economically efficient project, that is the one which produces the lowest ratio.

The types of costs and benefits vary according to the type of project. For instance, costs and benefits involved in transportation projects differ from those of housing renewal schemes. According to Schofield the benefits of urban renewal include increased site productivity, neighbourhood spillovers and reduced social costs, while costs comprise site acquisition cost and expenditure to redevelop the site.[2] Of all these estimates of cost, the most difficult to measure are the social costs, such as crime reduction.

In *Urban Design: Street and Square*, there is a case study of urban design from Belfast.[3] The main objective of the Markets Area project 'was to provide a pleasant residential environment for the existing people of the Markets ... In specific terms it meant the rehousing of 2200 people on at least 9.5 ha (21 acres) of land in two- and three-storey terraced housing ... Other goals included the rehabilitation of some of the better-quality housing, to relocate small industries in the area, to minimize pedestrian–vehicular conflict and the physical separation of the Upper and Lower Markets, to provide a shopping centre to act as a focus and, finally, to provide a primary school campus'.[4] For each of these goals the costs and benefits involved were different. The choice between two alternative options to achieve the same goal was based on the grounds of economic efficiency. For instance, the sinking of Cromac street was abandoned in favour of the simple widening of the street at ground level because of the prohibitive costs involved in the first option.

Zoppi carried out a cost–benefit analysis of the Central Artery/Third Harbour Tunnel project in Boston.[5] The costs of the project were distinguished in fixed and variable costs. The former includes land costs, development costs, construction costs and administration costs, what Schofield calls project resource costs; while the variable costs are those which are sustained for maintenance during the project's life time.[6] The benefits of the project were calculated as intrasectoral and intersectoral benefits. Among the intrasectoral benefits there are the reduced vehicle operating costs, decrease in the number of accidents and the reduced costs in travelling time for the transportation of goods and passengers; these are user benefits, while the increase in regional income is an intersectoral benefit.

Central to the cost–benefit analysis is the selection of the appropriate discount rate to make costs and benefits calculated at different years comparable. This rate is the level at which future costs and benefits are converted into present-day values.[7] Table 6.1 presents Zoppi's results of this analysis. It

Table 6.1 Results of the cost–benefit analysis.

Discount rate (%)	*Fixed costs (in 1987 millions of dollars)*	*Difference between benefits and variable costs (net benefits) (in 1987 millions of dollars)*	*Difference between net benefits and fixed costs (in 1987 millions of dollars)*
5	4842	6795	1953
6	4970	4364	–606
7	5110	3938	–1172
8	5246	3388	–1858
9	5385	2594	–2791
10	5521	1651	–3870

Source: Zoppi, 1994.

is apparent that the results change radically in relation to the selected discount rate. While with a discount rate of 5 per cent the project is economically efficient because the difference between net benefits and fixed costs is positive; with a discount rate equal to or greater than 6 per cent the project is not economically viable. Another important issue in cost-benefit analysis is the assessment of the intangibles, i.e. those elements for which it is difficult to quantify their value, for instance 'the quality of life'. In conclusion, cost-benefit analysis is an important tool in the assessment of the economic viability of a project. At the same time, it is difficult to account for those elements which improve the individuals' well-being. The Balance Sheet Method and the Goals Achievement Matrix are two techniques which derive from, and improve on cost-benefit analysis.[8] The two techniques are not explained here as they are based on the same principles as cost-benefit analysis; the interested reader can consult the above-mentioned literature.

ENVIRONMENTAL IMPACT ASSESSMENT

Central to sustainable development is the assessment of urban projects in terms of their environmental and social impacts, as a study of the economic viability of the project would give only a partial picture of the project's impacts. It is recognized that the term 'environment' should include both physical and socio-economic dimensions. According to Glasson *et al.*, the consideration of physical elements exclusively, as is the case with the Department of Environment checklist of environmental components, is too restrictive.[9] Table 6.2 shows both types of components to be taken into account when trying to assess the full extent of

Table 6.2 Environmental assessments: components.

Physical environment (adapted from DoE 1991)	
Air and atmosphere	Air quality
Water resources and water bodies	Water quality and quantity
Soil and geology	Classification, risks (e.g. erosion)
Flora and fauna	Birds, mammals, fish, etc.; aquatic and terrestrial vegetation
Human beings	Physical and mental health and well-being
Landscape	Characteristics and quality of landscape
Cultural heritage	Conservation areas; built heritage; historic and archaeological sites
Climate	Temperature, rainfall, wind, etc.
Socio-economic environment	
Economic base – direct	Direct employment; labour market characteristics; local/non-local trends
Economic base – indirect	Non-basic/services employment; labour supply and demand
Demography	Population structure and trends
Housing	Supply and demand
Local services	Supply and demand of services; health education, police, etc.
Socio-cultural	Lifestyle/quality of life; social problems (e.g. crime); community stress and conflict