

**TRANSPORT INFRASTRUCTURE INVESTMENT:  
OPTIONS FOR EFFICIENCY**

**SUMMARY DOCUMENT**

This is a summary of the primary conclusions and recommendations from the report *Transport Infrastructure Investment: Options for Efficiency*, which was developed by a group of international experts under the Joint Transport Research Centre of the Organisation for Economic Co-operation and Development (OECD) and the International Transport Forum. The purpose of that report is to examine the elements that should be considered by governments in choosing the appropriate models for the provision of surface transport infrastructure. This includes maintenance of old and investment in new capacity, as well as questions of financing. The primary focus is on roads and rail, and, to a lesser extent, inland waterways.

This summary document is divided into two sections: (1) a short list of *Key Messages* and (2) a longer *Summary of Conclusions and Recommendations*.

The full report covers a wider range of issues, including:

- The overall challenge of providing surface transport infrastructure, and description of the available models.
- The current situation observed around the world.
- How borrowing for investment in surface transport infrastructure should be treated in public accounts.
- The potential benefits and limitations of different models for the provision of infrastructure, including the essential issue of risk sharing.
- The extent to which users should be expected to pay for infrastructure, and the potential impacts of this on efficiency.
- Key questions related to the design of PPPs, particularly their legal and regulatory frameworks and procurement processes.



## **TRANSPORT INFRASTRUCTURE INVESTMENT: OPTIONS FOR EFFICIENCY**

### **KEY MESSAGES**

#### ***Alternatives for the provision of surface transport infrastructure***

All governments are faced with the challenge of maintaining surface transport infrastructure networks and adding new capacity in strategic areas. This requires very large expenditures.

To meet this demand, governments are increasingly looking to a wide range of alternative models characterised by increasing use of private sector resources, expertise or management. Options include the selective contracting out of specific tasks; public-private partnerships (PPPs); fully or partially state-owned companies; private, not-for-profit entities; and outright privatisation.

#### ***Efficiency should be the key***

The primary reason for choosing any specific model for the provision of surface transport infrastructure should be to increase efficiency. Efficiency refers to ensuring that projects are carried out when the social benefits of doing so, calculated over the lifetime of the asset, exceed the costs, and that they are built in the way that provides the greatest outputs for money spent. Thus, the injection of private resources is useful to the extent that it serves to overcome inefficiencies in public models of infrastructure provision. Such inefficiencies include, above all, the short-term budgeting processes employed by governments, which limit the resources available and the options for life-cycle cost management.

#### ***Private financing does not generate “new money”***

Ultimately, most infrastructure must be paid for by some combination of users and taxpayers. While innovative financing models may access new sources of borrowing – which can be useful in bringing infrastructure on stream more quickly – they will not create new funding sources *per se*. Moreover, the additional costs of private borrowing must be offset by efficiency gains.

#### ***Moving expenditures off the public balance sheet should not be the only objective***

Limitations on deficit spending exist for a reason, namely to provide for long-term growth and stability. Thus, the model for infrastructure provision should not be chosen for the sole purpose of avoiding public debt and deficit limits. There is no inherent link between the budget treatment of investments and economic efficiency, although off-budget mechanisms may, in some cases, be the most efficient.

#### ***Public-private partnerships (PPPs) can allow for life-cycle cost management***

Public-private partnerships (PPPs) allow for a project to be managed taking into account its full life-cycle costs, transferring responsibilities for both upstream activities – such as design and building – and downstream activities – such as operations and maintenance – to a private company. The PPP model means that the firm is motivated to reduce overall costs – *i.e.* enhance productive efficiency – in order to increase profits, meaning that the profit motive is put to social use.

Cost reductions must not, however, be achieved by compromising quality. Strict quality guidelines are thus required, establishing availability, physical, safety, environmental and other standards. Performance contracting can also be employed, rewarding above-standard,

and penalising below-standard delivery. This means that PPPs involve shifting the procurer's focus from *how* a project is to be built to its ultimate performance.

Competition is a key element in lowering production costs. Procurement processes must be carefully designed to attract a reasonable number of highly qualified bidders, and award contracts on a consistent basis to realistic bids that represent value for money.

***Effective risk sharing and management are key elements in PPP success***

PPPs inherently involve sharing risks between the public and private partners. Private companies will expect compensation for assuming risks and, in preparing tenders for PPPs, governments should compare the benefits of risk transfer – in terms of efficiency gains – with the additional costs.

Risks should be assigned to the partner best able to manage them. Private partners should take on the risks that result from factors under their control, especially those associated with construction costs, project management and delays. The exact division of risks will be determined by the particularities of the project and the capabilities of the partners.

Failure of a PPP project involving surface transport infrastructure will result in important political and economic costs for the government. This can provide private partners with significant leverage in any renegotiation process. Care must therefore be taken to avoid the unrealistic assignment of risk to private partners. Demand (*i.e.* road use, rail ridership, *etc.*) is highly susceptible to changes in circumstances that are exogenous to the project, and any transfer of this particular risk must be subject to careful consideration and formulation. Many PPPs have failed, at great public expense, because demand risk was inappropriately assigned to the private partner. Project bids need to be carefully vetted to eliminate those that are based on unrealistic assumptions.

Contracts must be designed to ensure that the consequences of risk transferred under the PPP are truly borne by the private partner and enforced; ultimately this may require insisting that the private partner relinquish the contract and forfeit performance bonds. One means of increasing private partners' commitment is by spreading remuneration for initial construction costs over the life cycle of the project, meaning that any failure will result in the company not being paid substantial amounts of money – this can increase the public sector's bargaining power in any renegotiations, although the additional cost of private borrowing must also be taken into account.

***PPPs create new governance challenges***

It is essential that PPPs be implemented within the confines of good fiscal management. They often create long-term financial commitments for government, and budget planning processes must be adjusted to take this into account. Otherwise, commitments can be made that prove to be unaffordable over time.

PPPs are highly complex arrangements, which require detailed negotiation with sophisticated private companies both before and during projects. Appropriate competencies are required in the public sector, and the necessary expertise may take a long time to develop.

Solid policy, legal and regulatory frameworks are essential to guide the use of PPPs, and can assist in ensuring that projects are implemented on the basis of specific principles of good governance – such as the pursuit of efficiency.

*There is need for a more advanced debate regarding the role of PPPs*

PPPs are a relatively new phenomenon, meaning that there is little *ex post* analysis available of the full costs and benefits over entire project life cycles. Governments are still learning with regard to the potential and limitations of these models.

Too often, the debate surrounding the use of PPPs has been polarised between those who see the private sector as superior under all circumstances, and those who see any divestiture as a threat to the public good. Similarly, too much stock has been placed in PPPs as a means of resolving budget shortfalls. A more sophisticated debate is required, identifying those projects where PPPs have the potential to add value, while recognising the limitations of private involvement in the provision of surface transport infrastructure. In reality, PPPs will not account for most infrastructure needs, although they may be employed for the creation and operation of significant assets – even countries that are very advanced in the use of these mechanisms see them accounting for little more than 15% of investment. They will not eliminate the need for public investment – most PPPs involve some degree of subsidies. PPPs must be carefully designed and overseen by government. Particular care must be taken to avoid the unrealistic transfer of risks and responsibilities to private partners.

*Devolution can bring about improvements by way of specialisation*

PPPs are not the only options available for seeking out efficiency improvements. An alternative is to devolve the provision of infrastructure to entities specifically created for the task. The options available – agencies; fully or partially state-owned companies; private, not-for-profit entities; privatisation – involve varying degrees of independence from the political process in decision-making. Unlike PPPs, devolution models do not involve the sharing of risks or contractual arrangements.

The primary benefit of such models – in comparison with direct provision by government ministries – is that they create entities that specialise in the provision of infrastructure. This means that decision-making is not influenced by unrelated priorities and issues, and there is less room for political interference in day-to-day operational decisions. These organisations can employ private sector management structures, and are often highly dependent on user fees and on public borrowing. In cases where entities are not exposed to competition or pressure from shareholders, their overall drive for efficiency is likely to be limited.

Such devolution is widely applied for surface transport infrastructure. Many countries have placed their roads under agencies, or motorway networks under state-owned companies. Rail infrastructure in OECD countries is typically managed by independent bodies, including state companies and outright privatisation. Often, these entities outsource a high degree of their activities to private contractors. Some agencies and state-owned companies also represent the public partner in PPP arrangements.

*The extent of user charging is a key factor in overall efficiency*

Direct charging for the use of surface transport infrastructure has important consequences for efficiency.

In theory, the most efficient use of infrastructure would be achieved by charging users for the marginal costs they impose. However, where user fees are applied to new infrastructure, this may result in under-usage and more traffic on adjacent, toll-free routes, especially when the rest of the system is not subject to the same user charges. Moreover, marginal cost pricing can result in insufficient revenues to cover the full costs of building new infrastructure. The alternative is to have government subsidise the project using tax revenues, which also has efficiency implications.

There is no intrinsic link between the extent of user charging and any particular model for the provision of infrastructure; PPPs, state-owned companies and other models can involve any blend of user charging and subsidies. Governments must decide on the appropriate balance of user charging versus subsidies as a key, up-front element in designing the model for infrastructure provision.

*The role of government remains key, whatever the model*

In devolving or outsourcing infrastructure, government must strike a delicate balance between the pursuit of new efficiencies and the need to oversee the maintenance and development of key public assets. There is an essential role for government no matter what model is employed.

## **TRANSPORT INFRASTRUCTURE INVESTMENT: OPTIONS FOR EFFICIENCY**

### **SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

#### ***Introduction***

The report *Transport Infrastructure Investment: Options for Efficiency* examines the full range of choices available to government when seeking to meet surface transport infrastructure needs. The report was developed by a group of international experts under the Joint Transport Research Centre of the Organisation for Economic Co-operation and Development (OECD) and the International Transport Forum.

Debates regarding new developments in the provision of surface transport infrastructure are often reduced to discussions of public-private partnerships (PPPs), and polarised between their supporters and proponents. PPPs are important, and this report examines their potential benefits and limitations, to the extent that these have been revealed by existing experience. At the same time, PPPs are not likely to provide for most infrastructure needs, meaning that a wider range of instruments must be considered, including direct provision by government ministries and agencies, fully and partially state-owned enterprises, private and not-for-profit companies, and outright privatisation.

#### ***Providing for surface transport infrastructure needs is a key government responsibility***

Surface transport infrastructure has qualities that differentiate it from many other sectors of the economy:

- The availability of transport infrastructure and services is of essential importance to most – if not all – sectors of society and the economy.
- The scale of infrastructure undertakings typically means that a fully competitive market in the sector is extremely difficult to achieve.
- Infrastructure is often a “natural monopoly”, meaning that the costs of its provision are minimised when there is only one facility.
- Once provided, much surface transport infrastructure – especially roads – becomes a public good, inasmuch as it can be consumed up to capacity by many users without affecting the availability of the service to others.
- Transport use results in important externalities that are, at present, seldom fully accounted for in any pricing system.

These qualities make it impossible for government to fully divest itself of the responsibility for providing surface transport infrastructure. If left entirely to market forces, infrastructure would not be built to the extent that is warranted from an overall social perspective. There is, thus, a need for governments to be engaged in the delivery of transport infrastructure, as well as a public expectation that they will fulfil this role adequately.

#### ***This does not mean that all tasks must be carried out by government***

The provision of surface transport infrastructure involves many separate tasks, including:

- *Administrative activities*, such as establishing policy frameworks, needs assessments, planning, initial development, tendering and contracting, oversight, regulation, *etc.*;
- *Works*, including initial building and/or ongoing maintenance;
- *Operations*, including collecting tolls, traffic management, providing appropriate signage, *etc.*; and

- *Financing*, meaning providing money at a time and in a quantity needed to ensure an adequate supply of infrastructure to meet society’s needs, meeting the costs of all the above-mentioned activities.

Some of the tasks are *sovereign*, in that they are inalienable from government responsibility. Such tasks are associated with protecting the public interest by setting directions, designing models for the provision of infrastructure, and overseeing their functioning. Other tasks are *operational*, meaning that they can potentially be carried out by entities that are independent from direct government control. In addition, some tasks may be carried out by way of co-operation between the public and private sectors, although the former must ultimately control the overall process. Table 1 describes the tasks that fall under these headings:

**Table 1. The Division of Tasks Associated with the Provision of Surface Transport Infrastructure**

Sovereign tasks (state responsibility)	Operational tasks (can be delegated)
<ul style="list-style-type: none"> <li>• Establishing policy directions</li> <li>• Deciding how much public resources should be dedicated to the transport sector, to particular modes, and to specific projects</li> <li>• Needs assessment (determining the demand for infrastructure)</li> <li>• Choosing and designing models for infrastructure provision</li> <li>• Deciding on the balance of user charging and tax-based subsidies that will be employed</li> <li>• Organising tendering</li> <li>• Designing and negotiating contracts</li> <li>• Creating required legislative and regulatory frameworks</li> <li>• <i>Ex post</i> monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Organising private financing for a given initiative</li> <li>• Works (new construction and maintenance)</li> <li>• Operations (<i>e.g.</i> traffic management, toll collection, <i>etc.</i>)</li> </ul>

### *Governments have many options for how to deliver infrastructure*

Various models for the provision of infrastructure can be distinguished from one another by the extent to which the execution of operational tasks remains under direct political control. The highest degree of political control occurs when all the elements in Table 1 are carried out by a government ministry using its own resources. From that point of departure there are two roads towards reducing that control: *outsourcing* and *devolution*.

*Outsourcing* means that the government retains overall responsibility for the provision of infrastructure, but selectively pays private companies to undertake specific operational tasks over limited periods of time, based on contractual arrangements. There are three levels of outsourcing:

1. *Simple contracting out*: At the most basic level, this involves tendering out discrete activities, such as road works or tolling management, on a case-by-case basis.
2. *Design-Build arrangements*: A further step involves the transfer of responsibility for designing and building infrastructure, as a single package, to a private partner.
3. *Public-private partnerships (PPPs)*: The highest level of outsourcing is PPPs. These involve the transfer of extensive responsibility for the designing, building, operation, maintenance and/or financing of infrastructure, as well as associated risks, to private partners over long periods, after which the project is transferred back to government.



*Devolution* refers to the transfer of responsibility for the provision of infrastructure to entities that exist specifically for that purpose. To a greater or lesser degree, the decision-making processes within these organisations are not under the direct control of elected officials. Different models of devolution include, with increasing degrees of independence:

1. *Government agencies* – Public bodies that report directly to government ministries, but which typically have a more limited set of responsibilities and a higher degree of leeway with regard to operational decisions than a ministry would have. Agencies can be established both for the delivery of works and to manage funds dedicated to infrastructure.
2. *State-owned companies* – Companies that are organised under private company legislation and whose management is largely independent in its decision-making, but which are subject to government control by way of ownership.
3. *Mixed companies* – Companies in which the government maintains an important ownership stake, but where there is also private ownership.
4. *Private, not-for-profit organisations* – Private entities that reinvest net revenues in the infrastructure asset, with management that is responsible before a board that is made up of stakeholders, which could include government.
5. *100% private owner-operators* – Situations in which the infrastructure asset is the property of a private company, which therefore assumes responsibility for all aspects of its provision, based on commercial principles.

Whichever combination of in-house production, outsourcing and devolution a country employs to supply infrastructure, governments create these models and remain responsible for ensuring that they are designed and implemented according to high standards of good governance.

#### ***What is distinct about the current context?***

Surface transport infrastructure has always had the qualities set out above, and it has long-since been obvious that the private sector can be used to handle operational tasks. Why then is there such particular focus at the present time on developing the role of the private sector, and on searching for alternative ways to organise infrastructure provision?

Governments throughout the world are facing similar problems with regard to surface transport infrastructure provision. Key elements of their transport systems are proving insufficient to meet demand, resulting in congestion and leading to calls for significant upgrading and additions of capacity. At the same time, the vast existing infrastructure systems in most countries need constant maintenance in order to remain serviceable. While expanding capacity is not the only means of addressing congestion, large investments will certainly be required in many instances. This will inevitably involve significant outlays of capital at a time when societies' resources are stretched by the need to meet a vast array of competing priorities.

An important point to note in this context is that tax revenues from the road sector are higher in many countries than the budget resources spent on road construction and maintenance. In other words, limitations in the availability of resources for financing surface transport infrastructure may reflect shortfalls in other areas of the economy, which have been subsidised using revenues derived from transport.

With this as a background, three reasons are often put forward for employing innovative means of providing surface transport infrastructure:

1. To seek out new sources of financing.
2. To overcome constraints on the size of budget deficits and state debt, and thus facilitate additional borrowing. Non-traditional models for infrastructure provision can be designed to meet this objective by putting borrowing and debt “off budget”.
3. To enhance efficiency in the infrastructure sector, *i.e.* to get more out of existing resources without jeopardising quality in service delivery.

The following sections address each of these three motives.

*The link between financing and the organisation of infrastructure provision is weak*

The task of financing infrastructure is sovereign to the extent that governments must decide how much public sector resources will be dedicated to transport, and in which modes and projects. But the task is also operational in the sense that responsibility for raising funds by way of tolling or borrowing can be delegated to private or otherwise independent entities.

One advantage often claimed for some outsourcing and devolution models is that they create new funds for infrastructure provision. This argument is weak, however, as most infrastructure must ultimately be paid for by taxpayers or infrastructure users, or a combination of the two. These may be today’s taxpayers and users making direct contributions towards costs, or tomorrow’s, paying off debt.

The means of channelling financing from these sources into infrastructure are also limited: It can come by way of allocations from the public sector budget; it can be derived from the application of user charges, such as tolls and fees; and it can come from private borrowing, repaid by future taxes or user charges.

Innovative financing mechanisms will not change these facts, although they may assist in bringing in new, private, sources of investment capital, including private borrowing and equity. This may bring projects on stream more quickly by reducing dependence on governments’ budgeting cycles. However, ultimately, users and/or taxpayers will have to pay back these loans.

No model for infrastructure provision automatically assumes a given financing mechanism. PPPs, state-run enterprises, not-for-dividend companies and public agencies can all be subject to different degrees of state support. They can also receive their incomes wholly or partially via user charges. User charges may be set by governments based on specific policy objectives, or left to the infrastructure provider’s discretion with a view to ensuring adequate return on investment.

The choice of which combination of financing sources will be employed and how funds will be channelled from these sources is always a key sovereign responsibility. It is a decision that must occur during the earliest stages of the design of the overall model for providing infrastructure. The choice of model for providing infrastructure is, thus, linked to the government’s decision with regard to how financing will take place. In particular, if an infrastructure provider does not have complete control over tariff levels or if user fees do not cover costs, then some provision must be included to ensure adequate compensation by government.

***Putting debt off budget should not be the sole basis for choosing the model***

Government can delegate the task of financing to an independent entity, for example through a PPP where the private partner or a special purpose vehicle (SPV) assumes debt. In this way, the loans taken out to pay for infrastructure are not reflected on the public accounts. This can be a politically expedient way to have new infrastructure built without an immediate visible impact on public debt.

Beyond these political considerations, there is little linkage between the budgetary treatment of debt and the benefits of a given model for infrastructure provision. But, even if debt is not visible in the public accounts, the government is committed to paying back the loan under some instalment scheme, to the extent that it is not paid back based on user charging.

Rigorous discipline is required when undertaking borrowing to finance infrastructure, especially where this is off-budget. Otherwise, governments may make commitments that prove to be unmanageable in the longer term. In other words, debt-based infrastructure financing requires long-term consideration of budget implications. This kind of assessment needs to be an explicit part of the policy and regulatory framework for infrastructure investment.

Formal limitations – such as credit ratings – on debt and deficit spending exist for a reason, namely to provide for long-term macroeconomic stability and growth. Thus, the means to provide for infrastructure should not be designed only to thwart these controls. Keeping debt off the budget is not an economic argument for preferring one model over others, although an off-budget mechanism may, in some circumstances, be the most efficient.

***Efficiency should be the primary objective in the choice of model for infrastructure provision***

A key point emphasized throughout this report is that the choice of model for the provision of infrastructure should be guided by the third motive stated above: Which model provides the greatest degree of socio-economic efficiency?

Efficiency itself can be seen in two dimensions. The first is *allocative efficiency* in the use of society's resources. There are two key aspects:

1. Resources should be allocated to infrastructure if the social benefits, calculated over the lifetime of the asset, exceed the costs – that is, if the net present value is positive, and is greater than that of other possible uses of the same resources. The acknowledged technique for carrying out this assessment is social cost-benefit analysis (CBA).
2. Available assets – *i.e.* the existing road and railway networks – should be used in the most effective way possible. Economic theory tells us that this occurs when users are charged the marginal social costs of infrastructure use, including externalities.

*Productive efficiency* – the second dimension – refers to minimising the use of resources in a given initiative, once the decision has been taken to carry it out. This means that infrastructure should be built at the lowest possible cost, without compromising quality.

***The direct government provision of infrastructure has its benefits and disadvantages***

Our benchmark for the analysis of different organisational models is a government ministry that is responsible for all activities related to infrastructure provision. This comes with some benefits and several problems.

The primary advantage is that government ministries provide for the greatest control by elected officials over key public assets and, thus, for the greatest accountability. A ministry is a hierarchical organisation that reports directly to the minister, and is subject to public sector rules regarding transparency. Oversight is typically provided by parliament and an office of national accounts, and perhaps also by the finance ministry, as well as by public scrutiny. Providing infrastructure via a ministry allows parliament, representing the voters, to hold the administration accountable for its decisions.

A further advantage is that ministries benefit from public sector borrowing rates, which typically are lower than those offered to the private sector.

However, the bureaucratic nature of decision-making in ministries may not lend itself to the operation of dynamic transport undertakings. Furthermore, it may be difficult to disentangle short-term political priorities from the day-to-day implementation of policies.

The lack of commercial orientation of a government ministry is perhaps not best suited for the pursuit of maximum efficiency. Furthermore, the typical government budget cycle, with decisions taken on an annual basis, makes it difficult to provide for long-term planning over the life cycle of infrastructure.

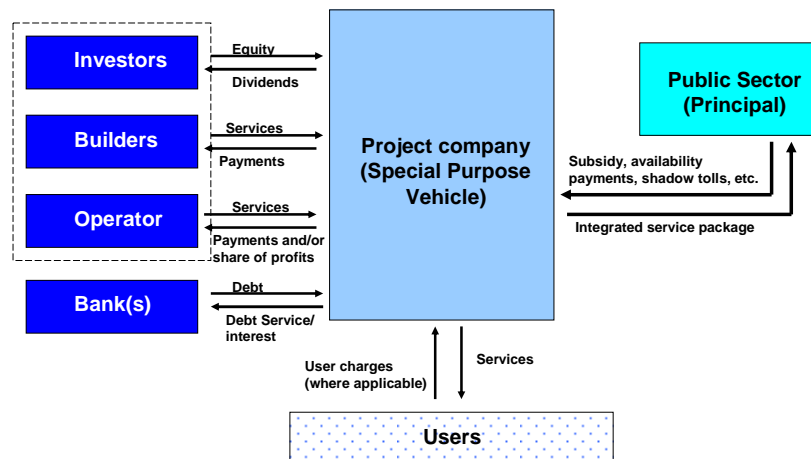
Ministries must also compete for funds with other public priorities. Since ministries are typically responsible for a wide range of activities, infrastructure funding may have to fight for resources in competition with other priorities within the organisation as well.

In short, by their very nature, ministries may be challenged in their ability to take decisions that maximise allocative and productive efficiency.

Outsourcing and devolution offer ways of overcoming these limitations. Indeed, the provision of all aspects of transport infrastructure by a ministry using in-house resources is rare in OECD countries. Rather, where roads are concerned, most countries outsource the operational tasks of works and maintenance on a case-by-case basis, and most rail systems are operated by independent entities that are either state-owned or fully private. Furthermore, governments are increasingly considering a variety of other options, including PPPs.

#### ***Outsourcing by way of PPPs has the potential to enhance productive efficiency***

PPPs involve transferring to the private sector an extensive package of responsibilities over a long period of time, including associated risks. The various tasks that can be included involve some combination of design (D), building (B), financing (F), operation (O), and/or maintenance (M), which are followed by the transfer (T) of responsibilities back to government after the end of the contract term. The arrangements are described by acronyms that characterise the elements involved, *e.g.* DBOT, DBFO, *etc.* As seen in Figure 1, PPPs can be highly complex structures involving a multitude of different partners.

**Figure 1. Typical Example of the Flow of Payments and Services in a PPP**

The potential benefits of PPPs derive from placing the operational tasks associated with the provision of infrastructure in the hands of the organisation best placed to carry them out successfully. This can be seen in terms of establishing an appropriate relationship between the *principal* – which establishes the required tasks – and the *agent* – which executes them. A basic assumption behind the use of PPPs is that a private-sector agent will have greater incentives to reduce overall costs – based on the pursuit of profits – than a public organisation. However, these arrangements also create a new management challenge, as the public principal and private agent will inherently have different objectives. The private agent's productivity may be very difficult to evaluate, which could induce the company to increase profits by cutting corners. Thus, the actual achievement of efficiency gains requires that the use of PPPs be very carefully structured.

In particular, the extent to which outsourcing via PPPs will enhance efficiency depends on the following factors:

- i. Adequate *ex ante* cost-benefit analysis
- ii. The bundling of responsibility for construction and maintenance;
- iii. The degree of competition during the tendering process;
- iv. If quality is appropriately accounted for in the request for proposals;
- v. If innovative behaviour is encouraged;
- vi. If risk is appropriately allocated;
- vii. Project realism;
- viii. The method of financing;
- ix. The cost of capital;
- x. Institutional arrangements; and
- xi. Ongoing improvements to PPP models based on *ex post* analysis of existing projects.

These prerequisites are examined in the following sections.

*i. Again, efficiency is the key:*

In order to maximise social welfare, PPPs should be employed when *ex ante* analysis demonstrates that the infrastructure resulting from a project will deliver greater benefits than it cost to build.

In a first stage of the decision-making process, rigorous *ex ante* cost-benefit analysis should ascertain that the initiative has a positive net present value. Costs and benefits should be considered in the widest social sense, including such questions as externalities resulting from the project. It is essential to consider the transactions costs associated with projects, as well as the cost of government oversight and regulation.

An important aspect of this analysis is the examination of alternative means of carrying out the work. A “public sector comparator” (PSC) is calculated in many countries to assess whether a PPP provides positive “value for money” in comparison with more traditional, public methods of investment. However, such analysis needs to recognise its limitations. Given the long life cycles of many projects, some basic cost elements may change due to conditions that cannot be foreseen, including changes in policies, demographics and technology. There may also be benefits associated with the involvement of public or private management – such as the level of accountability and transparency, management efficiencies, and other elements – that may not lend themselves to strictly financial comparisons.

*ii. Projects should be designed to minimise life-cycle costs:*

A primary motive for PPP contracting is to enhance productive efficiency by minimising costs over the life cycle of the asset. A basic logic is that more spending on creating the original asset can result in lower future maintenance costs, and *vice versa*. A profit-seeking organisation that is responsible for construction as well as ongoing maintenance and operation will have incentives to minimise the overall costs over the longer term. Many public entities would find this a challenge because of restrictions posed by annual budgeting.

This implies that, for successful PPPs, construction and maintenance should be included in one single contract. The contract should be for a long period of time and formulated so that any consequences of the initial design standard are assumed by the party that has chosen this standard.

*iii. Effective tendering is essential for cost minimisation:*

To identify the private partner that is willing to carry out the project for the lowest possible cost, it is essential that there be sufficient competition in the tendering process. This provides potential builders with incentives to submit bids that are as close as possible to the costs of carrying out the work. This is particularly important given that, once the contract is let, the private partner’s performance may be difficult to fully monitor. Competitive bidding must, therefore, include the participation of a number of truly qualified bidders. The tendering process should allow access to international partners in order to ensure that the best available expertise has an opportunity to participate.

*iv. The contracting conditions must safeguard quality:*

However, cost reductions could be achieved by compromising quality, resulting in higher costs to users in the form of future wear on vehicles, reduced safety, *etc.* To avoid this, the tendering process must include some detailed quality specifications and related performance criteria. These typically cover the following issues:

- The road or railway must be available for use as early as possible, and should not be unduly closed down for maintenance or any other reason.
- The physical quality of the asset – such as a road’s smoothness – should meet a minimum acceptable technical standard.
- The asset should be safe and meet with appropriate environmental standards.

- When the contract is terminated, the asset should not be in a condition such that major rehabilitation would be required.

To make these conditions stick, payment to the contractor should be performance-based, meaning that the service provider should be paid less if the quality provided is below set standards, and, optimally, more if it is higher. The bids submitted during the tendering process should be for life-cycle costs; the bidder that is willing to take on the project for the lowest amount of money, calculated over the length of the contract, while maintaining quality standards, should be given the assignment, other things being equal.

*v. Contracts should promote innovation:*

The combination of long contracts and performance-based specifications provides incentives for innovation. This is particularly the case if contractors are given the freedom to build the facility in the way they see as most effective, and quality criteria avoid unnecessary detail. A profit-maximising private partner can be expected to constantly seek out innovations, to the extent that they lower costs. PPP contracts should be more concerned with the outcomes of the work, as opposed to determining how the work gets done.

*vi. Risk must be appropriately allocated:*

There are many risks associated with infrastructure provision. These include, *inter alia*, those resulting from design, construction, availability, demand, operations, financing, political circumstances, environmental questions, and *force majeure*.

Some of these risks can be mitigated by the way in which the infrastructure is designed, built and managed. Others are beyond the direct control of any partner.

The conditions for handling risk must be carefully established in the contract. A fixed-price payment, for instance, means that the private partner must take on any extra costs, if these occur, with the result that unforeseen circumstances will affect the company's profits. However, because many risks are beyond the private partner's ability to control, fully fixed-priced contracts are unlikely. A typical contract identifies certain risks to be retained by the government. For example, the indexing of payments reduces the consequences for the agent of unanticipated changes in the inflation rate. Also, payments to the private operator may be higher if the number of vehicles increases faster than expected, since this would increase maintenance costs.

In general, risks should be assigned to the partner best able to manage them. To establish whether this is the principal or the agent, the following questions should be considered:

- Who could best avoid or eliminate the source of the risk?
- Who could best reduce the likelihood of a bad outcome, should the risk materialise?
- Who could mitigate its consequences?
- Who has the lowest costs for carrying risk?
- Can insurance mechanisms be used to spread the costs of the risk?

The assignment of risk requires the careful allocation of project risks to the private partner, and of external risks to government. If a private company is responsible for construction, it makes sense that it would also be made responsible for inappropriate performance of the asset, as well as for its overall availability. In this way, the company will be motivated to ensure that the design does not generate risks that impact on downstream performance and availability.

This does not, however, preclude that some external events, such as high inflation or *force majeure*, could affect the construction or service delivery phases of the project. Government actions can also have an impact on construction and service delivery, for instance by failing to secure required rights of way, legal approvals or public buy-in for a project. It may thus be appropriate to leave some of this risk with the public sector, but it is important to make explicit which risks, and in what circumstances, fall to each of the parties.

*Demand risk* is highly conditioned by GDP and fuel prices – factors that a private contractor cannot control. Provision for this risk can be made in a number of ways. For instance, traffic growth above or below what is anticipated can be made to affect the length of the contract, thereby mitigating the most serious consequences of unexpected deviations from traffic forecasts. Private partners can be compensated at different levels, or subject to different interest rates on public loans, depending on traffic.

Table 2 gives an initial overview of how risks might be divided between the public and private parties. However, there is no way of generalising exactly how risks should be allocated between the parties; rather, this must be carefully designed based on the nature of the project. It is also essential to recognise that the private partner will expect to be compensated financially for any risk it takes on, and this will be reflected in the bids that are submitted. In many cases, the costs of transferring risk will outweigh the benefits of an initiative, meaning that a PPP is not an option.

**Table 2. Typical Infrastructure PPP Project Risks and Hypothetical Allocation**

Risk Category	Example	Partner Likely Well-Suited to Manage Risk
<i>Force Majeure</i>	Loss from war and natural disasters	Public
Regulatory/Political Risk	Delay in project approvals, land acquisition, changes in law/policy affecting revenue	Public
Revenue/Demand Risk	Deficient revenue due to low traffic volume or lower price due to demand elasticity	Mostly Public – Some Private
Design/Technical Risk	Engineering or design failures	Private
Construction Risk	Cost escalation due to delay or faulty techniques	Private
Operating Risk	Costly operation and life-cycle maintenance	Private
Environmental Risk	Damage and liability/mitigation costs from adverse environmental events	Private
Financial Risk	Costs of inadequate revenue hedging and debt management	Mostly Private – Some Public
Project Default Risk	Project bankruptcy from any/all of the factors above	Shared Public/Private

Source: Virtuosity Consulting, 2005

PPP contracts are typically incomplete in that all eventualities are not foreseen in the formal statutes. Given the length of these contracts, events are likely to occur that cannot be anticipated when the contract is signed. Thus, renegotiation at some point of time should be foreseen for most long contracts, and should take place in an orderly fashion, emphasizing the “partnership” element of PPPs.

Because of the incompleteness of contracts, a key question is the extent to which risk can genuinely be made to stick to the private partner over time. Most transport infrastructure assets have no value other than that for which they are created, and a failed project cannot easily be taken over from one private partner and resold to another without the government assuming important additional costs. This caveat implies that the private partner can have significant leverage over government in renegotiating the contract. Thus, there is a genuine risk of strategic underbidding on tenders on the assumption that additional payments can be negotiated at a later stage.



*vii. Project realism is vital:*

Where projects run into difficulties, the roots of these are often to be found in their design. Projects must be *realistic*. This concept comprises several dimensions.

To begin with, the project must be founded on rigorous assessments, particularly with regard to projected demand, and the extent to which users will be willing to pay tolls where these are applied. These calculations should take into consideration possible alternatives to the new infrastructure and how these might be affected and develop – for example, improvements in bus and taxi services may greatly reduce ridership on a new rail link.

Perhaps the most important principle is that PPPs should not be employed as a means of expediting politically attractive projects that otherwise do not meet the performance criteria for selection under standard public sector procedures. For both fully public and PPP projects, priority should be based on socio-economic returns.

*viii. Private financing can enhance commitment and expedite projects:*

Many PPPs involve the outsourcing of financing. This means that the private partner(s) provide up-front investment, usually based on some mix of equity capital and commercial loans. Asking the contracting parties to invest directly in the project can be a means of increasing their commitment and reducing their leverage over government in later renegotiations, depending on the contract design.

If the private partner is reimbursed for initial construction costs over the life cycle of the project, either by user charges or government payments, this means that it risks greater losses in the event of project failure, and any renegotiations with government are more likely to occur on a more even footing. In contrast, an agent that is reimbursed for construction costs immediately and subsequently only receives annual payments for maintenance costs has less to lose. The outsourcing of financing is, in this sense, an instrument to increase the likelihood that the scheme will be a true partnership. However, a key issue is the extent to which the partners are truly exposed financially by the nature of their investment – for example, borrowing by a special purpose vehicle may shield some partners from the full consequences of failure.

The participation of commercial lenders can also prompt outside oversight, as banks will want to ascertain that the concessionaire is demonstrating due diligence in order to reduce the risk of default. The interest paid by a private partner can thus be partly seen as payment to the lenders for their monitoring of the agreement. An important question, though, is the degree of bank expertise where transport infrastructure projects are concerned.

Commercial financing can also provide incentives to open a new piece of infrastructure earlier than would otherwise have occurred using “traditional” public budgeting processes based on annual allotments. The private builder will be motivated to open the facilities as soon as possible in order to commence receiving related payments.

*ix. The cost of capital is a key determinant:*

One down side of employing private financing is that a private consortium typically has to pay higher interest on its loans than the public sector, depending on the country and the level of risk assumed. However, from a social perspective, the difference in the costs of public and private borrowing may be less relevant, as it can reflect the fact that governments enjoy credit insurance in the form of the right to tax, without any obligation to remunerate taxpayers and users for cost overruns and time delays. The key question is the extent of the difference

between the costs of public and private borrowing, and this plays an important role in calculations of the relative benefits of public versus private options for infrastructure delivery.

Governments may seek to reduce the interest differential by way of loan guarantees. However, any instrument that lessens the consequences of non-payment will also reduce the private partner's commitment to the project, as well as the government's bargaining position in the case of renegotiation.

*x. Adequate institutional arrangements are essential:*

There must be adequate preparation of the procurement process. The public sector procurer must have a clear vision of what is to be achieved and how success will be judged. The public should be consulted in advance, and necessary approvals (*e.g.* environmental assessments) obtained before work begins. Otherwise, legal and other challenges could lead to costly work stoppages.

An appropriate regulatory environment must be in place to protect the public interest, as well as to provide private partners with the assurance that their rights and commitments will be respected. This may include enabling legislation to allow PPPs to exist, as well as legislation allowing for tolling and safeguarding property rights. These instruments must be created at an early stage of the process, as their absence can lead to costly time delays at later stages.

There must also be adequate capacity within the public sector to design the contracting process, oversee contracting and negotiations with bidders, and monitor and regulate the implementation of the project over the longer term. Governments need to gain adequate knowledge and capacity before creating PPP arrangements. Governments that have no experience with Design-Build arrangements cannot be expected to instantly attain the capacity to manage highly complex PPPs, which require negotiating with experienced international companies. There is much logic in creating a central unit, serving all of government, where employees with a range of skills in this area are concentrated. This will also assist in ensuring policy coherency, and avoid the duplication of competencies throughout the various ministries overseeing PPP arrangements.

Insufficiently prepared projects will very likely be subject to renegotiation to the detriment of the public partner, with the costs borne by future taxpayers and users long after those responsible for the arrangements are retired. Thus, clear principles should be established for the use of these instruments, including many of the points outlined in the above discussion. The primacy of efficiency as an objective should be front and foremost among these.

*xi. Ongoing ex post analysis is essential:*

PPPs are a relatively new phenomenon. Few such projects have been brought to completion, and there is an important need for ongoing, independent *ex post* analysis. The results of analysis of this sort, across a range of countries, will be very valuable in designing future PPPs.

***Devolution of control can also enhance efficiency***

Government options are not reduced to the choice between infrastructure provision within ministries versus PPPs. The devolution of control over the provision of infrastructure to independent or quasi-independent entities – such as agencies; state-owned companies; private, not-for-profit organisations; and outright privatisation – may also result in efficiency gains.

*i. Specialisation is a key factor:*

Ministries are typically responsible for a wide range of responsibilities and tasks. In contrast, an entity focusing strictly on a single task – such as providing roads – does not have to juggle unrelated priorities, and is thus better able to concentrate decision-making on the specific issues surrounding infrastructure provision. This includes the planning process regarding where and how projects should be built, as well as the procurement of work related to new investment, maintenance and operation. Devolution of control can, therefore, enhance the likelihood of producing the correct services, in the right amounts, at appropriate quality, and at the lowest possible costs in order to meet society's needs. An organisation that focuses specifically on a given task can, in other words, be better placed to maximise allocative efficiency in the choice of which initiatives to undertake, and productive efficiency in carrying them out.

*ii. Management improvements may accompany devolution:*

There are various reasons to suppose that infrastructure management may be more effective under independent entities.

To begin with, greater independence is usually accompanied by increased de-politicisation of operational decision-making processes. Although elected officials should have a decisive influence over how much public money is spent in different sectors of the economy, their input into the planning process should first and foremost be in terms of high-level priority setting. Project planning should, in turn, be based on expert advice regarding the relative efficiencies of the different options to deliver the objectives established at the political level. More operational decisions – such as how works are executed, and by whom – should be taken at an entirely non-political level.

Secondly, if an independent entity does not have to rely on the government's annual budgeting process, it is in a position to take a longer-term, strategic approach to the management of assets. This independence may come in several forms and various degrees. With the exception of the government agency, all of the models of devolution can borrow from private sources, which can impose additional discipline based on the need to retain a high credit rating, at least as long as the government does not underwrite their debt. Where independent entities are financed by tolls or earmarked charges and taxes, and not totally dependent on public-sector financing, they can take a longer-term perspective on investment than would be possible under government budgeting rules.

Independent entities should also be free from some of the more bureaucratic aspects of public sector decision-making and management.

*iii. Government oversight will remain a key issue:*

The virtues of the various models for the devolution of control are also, potentially, their failings. Models that provide a high degree of direct political accountability are also most likely to be subject to political interference in operational decision-making, and have the least incentives for efficiency. Those with the greatest independence are the hardest to hold accountable. It is always important to keep in mind that surface transport infrastructure comprises key public assets, typically created using significant public contributions, and which have enormous consequences for the rest of society. This is why the public sector typically must maintain a strong interest – the question is to what extent and how.

Government agencies allow for a high degree of public oversight and remain closely beholden to political decision-making, especially with regard to financing, and are still subject to many government rules with regard to internal processes. Fully or partially state-owned companies

are also subject to oversight by way of their ownership, and this can limit their leeway in taking decisions on a strictly commercial basis, such as in decisions to cut services or staff. The agency, state-owned company and private, not-for-profit models do not involve the inherent discipline and drive for efficiency that should result from the need to report to shareholders, although they have the advantage that all revenues can be reinvested in the infrastructure.

The further the devolved entity's operational decision-making is from direct political control, the more important it is to have a solid legal and regulatory framework in place to ensure that the public interest is taken into consideration. This is particularly the case where the entity essentially operates as a monopoly. Developing and maintaining this framework requires the government to build up appropriate competencies, and supposes costs.

Private, not-for-profit companies perhaps allow for some middle ground, in that the presence of stakeholders – including government – on the board of directors may limit the need for regulation. Also, these entities are created by government, which may establish clear terms for reporting and accountability in their enabling agreements. The precise benefits and problems with not-for-profit companies will, at the end of the day, depend on how the government sets up the organisations.

Where any privatisation is concerned – be it of the operating company or the actual assets – close consideration should be given to the motives, as the consequences are long-standing. Politically, it may be expedient to facilitate an influx of capital into the public coffers, which may then be spent on other priorities; however, the financial benefits of this will be short-lived, while the impact on the transport system and its users will endure. Of course, the devolution of an inefficient public entity may cause it to introduce better management practices, while lifting a weight off the public budget.

In reality, infrastructure may go through phases depending on its level of development at any given point, as well as on society's needs and the strength of institutional structures. For example, considerable state involvement may initially be required to create new networks; however, at a later stage they may be more stable in terms of their usage and construction needs, implying that they may more easily be operated on an arm's length basis, to one degree or another.

*“Who should pay for infrastructure, the user or the taxpayer?” The question has no unambiguous answer*

Our description of allocative efficiency established principles regarding how much users should pay for the infrastructure they employ: The use of surface transport infrastructure should, in principle, be charged for on the basis of marginal social costs. This means that the amount paid by users should cover the additional costs imposed on the system by their use of it. These costs include wear and tear and congestion, as well as the environmental and safety costs of infrastructure use.

In reality, there are several practical problems related to the implementation of marginal cost pricing. Costs may be difficult to estimate, especially where externalities are concerned. Also, as costs vary across road and railway networks, efficient pricing requires a much higher degree of differentiation of charges than is currently practised. For example, fuel taxes are basically the same over the whole road network, although the costs of using the network in different locations and at different times are not the same. It should be more expensive to use congested road or railway capacity at peak traffic times.

Charging technology is developing rapidly and new innovations – such as satellite-based pricing – can facilitate a much higher degree of differentiation of charges. Moreover, several

countries are now employing systems for urban congestion charging (*i.e.* Singapore, London and Stockholm) and for charging for the use of separate parts of the road network, particularly by heavy vehicles (*i.e.* Austria, Germany and Switzerland). The public is clearly much more receptive to new charging structures where it perceives concrete benefits, or at least a means of dealing with specific problems.

Applying marginal cost pricing principles to large infrastructure facilities often implies a relatively low price. This is because marginal wear and tear costs on a new facility are generally low and, most importantly, it is likely to be uncongested – at least at first. Charging a high price to recover investment costs quickly would induce users to seek out other, possibly more congested or less safe routes, especially if these are not tolled. This would, in turn, mean that the new facility is underutilised.

If governments limit charging on new infrastructure, they must be willing to provide subsidies. But taxation to cover the cost of the subsidy also has well established efficiency-reducing consequences. For example, income taxes will change peoples' tradeoffs between work and leisure.

This brief discussion only begins to reveal the complexity of the challenge of identifying appropriate pricing; essentially governments must strike a balance between the distorting consequences of tolls and user charges on one hand, and of taxation on the other. If high tolls on a road would lead to underutilisation, then government would be mistaken in giving a private operator *carte blanche* in applying charges. However, if the private operator cannot charge as it sees fit, the government must be ready to make up any difference between costs and revenues. Thus, the reasons for seeking non-government involvement must, again, be rooted in the pursuit of efficiencies, as opposed to a desire to see someone other than the general taxpayer carry the full costs.

Governments must take a stand on pricing policy at the point when different models for infrastructure provision are being conceived, particularly given the impact of pricing on the achievement of relative allocative efficiency.

### *What we are seeing today*

Current international experience reveals a great diversity in the use of the models discussed above.

Where roads are concerned, in terms of kilometres, the extensive systems that exist in most countries are provided, for the most part, by public entities using the structures that allow for the greatest political control – ministries and agencies. However, particularly in developed countries, they are also subject to much basic contracting out of discrete tasks.

**Table 3. Cumulative Funded PPPs by Region and Mode  
1985-2005**

Region	Roads		Rail	
	Projects No. (% of world)	Value USD M (% of world)	Projects No. (% of world)	Value USD M (% of world)
<b>Europe</b>				
Funded Projects	106 (27%)	68 329 (39%)	43 (38%)	74 133 (51%)
<b>North America</b>				
Funded Projects	112 (29%)	35 871 (20%)	17 (15%)	14 361 (9%)
<b>Asia and Far East</b>				
Funded Projects	79 (20%)	50 039 (28%)	30 (27%)	48 842 (34%)
<b>Latin America and the Caribbean</b>				
Funded Projects	85 (22%)	19 474 (11%)	22 (19%)	7 189 (5%)
<b>Africa and Middle East</b>				
Funded Projects	7 (2%)	3 656 (2%)	1 (1%)	168 (0.1%)
<b>Worldwide</b>				
Funded Projects	389 (100%)	177 369 (100%)	113 (100%)	144 693 (100%)

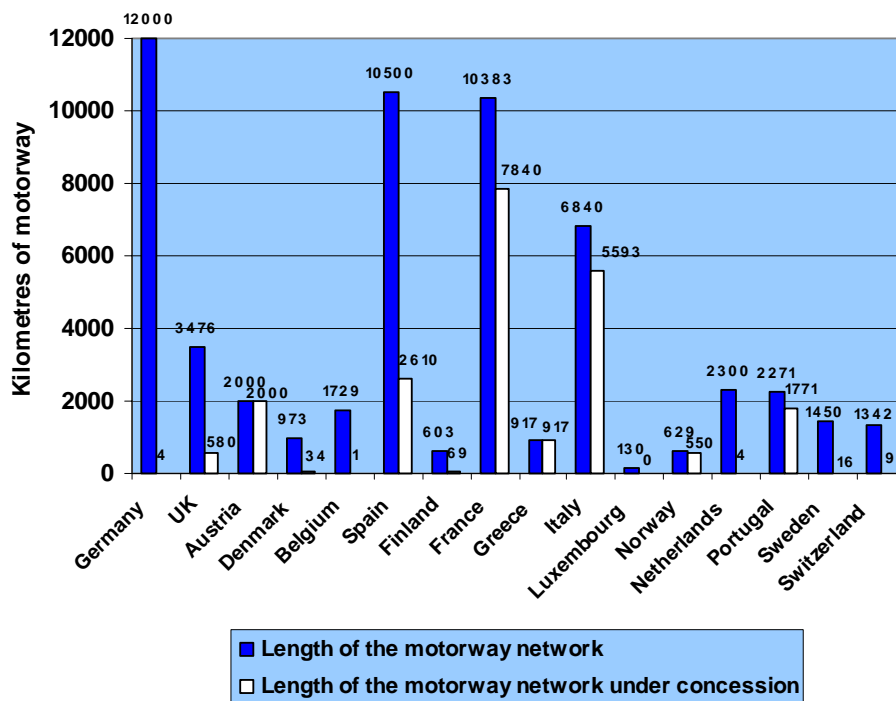
Source: Public Works Financing (2005)

Note: Includes some instances where similar projects are grouped under a single project name but still counted as more than one project.

At the same time, there is also considerable use of alternative models. As seen in Table 3, internationally, in the period 1985-2005, 389 PPP road projects were funded, representing a total of over USD 175 billion. In some countries, much or all of the national motorway networks has been placed under private operation. In other instances, networks are operated by fully or partially state-owned companies. Figure 2 shows vastly different concessioning practices in Europe alone. Full privatisation of major roads has not been attempted.

The infrastructure subject to PPPs and concessions tends to be high quality routes, which offer special services, such as greater convenience, higher speeds, less congestion and more safety. Many PPPs focus on particular, high-profile links, while many network concessions involve the transfer of mature motorway assets created with considerable public support.

**Figure 2. Overview of European Practices in Motorway Concessions**



The fact that these alternative models do not account for most kilometres of road should not downplay their importance – in many cases they provide for key infrastructure in important, strategic areas, and move a high proportion of total traffic. There are countries where more road investment now comes through private companies than public entities.

Most roads are not subject to direct charging, and most OECD countries extract more revenues from the roads sector – especially fuel taxes – than they spend there. There are few exceptions where all road revenues are specifically earmarked. Table 4 reveals a great divergence of practices in Europe alone with regard to the sources of revenues derived from the road sector. Clearly, the degree of tolling varies greatly, although fuel taxes remain the most important source in any country.

**Table 2.2. Shares of Revenue from Road-Related Taxes and Fees in European Countries, 1998 (%)**

	Vignettes	Tolls	Fuel Tax	Vehicle Tax	Sale or Registration Fee	Other	Insurance	Road Revenues as % of GDP
<b>Austria</b>	6	5	60	19	9	0	0	3
<b>Belgium</b>	2	0	57	20	5	1	14	3
<b>Denmark</b>	0	1	26	16	53	0	4	3
<b>Finland</b>	0	0	60	28	12	0	0	3
<b>France</b>	0	15	67	18	0	0		3
<b>Germany</b>	1	0	78	21	0	0	0	2
<b>Great Britain</b>	0	1	80	19	0	0	0	4
<b>Greece</b>	0	26	54	5	14	0	0	5
<b>Hungary</b>	0	8	84	2	0	5	0	4
<b>Ireland</b>	0	1	51	16	32	0	0	3
<b>Italy</b>	0	8	75	14	0	0	3	4
<b>Luxembourg</b>	1	0	90	7	0	0	2	2
<b>Netherlands</b>	1	0	53	20	26	0	0	3
<b>Portugal</b>	1	9	61	27	0	2	0	4
<b>Spain</b>	0	8	73	11	8	0	0	3
<b>Switzerland</b>	6	0	67	24	0	3	0	2
<b>Sweden</b>	1	0	82	16	1	0	0	2
<b>Average Share</b>	1	5	66	17	9	1	1	3

Source: The Unite Project, EC (Compiled in Lindberg and Nilsson, 2005).

Note: These numbers emanate from Unite, a project funded by the European Commission. Much effort was spent on eliminating the measurement problems mentioned in the main text.

A wide range of means is employed for remunerating infrastructure providers, including shadow tolls, availability payments and direct tolling. Often, different means are employed in the same project. Direct tolling generally involves routes providing special levels of service, which are often accompanied by alternative, untolled roads. Some PPP and devolution arrangements transfer responsibility for tolling, although charging levels are usually regulated; in other instances, governments collect tolls and transfer these to the infrastructure provider. Efforts to link user charging with the specific impacts of road use are sporadic, although there is growing interest in the area, and technological advances are creating new opportunities.

Private borrowing is common, by concessionaires as well as by state-owned companies. Governments are also seeking innovative means of accessing private borrowing and investment without this necessarily being linked to devolution or outsourcing. For example, special financing instruments, such as bonds, may be created to leverage private funds for a specific project that is managed by government, thus allowing for a steady stream of financing over the longer term. Also, some governments are considering ways of taxing the

increase in land values associated with new infrastructure. Additional revenues can also come from renting land for ancillary services, such as gas stations on motorways or parking at train stations.

Rail infrastructure provision also presents a varied picture around the world. Current experience shows essentially three options for network service management: (1) Large organisations that integrate both carrier service and infrastructure; (2) fully separate infrastructure and service providers; and (3) service providers that pay to access the infrastructure owned by those in the first category. There are instances of infrastructure provision falling under the responsibility of government ministries, but most OECD and International Transport Forum countries employ some degree of devolution.

One key factor in determining how the rail sector is organised is the extent to which it is oriented towards self-financed commercial operation, or towards the subsidised provision of rail service based on perceived social or environmental benefits. Various combinations exist in different countries – in North America, for example, freight rail is commercially provided by vertically integrated private companies, while passenger rail is subsidised and provided mainly by state-owned companies. In most countries where vertical separation is the norm, state-owned companies provide the infrastructure. One country, the United Kingdom, is experimenting with a private, not-for-profit provider, following the collapse of its privatised national rail infrastructure company.

PPPs are also increasingly common where rail is concerned. As with roads, they are often employed to provide special, high-profile services, such as high-speed lines or city-airport links. From 1985 to 2005, 133 rail PPPs were funded internationally, for a total of over USD 140 billion.

Where rail financing is concerned, it is usually assumed that some degree of user charging will be employed. However, there is a great range of experience across countries with regard to the extent to which the costs of infrastructure use by carriers are covered by charging. In a few cases in Europe, user charges do not cover the marginal costs of infrastructure use, which suggests that assets are not being sufficiently maintained.

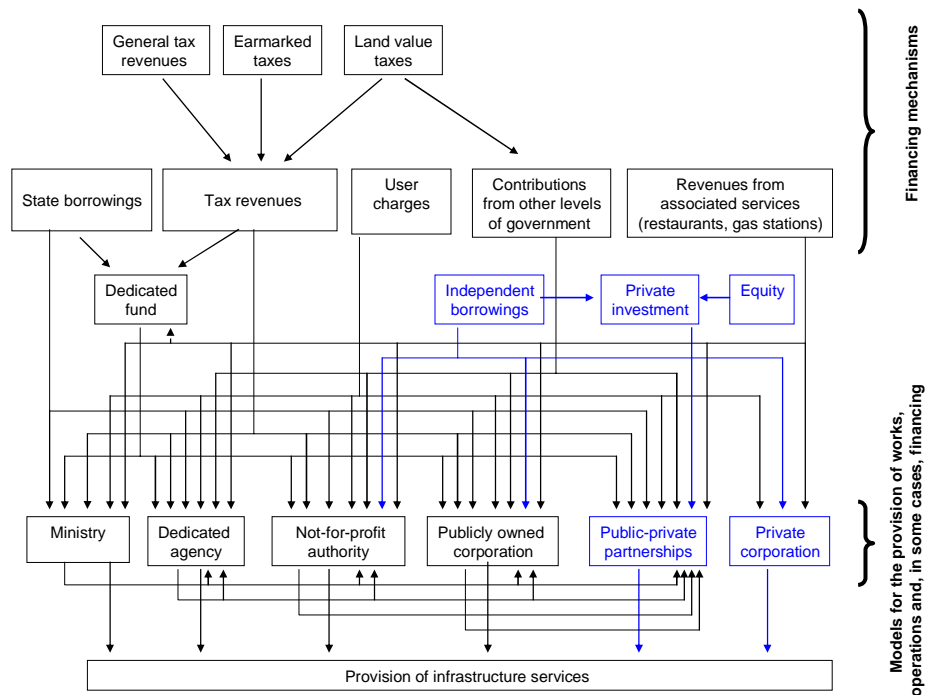
It is clear that the use of devolution and outsourcing, and of innovative financing, varies enormously around the world. Where PPPs are concerned, while these have become a standard part of the infrastructure provision lexicon, their role in different countries is far from homogenous. While great differences exist among OECD countries, the greatest are perhaps with regard to transition, middle and low-income countries. In the 1985-2005 period, Africa and the Middle East accounted for just over 1% of funded road and rail projects, by value, while Latin America and the Caribbean accounted for just over 8%. This compares with 54% in Europe, 37% in Asia and the Far East, and 19% in North America.

### ***Concluding Remarks***

As Figure 3 reveals, governments are faced with a wide and complex palette of options when choosing how to invest in surface transport infrastructure. In all likelihood, many different combinations of models and financing options will be combined within the same country, and even within the same networks. A key challenge is in ensuring consistency in the application of policy principles.



**Figure 3. Options Available for the Provision of Surface Transport Infrastructure**



It is not possible to provide a universal blueprint for the models that should be used for the provision of surface transport infrastructure; a wide range of options is available, combining different institutional and financing models, and solutions must be adapted to each set of circumstances.

However, *Transport Infrastructure Investment: Options for Efficiency* identifies a number of basic principles and issues that should be considered by governments in deciding how to meet infrastructure needs. At the core of these is the conclusion that the pursuit of long-term efficiency gains – considering costs and benefits in the widest socio-economic sense – should be at the heart of the decision-making process.