PUBLIC PRIVATE PARTNERSHIP IN MOTORWAY SERVICE AREAS: DECISION MAKING, INVESTMENT ANALYSIS AND BEST PRACTICE TOOLS

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The theoretical framework of Public Private Partnership (PPP) for construction-financing-operating of Motorway Service Areas (MSA) is initially presented and illustrated through diagrams. Further, relevant research carried out at Bauhaus - Universität Weimar (Germany) and Egnatia Odos SA (Greece) is described, wherein data from four European countries: England, France, Italy and Greece have been collected, compared and analyzed. Next, the MSA planning procedure on an expanding highway is described and the decision making stages for the selection of the suitable positions are analyzed. This process includes a successive approach from the macro to the micro environment. Thereafter, the "base case" cash flow model for investing in a typical MSA is presented and as well as the partial components (construction-financing-operating costs and revenues) and the estimation methodology (input/algorithm/output) are explained. The final cash flow diagram provides exemplary illustration of this case study. Hereupon, MSA risk management: identification, analysis and allocation of essential risks are qualitatively approached. This approach is integrated using a critical analysis of the macro economic components. Last but not least, precise conclusions that could be applied as "best practice tools" regarding the planning decision, the traffic break / income estimation and risk management are presented.

Keywords: cash flow, decision, MSA, planning.

INTRODUCTION

The relevant research was carried out at Bauhaus - Universität Weimar (Germany) and Egnatia Odos SA (Greece). The aim was the comparative analysis of the everyday operation of the Motorway Service Areas in the European Union, so that best practice tools for their whole life cycle could be described.

Initially the relationship between service and fees is presented – especially during the cooperation of public and private sector. In this framework appear various forms of functional privatization. At the same time a special questionnaire was sent to selected highway / MSA operators (respectively two in England, France, Italy and Greece). Simultaneously, various interviews with a number of their managers took place.

A step by step procedure has been developed for MSA planning on an expanding highway. The selection of the suitable places that follows successive decision making stages is described and analyzed taking into account both the macro and the micro environment.

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The investment costs (construction-financing-operating) and revenues for a typical MSA have been estimated and imported to the "base case" cash flow model. The estimation methodology is explained and the final diagram illustrates this case study.

The essential investment risks are qualitatively approached and described. The risk management also includes an analysis of the macro economic environment.

The whole research is completed with conclusions that may be used as best practice tools regarding the planning decision, the traffic break / income estimation and the risk management of MSA investment.

FUNCTIONAL PRIVATIZATION

The most contemporary tendency in European motorway networks is privatization: material – formal – functional. This situation could be interpreted as the appliance of the European Guideline "the user pays".

Public works could be seen as typical example: the constructor hands over the road to the state against payment. The state passes it along to the citizen who uses it.

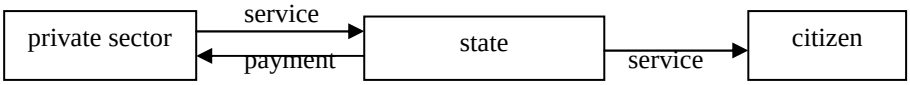

Figure 1: Linear service chain[2]

What happens in the "indirect" concessions is that the private enterprise gets the right – after a public tender – to offer a concrete service directly to the citizen. The citizens pay fees to the state that thereafter compensates the company. A particular form of this cooperation is the shadow tolls concession at the Design – Build – Finance – Operate (DBFO) contracts: the road operator is compensated according to the traffic volume times the average velocity (vehicle kilometres).

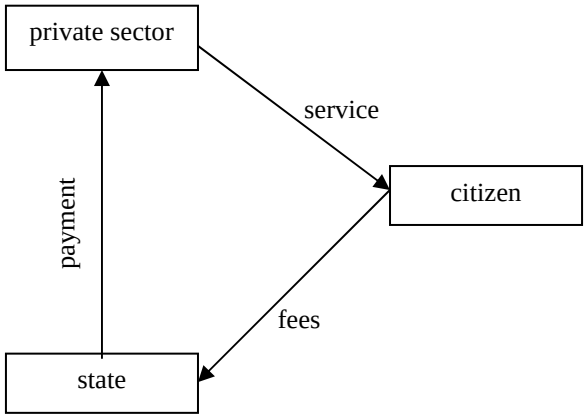

Figure 2: Trilateral service chain[3]

In "direct" concessions typically, a direct relation between the user and the service provider appears. For this provision the private sector acquires the right to collect fees from the citizen.

This kind of contracts is BOT, BOOT, BOO, BTO etc.

[2] Based on Zeiss 2000: 22.
[3] Alike.

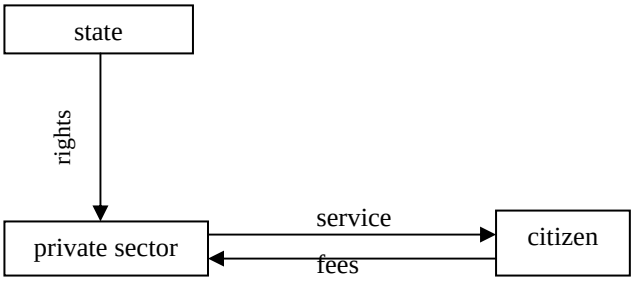

Figure 3: Direct concession[4]

The differentia in MSA contracts is that the private sector pays a lease to the state / land owner in order to obtain the exploitation right of the field. This characteristic describes their contractual relation as leasing.

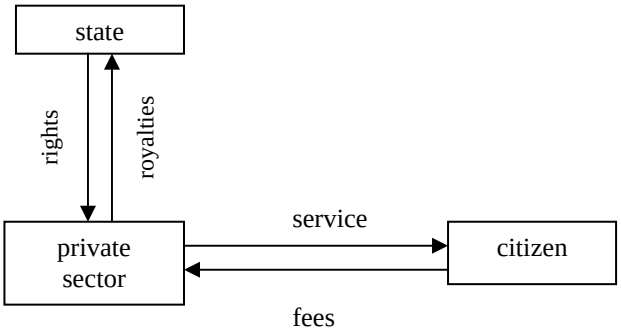

Figure 4: Land leasing

SITUATION IN EUROPE

The MSA royalties that the motorway operators collect are really low compared to the incoming tolls: for Autostrade only 2,95% its annual turnover (2000) and for Autoroute du Sud de la France (ASF) only 1,44% its annual turnover (2002). Fuel products represent the chief source of income for MSA operators: circa 75% their annual income. The remaining 25% that are generated through meals – beverages – shopping offer much higher profit than gas station products[5]. This fact explains why oil companies initially started this business. Meanwhile, specialized gastronomy companies have been created, like Autogrill in Italy. A recent development is that big super markets (i.e. Carrefour) plan to enter the market because of significant high Return on Equity (ROE).

Following the processing of the above mentioned questionnaire and the answers grouping the following table was produced:

[4] Based on Zeiss 2000: 23.
[5] According to interviews with MSA managers.

Table 1: Abstractive presentation of research results

		England	France	Italy	Greece
Contract duration	A	50 years	10-25 years	10 (+) years	25 years
	B		15 years	15 / 30 years	30 years
Design principles	A	Operation + necessary parking	Technical guidelines	Technical guidelines	Technical guidelines
	B		Technical guidelines	-	Technical guidelines
Expropriation	A	MSA operator: 4-8 years	Motorway operator: 1-1,5 year	Motorway operator: 1 year (+)	(during highway construction)
	B		Motorway operator: 2 years	Motorway operator: 6 months	Motorway operator: 4 years
Royalties	A	Premiums + nominal rents	Turnover rate	Turnover rate	Turnover rate
	B		Lump sum + fees (gas station) + turnover rate (meal...)	Fees (gas station) + turnover rate (meal...)	Turnover rate
Traffic volume	A	20.000 vehicles / day – Traffic break: 10% all vehicles	10.000 vehicles / day - Traffic break: 8,5% trucks, 5% cars	-	-
	B		20.000 vehicles / day	-	-
Motorways network – MSA closeness		9.400 kms - per 30 miles[6]	10.565 kms – (7.970 kms[7] - 584 MSAs, per 27 kms)	5.635 kms[8] – 415 MSAs, per 27 kms (3.400 kms[9] – 207 MSAs, per 30 kms)	915 kms (+670 kms[10]) - 10 MSAs

General structure

In two of the above mentioned countries examined (England and Greece) the MSA contracts are managed by state owned corporations (Highways Agency and TEO / EOAE respectively). In France and Italy the motorway operators (concessionaires) create sub-concessions.

Contract duration

According to the questionnaire results the contract duration varies from 10/30 years (France, Italy) to 50 years (England).

[6] Highways Agency.
[7] Motorways with concession.
[8] Alike.
[9] Autostrade network.
[10] Egnatia Odos motorway.

Design principles
In France, Italy and Greece the required technical guidelines (i.e. particular surfaces) are given before tendering. Conversely, in England the operational demands (i.e. required functions) are basically described, creating this way a more flexible framework.

Expropriation
In France, Italy and Greece the expropriations are realized through the state / concessionaire and the necessary land is handed to the MSA operator who carries the traffic estimation risk. In England conversely, the operator carries a higher risk since he proposes the adequate location for a new MSA and bears the expropriation costs.

Royalties
The royalties vary from premiums plus nominal rents in England, to turnover rate before taxes in France, Italy and Greece. In France and Italy we also have the combination of the afore mentioned turnover rate, plus an annual lump sum.

Traffic volume
As the majority of the interviewed managers emphasized, the basic success factor is the traffic volume. Fluctuations up- or downwards do not influence the contract clauses. Necessary minimum annual average traffic volume for a lucrative operation has been declared to be 10.000 to 20.000 vehicles / day. The average turn in rate is 5 to 10% of this figure.

Motorway network – MSA closeness
The difference between Greece and the other countries is apparent: both the network length and the MSA closeness are comparably low. Additionally there is no MSA on the Egnatia motorway yet. 50 km between MSAs is seen as ideal by some operators.

PLANNING DECISION MAKING

In order to guarantee a lucrative operation for new MSAs we need initially, for the planning, an estimate of traffic volume and turn - in rate. The location selection on an expanding highway is a step by step decision making process:

a) The existing and foreseen traffic movements on various highway sectors are carefully examined

b) Regions where MSAs are not allowed due to environmental or technical reasons are excluded (protected natural and/or archaeological zones, crossing areas with serious infrastructure nets)

c) Adequate sectors between junctions are specified according to general planning criteria (toll station locations, traffic volumes, distances between successive MSAs, urban centres contiguity etc.)

d) Planning zones inside the sectors are determined using more specified planning criteria (environmental items, planning parameters, motorway service supply etc.)

e) Selection of concrete planning locations applying specific criteria (morphological characteristics, construction cost, land availability, closeness of municipal nets etc.)

The final results are re-examined several times. Especially the traffic volume forecast is carefully rechecked because of its crucial influence on the cash flow model.

It has to be stressed that the continuity of bridges and tunnels on mountain passes causes great problems for a safe and satisfactory MSA. Additionally, the buildings should not lie lower than the contiguous highway, thus the lowest possible embankment is always economically welcome.

CASH FLOW MODEL

Initially the construction cost estimation takes place. The necessary building surfaces are based upon the technical guidelines that are used by Egnatia Odos SA (Greece).

The total cost includes the design and building of constructions with chattels, surroundings and roads, mechanical and electrical installations. This sum could increase if special formations (i.e. high embankments, service roads deviation) and larger buildings are required. The estimated construction cost for a typical one-sided MSA in Greece including all necessary equipment comes to at least three million Euros[11] (without VAT). Potential higher embankment, service roads deviation or larger buildings naturally lead to substantial increases.

The necessary land is circa 20.000m² and the minimum construction (travellers' service building – fuel station) surface 1.200m². The access roads cover circa 1.000m². The remaining area is used as parking and green space.

The financing costs include both the debt and the equity expenses. The leverage rate (equity/debt) has been assumed at 30/70, the opportunity cost 5% and the investment duration 30 years, the loan interest rates 6 – 6,75% (senior – junior loan) and the credit period 15 years, the annual inflation 2% and the taxes 35%, the participation in sales (turnover rate) 4%.

The maintenance / renewal costs of the installations and the equipment are also estimated as part of the operating expenses during the whole contract duration (30 years - afterwards the buildings and equipment are transferred in good condition to the land owner). Labour and material costs, utilities and overheads have been included in this calculation, too.

Revenues generated through various activities (fuels, meals, advertisements etc.) are based on estimated traffic break volume and relevant consumption: 30 lit petrol (0,90 €/lit) per car and 80 lit diesel (0,82 €/lit) per truck plus shopping 12 €/vehicle etc. An annual average daily traffic (AADT) of 7.000 vehicles both ways and a turn - in rate 7% (fuel station) – 8% (snack-bar, mini market) have been adopted. The traffic splitting has been assumed at 80% light and 20% heavy vehicles.

Thereafter, the most likely case cash flow is estimated based on the above mentioned data as input. A spreadsheet calculation and basic mathematical algorithms have been used to produce the desired cash flow diagram that clearly shows a lucrative business. New outputs can be produced by changing independently any of the data because the input process does not influence the calculation methodology. Therefore many variations can be checked.

[11] According to current calculations at Egnatia Odos SA.

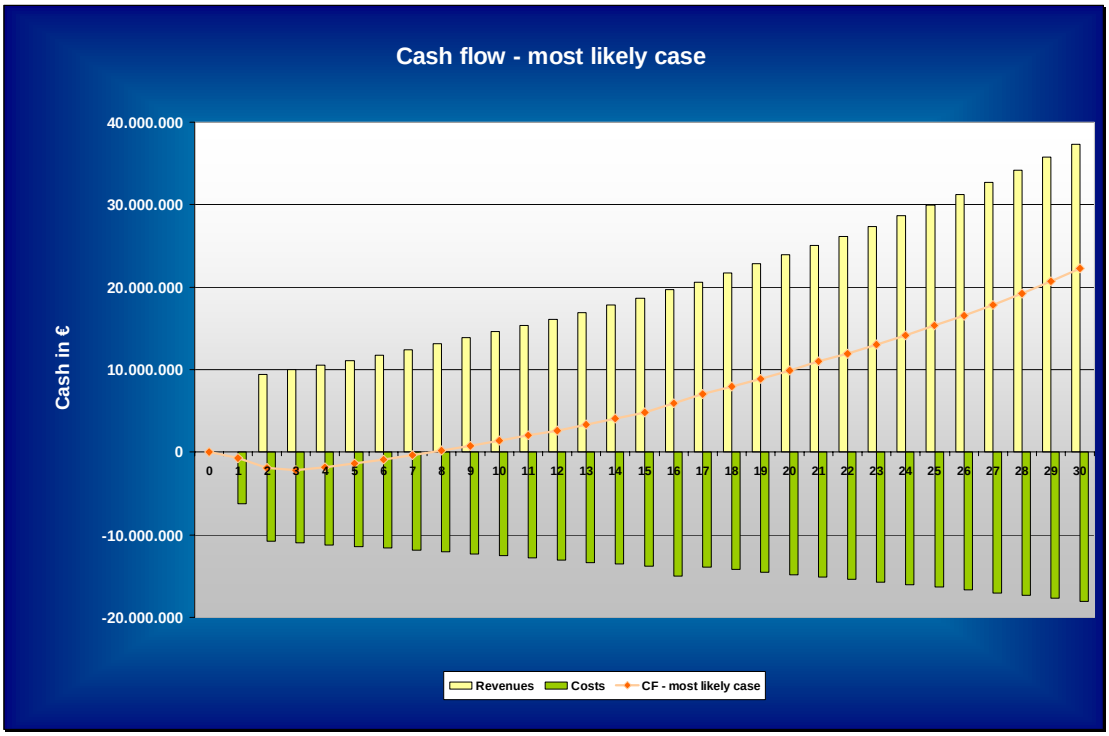

Figure 5: Cash-flow forecasting for a 30 years MSA life cycle

At least two additional alternative scenarios (best case – worst case) and a basic sensitivity analysis should also be examined in order to obtain a more complete view of the economic model. For a further investigation a Monte Carlo analysis is strongly recommended.

INVESTMENT RISKS

The MSA investment risks are classified to project (market, construction and financial) and global (political and environmental) risks. For the first group specific measures can be taken whereas the second group (except archaeological complications) can not be directly influenced by the project stakeholders.

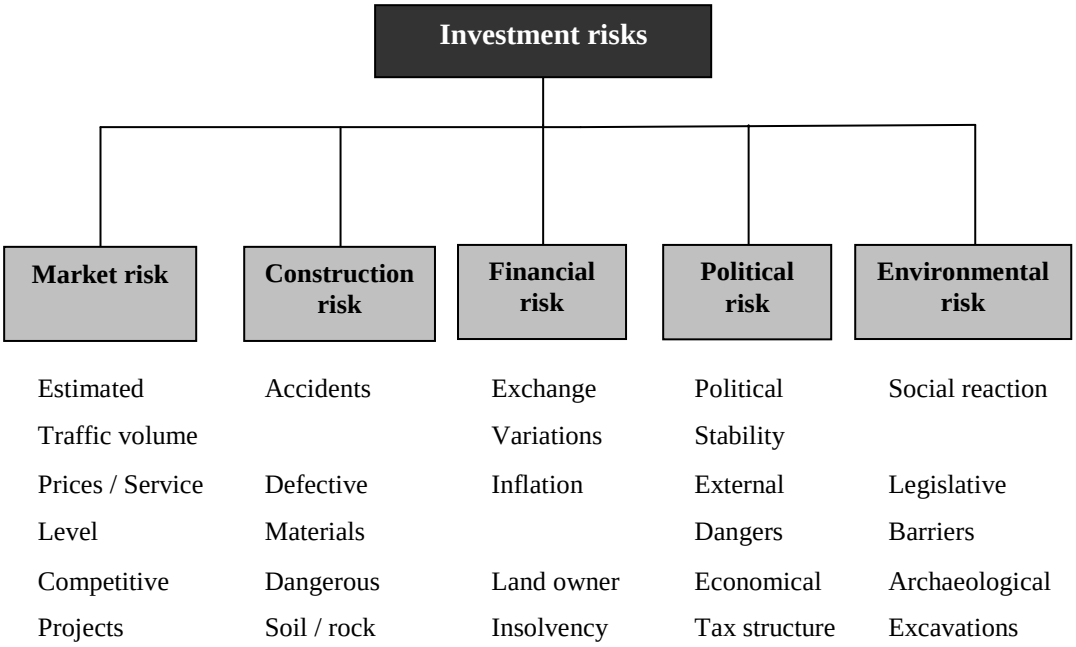

Figure 6: Basic MSA investment risks[12]

Regarding the management of the crucial MSA investment risks we could observe:

The construction risk is low because the project is conventional and technologically known. The construction cost is quite precisely estimated. Consequently, the most usual construction risks appear: accidents, defective materials and foundation soil.

The archaeological issues are a serious subject. The relevant legislation is really severe and frequency of excavations in Greece high. The involvement of the archaeological agency could cause both delay and cancellation of the project. Nevertheless, the likelihood of archaeological excavations can be precisely foreseen through the geological data of the conterminous highway. Even so, the excavations should be avoided at dubious areas.

Financial risks can be easily controlled. Exchange variations are not expected because transactions will most likely take place inside the same country or the Euro zone. Inflation can be handled through reasonable price augmentations.

The theoretical case of land owner insolvency can be dealt through a contract clause or an equivalent assurance. This scenario seems highly unlikely because state support during economic crises is certain.

The basic market risk is traffic volume on which the size of traffic breaks at MSAs depends and which, in turn affects consumption (fuel, meal, shopping etc.).The highways traffic increase, and consequently, the traffic break increase is affected by demographic evolution and the Gross National Product[13]. The dependence through macroeconomic factors is obvious. For instance, the expected traffic volume increase along Egnatia motorway (from Adria through Thessaloniki to the Turkish borders) is

[12] Based on Tsamboulas 2000.
[13] The average traffic volume increase of Autostrade network in Italy during 1990-2000 was 2,9% yearly. Meantime the equivalent GNP increase was 1,4% (Chevreux 2001: 6).

3,5% yearly[14]. The GNP increase in Greece for 2004 was 3,6%[15] while the Euro zone it stood at 2,3%.

External competition (similar service outside the highway network) is insignificant because the users prefer to stay on the motorway accepting the slightly higher price level of the MSAs. Of course, there is competition between various MSA operators that can be managed through rational planning at certain distances.

CONCLUSIONS AND BEST PRACTICE TOOLS

Regarding the afore mentioned Table 1 that shows abstractive the research results, many practice tools used in France and Italy have been adopted in Greece.

Furthermore, contract duration usually lasts from 10 (renewal and operation case) to 30 (build and operation case) years – the investment repayment period has been usually completed. A longer duration is a matter of negotiation between partners.

Referring to the design framework a high functionality is requested. Thus the operational guidelines – and not the technical ones – must shape the whole design.

It is preferable for both sides to realize the expropriation from the highway construction stage. This way huge access / infrastructure costs and valuable operation time can be saved as result of scale economy.

A rational turnover rate (participation in sales after taxes) plus an annual lump sum represents a fair royalties system for both contract partners. This way the highway concessionaire (land owner) essentially takes part in the operation risk.

A crucial factor that reduces operating costs is the MSA planning on both sides of the highway. This way labour and utilities costs can be considerably saved.

Traffic volume in combination with the location closeness of MSAs plays a critical role. A 50 km distance between successive MSAs appears reasonable. In this case an average turn - in rate from 5 to 10% can be expected and thus a consumption that produces high income. A prudent operation that holds the prices slightly over the average market level creates a lucrative business because of the branch oligopoly.

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