Chapter 4
Railway Investment Appraisal Techniques

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ABSTRACT

Railway transport involves the expenditure of resources on a combination of investment in capital items (e.g. stations, tracks, equipment) and/or in operations (e.g. subsidies). Concerning the fact that there are limited amounts of resources, it is necessary to maximize the returns obtained from the investments of those resources. The best way to do this is to ensure that the resources will be allocated on those projects that maximize their return. Railway appraisals therefore represent a way of thinking about all the costs and benefits of different railway related spending projects in a systematic manner so that, the projects can be compared and investments made in those which are going to provide the maximum possible return on the investment. This chapter provides a review of the main analytical tools that should be used in the process of railway investments appraisal. Namely, a detailed description of discounting, Net Present Value (NPV), Internal Rate of Return (IRR) and Cost Benefit Analysis (CBA) is covered by this chapter.

1. INTRODUCTION

To accomplish a continuous development process a railway company must invest its own and borrowed assets, to postpone possible consumption today, in order to provide new consumption and new investments in the future. On this way a railway company is forced to accumulate capital and to invest it, because investing represents the only way of achieving development objectives. Therefore, investments represent the necessity because the future development of every railway company merely depends on good planning and efficient management of investment process (Jovanović, 1991).

An investment represents a very complex process that involves a number of activities and participants. The most part of financial assets for planning and development is spent within the investing process as
a main mean for achieving planned development. The importance and complexity of investing process implies the need for its management in order to realize it on the best way. Total process of investing and gaining effects from an investment is characterized by a single- and a multi-period investments performed today, and in most cases a sequence of effects expected in the future. In order to get a real picture of this process and to manage it, especially to evaluate the benefits of an investment, it is necessary to analyze and determine the effects made by realization of an investment project.

There are different classifications of investment effects. These effects are mostly categorized on economic and non-economic. Economic effects represent a certain volume of services in railway passenger or freight transport and they are the most often expression of results of some investment. Non-economic effects – political, social, etc., may in certain cases be more important than economic and therefore it is necessary to include them in evaluation of some investment. Railway line across some area may be economically inefficient, but non-economic effects from this investment (environment, employment, etc.) justify its realization. Also, effects from an investment, as a result of investment realization, may be expressed through a specific volume of railway service production or some production expressed in certain value terms. Measuring of total effects gained from an investment and their quantitative expressing through some indicators or criterion, enable us to evaluate if the estimated effects will exceed the total investments. This procedure represents the estimate of efficiency of an investment program and it serves for making investment decision.

In practice, validity of realization an investment program is performed through analysis and evaluation of effects obtained by investment realization. Considering that economic effects of an investment may be measured and quantitatively expressed, analysis is in most cases focused on economic effects which will be delivered by investment realization and an estimate if that effects are enough with respect to needed investments. This procedure is known as analysis and evaluation of efficiency and profitability of an investment program.

Effects of an investment may be measured by calculation of certain indicators or criterion by which certain effects of an investment may be expressed. There are static and dynamic approaches for profitability evaluation of an investment proposal. Static approach does not involve entire time horizon of investing and exploitation of certain investment, just one time period. In contrast to static approach, dynamic estimate takes the whole time period in analysis and evaluation of an investment project covering its whole period of investing and exploitation. By the use of discounting method all positive and negative effects from every year of investing and exploitation period are included and dynamic criterion are calculated. Dynamic criterion represent complex indicators that provide more realistic analysis of different aspects of some investment project and evaluation of its profitability. A number of dynamic criterion is proposed in literature and practice for investment proposals evaluating. Therefore, in this chapter, the Present Worth and Internal Rate of Return are introduced as the most important dynamic criterion. In the case of investments that have substantial indirect effects (non-economic), like investments in transport infrastructure, Cost Benefit analysis will be presented. The use of these techniques in the context of railway related investments will be reviewed.

The chapter is organized as follows. In Section 2. the discounting cash flow technique is explained, as the main prerequisite for dynamic evaluation of investment proposals. Section 3. presents an explanation and classification of investment alternatives. Section 4. contains Present Worth, its definition and main features. In Section 5. Internal Rate of Return is explained. Section 6. contains basic prerequisites for applying Cost Benefit approach in evaluation of public projects. Section 7. contains a summary of presented methods. In Section 8. a review of railway related applications of appraisal techniques is given.