SYNCHRONIZING CORPORATE AND GOVERNMENT BUDGETING PROBLEM IN RAILWAY INFRASTRUCTURE MANAGEMENT

Agus Salim RIDWAN
Senior lecturer
Department of Industrial Engineering
Bandung Institute of Technology
Ganesha 10 Bandung
Indonesia
Fax. : +22-2500996
E-mail: agussr@indo.net.id

Sri HARTINI
Lecturer
Department of Industrial Engineering
Islamic University of Bandung
Tamansari 1 Bandung
Indonesia
Fax. : +22-2500996
E-mail: agussr@indo.net.id

Abstract: Management of the National railways was changed in 1991. The government retained ownership of the track, signals, and the right-of-way, while National Railway Operator (NRO) was assigned ownership of the rolling stock, stations, and other assets. The main responsibility of NRO was to operate freight and passenger services, and maintain the railway infrastructure on behalf of Government. During 1999, NRO scheduled to transform into a more autonomous company structured according to business principle as a Private Railway Operator (PRO) is. Integrating the railway policies and operations must be done to get the optimal railway development in the country. NRO does the existing railway budgeting in the complex operational budgeting system. This procedure is very difficult and detail in the context of national budgeting system. The simple maintenance infrastructure planning, programming and budgeting system is needed. A new procedure in budgeting system must be developed to facilitate integrated policies on railway sector and to accommodate a full participation of government institution. This procedure must be a simple one and on the right way to the objectives of the railway sector development.

1. INTRODUCTION

National Railway Operator (NRO) was an only one-railway operator and was the responsible of railway sector management in the country. This Operator managed the infrastructure and the operation of the railway transport in the entire region in the country. In the year of 1991, in order to share the responsibility and to make the equal treatment between road and railway transport, NRO abandoned the responsibility of infrastructure to the Directorate General of Land Transport. The government is fully responsible to manage the development, maintenance, and operation of railway infrastructure network.

However, the process of sharing the responsibility and management is not easy. It is because that the capability to manage, maintains, and operates the railway infrastructure is still owned by NRO. The information system, Human resource, technological capability

needed are owned by Operator, and Government must finance all of infrastructure maintenance and operation without knowing all of railway network problems. The condition make the government can't manages the infrastructure network system in the optimal ways and in consequence, the railway operation still stays in the low performance. Infrastructure system management was not synchrony with the need of railway operation management.

In order to develop the railway sector, as a whole in the country, the management of railway transportation must be improved. During 1999, NRO is scheduled to be transformed into a more autonomous and commercially-focused company structured according to business principle (Private Company). For that purpose, the infrastructure system planning, programming, and budgeting must be synchronized with the need of operation of railway transport. The system standard and procedure can play an important role in coordination between government as an owner and NRO as a contractor of infrastructure maintenance and operation. Also for better calculate the government payment due for the economic class services offered by NRO.

2. BUDGETING SYSTEM

Budgeting always has been conceived as a process for systematically relating expenditure of funds to accomplishment of planned objectives. In this important sense, there is a bit of Planning Programming and budgeting in every budget system. Every budget system, even rudimentary ones, comprises planning, management, and control processes. Operationally, these processes often are indivisible, but for analytic purposes, they are distinguished here. In the context of budgeting, planning involves the determination of objectives, the evaluation of alternative courses of action, and the authorization of select programs. Clearly, one of the major aims of PPBS is to convert the annual routine of preparing a budget into a conscious appraisal and formulation of future goals and policies.

One of the most important characteristic of the transportation activities which tends to set it apart from other economic activities is that the interrelationship between the transportation system and the entire socioeconomic system which it serves is very strong. In almost all aspects of transportation where engineers and planners are engaged in analyses of alternative policies, plan and designs, it has been found useful to have standardized cost models which can be used readily for different types of analyses. These models are standardized in the sense that they are developed for future application to different problem situations and are designed to use with ease, requiring a minimum on data gathering on the part of the user.

The weaknesses of the existing railway transport management in the country may be summarized as follows:

(a) As a responsible of railway infrastructure, government has not the standard and the system and procedures to measure and calculate the budget needed for maintenance and operation of railway infrastructures,
(b) As an operator, NRO has a difficulty to get the good payment for the public services offered to the economic class,

(c) There is no payment from NRO to government for the use of railway infrastructure in producing the railway services,
(d) Lack of a good data base which could be used by government and NRO to provide the good railway infrastructure management,
(e) There is no a common strategy to develop a railway sector in The country.

Planning, programming, and budgeting system could be applied in railways sector management, especially in maintenance and operation management. The technical standard and cost estimation of Infrastructure Maintenance and Operation (IMO) can help them to decide the budget of infrastructure maintenance and operation needed for produce a certain level of railway services quality. The Track Access Charge (TAC) is used to estimate the utilization charge of railway infrastructure network must be paid to the government. The payment of the subsidies from the government to the economic class services is calculated in Public Services Obligation (PSO). The performance of the track and quality of services in the corridor can be used as an indicator of goal achievement of the railway sector management.

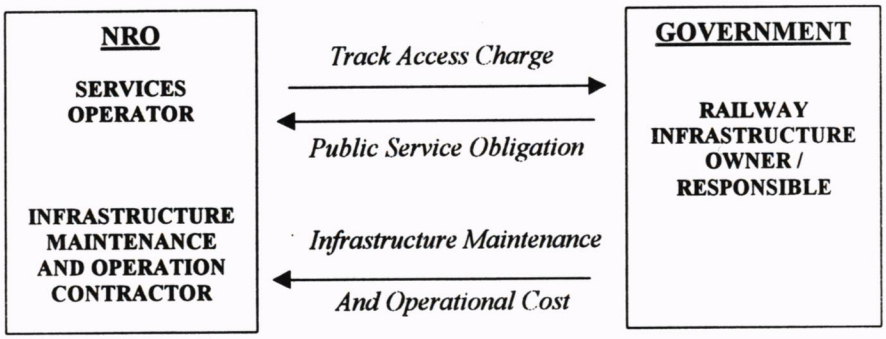

Figure 1 Financial relationship between NRO and Government

3. IMO AND TAC

The present study identified the following three areas crucial to achieving the ultimate objective of railway infrastructure management and to get the better railway sector development in The country:

a. Development of a procedure to estimate the cost of Infrastructure Maintenance and Operation (IMO) and Track Access Charge (TAC).
b. Development of a procedure to estimate the Public Service Obligation (PSO).
c. Development of a procedure and mechanism to asses routine planning, programming and budgeting system in the integrated effort of NRO, Department of Communication and Department of Finance.

Cost estimates are used in almost all aspect of engineering and planning for the evaluation of alternative designs and other options. There are two approaches to estimate cost, although in practice a combination of both is often used. One of the two types of cost estimation, the so-called engineering unit cost method, actually traces through this process, first estimating the amount of physical resources needed and then applying prices to yield the total cost. The other approach, termed the statistical cost or cost output method, relates costs and transport service (output) provided, bypassing the need to develop an explicit model of the particular resources used. Statistical cost model is developed with the aid of data on the costs incurred in actual transport system. An improved system and procedure was developed in the management of railway infrastructure maintenance and operation system. The combination of engineering and statistical cost models could be used to estimate the standard cost.

The development of proposed procedure for assessing routine maintenance cost estimate consist of two parts: devising a reliable and practical procedure of railway infrastructure maintenance cost estimate and establishing quantity standard by which work load requirements for each routine maintenance activity. The current practice requires unit foremen to drive along the track to inspected and report any deficiency to be the database for estimating maintenance cost. It was recognized in the study, that a detailed condition survey completed with physical measurements of track condition was not practical because it would be too time and energy consuming. Those procedures, makes the communication between NRO and Government difficult, because a lack of data base used by both of them. NRO and Government must make a listing of track to be improved every year to be based of Infrastructure maintenance budgeting.

In maintenance of railway infrastructure, it must be clear at what level the maintenance will be done periodic maintenance, rehabilitation, or renewal. In this study, the maintenance problems are focusing on periodic maintenance for keeping the railway infrastructure on fixed or normal condition. A new procedure proposed is that the maintenance cost should be calculated with the simple method considering infrastructure and operational condition of all railway networks in the country. Estimating unit maintenance cost can be done in two important steps; (a) determining the need of components maintained material and work requirement, and (b) unit price each cost component. The use of the above procedure presented an improvement over the existing practice in that standard description would be adopted in performance demand. This is especially important from the standpoint of quantifying track performance achieved.

3.1. Track classification

Railway infrastructure is classified on five operational standards, which are based on passing tonnage, speed, and other operational variables. The geological factor of the track can be divided in two-terrain (1) mountainous and (2) level terrain. Development of the methodology under assumption that each class has the same physical and operational characteristic, and needs the same unit cost for periodical maintenance. The railway operation depends on passing tonnage, services frequencies, tam formation, type of locomotive, type of wagon, speed, and axle load.

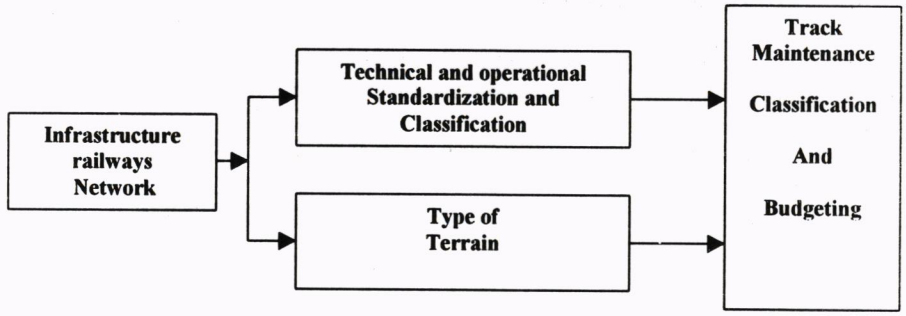

Figure 2 Track classification

Table-1: Track classification

TRACK CLASSES	PASSING TONNAGE (MILLION TON/YEAR)	TYPE OF TERRAIN MOUTAINEOUS/LEVEL
1	> 29.75	L
2	>29.75	M
3	9.8 – 29.75	L
4	9.8 – 29.75	M
5	4.9 – 9.8	L
6	2.45 – 4.9	M
7	0.525 –2.45	L
8	0.525 – 2.45	M
9	< 0.525	L
10	< 0.525	M

3.2. Maintenance cost

The maintenance cost per km be estimated through the detail survey for each class and calculated with the engineering costing approach. In the end, the classification of track and maintenance cost per km can be updated every year to get an optimum maintenance budget. Total infrastructure maintenance cost could be estimated as follows:

$$C_m = \sum_i C_i \qquad (1)$$

Where: C m = Total maintenance cost
C i = Maintenance cost of track class i
i = Track Classes 1,2, 10

3.3. Infrastructure operational cost

These costs are all of expenditure to operate and control the track in producing the railway services. In general, this cost could be detailed as the expenditures for:

a. railway operation
b. operation of signal, telecommunication and electricity
c. operation of turnout
d. Controlling the track and one level crossing with other mode of transport

$$C_{op} = \sum_{j} C_j \qquad (2)$$

Where: Cop = Operational Cost
Cj = Cost of activity j
j = Infrastructure operational activity

IMO Cost = Maintenance cost + Operational cost
= Cm + Cop (3)

3.4. Track Access Charge (TAC)

TAC consists of two components of charge (1) charges for infrastructure maintenance and operation and (2) charges for infrastructure renewal. So TAC could be calculated as follows:

TAC = IMO Cost + Depreciation (4)

4. PUBLIC SERVICE OBLIGATION

Government has an interest to improve the transport services for the low-income society. Railway is a good mass transport for medium and long distance. The quality of railway services for the lower income society was reflected from the economic class services. The government wants that the economic class has a certain level of quality, and pays the public services obligation as compensation to NRO. PSO is the different between total cost and total revenue of the economic class services.

4.1. Cost estimate

The full-costing model could estimate the total operational cost of railway services. The total cost is modeled as the sum of several cost items; direct, indirect and general costs. The direct costs of the railway services can be divided into specific and non-specific direct cost. All expenditures for rolling stock component and operation could be classified as a specific direct cost. The infrastructure cost used to produce seat-km services is classified as a non-specific direct cost. General costs are all of expenditure needed to maintain the administration of the railway sector.

$$C_{train} = \sum_{k}\sum_{c} C_{kc} \qquad (5)$$

Where: Ctrain = Total cost of economic class trains
Ckc = Cost component c of train k

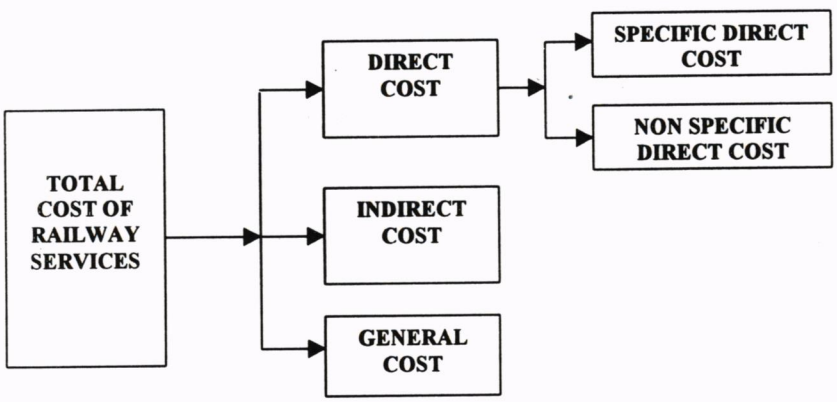

Figure 2 Full-costing model

4.2. Revenue estimate

The problem of estimating revenue is to estimate the number of passengers, and in transportation terms is in estimate the load factor of railway services. Total revenue of the economic class railway services is calculated from the total income of all the economic classes offered by NRO in one year and the other non-operational incomes.

$$R_t = \sum_k R_k + R_{nop} \quad (6)$$

Where: R t = Revenue economic class in the year t
R k = Revenue train k
R nop = Non operational Revenue

4.3. Public Service Obligation

PSO could be calculated as a different between total revenue and total cost per year to produce the economic class services.

$$PSO_t = C_{train} - R_t \quad (7)$$

Where: PSOt = Public Service Obligation in the Year t
C train = Total cost of economic class services
R t = Total Revenue of economic class in the Year t

5. MECHANISM OF BUDGETING

The PPBS can be applied in the railway infrastructure management if the government and NRO are in an integrated budgeting system. The budgeting process starts from the coordination memo of the Ministry of Communication. Based on the memo and Railway Master plan, NRO calculates an estimation of IMO cost, TAC and PSO. Ministry of communication and Ministry of Finance will evaluate this proposal in the integrated budgeting system of the Year. The process and mechanism of budgeting system could be seen in the figure 3.

6. CONCLUSION

Railways sector development of the country depends on the corporate management of NRO and the commitment of government in managing the railway infrastructure. In condition where the railway infrastructure and operation was managed by the different institution, it needs the special procedures in management. The problem to synchronize the corporate and government budgeting in the programs of maintenance, operation, and development of the railways sector must be solved. The Planning, Programming, and budgeting System (PPBS) could be used to support the coordination between government and NRO in managing the railways sector as a Tim. In this context, the concept of Infrastructures Maintenance and Operation (IMO), Public Service Obligation (PSO) and Track Access Charge (TAC) was developed.

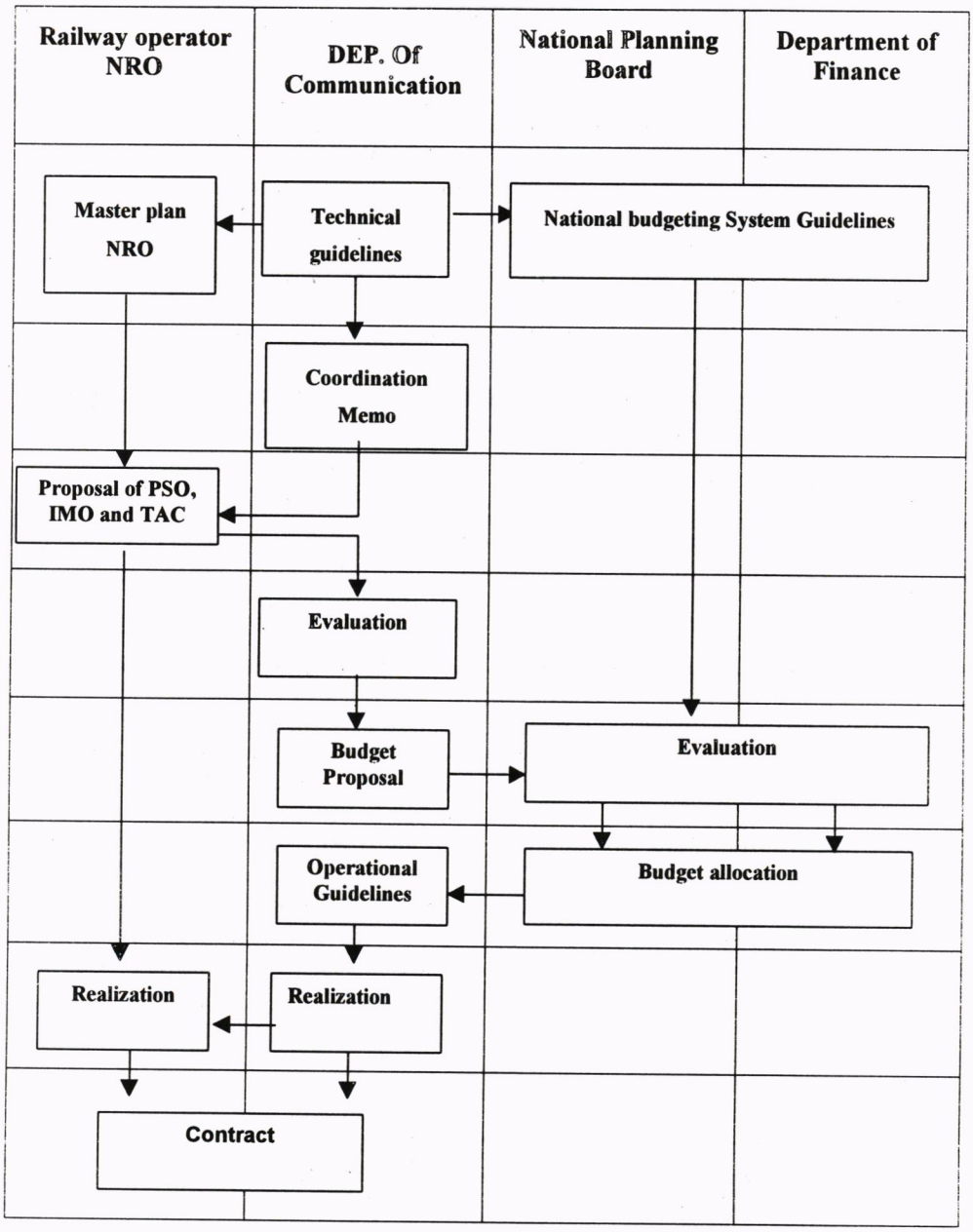

Figure 3 IMO, PSO AND TAC BUDGETING MECHANISM

REFERENCES

a) Books and Books Chapters

1. Derek R.Hall, 1993, **Transport and economic Development in the new Central and Eastern Europe**, Belhaven Press, London and New York.
2. Fremont J.L. and Ernest G.M., 1972, **Planning, Programming and Budgeting, A System Approach to management**, Rand McNally College Publishing Company, Chicago.
3. George E.G., Lester A.H., 1992, **Public Transportation**, Prentice Hall, Englewood Cliffs, New Jersey.
4. Jan Owen Janson, 1984, **Transport System Optimization and Pricing**, John Wiley & Sons, New York.
5. Pearce, Robinson, Zahra, 1989, **An Industry Approach to Cases in Strategic Management**, Irwin, Homewood, Boston.

b) Journal papers

1. Reid EWING, 1993, Transportation Service Standards- As if people matter, **Transportation Research Record no. 1400**, National Academic Press, Washington DC.
2. Ali E. Hoghani and Chien-Hung Wei, 1993, Optimization of Capital Budgeting for Interrelated Capacity Expansion Project, **Transportation Research Record no. 1400**, National Academic Press, Washington DC.
3. Lazar N. Spasovic, Maria P.Boile, and Athanassios K.Bladikas, 1994, Bus Transit Service Coverage for Maximum Profit and Social Welfare, **Transportation Research Record no. 1451**, National Academic Press, Washington DC.
4. Dennis Hinebaugh and Daniel K.Boyle, 1994, Survey of Fare policies at Large Transit Systems, **Transportation Research Record no. 1451**, National Academic Press, Washington DC.
5. Larry W. McPerson, Marrion R. Pole, and Marvin P.Stong, 1992, Use of Highway Performance Monitoring System and Bridge Needs and Investment Process for reporting Conditions, Needs, and Performance trend, **Transportation Research Record no. 1364**, National Academic Press, Washington DC.

c) Other documents

1. NRO, ITB Research Center, 1998, **The technical Standardization For Public Services Obligation, Infrastructure Maintenance and Operation and Track Access Charge**, Project Study Report.