

As a closing observation, it seems as if the two countries' institutional designs for common private roads are based on two diametrically contrasting views on how to resolve society's requirement for private roads. The Danish approach implies that private roads are matters for the private property owners, and should only be interfered with when necessary to secure public interests. The Swedish perception suggests that the need for a functional organization is fundamental, and that it is a public responsibility to provide for its establishment.

5 Discussion

The introductory section of this article presents a hypothesis that in stable and enduring political systems where legal reforms have evolved within the democratic framework – as is the case for Denmark and Sweden – one could expect for efficient institutions to have a better ability for survival in the political processes. Consistent similarities between the national institutions would consequently imply efficiency, or at least absence of evident inefficiency, while clear differences rather suggest that improvements are conceivable. It should be noted that, historically based similarities can also be a sign of institutional inertia and path dependence (cf. North, 1990). To test that idea would however require a different approach and falls without the bounds of this article. Having raised this query, the exploration

and analysis undertaken here have at least not found any apparent indications of institutional inefficiencies in that respect, with the exception for joint common private roads that are discussed below.

5.1 National roads

The institutional designs for national roads are very similar in both Denmark and Sweden, and can easily be related to different aspects concerning institutional efficiency. A national road network create widespread externalities, both of a positive and negative character. The externalities affect an undefined collective, since this road network serves both national and international interests. It is evident that voluntary negotiations are not plausible in this context, but would create prohibitive transaction costs. Consequently, we find a public responsibility for national road management at state level.

One may also note that there is a political dimension in the executive powers regarding national roads. In Denmark, the decision to construct a new national road is made at Parliament level. In Sweden, the adoption of a road plan is appealed to the Government. The economic interpretation of this observation can be related to the nature of the widespread externalities generated by the road project. Most affected individuals, firms and organizations can be depicted as having rather low stakes in a specific road project. The costs of active involvement and participation in hearings or consultations will generally exceed potential benefits. In order for the responsible authority to still receive some information on the public opinion, the political decision system may be blunt and imperfect, but still potentially better than the alternatives available, such as administrative or court procedures. Given the notion of international and global markets, these arguments can also indicate a feasible future reform for the European E-road network to be managed at EU-level. Although the political and organizational framework do exist for funding of infrastructure investments and research in the Trans-European Transport Network (TEN-T), planning and management of road infrastructure is still not part of the EU legal competencies.

As mentioned previously a road can to a large degree be characterized as a collective good, which may be particularly relevant for national roads open to public transport. In the absence of congestion, the marginal cost for each vehicle using the road is negligible. According to standard economic theory, the efficient pricing of a collective good should equal the marginal cost for producing the good (i.e. the road service). This line of reasoning is a strong support for financing construction and management with taxes, which is the main principle in both countries.

5.2 Municipal roads and streets

The above presented arguments regarding institutional design for national roads holds to a large degree also true for municipal roads and streets. Both countries have, essentially, corresponding institutions. Although the positive and negative externalities for this type of road network are still widespread, they are primarily limited to the municipal community with a reduced and different collective of

individuals, firms and organizations. However, one can still expect the transaction costs for voluntary negotiations to be prohibitive in urban surroundings. We find here that the executive and management level is lowered from state to municipality, although the political dimension is still present.

Lowering the management level to correspond with the mainly affected collective should reduce the political and administrative transaction costs for planning and management. However, the same shift in level will most likely also improve the decision-making body's access to accurate information regarding the public opinion, since the above described situation with individual low stakes is liable to prevail also in these contexts.

In practice, both Denmark and Sweden finance municipal roads and streets with taxes. Interestingly enough though, both countries have legal possibilities to charge the landowners for some of the construction costs, in certain situations. This may be an indication of the benefits, in some dimensions, to a larger degree accruing to the local properties in comparison with national roads. These situations may be particularly at hand in limited residential areas with no thoroughfare, business nor trade.

5.3 Common private roads

For common private roads outside urban areas, the number of involved individuals is decisively more limited. The incentives for the property owners to actively participate in negotiations over the road issue would be much higher, and the transaction costs for negotiations apparently lower. Access to accurate information of local conditions and preferences is also enhanced with local management. Both Denmark and Sweden accordingly have institutional designs allocating rights as well as responsibilities to the landowners for managing and financing this category of roads. The responsibility for financing can be defended on the grounds that the economic benefits from road access mainly have impact on the local property values and serve transport needs for the individual property owners.

However, the noticeable differences between the national institutional designs for common private roads raise several questions concerning the functionality and efficiency of the systems. There exist several obstacles and impediments that may result in breakdowns during voluntary negotiations, such as imperfect information, high transaction costs in multilateral relations, or the employment of opportunistic behavior (e.g. hold out or free riding). The presence of efficient legal institutions have significant importance also in the context of negotiated agreements. Institutions can define and establish the property rights to be negotiated, they can comprise possibilities for imperative decisions in cases where no agreement is reached. The mere threat of this optional compulsory outcome can serve as "rules of the game" and thus facilitate negotiated agreements.

6 Conclusion and further research prospects

This short discourse has presented an overview of the existing institutional systems for road management in Denmark and Sweden at the different scale

dependent levels with regards to legal solutions. The comparison and analysis of national roads and municipal roads and streets offered few surprises, while the examination of common private roads institutions revealed conspicuous and distinct differences in several dimensions.

The present study thus implies that a more comprehensive and detailed comparison of the institutional designs for common private roads in Denmark and Sweden is justified. Since a common private road, shared by a number of real properties, is a special instance of the more general situation with common pool resources, the follow up study would potentially benefit from the works of Elinor Ostrom (1990) and the specific features – design principles – that successful common pool resource institutions need to possess in order to function well and prevail. Besides a theoretical analysis, such a study would also benefit from some empirical case studies in the respective countries.

References

2010/1 LSF 48, The legislative material behind the Danish Private Road Act, 2010, Introductory remarks to “L48 Forslag til lov om private fællesveje”, The Official Report of the Parliament Proceedings (Folketingstidende).

2014/1 LSF 20, The legislative material behind the Danish Road Act, 2014 – Introductory remarks to “L20 Forslag til lov om offentlige veje” 2014–15”, The Official Report of the Parliament Proceedings (Folketingstidende).

Björklund, M. & Wedman, A. (2004) Gemensamhetsanläggningar. Basfakta 1990–2003. [Joint Facilities. Basic facts 1990–2003] Master thesis, Real Estate Planning and Land Law, Royal Institute of Technology, Stockholm.

Christensen, F. K. & Sørensen, M. T. (2014) Grundejerforeninger og lokalplanen. [Houseowner associations and the detailed land use plan] Tidsskrift for Kortlægning og Arealforvaltning, vol. 122/ 47, pp. 35–49.

Coase, R. (1960) The Problem of Social Cost. *Journal of Law and Economics*, vol. 3, pp. 1–44. https://doi.org/10.1057/9780230523210_6

Cohen, L. (1991) Holdouts and Free Riders. *Journal of Legal Studies*, vol. 20, pp. 351–362. <https://doi.org/10.1086/467890>

Ekbäck, P. (2011) Externa effekter och markanknutna rättigheter. Coase-teoremet och svensk fastighetsrätt. [Externalities and Real Property Rights. The Coase Theorem and Swedish Real Property Law.] Div. of Real Estate Planning and Land Law, KTH, Stockholm.

Ekbäck, P. (2016) Fastighetssamverkan för utförande, drift och förvaltning av gemensamma anläggningar. Särskilt om anläggningslagen och lagen om förvaltning av samfälligheter. [RealProperty Cooperation for the Design, Operation and Management of Common Facilities. In Particular the Joint Facilities Act and the Joint Property Units Management Act.] 3 ed. Div. of Real Estate Planning and Land Law, KTH, Stockholm.

Julstad, B. & Vesterlin, T. (2016) Servitut i teori och praktik. [Easements in theory and practice] Wolters Kluwer, Stockholm.

- Kalbro, T. & Lindgren, E. (2018) *Markexploatering*. [Land Development] 6 ed. Norstedts Juridik, Stockholm.
- Kreps, D. M. (1990) *A course in microeconomic theory*. Harvester Wheatsheaf, Hemel Hempstead, UK. <https://doi.org/10.1515/9780691215747>
- Kågeson, P., Nature Associates (2004) *Väginfrastrukturens framtida finansiering*. [Future Financing of Road Infrastructure.] Vägverket, Borlänge.
- Mølbeck, H., Flensburg, J. & Højgaard Mørup, S. (2019) *Ekspropriation i praksis*. [Expropriation in Practice.] 2 ed. DJØF forlag, Copenhagen, Denmark
- North, D. (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge. <https://doi.org/10.1017/CBO9780511808678>
- Olson, M. (1965) *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press, Cambridge, Mass.
- Ostrom, E. (1990) *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge. <https://doi.org/10.1017/CBO9780511807763>
- Proposition [Government's Bill to the Parliament] 2009/10:170 En enklare plan- och bygglag. [A more simple Planning and Building Act]
- Proposition [Government's Bill to the Parliament] 2011/12:118 Planeringssystem för transportinfrastruktur. [Planning systems for transport infrastructure]
- Sharkey, W. (1982) *The Theory of Natural Monopoly*. Cambridge University Press, Cambridge. <https://doi.org/10.1017/CBO9780511571817>
- SOU [Swedish Government Official Report] 1996:168 Översyn av PBL och va-lagen. [Review of the Planning and Building Act and the Act on Public Water and Sewage Facilities.]
- SOU [Swedish Government Official Report] 2001:67 Enskild eller allmän väg? [Private or Public Road?]
- VEJ 9017 2016 VEJ nr. 9017 af 13/01/2016 Vejledning i lov om offentlige veje. [Guidance to the Roads Act.]
- Williamson, O. E. & Masten, S. E. (1995) *Transaction Cost Economics. Volume I: Theory and Concepts*. International Library of Critical Writings in Economics. Edward Elgar Publishing Ltd, Aldershot.