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**RAILWAY INDUSTRY STRUCTURES
AND CAPITAL INVESTMENT FINANCING**

o **Pekka Leviäkangas**

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SUMMARY

The aim of this paper is to study and analyse railway industry structures in some European countries and, on the basis of the analysis, form some basic forms of railway industry organisation. Furthermore, this paper aims to seek suitable alternatives for capital investment financing. It is assumed that industry organisation, legislation and present state-of-the-art practices largely dictate the financing arrangements available.

In the United Kingdom, railway industry has been privatised into smaller entities. Infrastructure operations, traffic operations and related service operations (eg engineering services and rolling stock leasing) are sold as independent companies to private investors. Even the owner of rail infrastructure has been privatised completely. In Sweden and Finland, traffic operations and infrastructure have been separated. The state still owns the traffic operator (both operators are state owned limited companies), which in practice hold a monopoly in the market. The owner of the infrastructure is a state rail authority. In Norway, railways are still public-owned, being quite a contrast to the arrangements in the UK.

The theoretical models of industry organisation may be constructed with the help of value-chain/line-of-business -matrixes. Each value chain link in each line-of-business represents a function which can be privatised if considered worthwhile. In the example countries, the value chains have been unbundled while the horizontal integration has remained. In principle, there should be no theoretical obstacles to unbundle the business vertically as well, provided that the railway market functions efficiently. Efficient market means a) several competitors in all sectors of the market b) minimum state intrusion and foremost c) that there is true market potential, ie that the market is large enough.

In the UK, the infrastructure investments are financed by a private infrastructure owner, Railtrack. The investments are recovered from train operating companies in the form of access charges. Major products may include Build-Operate-Transfer (BOT) type arrangements. In all Nordic countries, infrastructure investments are financed through state budget. In Norway and Sweden, some BOT-projects are under planning phase, while in Finland the discussion is about to begin.

There are no major obstacles for the employment of private capital in rail infrastructure investments in Finland. This could be done either by project company arrangements (that is, BOT-model) or by special arrangements where VR (former State Railways) possibly together with other investors directly finance the investment. The former model guarantees transparency as far as economical aspects are concerned. Furthermore, BOT-arrangement would enable fair competition between potential project promoters who are willing to finance, build and operate the line. The latter model is probably easier to implement, at least in the short term. However, numerous variants and possibilities are available for the financing of infrastructure investments.

Political and socio-economic viewpoints must be considered carefully when alternative financing methods are evaluated. Politicians and authorities would probably feel more comfortable if a clear financing strategy, as a part of national traffic policy, for rail investments existed.

Finally, it should be emphasised that the potential railway market extends over the eastern borders of Finland. Know-how of financing arrangements will provide a competitive edge in the international competition of building and operating new rails.

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TIIVISTELMÄ

Tämä tutkimus kuvailee rautatieliikenteen toimialarakennetta Isossa-Britanniassa, Ruotsissa, Norjassa ja Suomessa. Toimialarakenteen tutkimisen motiivina on etsiä erilaisia vaihtoehtoja infrastruktuurin pääomainvestointien rahoitukselle, johon toimialan rakenteella on ratkaiseva merkitys. Lisäksi lainsäädännölliset, organisatoriset ja totutut menettelytavat vaikuttavat rahoitusvaihtoehtojen muotoutumiseen.

Isossa-Britanniassa rautatieliikenne on täysin yksityistetty ja palveluketjujen osat on pilkottu osiin. Toimintoja on yksityistetty myös alueellisesti jaotellen. Infrastruktuuriin liittyvät toiminnot, liikennöinti ja erilaiset palvelu- ja tukitoiminnot (esimerkiksi radansuunnittelu ja kalustonvuokraus) on myyty yksityisille sijoittajille omina yhtiöinä. Jopa infrastruktuuriomaisuus on yksityistetty. Suomessa ja Ruotsissa infrastruktuurin omistus ja liikennöinti on erotettu toisistaan. Molemmissa maissa valtio kuitenkin omistaa edelleen kansallisen rautatieyrityksen. Ratainfrastruktuurin omistaa valtion virasto. Norjassa valtio sekä omistaa infrastruktuurin että harjoittaa liikennöintiä ja toimialan rakenne oli perinteinen valtiojohtoinen virasto tai liikelaitos ennen vuoden 1996 lopulla toteutettua uudistusta.

Toimialarakennetta kuvattaessa voidaan käyttää matriisia, jossa jalostus-/palveluketjun osat ja liiketoiminta-alueet on eroteltu. Ketjujen osista ja liiketoiminta-alueista voidaan haluttaessa muodostaa itsenäisiä toimintoja, jotka voidaan edelleen yksityistää. Tutkituissa maissa yksityistäminen on tapahtunut nimenomaan jalostusketjujen kautta ja liiketoiminta-alueet on säilytetty ennallaan. Osaltaan tähän vaikuttaa asiakassegmenttipohjainen liiketoiminta-alue jaottelu, jota tässä tutkimuksessa sovellettiin. Teoriassa yksityistäminen voidaan tehdä toisinkin, jos markkinat toimivat hyvin. Ns. tehokkaat markkinat ovat olemassa jos a) toimialalla on useita kilpailijoita, b) valtio ei säätele markkinoita ja c) markkinat ovat riittävän suuret, toisin sanoen kysyntä on riittävä.

Isossa-Britanniassa infrastruktuurin pääomainvestoinnit rahoittaa Railtrack Ltd, joka omistaa rataverkon. Investoinnit kuoletaan liikennöitsijöiltä perittävällä ratamaksulla. Joissakin suurissa hankkeissa voidaan soveltaa BOT-tyyppisiä järjestelyjä (BOT = Build-Operate-Transfer), joissa rakennetulle rataosuudelle taataan rahoittavalle konsortiolle yksinoikeus harjoittaa liikennettä. Pohjoismaissa rataverkon pääomainvestoinnit rahoitetaan valtion budjetista. Norjassa ja Ruotsissa on jo kokeiltu BOT-hankkeita. Suomessa asiasta on käyty alustavaa julkista keskustelua.

Yksityistä pääomaa voidaan käyttää ratainvestointeihin myös Suomessa - mitään periaatteellista, ylivoimaista estettä ei ole olemassa. Yksityistä pääomaa voidaan käyttää esimerkiksi muodostamalla erillinen rakennus- ja liikennöinti-yhtiö, projektiyhtiö, joka rahoittaa, rakentaa ja liikennöi rataosuutta. Toinen vaihtoehto on se, että VR Osakeyhtiölle annetaan erillisjärjestelyin oikeus rahoittaa ja rakentaa rata, jonka liikennöintiin VR säilyttää yksinoikeuden. VR voi toimia hankkeessa joko yksin tai yhteistyössä muiden yksityisten tai julkisten (esimerkiksi kunnat ja kaupungit) sijoittajien kanssa. Edellinen vaihtoehto, projektiyhtiö, takaa rahoituksellisen ja taloudellisen transparensin ja mahdollistaa lisäksi kilpailuttamisen toimiluvasta asianomaisella rataosuudella. Jälkimmäinen tapa on luultavasti helpompi toteuttaa käytännössä.

Eri vaihtoehtoja punnittaessa törmätään väistämättä poliittisiin ja ideologisiin kysymyksiin ja niistä tulisikin keskustella, jotta ymmärrettäisiin millaisia seuraamuksia eri vaihtoehtoilla saattaa olla. Poliitikkojen ja viranomaisten tehtävänä onkin määrittellä periaatteet ja strategiat, joilla pääomainvestointeja tulevaisuudessa voidaan tehdä.

Eri rahoitusmuotojen hallinta saattaa olla tärkeä kilpailuetu kilpailtaessa esimerkiksi Itä-Euroopan infrastruktuurihankkeista. Ilman kotimaista kokemusta tätä kilpailuetua ei voi syntyä.

FOREWORD

This study attempts to clarify the concepts and models of private financing of railways. The study includes examples on railway industry structures in UK and some Nordic countries.

The study has been prepared by Mr. Pekka Leviäkangas, Licentiate of Technology.

Helsinki, November 1997

Finnish Rail Administration
Strategy Unit

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1 INTRODUCTION

1.1 Organising and Contracting Privately Financed Projects

Many forms of organisational and contractual arrangements are available for privately financed infrastructure projects. The problem is not to find examples of these arrangements but to select the one that best - or at least, well - meets the needs of different parties involved in a project. These parties, whose goals and needs differ from each other, include

- the ultimate owner of the project, ie government or its representative organisations
- the project investors, both equity and debt investors, and the guarantors
- project contractors, subcontractors, and suppliers
- operators of the facility, who play an important role in the rail sector
- the final users of the services provided by the completed project.

While practically an infinite number of alternatives exist for organising, financing and contracting a privately financed project, some popular base cases have arisen. Table 1-1 introduces some of these cases and their basic characteristics. It is obvious that the presentation is far from exhaustive and is more of a list of examples.

The key word in the context of financial and contractual arrangements is risk. The aim of these arrangements is to allocate risks involved in a project in such a manner that the financiers receive an adequate return on their investment, while maintaining the prices on a reasonable level from the viewpoint of the government. Risk-return trade-off is one of the fundamental concepts of financial theory: the riskier the asset, the higher is the required rate of return on it. If the risks are too high for private investors, this will lead to higher pricing of services, and the society will suffer a welfare loss as the benefits of the services will not cover the prices paid for them. Private investors, both equity and debt investors, evaluate very carefully their risk position in each project and set the rate of return at an adequate level. Thus, it is in the interest of the government organisation that represents the whole society to create an investment opportunity for private investors which investors feel comfortable enough about so that their risk premiums are set at a level which does not impair the social net benefits of the project.

In Finland, the liberalisation of railways has created a new situation in the rail transport market. The former State Railways Authority (VR, Valtion Rautatiet) has been divided into two entities: 1) the Finnish Railway Administration (RHK) that has adopted the public authority responsibilities and is the owner of the rail infrastructure, and 2) VR limited company that operates the rail equipment on a business basis. The State of Finland is still the owner of VR company. The ownership of the rail infrastructure remains in the hands of RHK which also maintains the rail network and is responsible for capital investments as well. However, first proposals for construction of new rails by VR and other investors have been introduced.

In the road sector, a similar pattern of re-organisation is expected to take place within a few years. The Finnish National Road Administration has already been divided into a business unit that plans, constructs and maintains roads, and an administrative part, which takes care of the duties of public authority and manages and owns the infrastructure.

Table 1-1. Alternative Organisational and Contractual Arrangements in Capital Investment Financing

Type of Arrangement	Description	Applications on
Public enterprise	A public, state-owned enterprise takes care of the financing and realisation of the project, and receives compensation from the users of the service or from the government; it is possible that the public enterprise tenders out the construction and operating contracts for potential concessionaires.	For example in France and Spain on toll motorways, where publicly owned toll companies receive toll revenues from road users. In Finland and Sweden, state-owned rail operating companies collect ticket charges from passengers in order to finance their operating activities, but they do not participate at the moment in the financing of the capital investments in infrastructure.
Public-Private Partnerships ¹	An arrangement where public capital is supplemented by private contributors, who will benefit from the project. The contribution may be voluntary when speculative development is involved in the project and compulsory eg in the form of access fees, construction permit fees, extra zone taxes, etc.	Applied in the United States, for example in connection with highway and rail construction projects.
Franchising	The government grants the franchisee a right to operate a particular transport function, eg rail passenger traffic on a particular route or region. Franchisee pays a charge to the grantor according to the franchise contract (or possibly vice versa in case of bad economic outcome). Franchisee is given the right to operate the business in question.	Applied in the UK in railway sector. The Franchising Director (FD) makes a franchising agreement with the franchisee who will operate a particular rail line. In addition to franchise payments to the FD, the train operating company pays an access charge for the use of the rail infrastructure to Railtrack, which in turn owns the infrastructure.
Build-Operate-Transfer concessions (BOT)	The government tenders out the concession contracts and the concessionaire builds the facility, operates it until the investment has been recovered (by user charges or shadow charges paid by the government) with interest by both the equity and debt investors, and finally transfers the facility back to public ownership.	All over the world in transport infrastructure, power generating facilities, telecommunications and other infrastructure, such as water supply, oil pipelines, etc. Some impressive mega-project packages have been carried out with BOT principles, eg Hong Kong's Chek Lap Kok airport with its other transport connections.
Build-Own-Operate concessions (BOO)	As with BOT arrangement excluding the transfer of the facility. The facility remains in private ownership through franchise agreement for an indefinite period of time.	As with BOT but perhaps not so extensively popular.
Build-Own-Operate-Transfer concessions (BOOT)	Essentially the same as BOT.	As BOT.
Design-Build-Finance-Operate contracts (DBFO)	The British version of BOT with essentially the same principles. Compare: Design-Build-Operate contracts that are also used.	Applied in the UK in road projects; the government pays a shadow toll according to traffic volumes.

¹ Public in this context refers to either state or regional/local authority involvement, ie public capital is eventually taxpayer money. Private capital is naturally the money of firms, banks and other similar institutions that usually operate on a commercial basis.

Also at EU level, the policy of the Commission is to improve the efficiency and quality of service by transforming railway services into businesses controlled by the market, ie to privatise rail traffic operations¹. As far as capital investments are concerned, the White Paper of the Commission proposes public/private partnerships for financing such investments, but lacks any specific models of how the investments are to be actually arranged financially. The basic idea, which can be read between the lines of the White Paper, that the infrastructure management includes capital investments as well and they are to be financed through access charges from the operators. The White Paper merely states as follows:

"The Commission will study further principles for infrastructure charging and capacity allocation, and will in due course make proposals."

One can conclude that at present the project financing issue has to be solved in each case individually depending on each state's existing organisation and legislation. Evidently, the harmonisation within EU will result in some common practices and models. Hence, the financing issue will also adopt some common features, and a more open market will be available for project investors.

1.2 The Purpose of This Paper

The purpose of this paper is

- to describe the structures of railway industries in the UK, Norway, Sweden and Finland
- secondly, to develop a conceptual analysis framework for different types of organisational, financial and contractual arrangements within rail industry
- thirdly, to study capital investment financing arrangements available within each industry structure; as organisational issues cannot be separated from financing issues they have to be simultaneously dealt with
- finally, to perform an analysis in the Finnish operating environment, where existing organisations, legislation and responsibilities of authorities dictate which forms of arrangements are desirable and applicable.

The results are a product of a qualitative analysis and therefore extremely general in nature. Each project and operation needs to be analysed individually if a functional arrangement is pursued. It should be emphasised that **the goal is to describe private financing on a project level, ie how to organise, finance and implement a capital investment**, not the process or sub-processes of privatisation as a whole. However, it is obvious that the chosen model of privatisation affects the eventual financing alternatives that are applicable for rail projects.

This paper is only a starting point for the inevitable discussion of rail project financing alternatives in Finland. The models and alternative arrangements presented in this paper need to be modified and examined in more detail when practical solutions are sought. In the road sector, the first privately financed motorway is currently under tendering process.

¹ Commission of the European Communities: White Paper. A strategy for revitalising the Community's railways. Brussels 1996.

2 METHOD OF ANALYSIS

Elements of the Analysis

The analysis is divided into three elements. Each are presented in an identical framework in order to clarify the comparisons between alternative approaches. These elements are

- organisation of the railway industry describing briefly the responsibilities and degrees of freedom of the parties involved
- capital investment financing arrangements, ie how the capital investments are financed, organised and carried out
- evaluation of the risks that are borne by different parties concerning the profitability of the investment.

Organisation

The value chain methodology is adopted here. This methodology is described in many strategic management textbooks, but was first introduced by McKinsey & Co¹. The analysis is compressed in a framework presented by Rennicke². First, Rennicke lists the value chain "links" of railway business as follows:

Stations, terminals (including related land properties)	Operations: Train Crew		Traffic Management (including traffic control, signalling and detailed track allocation)
Design and Engineering	Traction and Rolling Stock: Maintenance Equipment Distribution		Ownership
Customer Account Control	Support Services: Marketing, pricing and sales		New Service Development
Design and Engineering	Infrastructure and Property Related to Tracks: Maintenance Construction		Ownership

Note the difference between land property related to stations and terminals and land property under the tracks. Note also that traffic management is understood in its broader meaning.

¹ See eg: Porter M: Competitive Advantage - Creating and Sustaining Superior Performance.

Any industry or business may be divided into five basic functions: 1) input logistics 2) operations 3) output logistics 4) marketing and sales 5) after sales and maintenance services. These functions form the value chain.

² Rennicke WJ: Private sector participation in railway activities. Rail International, 12/1996, pp 26-29.

Secondly, primary businesses and services can be divided into the following categories (business sectors or lines of businesses):

Intercity Passenger:			
Train Operations	Ticketing	Information Services	Stations
Commuter:			
Train Operations	Ticketing	Information Services	Stations
Wagonload Freight:			
Linehaul		Bulk Transload	
Combined Transport:			
Pickup and Delivery	Terminal	Information Services	

A matrix presentation can now be drawn showing the vertical and horizontal integration (or disintegration, for that matter) of operations. An example is presented in table 2-1. Traditionally, state owned railways have been fully integrated in both horizontal and vertical directions.

Table 2-1.

Value Chain Link		Line-of-business	Intercity Passenger	Commuter	Wagonload Freight	Combined Transport
Operations	Stations, Terminals					
	Traffic Management	<i>Vertical integration</i>				
	Train Crew					
Traction and Rolling Stock	Design and Engineering					
	Fleet Distribution					
	Maintenance				<i>Horizontal integration</i>	
	Ownership					
Support Services	Customer Account Control					
	Marketing, Pricing and Sales					
	New Service Development					
Infrastructure and Property	Design and Engineering					
	Maintenance					
	Construction					
	Ownership					

As the analysis proceeds, each organisation chart is followed by the matrix showing the strategy on which the organisation of the industry is based. The organisational units are placed in the matrix in their proper cell.

The practices followed in capital investments in infrastructure are described also by a matrix showing the flows of capital, cash, and real assets as these transactions take place within the industry organisation. The presentation is extended beyond mere investment financing since a useful picture of the financial flows between the protagonists is achieved, thus serving other analyses as well. The financial flows and contractual relations are given in appendices.

Investment Financing

The investment financing question is discussed in a little more detail describing the state-of-the-art practices in a particular country and organisation.

Risk Characteristics

Finally, after the financial flows have been described, the risks of different parties are summarised and evaluated. Hedging possibilities and arrangements are discussed briefly.

The risks involved in a privately financed infrastructure capital investment project may be classified according to uncertainties that relate to either 1) receiving an expected benefit or cash flow, or 2) investment cost or costs of operating the facility. Deficit or surplus in these items affects the profitability of the investment and the profitability of different operations. Some risks appear to be critical while others are more trivial. However, the organisational and contractual framework allocating the risks between parties involved determines the significance of each risk from different viewpoints. The risks may be listed in their economical context as follows:

- investment cost risk
- interest rate risk; cost of debt capital
- foreign exchange rate risk in case of foreign investors
- operating cost risk; inflation
- demand risk; revenues from operation (from users of the service or as shadow charges from the government)
- risks related to government policy changes; taxation (eg corporate tax, fuel tax, environmental taxes, etc.)
- risks related to technical implementation and operation of the project - eg time delays in construction or closing down the facility in case of accidents, etc. - which causes a disturbance in operating revenues even if demand factors remain unaltered.

These are the fundamental financial risks (in the end, technical risks always transform into financial risks) that can be transferred and allocated in various manners depending on the contractual arrangements applied in each case. Equity holdings arrangements also affect the behaviour and risks of different parties. For instance, if project contractors and suppliers are also the equity investors of the project company, they have an incentive to complete their contracts economically and efficiently in order to guarantee a successful starting point for their investment, ie the project. Debt financiers are similarly interested in ensuring a successful implementation and operation of the project as they face the risk of losing some of their investment in case of bankruptcy.

From a purely theoretical viewpoint, greater risks also offer possibilities of greater returns, as the variance of return usually increases when the other variables' variance increase. However, investors are traditionally considered to be risk averse in their behaviour.

3 ORGANISATIONAL AND CONTRACTUAL ARRANGEMENTS APPLIED IN OTHER COUNTRIES

3.1 The United Kingdom

□ Organisation¹

The industrial structure of the British railways after the restructuring and privatisation of British Rail in 1992 includes the following parties and organisations:

- **Railtrack**, which is the new responsible infrastructure authority. It owns and operates the track and the associated infrastructure (eg signalling). It also owns most of the stations and depots; there are some Independent Stations that are usually large, high volume facilities, and Independent Depots. Railtrack plans access to the network and manages the rail traffic. Operators are granted an access to the network through an access agreement with Railtrack. Railtrack is also the lessor of stations and depots it owns. Railtrack is responsible for the planning and securing of investments in the infrastructure. Railtrack was completely owned by the government but has now (1996) been privatised.
- **Franchise operators**, who provide the passenger transport services by competing over the franchise contracts. Until the franchise is granted to a private operator, the **train operating company (TOC)** is a subsidiary of British Rail. At the end of 1995, there were 25 TOCs that operated different passenger lines. TOCs have organised themselves as an association to take care of common interests. At present, the minimum franchise period is seven years. Longer periods may be tendered by the competing operators.
- **ROSCOs**, which own or lease the majority of the rolling stock previously owned by British Rail. ROSCO leases out the rolling stock and provides heavy maintenance services to TOCs. By now, all three ROSCOs have been sold to private investors. (Spare parts supply and services are also organised as independent enterprises SPARESCO and RAILPART).
- **Freight operators**, who provide goods transport services and are likewise granted an access to the network by Railtrack. Freight transport operations were sold directly to the private investors by British Rail / Her Majesty's Government. Different lines-of-businesses were sold as separate packages (domestic bulk transport, domestic parcel services, international transports, etc.).
- **Infrastructure maintenance and track renewal units**, that have been partly sold to private investors the rest being for sale. By March 1996, six of British Rail's thirteen infrastructure and maintenance units had been sold.
- **Design and engineering units**, that have been privatised (all seven design offices).

¹ Sources: 1) Office of Passenger Rail Franchising (OPRAF): Passenger Rail Industry Overview, September 1995. 2) OPRAF: Passenger Rail Industry Overview, Supplement March 1996.

- **British Rail (BR)**, that continues to exist and operates those businesses not yet sold to private investors and those operations for which there is no market, eg non-operational land property and buildings.
- **Franchising Director**, who is a statutory officer established in order to take responsibility of negotiation and awarding of rail franchises to licensed operators on the basis of competitive tendering. It also monitors the franchisee's performance. The Franchising Director receives payments from operators on profitable franchises and subsidises non-profitable lines under the franchise agreement when necessary.
- **Rail Regulator**, that functions under the Railways Act and assumes the following responsibilities: a) granting of licences and enforcing compliance with their terms, b) regulating access to track, stations and depots and enforcing domestic competition law in relation to railway services.

The organisation of the British railway industry is shown in figure 3-1.

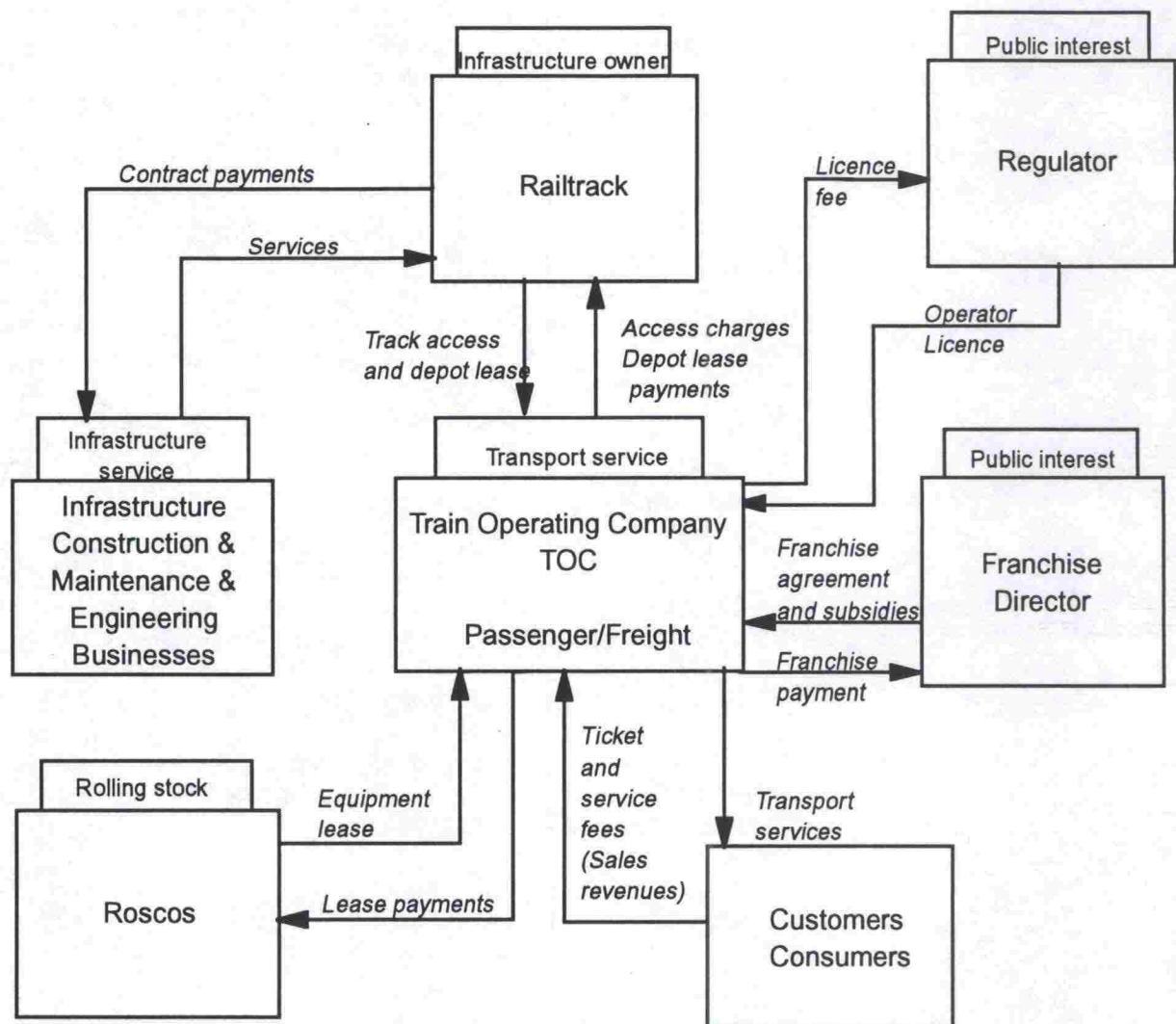


Figure 3-1. The British Railway Industry. Note the private infrastructure owner and the role of ROSCOs. Also note the roles of public authorities.

Table 3-1 shows the organisational arrangements in a value-chain/line-of-business-matrix. It is observed how the vertical integration that previously dominated British Rail has been transformed into more concentrated, horizontally integrated businesses.

The financial and contractual relations are also shown in the form of a robust matrix in appendix 1.

Table 3-1. UK Railway Industry. Value-chain/Line-of-business matrix

Value Chain Link	Line-of-business	Intercity Passenger	Commuter	Wagonload Freight
Operations	Stations, Terminals	TOCs	TOCs Independent stations	Freight companies ¹ (private) Freight companies (BR)
	Traffic Management	Railtrack	Railtrack	Railtrack
	Train Crew	TOCs	TOCs	Freight companies
Traction and Rolling Stock	Design and Engineering	Private businesses	Private businesses	Private businesses
	Maintenance	ROSCOs	ROSCOs	ROSCOs
	Ownership	ROSCOs	ROSCOs	ROSCOs
Support Services	Customer Account Control	TOCs	TOCs	Freight companies
	Marketing, Pricing and Sales	TOCs	TOCs	Freight companies
	New Service Development	TOCs	TOCs	Freight companies
Infrastructure and Property	Design and Engineering	Private businesses ²	Private businesses	Private businesses
	Maintenance	Private businesses	Private businesses	Private businesses
	Construction	Private businesses	Private businesses	Private businesses
	Ownership	Railtrack	Railtrack	Railtrack

¹ It is possible that Freight company = TOC in a particular line

² All the private businesses in engineering, construction and maintenance include ex-British Rail units

Investment Financing

For capital investments the basic principle is clear. Railtrack acts as an investor in new infrastructure. The primary method of financing a capacity extension or a new link investment is by access charges received by Railtrack. Railtrack is entitled to receive an adequate return on its investment. It is obvious, since Railtrack owns and operates the infrastructure, that Railtrack has an incentive to "extend" its markets and make the infrastructure more lucrative to operating companies. Railtrack can also utilise its commercial freedom in raising funds from external sources. For example, a capital project could be financed by Railtrack's and Operator's equity infusion added with necessary debt capital raised from private capital market. In addition, Railtrack can utilise the same off-balance-sheet financing arrangements as any other private firm. Nevertheless, special arrangements are required without exception in large capital projects.

The Regulator is concerned with major capital investments in the sense that it gives its approval to special arrangements, eg major BOT projects. Exclusive rights for the use of infrastructure, as it is with BOT projects, are possible provided that financial transparency is ensured, and that concession contracts or other exclusive rights guaranteeing arrangements are prepared on a fair basis. The Rail Regulator adopts the public benefit view much in the same way as the Franchising Director and is the licence grantor in these cases as well. Hence, it may influence the investment plans prepared mainly by Railtrack.

Risks

Typical capital investment risks can be summarised and allocated according to table 3-2:

Table 3-2.

Typical Risk Allocation in Rail Infrastructure Capital Projects in the UK		
Risk	Party	Risk-Return Trade-offs and Hedging Options
Investment cost	Railtrack	(Railtrack may try to increase access charges, but faces then demand risk.) Railtrack can cover investment cost risk by fixed-priced contracts and thus transfer the risk to the contractor.
Interest rate (cost of debt)	Railtrack	(Railtrack may increase access charges, but faces then demand risk.) Railtrack has an incentive to attach the interest rate on debt to long-term market-based interest rates to smooth the fluctuations of rates. In any case, financiers are most likely to use floating rates added with premiums. Numerous alternatives exist for hedging against changing interest rates. For example, a forward contract ¹ may be agreed upon between financiers and Railtrack.
Foreign exchange rate (if foreign capital is employed)	Railtrack	(Railtrack may increase access charges at the risk of decreasing demand.) Hedging may be done with instruments like forward contracts (see above) or swap contracts ² .
Operating cost	Operator (TOC)	Basically there are two things a TOC can do to handle risks. First, it can try to negotiate as favourable a franchise agreement with the Franchising Director (FD) as possible. This includes negotiation concerning government subsidies. Secondly, TOC may try to renegotiate ticket pricing principles initially defined in the franchise agreement. Then, of course, it assumes risk of demand. Operating cost risks are hedged by indexing, demand risks by FD's guarantees in the agreement, operating revenues risks -in case of eg accidents - and government policy changes are hedged by the formulation of agreement terms.
Demand	Operator	
Operating revenue	Operator	
Government policy	Operator	
<p>¹ A forward contract is an arrangement where eg 12 month rate is agreed as a base rate for debt. After 12 months the borrower pays the difference of the initial and present rate if the present rate is higher than it was initially; in an opposite case, the lender compensates the difference.</p>		
<p>² For example, Railtrack may agree to pay a dollar debt in pounds. The arrangements may also involve forward contract type of risk sharing against exchange rate fluctuations.</p>		

Discussion

Rail industry structure in the UK is complex as the value chain links are cut vertically in to small, if not minimal, pieces. However, individual rail lines or links still remain a natural monopoly at least during the period of a franchise agreement. Very strong regulating and monitoring bodies are needed to ensure the functionality of the system and to guarantee that the welfare effects are achieved. A highly complex contractual system is needed to allocate various risks and responsibilities between the parties within the industry.

As long as Railtrack is financing capital projects through access charges and is at the same time allowed to receive a full return in respect to the risk of the investment, there is an equilibrium in risk-return and demand-price trade-offs. Similarly, if Operator is investing equity in the project and expects to recover its investment from ticket fees or service payments received from customers (added with government support), the same economic principles apply. Theoretically taken, the British model should be functional in this respect, which explains largely the new industry structure. Government, ie the Franchising Director, is interested in capital projects as it may be required to subsidy the investment, and this may cause some distortion to the otherwise

orthodox framework. On the other hand, the government may have a strong incentive to see the project realised, and thus it may have to accept both subsidies and high returns to project investors. It would be certainly in the government's interest to formulate the franchising agreement in these circumstances such that the payments from the Operator provide some return also to the government / Franchising Director. The difference between the parties in the bargaining process, as project financing is arranged, is that other parties look for economic return in monetary terms, while the government / Franchising Director looks for social return. Both goals may be satisfied simultaneously.

As for risks, it is observed that major risks are almost completely transferred to the private sector, namely Railtrack and Train Operating Companies.

3.2 Sweden

□ Organisation¹

The re-structuring of the Swedish railway industry started in 1988 with Transport Policy Act adopted by the Parliament. Since then the re-structuring has been more or less a constant process. The industry consists of the following parties and organisations:

- **Banverket** (BV for short; National Rail Administration), that owns and manages the rail and the related infrastructure. Banverket adopts the view of public benefit. It is also responsible for the development of infrastructure, ie investments. Banverket charges access fees, or rather infrastructure use charges, from the train operating companies that are in passenger or freight traffic business.
- **Railway Inspectorate (RI)**, which is responsible for track allocation and traffic management. RI is an independent unit organised within BV.
- **Statens Järnvägar, SJ** (State Railways), a state-owned railway company that operates both passenger and freight traffic. Like any operator, SJ pays infrastructure charges to Banverket. The majority of the rolling stock in Sweden is owned and managed by SJ. The stations are owned by SJ as well. SJ operates on a business basis, ie maximises profits. It has an exclusive right to operate main rail lines.
- **Private operators**, that have an access right, though only after SJ, to network in order to carry out their transport business. Operators can run their business only on regional lines. Anyone who conforms to the requirements specified by the state, is eligible to operate a rail line.
- **County Transport Authorities (CTA)**, who have a right to exercise local passenger transport, which is usually purchased from SJ or private operators. The infrastructure charge for those passenger lines is paid by the operator. CTA has received the rolling stock that was used previously by SJ to provide local/regional transport services on a non-profit basis.
- **Swedish Transport Board (STB)**, that purchases or subsidies non-profitable transport services to achieve regional policy objectives, and covers SJ profit account deficit if necessary.

¹ Sources: 1) Hansson L: A New Swedish Railroad Policy: Separation of Infrastructure and Traffic Production. Transportation Research, vol 25A, no 4, 1991, pp 153-159. 2) Government Bill 1995/96:92 of the Swedish Government 3) Larsson S & Ekström A: The Case of Swedish Railways. Privatisation of Railways. European Conference of Ministers of Transport, Paris 1993, pp 51-80.

- **Engineering consultants, maintenance service suppliers, construction contractors,** who provide services for Banverket. Banverket still includes some construction and maintenance units that carry out operations.

The industry-wide organisation is shown in figure 3-2 and a corresponding value-chain-link/line-of-business matrix presentation is shown in table 3-3. In appendix 2 another description of the intra-industry relations is presented.

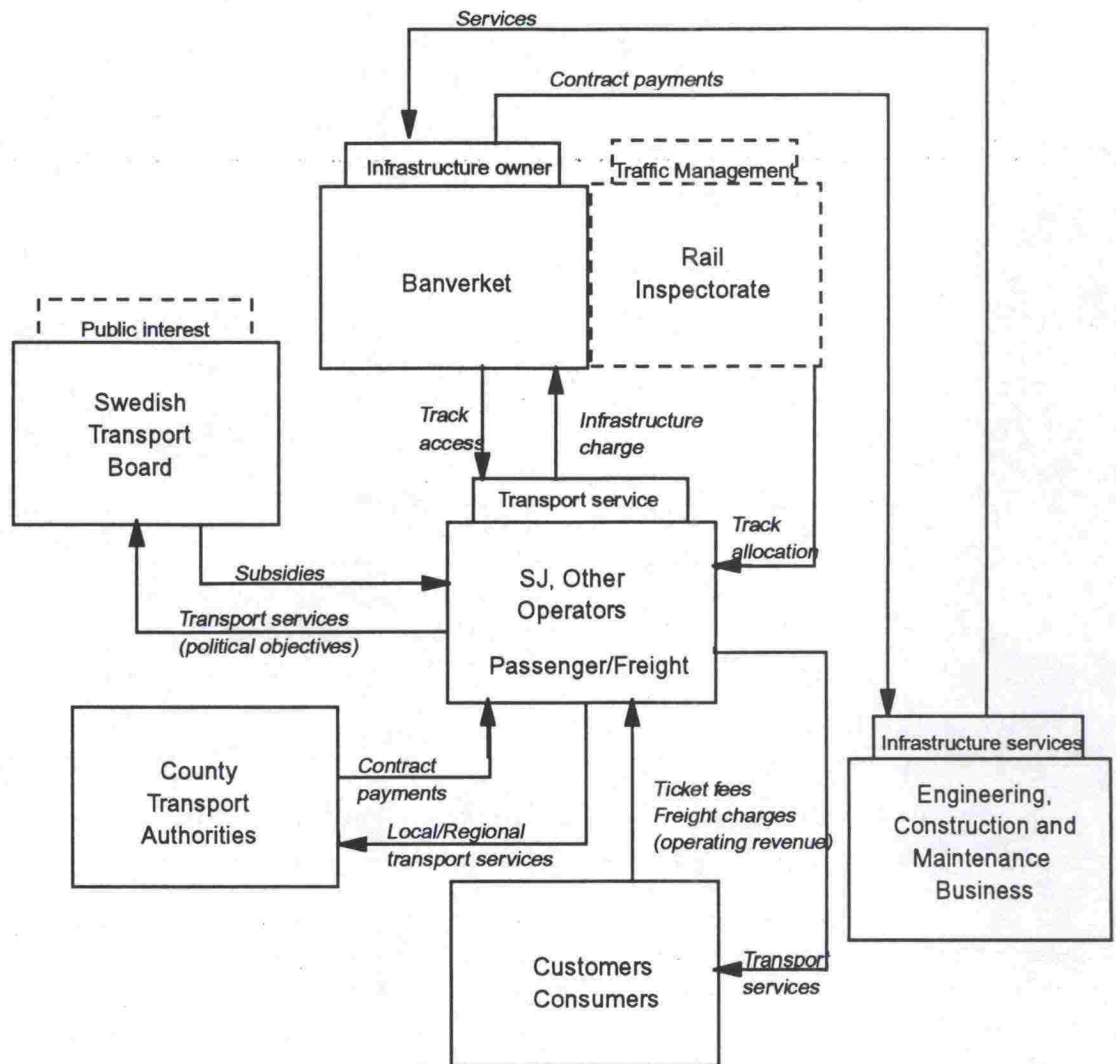


Figure 3-2. The Swedish Railway Industry. Note the roles of Transport Board and County Authorities as important transport service buyers. In a way, they are customers from the operators' point of view.

Table 3-3. The Swedish Railway Industry. Value-chain/Line-of-business matrix

Value Chain Link	Line-of-business	Intercity Passenger	Commuter	Wagonload Freight
Operations	Stations, Terminals	SJ	SJ	Banverket
	Traffic Management	Rail Inspectorate	Rail Inspectorate	Rail Inspectorate
	Train Crew	SJ	SJ, Private Operators	SJ, Private Operators
Traction and Rolling Stock	Maintenance	SJ	SJ, CTA	SJ, Private Operators
	Ownership	SJ	SJ, CTA	SJ, Private Operators
Support Services	Customer Account Control	SJ	SJ, Private Operators	SJ, Private Operators
	Marketing, Pricing and Sales	SJ	SJ, Private Operators	SJ, Private Operators
	New Service Development	SJ	SJ, Private Operators	SJ, Private Operators
Infrastructure and Property	Design and Engineering	Banverket (assumes responsibility, but operations contracted out to private firms)	Banverket (as previously)	Banverket (as previously)
	Maintenance	Banverket (as previously)	Banverket (as previously)	Banverket (as previously)
	Construction	Banverket (as previously)	Banverket (as previously)	Banverket (as previously)
	Ownership	Banverket	Banverket	Banverket

Investment Financing

Capital investments in the rail infrastructure are financed by the state budget. Banverket is responsible for preparing and implementing capital budgets after parliament approval. However, private investments may also take place. As an example one can point out Arlandabanan, the fast train connection from the centre of Stockholm to Arlanda airport. A single-project company owned by the state (A-Banan Projekt AB) was founded to manage the project in the interest of the state, while a private consortium (A-Train AB) was built to engineer, finance, build and operate the train connection. A concession contract was agreed upon between A-Train and A-Banan, giving the A-Train AB the right to operate the line until year 2040 after which A-Train AB transfers the project to A-Banan Projekt AB. In this respect the project is a pure example of BOT concept with the exception of state being involved as an owner through a separate project company. The Arlanda project organisation is shown in figure 3-3. The shareholders of A-Train are multinational mega-firms (GEC, Mowlem), large power generating companies (Vattenfall) and construction contractors (NCC, Siab). A-Train pays no infrastructure charges to Banverket, but SJ pays some track fees for track use to A-Train.

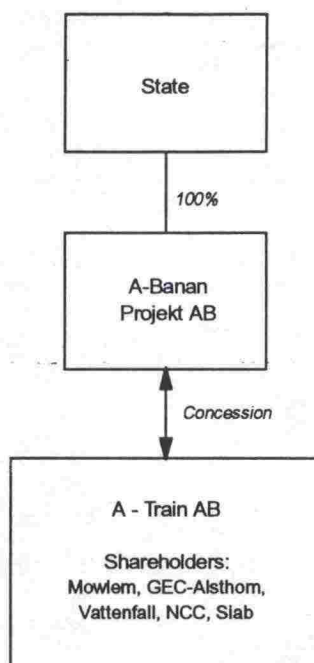


Figure 3-3. Arlandaban Project Organisation¹. Note the two-staged organisation where the state has isolated itself from any contractual obligations. The state bears the risks of an equity investor and, of course, the risks of public benefit losses in case of bad outcome of the project.

□ Risks

Risks are usually allocated according to table 3-4. It can be noted that as long as the number of private operators is modest, most of the risks within the industry are borne ultimately by the state of Sweden (which owns SJ) and therefore by the Swedish taxpayer. In the case of Arlandaban major project risks are, as always in BOT projects, borne by the equity investors and debt investors. More detailed contractual arrangements dictate the risk allocation between the parties involved.

Table 3-4.

Typical Risk Allocation in Rail Infrastructure Capital Projects in Sweden (excluding special arrangements such as Arlandaban)		
Risk	Party	Risk-Return Trade-offs and Hedging Options
Investment cost	Banverket (state)	No risk-return trade-off analyses are done in public projects based on traditional benefit-cost-analyses. The state may use contractual clauses, eg fixed-priced contracts, to protect itself against cost overruns.
Interest rate (cost of debt)	Banverket (state)	Long-term reference rates may be used as debt interest rate.
Foreign exchange rate (if foreign capital is employed)	Banverket (state)	Forward contracts, swaps.
Operating cost	SJ, Private Operators	Basically all risks during and related to operation of traffic are borne by operators. No protective contractual security exists.
Demand	SJ, Private Operators	
Operating revenue	SJ, Private Operators	
Government policy	SJ, Private Operators	

¹ Source: Brochures of Arlandaban (Banverket).

Discussion

The Swedish model differs from the British one in the sense that privatisation has not been taken to the extreme. In fact, state still owns SJ that holds exclusive rights in regard to traffic operating. Thus, it can be said that even in traffic operations true competition is lacking. On the other hand, the first elements of free competition have now been created, and it is expected that the industry is re-structured in time due to market forces and growing liberalisation on the behalf of the state.

Project financing and concessions can be used in special cases where the project (and its prospects in terms of cash flow generation) in itself is profitable enough to invite private investors.

3.3 Norway

Organisation

In Norway, the state company NSB is practically the same as the industry. It possesses monopoly rights concerning both infrastructure and traffic production. The industry consists simply of NSB, the customers using its services and contractors and suppliers offering their services to NSB.

Financing of Investments

A special case in Norway is Gardemobanen¹, a Norwegian version of Arlandabanan. Gardemobanen extends from the centre of Oslo to Oslo airport (Gardemoen). A single-project company was formed by the state via NSB. NSB is the sole shareholder of NSB Gardemobanen A/S. The company is responsible for the building and operation of the line. It buys its own equipment. If other operators wish to use the line, they pay a track charge to Gardemobanen project company. The state of Norway is both the equity and debt financier of the company.

Investment Risks

Since all typical capital projects are financed by the state budget, the State of Norway / NSB bears the risks. Even in special project arrangements, like Gardemobanen where state is involved as a major shareholder of the project company, the ultimate risks are borne by the state.

Discussion

It is easy to conclude that Norway's model represents the traditional rail industry arrangements even if some special forms of project financing are experimented with. From project financing point of view, extending the project equity holders to private sector should have some effect on incentive to implement and operate the project more efficiently. For example, road investment financing with tolls in Norway usually involves also other promoters besides state authorities².

¹ Sources: Brochures received from Norwegian State Railways (NSB).

² Leviäkangas P: Bomvägfinansiering i Norge (Road Toll Financing in Norway). Vägverkets interna publikationer 37/1996.

3.4 Finland

□ Organisation¹

In Finland, the railway industry structure resembles that of Sweden. Infrastructure and operations are separated and licensed operators have access to tracks. Parties within the industry can be listed as follows:

- **The Finnish Rail Administration (RHK)** owns the infrastructure and is responsible for its development and acts as a public authority. It receives access or infrastructure charges from operators. It also finances its operations by receiving funds from the state budget.
- **VR, the former State Railways**, that has recently been turned into a profit seeking business unit, is a limited company, but is maintained completely in state ownership through its shares. VR in turn is divided into separate independent companies according to their lines of business. The mother company takes care of the administrative and financial operations. VR Ltd owns the majority of the rolling stock, both passenger and freight, in Finland. VR owns the major stations and terminals through separate property companies. A more detailed company structure is shown in figure 3-4.
- According to the 1995 railways act **other EU-originated operators** may enter the tracks to exercise their passenger or freight traffic business if a license is granted by the Ministry of Transport and Communications. Only international passenger and freight traffic is open to competition (no licence applications have been received so far, that is September -96). VR holds exclusive rights to domestic traffic, but only until year 1999.

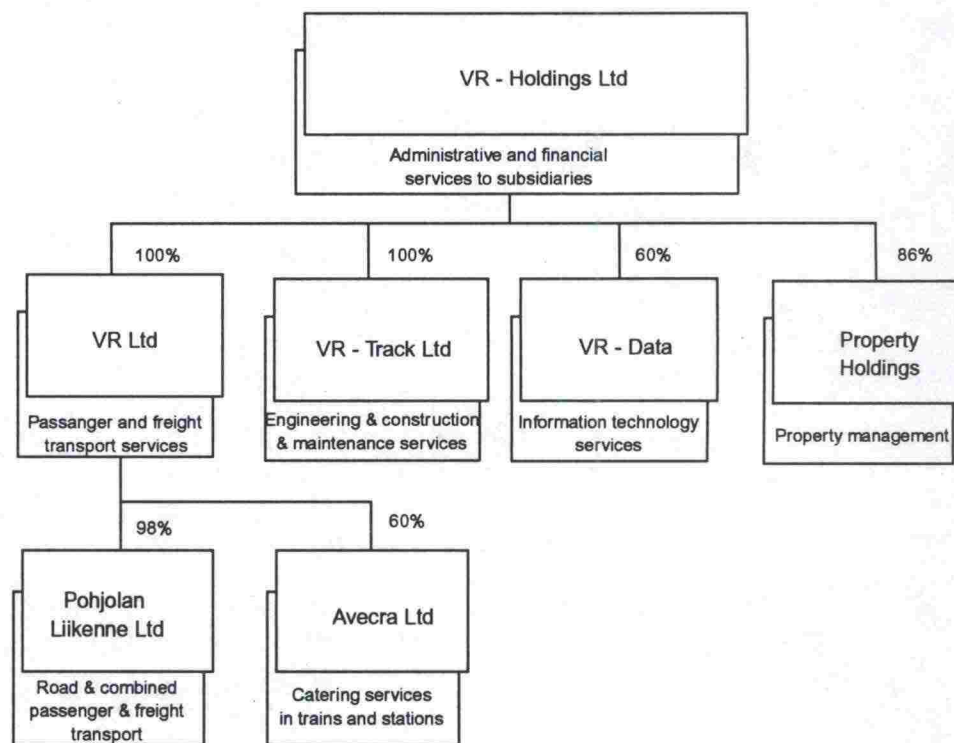


Figure 3-4. VR Company Structure in 1996. Note that practically all operations are arranged under the holding company which makes the company a very integrated business in both vertical and horizontal directions.

¹ Sources: 1) The Finnish Rail Administration: Annual Report 1995. 2) VR Annual Report 1994. 3) 1995 Railways Act of the Parliament. 4) Discussions with RHK and VR executives.

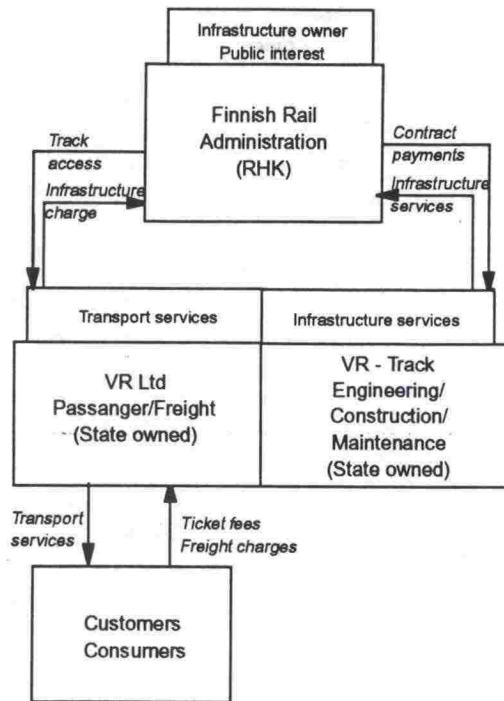


Figure 3-5. The Finnish Rail Industry. This is a simplified version. A more detailed description can be found in chapter 5.

Financing of Investments

RHK is solely responsible for capital budgeting of the rail infrastructure. It receives the necessary funds from the state budget (or perhaps to put it more accurately: the funds the parliament sees appropriate). Infrastructure charges paid to RHK by the operators are taken into account as RHK receives budget funds (net budgeting).

Some recent proposals have been made to finance investments with private capital. However, applicable policies or practices do not exist so far. Eg who are the appropriate promoters for a particular project is unclear since the Finnish framework is relatively new and both experience and analyses lacking.

Risks in Capital Projects

As long as investments are financed by the state budget the risks are borne by Finnish taxpayers.

Discussion

The Finnish case is discussed in more depth in chapter 5.

4 SOME BASIC MODELS - A SYNTHESIS

4.1 Synthesis

On the basis of previous examples it is possible to formulate a synthesis. The value chain / line-of-business matrix and presentation are adopted in order to make the synthesis clear, comprehensible and comparable. Four types of organisational basic models are synthesised:

1. **Extreme vertical disintegration**, where value chain links are separated to as many units as possible. This is the British model. The track allocation and traffic management activities are assumed to remain the responsibility of the state authority.
2. **Separating infrastructure and traffic operations and allowing free competing in operations**. This is a slightly more liberal model than the Swedish solution. However, in Sweden this type of an arrangement is partially used on local and regional lines.
3. **Separating infrastructure and traffic operations while maintaining both in state ownership**. This perhaps resembles most the Finnish model. However, in infrastructure construction operations there is practically free competition in Finland (unlike in Sweden where a larger portion of construction and rehabilitation work is done by Banverket itself).
4. **Public railways**, where the state owns and manages both the infrastructure and traffic as in Norway.

Other possibilities for simplified modelling exist, of course, but since they are not applied in the countries examined in this paper, they have been omitted. These other alternatives are

- horizontal disintegration, ie unbundling the lines of business; there are no theoretical obstacles for this
- regional disintegration which in turn leads to regional monopolies
- privatising the railways as a single unit, ie creating a privately or part-privately owned national monopoly.

The intra-industry organisation has a most restricting affect on the financial and contractual arrangements available.

4.2 Business Areas

Tables 4-1a to 4-1d show the basic models in their value chain / line-of-business framework. The shaded cells refer to private participation or ownership.

Tables 4-1a and 4-1b.

MODEL 1: EXTREME VERTICAL DISINTEGRATION				
Line-of-business		Intercity Passenger	Commuter	Freight
Value Chain Link				
Operations	Stations, Terminals			
	Traffic Management			
	Train Crew			
Traction and Rolling Stock	Maintenance			
	Ownership			
Support Services	Customer Account Control			
	Marketing, Pricing and Sales			
	New Service Development			
Infrastructure and Property	Design and Engineering			
	Maintenance			
	Construction			
	Ownership			

MODEL 2: SEPARATING INFRASTRUCTURE AND MAINTENANCE, FREE COMPETITION IN OPERATIONS				
Line-of-business		Intercity Passenger	Commuter	Freight
Value Chain Link				
Operations	Stations, Terminals			
	Traffic Management			
	Train Crew			
Traction and Rolling Stock	Maintenance			
	Ownership			
Support Services	Customer Account Control			
	Marketing, Pricing and Sales			
	New Service Development			
Infrastructure and Property	Design and Engineering			
	Maintenance			
	Construction			
	Ownership			

Tables 4-1c and 4-1d.

MODEL 3: SEPARATING INFRASTRUCTURE AND OPERATIONS, PUBLIC ENTERPRISE/STATE MONOPOLY					
Value Chain Link		Line-of-business	Intercity Passenger	Commuter	Freight
Operations	Stations, Terminals				
	Traffic Management				
	Train Crew				
Traction and Rolling Stock	Maintenance				
	Ownership				
Support Services	Customer Account Control				
	Marketing, Pricing and Sales				
	New Service Development				
Infrastructure and Property	Design and Engineering				
	Maintenance				
	Construction				
	Ownership				

MODEL 4: PUBLIC RAILWAYS					
Value Chain Link		Line-of-business	Intercity Passenger	Commuter	Freight
Operations	Stations, Terminals				
	Traffic Management				
	Train Crew				
Traction and Rolling Stock	Maintenance				
	Ownership				
Support Services	Customer Account Control				
	Marketing, Pricing and Sales				
	New Service Development				
Infrastructure and Property	Design and Engineering				
	Maintenance				
	Construction				
	Ownership				

4.3 Contractual and Financial Relations

A similar illustration of contractual and financial relations as was presented in appendices 1-3 is shown in the next four tables (see next pages). It can be observed how quickly the industry structure becomes more complicated and thus requires more detailed legislation concerning licence regulation and competition rules, for example. Also technical requirements are emphasised as far as traffic management and control and other traffic safety systems and activities are concerned.

MODEL 1: EXTREME VERTICAL DISINTEGRATION						
TO:	Rail Authority	Private Infrastructure Manager	Private Infrastructure Services	Private Traffic Operator passenger /freight	Private Rolling Stock Manager	Customers, Consumers
FROM:						
Rail Authority		<i>Licence to manage infrastructure; State control</i>		<i>Licence to operate passenger and freight traffic; Franchises rail lines</i>		
Private Infrastructure Manager	<i>Licence fee</i>		<i>Contract payments for services</i>	<i>Infrastructure provision; Track allocation</i>		
Private Infrastructure Services		<i>Service provision (engineering, construction, maintenance)</i>				
Private Traffic Operator passenger/freight	<i>Licence fee; Franchising charges</i>	<i>Access charges; Infrastructure charges</i>			<i>Lease payments for equipment; Payments for maintenance services</i>	<i>Transport services</i>
Private Rolling Stock Manager				<i>Equipment leasing</i>		
Customers, Consumers				<i>Ticket fees; Freight charges (sales revenues)</i>		

MODEL 2: SEPARATING INFRASTRUCTURE AND OPERATIONS, FREE COMPETITION IN OPERATIONS				
TO:	Rail Authority; Infrastructure Manager	Private Traffic Operator passenger/freight	Private Rolling Stock Manager	Customers, Consumers
FROM:				
Rail Authority; Infrastructure Manager		<i>Track access; Infrastructure provision; (Subsidies)</i>		
Private Traffic Operator passenger/freight	<i>Access fees; Infrastructure charges</i>		<i>Lease payments</i>	<i>Transport services</i>
Private Rolling Stock Manager		<i>Equipment provision; Maintenance services</i>		
Customers, Consumers		<i>Ticket fees; Freight charges (sales revenues)</i>		

MODEL 3: SEPARATING INFRASTRUCTURE AND OPERATIONS, PUBLIC ENTERPRISE/STATE MONOPOLY			
TO:	Rail Authority; Infrastructure Manager	Public Traffic Operator passenger/freight	Customers, Consumers
FROM:			
Rail Authority; Infrastructure Manager		<i>Track access; Infrastructure provision; (Subsidies)</i>	
Private Traffic Operator passenger/freight	<i>Access fees; Infrastructure charges</i>		<i>Transport services</i>
Customers, Consumers		<i>Ticket fees; Freight charges (sales revenues)</i>	

MODEL 4: PUBLIC RAILWAYS		
TO:	Rail Authority; Infrastructure Owner	Customers, Consumers
FROM:		
Rail Authority		<i>Transport services</i>
Customers, Consumers	<i>Ticket fees; Freight charges (sales revenues)</i>	

These models may also be presented as in figure 4-2. The presentation is oversimplified and is modified from previous models by simply converting the vertical value-chains to horizontal direction.

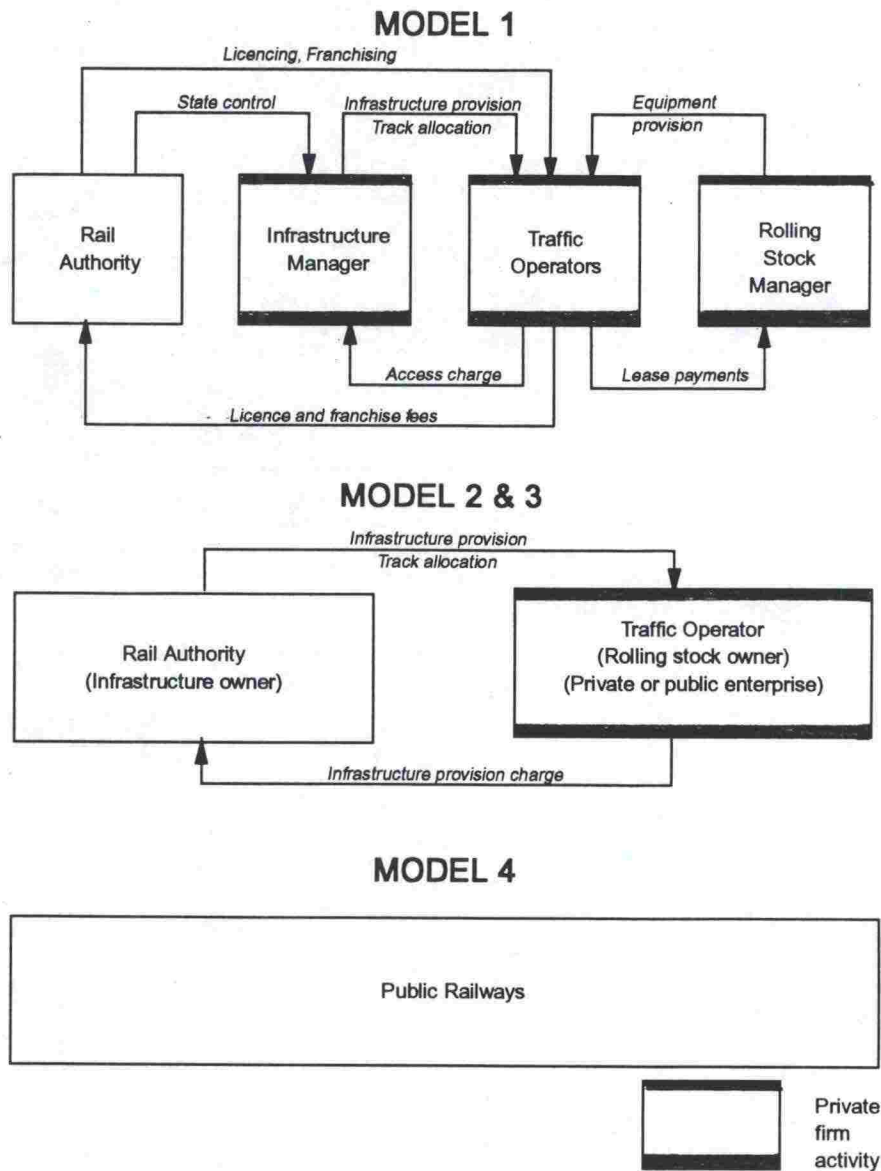


Figure 4-2. Oversimplified Organisational Models and Their Contractual and Financial Relations. Note the relevance of vertical integration or dis-integration.

Another figure (4-3) attempts to set the country examples in the model framework. The vertical axis of the figure describes the intensity of competition in different operations within the industry. The horizontal axis is the state ownership of the industry. As it can be seen from the figure, the UK and Norway represent the extreme cases of rail industries, while Finland and Sweden are in the "midway" of industry re-structuring. Naturally, the figure is highly conceptual and is only meant to be an illustration of differences between the countries.

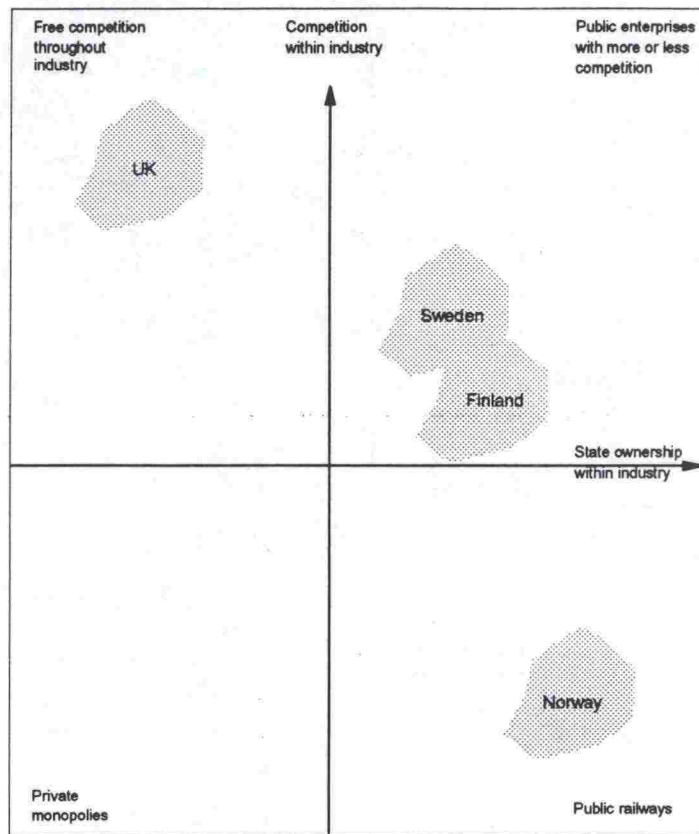


Figure 4-3. A Comparative Illustration of Rail Industries in the Example Countries. Note the keener competition (or rather, possibilities of keener competition) in traffic operations of Sweden compared to that of Finland. However, in Finland the competition in construction and rehabilitation works is keener than in Sweden.

4.4 Investment Financing Considerations

As for capital investments in rail infrastructure, the key question is who owns and "sells" (ie provides track for use) the infrastructure. When this question is reflected against the synthesised basic models some potential alternatives emerge in the arranging of finance. The following discussion deals with each model separately.

□ Model 1: Extreme Vertical Disintegration

Assuming that rail infrastructure is privately owned and managed as it is in the UK, the infrastructure owner evaluates the investment strictly in economic terms. Hence, the owner of the tracks evaluates the demand from the side of potential operators; these in turn evaluate the demand of potential customers thus making projections of future cash flows. If public interest is to be included in project evaluation, then the rail authority has to participate in the investment with a financial input. This means in practice one of the following alternatives (or a combination of them):

- subsidy arrangement for the infrastructure owner
- direct equity or debt infusion on behalf of the government
- loan guarantees provided by the government

- indirect support, eg by subsidising train operating companies on the new line, who in turn pay access or infrastructure charges to the owner of the tracks.

If the track owner succeeds in participating with the operator as an equity partner, this will put both parties in the same boat and risks are divided into smaller portions. The stronger the equity investors' involvement and the greater their number, the easier it will be to raise debt capital from capital market. All possibilities of free capital markets and their instruments of financing are available for project investors.

Model 2: Separating Infrastructure and Operations, Free Competition in Operations

In this model, the infrastructure owner, assumed to be state authority, will be able to finance a capital project by receiving access or infrastructure charges from operators - provided that the project is economically viable and profitable. Any other cases demand for state input. The following arrangements may be considered:

- founding a separate private (or partly private) project company to finance, build and operate the project; a concession period may be granted to the project company that is sufficiently long to amortise loans and provide return on equity; the required cash flow is received from either access charges or directly from consumers and customers or from a combination of both sources
- the previous arrangement supplemented with state guaranteed loans or direct subsidies especially in projects with political goals but which include uncertainty concerning profitability
- financing the investment by the state budget (with the possibility of raising a part of the capital from other authorities, eg local government).

The first two alternatives are the typical off-balance sheet financing methods state authorities use, eg in BOT-projects.

Model 3: Separating Infrastructure and Operations, State Ownership or Major Holdings of Operations

This model offers only one alternative of financing a project with private capital and keeping the state's "balance sheet" clean from additional debt:

a state-granted concession right for a particular project company, with the project company assuming major financial risks of the project. Any other arrangement will evidently transfer the risks back to the state and the taxpayer.

In Norway, the Gardemobanen is financed by a state-owned project company. Furthermore, the state is the debt investor of the project thus bearing practically all project risks.

Model 4: Public Railways

In principal, various project financing alternatives exist also in this model. However, it is easy to foresee that there might be numerous potential conflicts of interest, if eg a BOT-concept would be employed. The initial starting points alone - profit maximising project company and public interest guarding rail authority - can easily lead to conflicts.

□ **Summary**

The previous discussion is summarised in table 4-2.

Table 4-2. Summary of Investment Financing Alternatives

Model	Standard Arrangement for Capital Investment Financing	Optional Arrangements
Extreme Vertical Disintegration	<u>Project promoters:</u> Infrastructure owner with potential allies <u>Capital source:</u> Private capital market for debt and equity, equity from financial assets <u>Investment recovery:</u> Access charges (and operating revenues if operating companies are investors)	State involvement as an investor if the project has some public benefit potential but is not viable in pure economic terms
Separation of Infrastructure and Operations; Free Competition in Operations	<u>Project promoters:</u> Infrastructure owner, ie the state <u>Capital source:</u> State budget <u>Investment recovery:</u> Access charges, licence fees	Project financing with concession contracts; promoters can therefore include several parties from private sector as well as from public sector; the investment is recovered either from access charges or operating revenues or from a combination of both
Separation of Infrastructure and Operations; State Ownership	<u>Project promoters:</u> State <u>Capital source:</u> State budget <u>Investment recovery:</u> Operating revenues / state taxes	Project financing as above
Public Railways	<u>Project promoters:</u> State <u>Capital source:</u> State budget <u>Investment recovery:</u> Operating revenues / state taxes	Project financing as above

Finally, it should be noted that there is really only one prerequisite for the unbundling and privatising of the activities of railway industry: the markets have to be **efficient**. To be efficient, the market has to fulfil three conditions:

- 1 there has to be several competitors within the market
- 2 the competition has to be fair, ie state intervention has to be restricted to the minimum¹
- 3 the market has to be sufficiently large in order to fulfil the first condition.

¹ Regulations are needed, of course.

5 FINANCING OF CAPITAL PROJECTS IN FINLAND

5.1 Introduction

The aim of this chapter is to discuss in more depth the project-specific financing alternatives that are available in the Finnish circumstances. It should be emphasised that all presentations from hereafter take the project-specific view, and therefore differ from the industry-wide outlooks of previous chapters. Some alternative arrangements are presented on the basis of previous analysis, and their strengths and weaknesses are evaluated. Referring to VR means the VR-group of companies as a whole. If it is of relevance, the particular subsidiary is referred to, for instance VR Ltd or VR-Track (see figure 3-4 where the company structure of VR is shown).

The Finnish framework is rather simple with VR holding a monopoly position in rail transport and RHK being the owner of the infrastructure¹. The main principle is that RHK receives budget funds for capital outlays which it realises by submitting contracts to VR (or more precisely, to VR-Track Ltd as the main contractor, which is a subsidiary of VR-Holdings Ltd). RHK may also tender out the works directly to private contractors and VR is participating in the competition like the others. VR in turn tenders out a part of the works to private contractors. Evidently, in some cases VR is in a position of a construction manager.

The procedure of investment activities is approximately as follows:

- RHK is the initial planner and programmer of investments
- RHK makes suggestions about investment needs to the Ministry of Transport and Communications, which submits the proposals to the State Treasurer
- the State Treasurer prepares annual state budgets and the Parliament gives the final approval
- RHK assigns the construction and other works directly to VR-Track for agreed cost or tenders out the works through open competition
- VR-Track tenders out part of the works subscribed by RHK.

Three main alternatives for project realisation can be identified in the Finnish context:

- 1 Direct state budget funding
- 2 Project financing with VR acting as the initial project promoter and equity investor
- 3 Project financing through a separate single-project company; equity investors may include several parties in addition to VR (in fact, VR does not necessarily have to be involved).

The last two alternatives clearly include numerous variants. For example, the second main alternative may involve public-private partnership arrangements or the project company arrangement may involve public equity investors including the state. Some variants are picked for closer examination as the analysis proceeds or they are presented as ideas for further examination.

¹ Including land property under the tracks.

5.2 State-of-the-art: State Budget Funding

The state budget funding model is shown in figure 5-1. It should be emphasised that the customers include eg a joint capital region transport organisation (YTV) consisted of four cities¹. YTV is one of the customers of VR Ltd that purchases services for its citizens. To be more exact, YTV purchases a certain amount of seat kilometres regardless of how many passengers actually use the train. Approximately one tenth of the revenues received by VR Ltd from domestic passenger traffic comes from YTV. The passengers still pay a ticket price but it is received by YTV.

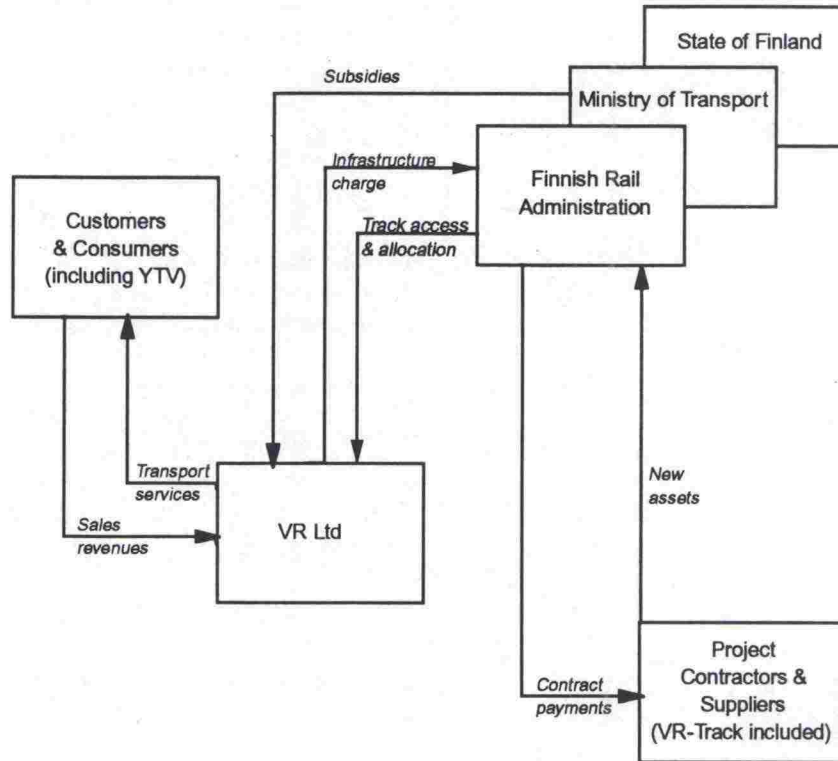


Figure 5-1. State-of-the-art Model: State Budget Funding of Capital Project. The subsidies received from the Ministry of Transport may be purchases of transport services on socio-economic grounds.

The risks are allocated according to table 5-1. The strength of this model lies in its simplicity since no new arrangements are required neither from VR nor RHK or any other authorities. The weakness is obvious: state budget is subject to strict constraints.

Table 5-1. Risks in Budget Funded Project

Risk	Party	Notes
Investment cost	RHK or Contractor	RHK bears the investment cost risk unless it employs a fixed price contract, thus transferring the risk to the contractor.
Interest rate (cost of debt)	RHK	Evidently, the state bears the risk.
Operating cost (traffic operations)	VR	VR has few options for covering these risks. Ultimately, the state of Finland and the Finnish taxpayer bear the risks if losses of VR are covered by subsidies.
Demand	VR	
Operating revenue	VR	
Government policy	VR	

¹ In fact, the existence of YTV is defined by law, which forces the four cities to organise their transport services on a common basis for the benefit of their citizens.

5.3 Project Financed Directly by VR

This model may be illustrated according to figure 5-2. VR acts as a primary investor and raises debt capital from capital market. Thus the project is totally financed internally. In this manner, VR purchases a new "market" for itself as long as it has exclusive rights¹ to operate the new line. In principle, VR should cover the debt service requirements and operation costs by cash inflows from operations. In theory, VR may also provide track capacity for other operators and thus finance part of the investment by access and infrastructure charges.

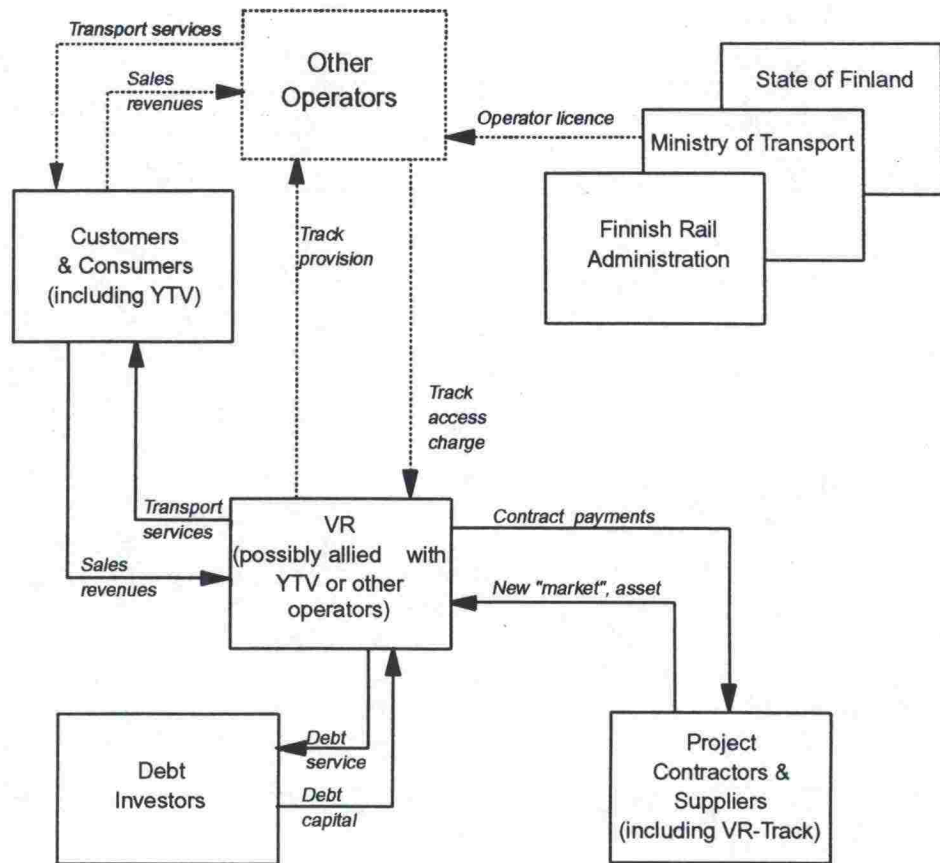


Figure 5-2. VR as an Internal Financier. Note that any debt raised is the liability of VR as a whole. The dotted lines represent optional arrangements.

The risks and their allocations may be listed as shown in table 5-2. The strength of this particular model is that the state assumes no direct risk. The weaknesses are that

- the investments are financed by cash flows received from all passengers and freight customers - not just from those who use the particular services provided by the project, which would lead to decreased demand because of higher prices; it is unlikely, in many cases, that cash flows from project's operations could reach a level at which debt service payments could be covered in addition to operating costs
- a direct consequence of the first weakness is that if price increases are out of the question, there has to be re-adjusting of access charges or subsidies by the state (the usual practices and prices have to be re-evaluated); VR has to be compensated for the risks it assumes and for the additional debt service payments.

¹ Note the 1999 limit. After that the domestic traffic operations should be totally free for competition. This rule needs to be altered in this particular project.

Table 5-2.

Risk	Party	Notes
Investment cost	VR or Contractor	The risk may be transferred or divided according to the type of contract.
Interest rate (cost of debt)	VR	As VR is a state-owned, large company it is not likely that debt investors face any serious risk of not receiving the promised debt service. Ultimately, of course, the state bears the risks of unsuccessful projects and operations.
Operating cost (traffic operations)	VR	
Demand	VR	
Operating revenue	VR	
Government policy	VR	

Variant 1: Other Investors Allied with VR

One possibility is that other investors take part. These could include eg cities or municipalities that directly benefit from the investment. If these authorities manage to avoid expensive road and street investments because of new rails, the savings could be invested together with VR. Public organisations should also consider public, non-monetary, benefits. Similarly, the other traffic operators could be persuaded to infuse capital in return for the right to operate the tracks together with VR Ltd. Stronger and wider commitment from investors is likely to convince debt investors as well. However, there are some doubts whether even stronger investor consortiums could make the project economically viable in pure monetary terms.

In this variant, the risks have to be divided between the equity partners according to a special agreement, ie the liabilities of the partners have to be specified beforehand. This is necessary especially if revenues do not provide sufficient cash flow to cover operating and debt service costs. It is reasonable to assume that VR Ltd and other operators face direct cash flow risk, while prospective public investors face mainly the risk of consumer surplus loss, ie loss of non-monetary benefits.

Variant 2: Financing Only Construction Works, Traffic Operating Principles Remain Unchanged (Shadow Toll Principle)

In this variant, VR or any other equity investor finances the construction works only and receives payments from the state, not from the users of transport services. The principle is the same as with shadow toll roads¹. The shadow price paid may be a passenger volume -based or quality of works -based price or a combination of both. For example

- the "concessionaire" (financier, builder and owner of the tracks) receives payments from the state (RHK) annually \times FIM/annum/passengerkm
- the "concessionaire" receives payments according to specified variables that are measured in frequent intervals; these variables describe the quality of construction works and the quality of maintenance works.

Since there is no involvement of the "concessionaire" in traffic operations, the passenger volume -based payments do not seem reasonable. The only way the "concessionaire" is involved in traffic operations is through the ownership of rails. In other words,

¹ Shadow toll is a traffic volume -based unit price payment that the concessionaire receives from the state. The concessionaire is granted a licence to maintain the road for a long period of time (eg 15-30 years). The main idea of this BOT-arrangement is that the concessionaire faces no demand risk that is directly related to prices of the services as is the case with conventional tolls. Järvenpää-Lahti stretch on main road no 4 will be the first shadow toll road in Finland. It is currently under tendering process.

the "concessionaire" permits access to its rails for a price that the traffic operators have to pay. However, because VR holds the monopoly position in rail traffic, there is little room for bargaining for the "concessionaire", and one can question the meaningfulness of the arrangement. As for quality of works -based and quality of maintenance -based incentives, which seem applicable, one can clearly observe that this arrangement is merely a special type of construction and maintenance contract. A similar system has been experimented in Sweden in road projects: "*funktionsentreprenad*"¹. In this particular contract type the contractor assumes responsibility for the quality of the road for approximately 20 years. On the whole, this variant resembles an advanced partial payment arrangement. To determine fair bonuses or sanctions based on the quality of works, a thorough and reliable measurement system needs to be established.

The concessionaire faces investment cost risk, interest rate risk, and maintenance cost risk. Depending on the form of concession agreement, the concessionaire faces also some demand risk from the operator side and perhaps from the consumer side. For the state, this alternative is practically risk free in pure monetary terms.

5.4 Project Company Arrangements

A hypothetical single-project company and the arrangements surrounding it are shown in figure 5-3. The model is in fact a pure example of the BOT -concept. The project company receives a licence to operate the line from the Ministry of Transport. Its equity investors are likely to be VR and project contractors and perhaps other firms in transport business. The project company raises the necessary debt capital from capital market, while VR and possibly other promoters, perhaps even the state, act as guarantors. VR is likely, though not sure, to provide necessary rolling stock for the project company through leasing contract. A concession contract is made between the Ministry and the project company defining the concession period and the terms of transfer. At the end of the period the company is liquidated, the tracks and the operating rights are transferred back to the state. The state in turn considers whether to sell or to franchise the tracks and operating rights to appropriate parties². The detailed concession contract may include many options - eg state step-in-rights, debt investor step-in-rights, rewards or bonuses at the transfer stage, extending concession period options, etc.

If any other operators, including VR Ltd itself, wished to use the tracks, they could pay their share of infrastructure charges to RHK, thus reducing the payments of the project company. This would increase the incentive to utilise the tracks more efficiently.

¹ Funktionsentreprenad (Swedish) = Toimintavastuurakentaminen, TVR (Finnish). The exact English term does not exist for this form of contract.

² Today, it is not known if more operators have entered the market and what is the destiny of infrastructure ownership.

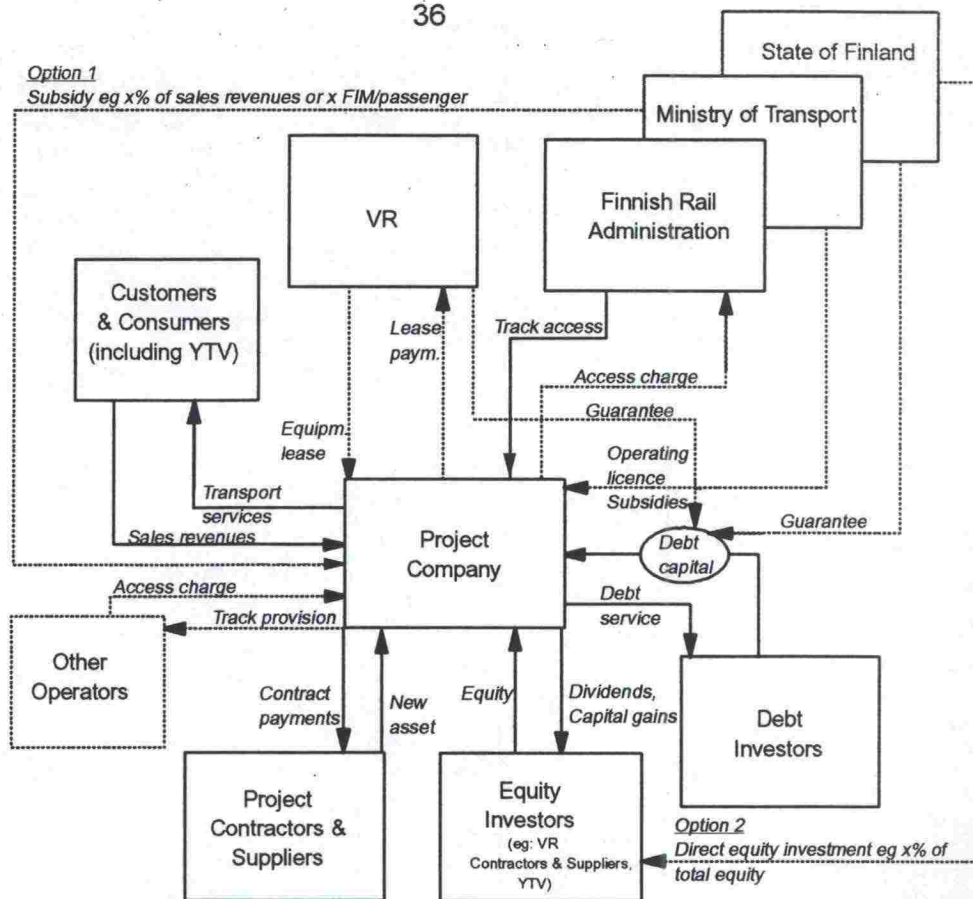


Figure 5-3. Single-Project Company Model. The dotted lines represent optional arrangements. The subsidy from the Ministry of Transport may also be a purchase of transport services on socio-economic grounds.

The risks may be allocated according to table 5-3. The first implication is that most risks are transferred to the project company, which is exactly the purpose of BOT-financing. Debt investors ultimately face the risk of financial difficulties leading to exceptional arrangements or in the worst case project bankruptcy. Bankruptcy will result in the lenders taking over the project and operating it or selling it further. On the other side, equity investors bear the ultimate risk of losing their equity input totally. In a less severe case, they do not receive the expected return on their investment in the form of dividends or capital gains (if the shares are tradable).

Table 5-3.

Risk	Party	Notes
Investment cost	Project company or Contractor	The risk may be transferred or divided according to the type of contract. Usually BOT projects employ fixed-priced contracts with incentives to speed up construction works. The motive for this is clear: a) as the project is likely to be a large one including numerous risk factors, the project company has an incentive to transfer as much investment cost risk to the contractor as possible b) the sooner the project is operational the sooner will the cash inflows occur.
Interest rate (cost of debt)	Project company	The project company is able to "smooth" the interest rate risk with various instruments (forward contracts, long-term rates, etc.).
Operating cost (traffic operations)	Project company	The risk may be partially covered with various index clauses included in the concession contract. One possibility is indexing the amount of subsidies (if subsidies are agreed upon) and the other is the freedom in service pricing.
Demand	Project company	Demand risk is difficult to cover unless the concession agreement states some principles of covering the losses of low demand.
Operating revenue	Project company	From the project company point of view, this risk is a result of demand risk.
Government policy	Project company	Concession agreement may hold some protective elements, if eg wage or materials costs rise due to government actions.

The strengths of the model are the following:

- practically all project risks are borne by the project company
- since the project company is subject to general accounting rules, a transparency of its operations is achieved
- the state has an opportunity to realise a project by off-balance-sheet finance and therefore perhaps earlier than otherwise would have been possible
- VR acts as a useful tool from the state's point of view in project financing operations; at the same time, VR can extend its business concepts to project financing activities
- if there are several equity investors with considerable input, there is a commitment to build and operate the project economically and efficiently; eg an involvement of project contractors results in an incentive to build the project fast (in order to produce early cash inflow) but well (in order to avoid extra repair and maintenance costs); the involvement of VR will result in a strong back up from the monopoly holder thus preventing misuse of its position.

On the negative side it is possible to list:

- complexity as the arrangement involves several parties with agreement and contract combinations that are difficult to manage; the more risk hedging is practised the more complicated will the whole structure be
- the concept is new in Finland; therefore the first applications will lead to many both practical and philosophical questions; there is also a lack of expertise and knowledge in this area in Finland
- since the projects tend to be large including large sunk costs as well and the period of investment recovery is probably between 10-30 years, the projects are highly risky; therefore:
 - * debt investors may feel that the investment is too risky and put extra premiums in the interest rate; this may result in high cost of capital for the project company
 - * debt investors may not take part in the project unless extensive guarantees are made; the guarantors must be reliable enough
- the potential (domestic) project investors are few in a small country
- the arrangement also requires political support (see below)
- finally, the 1995 legal act concerning railways states that an operator licence may be granted only to operators in international rail traffic; thus, the domestic monopoly position of VR Ltd is protected by law until year 1999; this legislation needs re-formulation or re-interpretation for the BOT-concept to be applicable before year 1999.

From the VR point of view, it is notable that if several projects are financed separately with similar arrangements, this will change the whole company structure of VR. Whether this is positive or negative development is worth further consideration, but beyond the scope of this paper.

Variant 1: State Subsidies or Purchases of Services
(see figure 5-3, options 1 and 2)

The project company will improve its position (and the project itself the possibilities of realisation) if the state is willing to contribute as well. The amount of input, or subsidy, should approximately equal the marginal socio-economic benefits that are not paid directly by the passengers. The form of subsidy could be either an equity input (option 2 in figure 5-3) or an aid paid to the project company as portion of sales revenues or passenger volumes (option 1). The latter alternative may also be a state purchase-principle employed in order to achieve political socio-economic goals as described previously.

The risks should remain essentially the same provided that the portion of subsidy is not very large.

Variant 2: Track Provision to Other Operators

As was previously pointed out when VR was considered as a direct capital investor, it is possible for the project company to provide tracks for other traffic operators and receive access charges and thus improve its financial position. Furthermore, from the socio-economic point of view, a more efficient utilisation of track capacity is most preferable. This variant is in a way two-phased competition: at the first phase, the state selects the project company, concessionaire, on the basis of competition; the second phase is that the concessionaire tenders out the operating contracts to the extent it sees appropriate and is allowed to by the rail authorities.

The risk of demand of traffic operators is borne by the concessionaire. If some forms of state subsidies are included in the contract, this revenue stream may also be risky if it is too depended on passenger demand.

Other Variants and Other Possibilities

Numerous other fine-tuned alternatives are available. For instance, one may list the following variants / possibilities:

- combinations of variants 1 and 2
- stronger commitment from cities and counties as guarantors, equity investors and customers
- capital raising from the public by issuing tradable shares and bonds
- private bond (or share) issues to investors who seek long-term and stable cash flows, eg pension funds and insurance companies.

5.5 Summary

There are two ways to involve private capital in rail projects:

- 1) VR and/or other investors make a direct capital investment and take the project risk as a whole; the debt capital used is shown in the investors' balance sheet;
- 2) A separate project company is founded to finance, build and operate the rail link; practically all project risks are transferred to the project company; the debt is written in project company's balance sheet.

Numerous variants are available in both cases. The main principle is that the private financier has to assume true business and performance related risks, eg traffic demand risk and/or investment cost risk.

The previous analyses may be further summarised as follows:

- VR's monopoly position is one of the key factors which affects the financial and contractual arrangements that are applicable in Finland; however, the situation is likely to change in year 1999;
- Only pure project company arrangements will guarantee that major project risks are transferred to private sector;
- Only project company arrangements will result in a financial transparency of operations;
- Other than single project company arrangements are more simple, and easier to implement;
- Whichever alternative is chosen, it has to be fine-tuned for the particular project.

6 CONCLUDING REMARKS

There are no "good" or "bad" solutions in rail project financing - there are only solutions that are accepted by different parties involved and furthermore, accepted politically as well. It is the perception of the author, that extensive discussion and evaluation of the possibilities of private finance is needed in this country. Private financing has, no doubt, also ideological aspects which affect the society as a whole. On the other hand, if good service at a fair price is provided to consumers after their demand, and if wide socio-economic benefits exist as well, the nature of capital employed would seem to be an issue of less significance.

As for Finnish context, the author believes that single-project company models are worth serious consideration. The arrangement provides possibilities of enhanced competition within the industry, as other operators and investors in addition to VR may be interested in the project. It also offers prospects of privatising a part of the infrastructure, if this is preferred by the society. Project company models should also emphasise the role of rail authority as guardian of performance of concessionaires, ie both the quality of transport services and quality of construction and maintenance works.

If it is preferred that VR maintains its monopoly position as a state-owned company, VR's interest in investing in rail infrastructure should be encouraged. However, it is noteworthy that this will further strengthen VR's position in rail transport market.

Finally, the possibilities of participating in Eastern Europe's railway markets are a great challenge to Finnish investors, who could co-operate with other international investors. For example, in Russia there are numerous projects with promising cash flow projections if **Russia's political and economic development is favourable**. The author feels that unless there is Finnish expertise gained in domestic projects, these possibilities abroad are beyond the reach of the Finns. Assuming that the rail infrastructure is to be privatised as well, meaning that RHK is sold to private investors or to its present managers, the possibilities of investment operations to foreign countries are even more important.

Both politicians and authorities would probably feel more comfortable if clear national strategy and guidelines for rail and other infrastructure financing would exist. This applies to investments both in the home country and foreign countries.

FINANCIAL AND CONTRACTUAL RELATIONS IN THE UK RAIL INDUSTRY (Including Capital Investments)										
"Recipient" TO: "Donor" FROM:	The Rail Regulator (Government)	Franchising Director (Government)	Railtrack	Train Operating Companies (TOCs)	Freight Operating Companies	Infrastructure Maintenance Companies	Design and Engineering Businesses	ROSCOs	Consumers, Customers	Project Companies, Project Contractors
The Rail Regulator				Rail licences	Rail licences				Performance and quality control in respect to the public interest	
Franchising Director				Franchises permits, Government subsidies					Performance and quality control in respect to the franchising agreement	
Railtrack				Track access permit, Station and depot leases	Track access permit, Station and depot leases	Contract payments	Contract payments			Contract payments
TOCs	Licence fees	Franchise payments	Access charges (including operational and capital costs), Lease payments					Lease payments	Transport services	
Freight Operating Companies	Licence fees		Access charges, Lease payments					Lease payments	Transport services	
Infrastructure Maintenance Companies			Maintenance services							
Design and Engineering Businesses			Engineering services							
ROSCOs				Rolling stock	Rolling stock					
Consumers, Customers				Ticket fees	Service payments					Ticket fees, Service payments (special arrangements)
Project Companies, Contractors			New infrastructure assets						Transport services (special arrangements, eg BOT)	

FINANCIAL AND CONTRACTUAL RELATIONS IN FINNISH RAIL INDUSTRY						
"Recipient" TO: "Donor" FROM:	Finnish Ministry of Transport and Communications	Finnish Rail Administration	VR company (owns the rolling stock and properties)	Other Operators	Consumers, Customers	Project Companies, Contractors (including VR-Track)
Finnish Ministry of Transport and Communications			Grants a right to operate traffic	Grants a licence to operate traffic		
Finnish Rail Administration			Track access permit Contract payments for infrastructure services	Track access permit		Contract payments
VR company		Infrastructure/access charge Infrastructure services			Transport services	
Other Operators		Infrastructure/access charge			Transport services	
Consumers, Customers			Ticket fees, freight charges	Ticket fees, freight charges		
Project Companies, Contractors		Infrastructure services				

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