NEW FINANCING MECHANISMS AND CHANGING ROLES IN THE SWEDISH TRANSPORT INFRASTRUCTURE SYSTEM

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ABSTRACT

In Sweden the Central Government (the Government) is responsible for the provision of, financing and management of the Transport Infrastructure system, covering road, railroad, aviation and maritime infrastructure. Lately new funding sources have been introduced mainly for rail and road, with more focus on user fees and congestion charges. International cooperation is successively more important for the Government in Transport Infrastructure. Further Regions and Local Governments have the resources to take on more active roles in the sector. This challenges the role of the Government and also points to possible future developments in the organization of the Transport Infrastructure sector. The use of the transaction cost approach for an analysis of an efficient future organization of the Transport Infrastructure sector is discussed. Finally, some models for possible future roles of the Government and models for the organization of provision of Transport Infrastructure are presented. These models could be seen as examples for privatization and other forms of market-openings in the Infrastructure sector in general.

1. INTRODUCTION

In Sweden the Central Government (the Government) is responsible for the provision of, financing and management of the Transport Infrastructure system, covering road, railroad, aviation and maritime infrastructure. Since the 19th century the Government has provided funding for road and railroad-investments, either based on tax-collection or via borrowing. Maritime services (lighthouses, piloting etc.) and airports etc. have been paid for mainly by user-fees. Lately new funding sources have been introduced, also for rail and road. This changes the role of the Government and also points to possible future developments in the organization of the Transport Infrastructure sector.

Transport Infrastructure is important, for everyday life of the citizens and for business in general, and substantial in economic terms. The Swedish Government's assets in airports and air-traffic control systems, fairways and other maritime assets, roads and railroads are valued to around 190 bill SEK (as of end 2009) [1], which is around 15 per cent of Government's total (on balance) assets. Yearly Government costs for Transport Infrastructure are around 40-45 bill SEK, of which 90-95 per cent is covered for by Government appropriations. This is around 4 per cent of Government's aggregated yearly costs and around 1.3 per cent compared to GDP. Fees charges for the use of Transport Infrastructure cover the rest of the funding. Transport Infrastructure, together with defense, police and social policy are the core areas of the Swedish Government's activities.

In the paper the role of the Government is discussed in relation to the number of roles the Government has (the 'width' of roles) and the different organizational levels ('depth') the Government is active within. It is argued that the Government needs to be more active on the international level to carry out its core functions while, leaving roles on the local and

regional level to other Public Sector actors. This would also bring market openings to private sector providers of Transport Infrastructure.

Road and railroad infrastructure is in focus of this paper. Clearly, only a brief picture of roles, changes to them and what could be a future structure can be presented and discussed in this paper. The paper highlights some recent developments and points to questions that need further research. The presented insights and models for future development could also serve as examples of possible ways of analyzing privatization and other forms of market openings in general. The challenges of the Government in Sweden in Transport Infrastructure are mirrored in many other countries. Technology and organizational change is altering the relations between market actors and the Government.

2. TRADITIONAL ROLE OF THE GOVERNMENT AND PRESENT SITUTATION

The present role of the Government has developed during the latest 150 years. Steps towards deeper involvement in the sector were taken by the Government in the 19th century with the development of inland waterways, railroads and roads, as industrialization and trade grew in importance. The Government was the only actor who had the power to take on both the financial risks and construction risks, and thus had the necessary power and strength to implement the major national projects. At the same time a mix of Government responsibilities for major Transport Infrastructure links and a role for private and local providers was a feature of the development of the system in Sweden, see e.g. Kaijser [2].

As road traffic grew during the first half of the 20th century major road investments were needed and new financing mechanisms necessary. World-war two also brought a need for the Government to control the assets of the Transport Infrastructure-system to enable planning for military and civilian purposes more in detail. A generally positive stance towards Government intervention and planning in most areas, and the interest to make use of scale effects and to reduce costs in general, motivated the next step in the development, where the Government nationalized most parts of the railway and road system (except for local and private roads and some local railroads). Between 1940 and 1960 the present system was successively implemented with Government Agencies for all four modes of Transport Infrastructure, and ‘wide’ Government responsibilities, including ownership, regulation, management and financing.

Transport policy in Sweden has developed in parallel to this. Major decisions (on transport policy and transport infrastructure policy) were taken in 1963, 1988, 1997, 2001 and 2008. Many changes have been discussed and implemented; such as deregulation, reregulation, privatization and reorganization. Proposals have been put forward in order to introduce user fees for funding, e.g. in the 1990s [3]. However, in practice most of the basic foundations of the policy and the Government’s role have been left more or less unchanged. User fees, as an example, have never been introduced at large scale, until recently.

The development has led to a situation where the Government has taken on a role which is complicated, since it includes both many roles on a horizontal and on a vertical level. This can be displayed in a schematic table, see Figure 1.

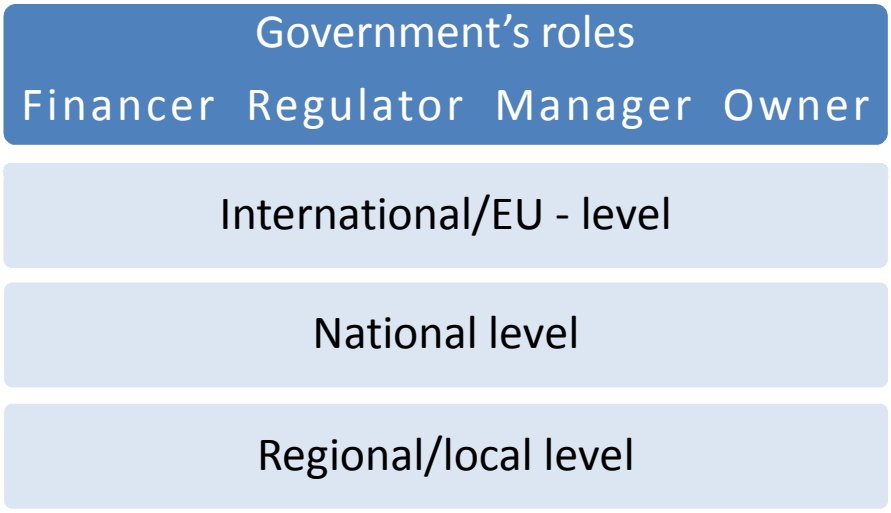

Figure 1 – Government's roles and levels of activities

The Government thus acts both as regulator and owner (including Governance and inspection roles), as manager and as financer of the Transport Infrastructure system. Further the Government is active both on the international, the national and the regional/local levels in the system. Clearly this leads to a number of possible goal conflicts, both between the different roles and between the different levels in the system.

To separate roles which might come into conflict is something that is generally emphasized when good governance practices of the Public Sector are discussed. A number of reorganization steps have also been taken in that direction in the Transport Policy sector in Sweden, where supervision and inspection have been separated from the operational agencies in the sector. See e.g. the Government's discussion in recent Bills to Parliament and subsequent decisions [4] regarding the separation of railway and aviation supervisory functions from the agencies.

Another potential role-conflict lies in the resource planning and coordinating functions of the Government Agencies, especially in rail. As competition is introduced in the rail-system for both passenger transport and freight transport, a number of new prioritization conflicts arise between the new operators' requests for availability and capacity into the railroad-network. It is vital that the Government, as long as it controls resource planning, treats all actors in a neutral way. Of course, the present situation where the Government owns the two major rail transport corporations (SJ and Green Cargo) as well as the Transport Administration might lead to suspicions that the neutrality of the resource planning is not upheld.

Besides a more strict view on the separation of roles within Government to safeguard good Governance in its activities, the present situation also makes the Government's role complicated as regards the different levels in the system. The growing importance of transport policy on the EU-level makes it necessary for the Government to focus on these issues and to formulate national Transport Infrastructure strategies. Growing powers of Regions and Local Governments in Sweden makes the Government's presently active role on these levels (via the Swedish Transport Administration) complex, e.g. when it comes to the Government's role in Urban Regeneration in relation to rail and road projects in cities. In most other sectors in Sweden the Government has chosen to leave similar active roles on the regional and local levels in favor of roles such as evaluator and supervisor.

3. ARGUMENTS FOR GOVERNMENT INVOLVEMENT IN THE TRANSPORT INFRASTRUCTURE AREA

3.1 Traditional arguments and regulation

Transport Infrastructure-assets have traditionally been seen as difficult to provide on market-like conditions. Transport infrastructure thus has been treated as a basic candidate when applying the theories of natural monopolies, as discussed e.g. by Samuelson in the 1950s [5]. Samuelsson in his article makes a split in the economy between goods provided on market like grounds and goods provided by the public sector. The existence of goods, such as Transport Infrastructure, that will likely be provided by the Public Sector is explained by their high investment costs related to Transport Infrastructure investments, efficiencies of scale and scope in the systems, the existence of external effects which are difficult to price, and the general deficiencies of payment systems, that has hampered the introduction of fee-funded roads and railroads. In air-traffic and maritime services (including light houses), on the other hand, fee based services have been the dominating model in Sweden. An often mentioned example in the popular debate about natural monopolies is the notion that lighthouses should be difficult to provide with fee based financing. This has, however, been countered by the practice in Sweden with fee based funding, as also pointed out by Coase in his 1974 article [6] on the lighthouse system in 19th century Britain.

Other reasons for the Government to take on a more active role in the Transport Infrastructure sector have been a political interest in influencing regional development, distributional effects in general and the interest to have some control over land use in connection to Transport Infrastructure construction. In addition to this it cannot be kept aside that Governments have had an interest in controlling the territory (physically) via the transport systems as a necessary means for the 'core' functions of the Government (as police, defense, tax collection, education) to function.

It is interesting to find that the Swedish Constitution Act [7] is silent on Transport Infrastructure. The Government thus has a choice at all times to expand or reduce its activities in the area, as long as it fulfills its obligations e.g. in relation to EU, where transport and infrastructure, and the development of Trans-European Networks for Transport (TEN-T) are mentioned in the Treaty as important areas of cooperation [8]. One of the most demanding areas in the Swedish Government's activities with a major part of the budget, is thus without clear support in the Swedish Constitution Act, whereas other similar 'core functions' (such as defense, education, social security) of the Government are mentioned in the Constitution Act.

3.2 Reform and reorganization

Over time since the 19th century Transport Infrastructure policies in Sweden have been discussed, debated and investigated, e.g. by a number of Government Committees. These efforts have mostly led to a stronger or unchanged role of the Government in the period from the 1930s up to the 1980s. From the later 1980s a number of measures have been taken in order to deregulate and reorganize the railway sector, with the split of the former vertically integrated Railway Administration (SJ) in two parts – infrastructure and transport separated – in the late 1980s as a major step. The railway transport market has, following this split, been successively deregulated, with openings for market-entry both in passenger and freight transport. The Government-owned railway operator (SJ) has gradually been

transformed into a number of state-owned corporations, providing services in relation to the railway, as property management and service for rolling stock.

Another step has been to separate, from both the Railway Administration and the Road Administration, consultancy and construction businesses. These have earlier been part of the Agencies, then transferred to business-like units and finally separated from the Agencies and organized as (so far) state-owned corporations, acting under market conditions.

As have been touched upon earlier other changes have been made within the Government Agency sector, with a separation of supervision and inspection to a separate Government Agency, responsible for regulation and inspection. In parallel to this the two major Infrastructure Agencies, the Railway Administration and the Road Administration were merged in 2010 to form the Swedish Transport Administration.

All these changes have been implemented from the late 1980s up to 2010, and represent a rather drastic reorganization of the sector. The changes have been made in order to improve efficiency of the sector. It is true that a more strict division of responsibilities has been achieved within the Government Sector and the opening up of the railway sector and growing consultancy markets have added to services provided on market conditions. In addition to this the newly formed Transport Administration is currently launching an initiative for reducing operating costs by some 20-30 per cents in the coming 2-3 years. Many signs point at increased efficiency and an organizational set-up that will give room for additional growth of services provided on the market. When it comes to the basic view on the role of the Government in Transport Infrastructure, however, less change has been seen.

3.3 Transport Infrastructure Policies remain unchanged

Turning to the basic structure of the infrastructure part of the sector, thus few things have changed. It is still the view of the Government that, due to the (perceived) existence of a natural monopoly-like situation in Transport Infrastructure (rail and road) there is a market failure which motivates the Government to own and manage the systems. This has e.g. recently been stated by the Government Committee analyzing the use of co-financing and user-fees in the transport system [9]. The Committee does not go into any deeper considerations in this respect, but more or less reflects the policies of the Government that has been stated a number of times the latest 30-40 years.

The introduction of user-fees for road users has been discussed a number of times, both in the late 1950s and the 1990s by Government Committees. Proposals have been made for the introduction of user fees for motorways, bridges and specific projects. In the end the Government has decided not to go for these projects. Some few projects with alternative funding have been implemented; mainly the two bridges connecting Sweden and Denmark/Norway and the Arlanda Railway, connecting Stockholm City and the major airport in Stockholm, Arlanda. This railway was built as a PPP-project. Lately congestion taxes have also been implemented in parts of the road system in the capital, Stockholm. So far these examples are minor exemptions from the overriding policy of Government funding.

In the present system funding, up to around 90-95 per cent of total costs, is provided by the Government, for the roads and railroads that are managed by the Transport Administration. Gasoline, diesel, VAT and vehicle taxes are the major funding sources for

road, while costs for the railways are funded mainly by general tax-income of the Government.
User fees are mainly used for railroad transport, where operators pay ca. 10 percent of the costs of the maintenance and depreciation costs of railroads, and for some freight-transport carriers in road transport, which also counts for only minor parts of the total funding.

Consequently the Government still has a number of different roles. The Transport Administration has the responsibility for all roles from planning of maintenance and investments, to the resource-utilization planning for railroads and the management and procurement of maintenance and construction works. This gives the Transport Administration a role where it cooperates with a large number of actors, both in the Public Sector on the regional and local level, and in the private sector, ranging from actors who are providers of services to the Transport Administration to the representatives of the users of roads and railroads. Physical planning is of course one of the activities that brings the Transport Administration into a large number of cooperative activities with external actors.

The dependence on Government Funding and the importance the political system puts on Transport Infrastructure, with goals covering many areas; from transport safety, to transport as an important factor in growth policies and accessibility, the Government Ministries gets deeply involved in the processes connected to Transport Infrastructure. The high dependence on Regional and Local Governments, their cooperation in physical planning and growth policies makes this an area of intensive policy debate. Local and regional aspects of Transport Infrastructure often dominate the discussion on the infrastructure system, rather than national or international aspects.

4. ARE THE ARGUMENTS FOR GOVERNMENT INVOLVEMENT STILL VALID?

A basic rule of thumb for deciding when the Government should take on a more active role in any sector, as owner or producer/provider, is whether a market failure is at hand. As the economy develops new products and services are introduced and new markets opened. Driving forces in this development is technology, (de)regulation and internationalization. The existence of market failures is therefore not set for once.

In modern western societies Governments have generally taken on a number of activities, which often goes beyond what constitutes market failure situations. Often Governments have good reasons for this, and perform well. Other cases are examples of mismanagement, and therefore of policy failures. The major difficulties in delivering promised punctual railroad services in Sweden during the latest winter periods might be an example of policy failure, while the success in bringing down car accidents in road traffic is an example of the opposite. Both are examples where the Government is responsible for the activities.

The traditional arguments for Government activities in the Transport Infrastructure sector, which largely are based on the one hand on the practical experience of the Government that private actors have not had the strength to provide Transport Infrastructure over time and, on the other hand, the wide-spread view that these systems are to be handled as natural monopolies, have not been challenged for a long time in Sweden. Consequently alternatives to Government intervention have often been seen as ‘dead ends’ in the debate. However, a number of tendencies have grown in importance during later years that needs

to be addressed, and that potentially changes the view on the Government's role. These are in short;

- The growing importance for Government to focus on international questions/EU cooperation and the need to develop national strategies to meet these new arenas
- The growing interest from more powerful regional and local level actors in the public sector to take a further responsibility for Transport Infrastructure
- The introduction of a number of new financing instruments for Transport Infrastructure, (user fees and co-financing) indicating the need for the Government to adapt to new governance regimes and cooperation forms

The challenges to the present organization of the Transport Infrastructure sector in Sweden thus comes both from organizational changes within the country and on the international arena, from technology that has enabled user-fees where only tax-collection has been seen as a financing tool, and new funding sources, where local and regional governments and private corporations are willing to contribute to financing of transport infrastructure projects. In the latest planning round for Transport Infrastructure these new funding sources contribute to 80 of 297 bill SEK in total spending on Transport Infrastructure investments for the period 2010-2021 [10]. New funding sources clearly will become important in the coming 12 years in Sweden's Transport Infrastructure system.

Experience from the present development in Sweden seems to catch up with some of the criticism voiced against the traditional view of Transport Infrastructure as a natural monopoly. E.g. Goldin [11] in a 1977-article concludes that there are

'…*no* goods that or services which are *inherently* public goods or externalities; that there is *always* a choice between equal access and selective access…'.

In particular Goldin refers to the changing technology of 'exclusion devices' and that new technology might make distribution of 'collective goods' into private goods. Technology seems to have brought us to the point where one of the basic foundations of Government intervention in Transport Infrastructure has to be reconsidered. The market failures of yesterday might not be the market failures of tomorrow. And growing possibilities for markets to be organized might reduce the scope for Government and political action. It is reasonable to expect that the challenges will affect both the 'width' and 'depth' of the Government's role. Before roles are changed a further analysis is necessary to decide in which areas the Government should continue its actions and in which areas other solutions are more efficient.

5. HOW SHOULD THE GOVERNMENT'S ROLE BE DEFINED IN THE FUTURE?

A classic question when studying the activities of the public sector is what the Government should focus on. Is it possible, based on a theoretical base, to define what areas Government should go into, and what areas to stay out of? There are different ways of analyzing this question; purely from en economic (resource) efficiency angle (such as market failure) or by taking into consideration also other aspects as the value of democratic representation, process efficiency and distribution between geographical areas or subsets of the population. The Transport Infrastructure sector includes many of these aspects. Here economic efficiency and questions of organizational structure will be in focus.

One way of analyzing the efficiency of different organizational settings in the economy is the transaction cost approach, introduced by Coase and developed by Williamson [12]. The original theories, which were developed for private sector organizations have later been adopted for public sector organizations by Williamson [13] and further by Ruiter [14]. The basic characteristics of transactions in Williamson's presentation are the asset specificity, uncertainty and frequency of transactions. In relation to public sector services Williamson also introduced the attribute 'probity', which stands for the specific 'soft' values of loyalty and rectitude common in some public sector services. The characteristics can, according to Williamson explain whether a complete contract can be made up and markets will prevail or whether incomplete contracts will be the general situation and hierarchies, possibly in the Public Sector, are more efficient.

In short it could be said that when expected efficiencies of scale and scope, together with the incentives for effective resource utilization originating from private ownership vs. public ownership override deficiencies of private sector provision, the private sector model should be applied. This can be adjusted, according to Williamson, if the reasons for public-sector provision are strong enough, exemplified by the term 'probity', as introduced by Williamson. Risks and cost of private monopolies, as one of the major deficiencies of private sector provision, naturally have to be considered in this discussion.

As exemplified below it could be expected that due to high asset specificity, high uncertainty as generally prevails both in the construction and use of Transport Infrastructure assets, the low frequency of contracts as regards infrastructure it could be expected that hierarchy (in the public of private sector) should be prevailing. The only factor in favor of market solution would probably be the low importance of 'probity', since Transport Infrastructure is more about technology and efficiency of resource-utilization than about ethical values, which are important in other parts of Transport, such as car-inspection.

Aspect	Hierarcy	Market
Asset specificity	High	Low
Uncertainty	High	Low
Frequency	Few	Many
Probity	Important	Less important

Figure 2 – Transaction costs and organizational model in Transport Infrastructure

To take the discussion further Ruiter introduces hybrid forms between market and hierarchy to analyze transaction costs in public sector settings, which seems appropriate

to bring into the discussion. Ruiter, in one step of his analysis defines three different modes for organization of public sector governance;

- full privatization
- regulation
- public agency

Out of the three models, the hybrid model with private actors, who supply goods and services to the public sector according to contracts, combined with roles in regulation and supervision, is an example of a de-regulative step taken in other sectors, e.g. as telecommunication. Since the Government will still have important roles as regulator and financier it seems less realistic to arrive at a situation where Transport Infrastructure could be provided solely on markets with full privatization. Even if new financing and a new organizational setting thus call for a new organizational set-up, the arguments of efficiencies of scale and scope, which makes regulation important to avoid monopolistic behavior, and the importance of policy goals such as distributive efficiency, accessibility, regional development etc. will still be important arguments for Public Sector involvement in the system.

The organizational form for providing Transport Infrastructure is not only a question of whether Transport Infrastructure should be provided by the public sector or the private sector. Rather it is one where provision can be organized in terms of both public/private and international/national/regional or local actors, or combinations thereof (and of course whether markets or hierarchies are most efficient). In Figure 3 below six different models are sketched for the provision of Transport Infrastructure, where it is illustrated that the Public Sector is still the main provider. One important reason for this is that costs and risks often are too high for private sector actors to handle or to absorb, even if user-fees can be introduced. Complete contracts might in this case be impossible to make up, and hierarchies (in the Public Sector) thus an expected solution.

	Public agencies	**Corporations (publicly or privately owned)**
International	EU Agency *EU TEN-T Agency*	Global Infrastructure Corporations *Posten Norden*
National	National Agency *Swedish Transport Administration*	Intermodal transport terminals *Kilenkrysset, AB Jernhusen*[*]
Regional/local	Regional/Local Agency *Planning functions of Regions* *Local Government's roads*	Harbors, terminals, rail systems *Regional Transportation Corporation in Stockholm (SL), Kilenkrysset, Stockholms Hamn*

Figure 3 - Transport Infrastructure Providers, some examples from Sweden

[*] Kilenkrysset – Privately owned corporation offering intermodal freight handling services, AB Jernhusen – Government owned corporation offering rail related intermodal services and station handling.

Changes in the short run could primarily be expected through vertical shifts in the table, from national to regional/local and from national to international, while few spontaneous shifts horizontally should be expected, without the Government taking on responsibility for residual risks as a 'guarantor of last resort', a model discussed e.g. by Obermann [15]. In this model Obermann describes a development where the Government over time becomes an actor that fulfills its obligations mainly through regulation and financing responsibility while it increasingly entrusts the operational execution of the services to non-governmental players. This is close to the hybrid models discussed by Ruiter. These kinds of shifts in the Government's role could make horizontal shifts in Figure 3 possible, going from Public Sector to corporate sector provision, with private or public ownership.

6. SOME MODELS FOR FUTURE PROVISION OF TRANSPORT INFRASTRUCTURE

Based on the discussion in this paper some different models for provision of Transport Infrastructure can be discussed. They represent different combinations of the Government's role, in relation to the 'width' of the roles and the 'depth' of organizational focus and with different room for market actors. Also transaction costs clearly differ between the models. Four main alternatives can be modeled at this preliminary stage to be compared with the present situation in Sweden (and other countries), a situation where the Government is active in all different roles presented in Figure 1 but has its focus rather on the regional/local level than on the national/international level. The models are:

1. An 'International provider model' – where corporations, privately or publicly owned, exploit the efficiencies of scale and scope-angle of Transport Infrastructure systems for improving efficiency. A possible step could be to organize one or more cross border (perhaps primarily within EU) corporations that provide road or railroad infrastructure for national and trans-European connections. Basic financing and/or guarantees could be provided via EU/Member States and additional financing via fees/tolls. Telecommunication, Postal Services and Airlines, with some Transport Infrastructure roles, act in this way, within an international structure.

2. The 'Horizontal club-model' (in relation to organizational level) where the Government as infrastructure provider and users/operators, perhaps mainly in rail, form an organization for the provision of Transport Infrastructure, possibly with considerable public financing or guarantees provided by Government. This would internalize some of the coordination issues between provider and user/operator which is part of the vertical disintegration of the Swedish railway-system. This model might be best suited for railroad-systems. The present UK rail-infrastructure system has some of these features.

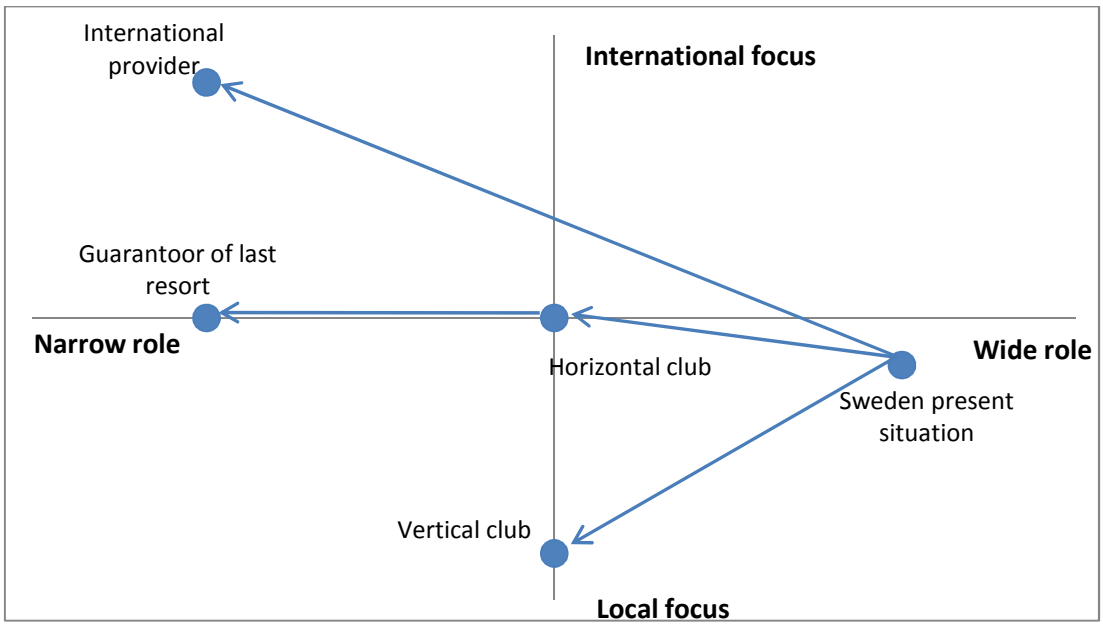

Figure 4 - Possible future organization-models in Transport Infrastructure and of the Government's focus in Transport Infrastructure

3. The 'Vertical club-model' would be to form an organization with the Government and Regions/Local Governments as owners/stake holders. This would internalize disputes between national and regional/local interests as regards funding and planning but might risk to reducing economic efficiency and make economies of scale to be down-played, at the expense of 'system-internal' aspects such as regional development or regional distribution. This model might be most accurate for road-systems.

4. The 'Guarantor-model' where Government leaves direct involvement in Transport Infrastructure provision. Government could offer concessions (as in telecommunications) and/or Government guarantees (as 'guarantor of last resort') to those who are willing to take on the responsibility for provision of Transport Infrastructure. The focus of the Government would shift to regulation and evaluation/supervision. This model is rather close to PPPs or procurement of projects as a road with a specified function and maintenance services as part of the contract, rather than a road or railroad with a detailed technical specification.

The different models would score differently as regards incentives, economic efficiency, transactions costs and performance in relation to political goals of the Transport Infrastructure system. The models should be further elaborated and evaluated against the different goals of the system. Possibly a combination of the models would be appropriate to implement, with different focus for different transport modes. A shift away from the present situation in Sweden with a wide role for Government to a more mixed organizational set-up is, however, something that will have to be addressed in the years to come, with growing pressures for change.

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