

Technical Report

Methodologies for the Appraisal of the National Skills Development Strategy



SUBMITTED TO
USAID/South Africa

SUBMITTED BY
Nathan-MSI Group
J.E. Austin
Nathan Associates

IN RESPONSE TO
OUT-PCE -I-810-98-00016-00

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Acronyms

CBA	cost benefit analysis
CBR	cost benefit ratio
CEAc	Central Economic Advisory Council
CGE	computable general equilibrium
DoL	Department Of Labour
GDP	gross domestic product
GEAR	growth, employment and redistribution
IRR	internal rate of return
NPI	National Productivity Institute
NPV	net present value
NSDS	National Skills Development Strategy
RDP	Reconstruction & Development Programme
SAM	social accounting matrix
SETA	Sectoral Education & Training Authority
SSA	Statistics South Africa

Preface

This project was undertaken by JE Austin Associates (the technical lead) and Nathan Associates, under the Nathan–MSI Segir–GBTI Joint Venture funded by USAID. The project team comprised Pundy Pillay (Team Leader), Lindsay Falkov (*SkillsWorks*, Johannesburg), David Mullins (Conningarth Consultants, Pretoria), Edward Brooke (Research Associate, Nathan Associates) and Kate Grubb (Research Associate, JE Austin). Martin Webber and Kevin Murphy, JE Austin Associates, Washington, D.C., oversaw the project.

The project comprises two parts: Part 1 is an international review of training systems with a particular emphasis on monitoring and evaluation. Part 2 reviews and proposes methodologies for assessing the National Skills Development Strategy. The principal researcher for Part 2 was Dr David Mullins of Conningarth Consultants, Pretoria.

1. Background: Some Economic Scenarios

The South African economy needs to embark on a higher economic growth path. Although necessary, a mere acceleration of growth in the Gross Domestic Product (GDP) will not address the major social and economic inequalities present in this country. Hence, a restructuring of growth is required towards *sustainability* greater *social equity* and *increased labour absorption*.

In its *Growth, Employment and Redistribution* (GEAR) strategy, government envisaged a macroeconomic environment conducive to job-creating, economic growth. The strategy delineated macroeconomic projections and economic policy targets, and assumed particular responses from business, labour and foreign investors to attain an average annual real economic growth rate of 6 percent and the creation of 400,000 additional employment opportunities per annum between 1997 and 2000.

Central to GEAR is the promotion of sustainable and job-creating economic growth, supported by

- Fiscal and monetary discipline;
- Tax reform and investment-friendly tax incentives;
- The gradual abolition of exchange controls;
- A competitive exchange rate;
- The promotion of international competitiveness;
- The acceleration of tariff reductions;
- The restructuring of state assets;
- An expansionary infrastructural programme;
- The upliftment of skills; and
- Greater labour market flexibility.

Since the announcement of GEAR in 1996, significant progress has been made with, inter alia

- A reduction in the budget deficit;
- A consistently restrictive monetary policy which resulted in the resumption of a downward inflation trend;
- The relaxation of exchange controls;
- The prevalence of a competitive exchange rate;
- The introduction of industrial support measures;
- The lowering of protective tariffs;
- The privatisation of state assets; and
- The delivery of social rdp-related objectives.

These aspects of macroeconomic policy triggered significant structural shifts in the economy, thereby improving industry's globalisation drive, advancing exports towards non-traditional higher value-added finished goods and permitting a generalised retention of South Africa's broad industrial base.

Unfortunately, the growth and employment projections of GEAR have not been realised. In order to accelerate the currently pedestrian economic growth rate, a focus is thus required on the *micro* or *sectoral level*. Value may be derived from highlighting the sectoral challenges envisaged by higher economic growth, as challenges for the government, business and labour leadership to improve the performance of the South African economy.

As indicated earlier, the government has made significant progress with the implementation of various critical policy initiatives that will ensure a higher level of performance by the South African economy. The majority of these measures are destined to improve the economy's growth potential by raising the efficiency/productivity of the production factors (labour and capital). [This is also referred to as supply-side supportive measures].

Recent studies have indicated the critical role that a more efficient and productive labour force has to play in realising South Africa's daunting employment and welfare goals as contained in GEAR.

The following table, an excerpt from a study by ABSA¹ Bank, shows the major challenges facing the South African economy over the next 15 years.

Table 1. Demographic and Labour Sector Developments (Annual Averages)

		1989- 1993	1994 - 1998	1999 – 2003			2004 – 2015		
				Cons	Base	Opt	Cons	Base	Opt
Total population ¹	million	35.8	39.9	45.4	45.4	45.4	50.5	50.5	50.5
	y/y %	2.3	2.2	1.8	1.8	1.8	0.9	0.9	0.9
Total labour force	million	12.10	13.79	15.69	15.69	15.69	19.30	19.30	19.30
	y/y %	2.6	2.7	2.5	2.5	2.5	2.4	2.4	2.4
Total formal employment	million	8.0	7.6	7.1	7.4	7.6	6.9	8.7	10.1
	y/y %	-1.3	-1.1	-0.4	1.3	2.2	-0.5	2.1	3.8
Employment: public sector	million	1.79	1.76	1.72	1.75	1.79	1.65	1.88	2.12
	y/y %	0.3	-0.2	-0.6	0.3	1.0	-0.4	1.1	2.6
Employment: private sector	million	6.19	5.85	5.41	5.63	5.80	5.24	6.77	7.93
	y/y %	-1.8	-1.4	-0.3	1.6	2.6	-0.5	2.4	4.2
Unemployment (not formally employed)	million	4.1	6.2	8.6	8.3	8.1	12.4	10.6	9.2
	y/y %	10.6	7.5	5.0	3.7	2.8	4.0	2.6	0.8

¹ Assuming maximum AIDS infection rate of 15 %

NOTE: Cons=Conservative; Base= Baseline; Opt=Optimistic

Table 1 shows that the unemployment situation (in absolute terms) can only be turned around if the economy realises its optimistic scenario. What is important to note here is that an important precondition for realising such an optimistic scenario is that some very significant reform initiatives are realised, including those on the labour front. These are summarised in Table 2 – also an excerpt from the same ABSA publication:

¹) Prospects for the South African Economy, 1999– 2015; ABSA, October 1999. [ABSA Group Economic Research].

Table 2. Economic Scenarios and Preconditions

		1989 - 1993	1994 - 1998	1999 – 2003			2004 – 2015		
				Cons	Base	Opt	Cons	Base	Opt
Real general government investment	% change	-17.7	4.0	4.7	10.1	16.2	1.5	2.9	6.1
Highly skilled labour/total employment ratio	% change	2.3	2.6	1.0	2.0	2.4	1.0	2.0	2.6
Real parastatal investment	% change	-17.3	17.0	-3.4	-1.2	1.6	1.3	3.0	5.0
Real government consumption	% change	1.9	1.7	1.2	1.8	2.3	0.9	2.9	4.1
Total labour force	% change	2.6	2.7	2.5	2.5	2.5	2.4	2.4	2.4
Cost of labour/cost of capital ratio	% change	2.5	1.9	2.6	1.2	0.6	2.5	1.0	0.4
Number of strikes	% change	90.4	94.9	69.3	71.4	73.7	25.3	28.4	31.8
Household debt/household disposable income	% change	50.9	58.8	61.0	61.0	60.7	61.6	61.2	60.7

ABSA's study clearly shows how important it is to raise the skills level of the labour force as a precondition for reaching the higher levels of economic growth that will significantly reduce unemployment. From Table 2 it is evident that the highly skilled labour/total employment ratio will have to increase considerably if the optimistic scenario is to be obtained. The ratio should improve by 2.4 % per annum between 1999 and 2003 and 2.6% per annum between 2004 and 2015. Furthermore the analysis shows that it is important that the change in the cost of labour/cost of capital ratio must be reduced in order to increase the labour absorption capacities of the economy. The role that a better-trained labour force, at all levels, must play to achieve these goals, is indispensable.

One important policy initiative that is still "outstanding" so to speak is the upliftment of skills. This aspect requires substantial work in the field of legal and institutional reform in order to implement a nation-wide sectorally-driven, vocational, workplace-situated education and training program. Such a national Skills Development Strategy has been designed by the Department of Labour, which is now embarking on its implementation.

2. Objective of the Study: Measuring the Impact/Effectiveness of the National Skills Development Strategy

The Department of Labour (DoL) has embarked on the implementation of a new skills development strategy which includes the creation of 25 Sector Educational and Training Authorities (SETAs) that will encourage and direct investment in worker training. A payroll levy (set initially at 0.5% and rising to 1% in April 2001) implemented in April 2000 is expected to generate 1 billion Rand in its first year of operation for a National Skills Training Fund that will finance workplace training and the administrative costs of the SETAs.

The SETAs will not conduct training. They will work with their industries to develop sector skills plans, certify the courses offered by training providers, and serve as the conduit through which companies access funds in the National Skills Fund. It is envisaged that this program will encourage investment in skill development, redress historic training inequalities, provide portable skills, and contribute to more transparent and flexible labour markets.

The DoL's National Skills Development Strategy constitutes an integral part of the government's human development investment programs. Through these programs, the government is investing resources in its citizens in the present time in the expectation that they will be more productive in the future (thus benefiting society as a whole).

One of the general techniques commonly used to evaluate the impact of training and educational investment is cost-benefit analysis (CBA). However, CBA is a very narrowly based technique which only takes into account the direct effect of a program or project. However, policymakers may prefer to know about the secondary impacts of their decisions.

To analyse the broader implications of the program or project, economic analysis techniques other than CBA are also required. However, some programs and projects do not lend themselves easily to such analyses, requiring many broad assumptions which may be unrealistic.

After consultation, the Department of Labour (DoL) indicated that this research project should not only look at cost-benefit analysis but should also focus on methodologies that analyse other economic aspects of the National Skills Development Strategy (NSDS). Further, the research should focus on the identification of indicators to monitor the performance of the NSDS.

To satisfy the various objectives of the DoL, this report focuses mainly on the establishment of a package of methodologies to analyse the feasibility of the NSDS from a narrow financial perspective to a wider economic and distributional analysis. The scope of work will thus concentrate on three different analyses, namely:

- Social cost-benefit analysis
- Economic and distributional analysis, and
- Performance indicators.

2.1 SOCIAL COST-BENEFIT ANALYSIS (CBA)

CBA is considered to be the most appropriate economic tool to analyse programs and projects where the majority of the costs occur at the beginning of the program or project and the benefits normally occur over a period of time. The future streams of costs and benefits are made comparable by discounting the streams to present day values.

From the discounted cost and benefit streams it is possible to determine important “performance indicators” such as the internal rate of return (IRR), the net present value (NPV) and the cost-benefit ratio (CBR). Such analyses will show whether the proposed program or project is viable from a narrow economic point of view.

Pre- and post CBA analysis can be performed on the SETA Programme. Pre-CBA analysis refers to a situation where the program is in a planning phase and the policy makers wish to appraise the net economic advantages of such a program. The disadvantage of the pre-CBA analysis, in the absence of data, is that most of the information needed for the analysis will be based on assumptions.

Post-CBA analysis is used where programs have already been instituted for a considerable time period. For instance, the income of persons who attend a specific SETA training program could be compared with those who have not attended such programs.

Multiple regression analysis can then be used to analyse the difference in income of the two groups of individuals and to estimate the benefits to those attending a specific skills development program relative to those who had not.

2.2 ECONOMIC AND DISTRIBUTIONAL ANALYSIS

The types of cost-benefit analyses described above typically only account for effects on persons and markets directly affected by the project. This approach, referred to by economists as “partial equilibrium” analysis, considers supply and demand relationships in one or a few isolated markets. Such analyses assume that other markets are either unaffected by a project, or that any effects in these markets are unimportant for the purposes of net benefit estimation.

Other macroeconomic models recognise that many economic sectors are interrelated, in terms of competing for inputs (e.g. raw materials, energy, labour), providing competing goods or services, or providing complementary goods or services. Such models can be used to assess these types of “ripple” effects on a region’s or nation’s economy. These models can also provide decision-makers with other types of information such as the influence on tax revenues, employment, productivity, competitiveness and new investment.

These macroeconomic tools include two “general equilibrium” approaches: Input-Output models and Computable General Equilibrium (CGE) models. Unlike partial equilibrium analysis, these models attempt to capture the interactions of a project’s direct and indirect impacts throughout an economy. The Social Accounting Matrix (SAM) is a third type of approach that can be applied in a project of this nature. These differ from Input-Output and CGE models through their focus on social rather than economic criteria. Although much more comprehensive, the SAM is based on the same principles as the conventional Input-Output Table and to some extent is a logical extension of it. The SAM however, differs from the Input-Output table in a few important respects. Besides information on the inter-dependence between the different sectors of the economy, which is also part of the Input-Output Table, the SAM also includes detailed information on the income and spending patterns of households. The SAM therefore lends itself

much more usefully to quantifying the income distributional effect of various institutions and income categories of a specific development initiative such as the SETA Programme.

In the South African public and private sectors these economic tools are being used by economists and statisticians on a regular basis for the appraisal of core investment programs and projects.

2.3 PERFORMANCE INDICATORS

An important aim of this study is to provide the Department of Labour and other stakeholders with performance indicators that can be used to monitor performance and to inform policy and practical implementation. The indicators should, inter alia, measure the impact on production, employment, productivity, and competitiveness.

From earlier sections it is evident that in searching for an appropriate tool/instrument to measure the impact and effectiveness of the national skills development strategy it may not be necessary, practical or cost-effective to undertake all of the CBA, measuring macroeconomic impact and distributional analyses.

To overcome this problem it is proposed that use be made of various other quantitatively orientated analytical methods used in econometric studies. These methods are mainly based on the basic interrelationships that exist in the economy between the various economic aggregates and variables. These interrelationships can be quantitatively determined through statistical methods. Building on the CBA principles and linking up with the broader economic theory of inter-dependencies, it is possible to construct suitable performance monitors pertinent to the workplace training initiative. It will be shown that these performance indicators can also serve as target parameters as part of the training strategy.

Due to the nature of the proposed performance monitors, it is foreseen that they could be constructed for each SETA separately, regionally and for the training programme in total.

It is also imperative that in order to bring this proposed system into operation, an appropriate computerised database be created and kept up-to-date.

3. Social Cost Benefit Analysis (CBA)

3.1 CBA IN PRACTICE

3.1.1 The Need for CBA

For both governments and individuals, the choice between different ways of investing resources rests to a great extent on an evaluation of the costs and benefits associated with the investments. The alternatives will differ as to the magnitude of the costs that must be incurred, the expected benefits that will be generated, the time scale of both costs and benefits, and the uncertainty or risks surrounding the project. Cost-benefit analysis is a technique by which these factors can be compared systematically for the purpose of evaluating the profitability of any proposed investment.

An investment is considered a profitable use of resources for the individual or society as a whole when the expected benefits exceed its costs. Thus, in choosing between alternative investments, individuals or governments try to evaluate both costs and benefits and identify the investments that will achieve the greatest possible benefit in relation to cost.

The technique of cost-benefit analysis has been developed to make this evaluation as systematic, reliable, and comprehensive as possible and to eliminate the need for guesswork, hunch or intuition (Psacharopoulos & Woodhall, 1985). Cost-benefit analysis is an aid to judgement, however, not a substitute for it, since future costs and benefits can never be predicted with certainty, and measurement, particularly with respect to the likely benefits of a project, can never be completely precise. Therefore, judgement must be used in the economic appraisal of investment projects. The value of cost-benefit analysis is that it provides a framework for evaluating both the magnitude of the costs and the benefits, and their distribution over time. Such a framework allows the judgements that must be made in assessing the likely yield of an investment to be explicit rather than implicit and possibly vague.

For example, judgements must be made about the real value of the resources to be used in an investment project since their real value may not be fully reflected in their market price because of distortions in the market, such as exchange controls or government control of wages. Judgements of this type can be incorporated into the appraisal by means of shadow prices, which are intended to reflect the real value of resources to the economy in the light of the social and economic objectives of a country. Shadow prices represent the weight given to different objectives, for example to future growth as opposed to present consumption.

All cost-benefit analyses use discounted cash flow techniques to compare the discounted present value of both costs and benefits, and to determine whether the benefits accruing from an investment project will be greater than the costs when both are measured in terms of present values. What is needed for such an appraisal is a convenient summary statistic that expresses the relationship between costs, benefits, and their distribution over time. This information can be expressed in three ways, which yield the following investment criteria: the benefit-cost ratio, which is the ratio of the sum of discounted future benefits of a project and the discounted value

costs; the net present value, which is the value of the discounted benefits of a project minus the discounted value of its costs; and the internal or economic rate of return, which is the rate of interest that equates the discounted present value of expected benefits and the present value of costs.

The evaluation of projects is often a difficult task since costs and benefits do not occur only once but appear over time. Furthermore, costs and benefits are often hidden, making them hard to identify; moreover, they are also frequently difficult to measure. The same problems occur when the decision-maker has to make a choice between a number of mutually exclusive projects intended to achieve the same goal via a number of different routes. These problems are not limited to capital projects; they also occur when decisions have to be made regarding the merits of current expenditure programmes.²⁾

The introduction of a human investment program such as the NSDS would contain economic costs and benefits to society. The decision-maker (in this case, the government/Department of Labour) should therefore determine what should be considered a benefit of and what a cost of the skills development strategy, from both the individual standpoint and that of society in order to implement and manage a human investment program efficiently.

3.1.2 CBA and Human Resource Programs

Gramlisch (1981) presents a list of the benefits and costs of a typical human investment program. Table 3 shows entries first for the individuals receiving the human capital investment, then for all others in society, and finally for the sum of the two.

Table 3. Benefits and Costs of a Human Investment Program

	Individual	Others	Society
Benefits			
Increase in earnings after tax	✓		✓
Future increase in taxes paid		✓	✓
Non monetary satisfaction	✓		✓
Costs			
Tuition costs	✓		✓
Costs of bursaries		✓	✓
Higher living expenses	✓		✓
Earnings foregone after tax	✓		✓
Taxes foregone		✓	✓
Transfer payments foregone	✓	✓	

In this way a distinction is made between those individual benefits and costs that reflect net social gains and losses from those that reflect only transfers from or to other members of society.

The first two items in the table record the future increase in income of the individuals in whom the investment is being made. For this calculation individuals are assumed to be paid what they are worth in the market place – hence if their income rises, this is assumed to reflect their

²⁾ See Central Economic Advisory Council (CEAC); Manual for Costs-Benefit Analysis in South Africa; 1989.

increased productivity, and therefore that would be regarded as a benefit of the human investment program. But individuals do not reap all of the benefits of their greater productivity: since they pay higher income taxes on their higher income, individuals gain the benefit reflected by future after-tax income increases (1), and other members of society gain the benefit reflected in future income tax increases (2).

The next item is non-monetary satisfaction, which shows that education, training, or human capital investment is not valued solely for its impact on income. Education may enable individuals to get jobs they like, even if those jobs do not pay any more than the jobs they would have had without the training. In this case the individuals are clearly better off, and since nobody is worse off, society gains as well, even though the form of the payment is in (non-monetary) units of enjoyment instead of money.

On the cost side, the most obvious one is the explicit amount paid for education/training by the students (tuition, 4) and by others (bursary costs, 5).

These payments measure the training institution's resource cost of providing the education. To this is added the higher living expenses, if any, incurred when students live away from home (6), another resource cost.

The next three items refer not to explicit costs but to opportunity costs. When individuals attend educational institutions, they may have to give up their job or at least reduce their working hours. They sacrifice current earnings to get an education, and these current earnings reductions are sacrifices in income to the individual and consumption goods to society just as much as the explicit out-of-pocket costs. Hence item 7 refers to inclusion in individuals' costs, their loss of earnings after tax, and item 9 includes any losses in transfer payments, such as public assistance or unemployment insurance when they attend school. Others in society give up the benefits of taxes students would have paid if they had opted not to be trained/educated. Thus they lose the taxes students would have paid on foregone earnings (item 8), but then they gain the transfer payments foregone (item 9).

Table 4 shows a cost-benefit analysis undertaken of the Job Corps, a long-running, intensive programme of remedial education, training and other services for highly disadvantaged youth in the United States (Grubb & Ryan, 1999). A summary of the results is presented in the final column of Table 4.

The benefits of the programme comprised the increased output produced by members, estimated as the increase in earnings caused by the programme (US\$ 4653) as inferred from statistical analysis of outcomes for participants relative to members of a carefully matched comparison group. The other important area of benefit was a reduction of criminal activity, a social benefit that lacks a ready market price for valuation purposes, but for which a shadow price was developed from evidence on the costs imposed on society by criminal activity. Second-order benefits were estimated to arise primarily from reduced use of drugs and alcohol, to which are added the savings in resource costs associated with reduced dependence on public income support and social services. Other benefit categories were considered too marginal or too difficult to cost, but programme effects upon them were generally favourable. Total quantified benefits to the entire economy, after discounting across the evaluation period, were estimated at US\$ 7343 per participant. Against those had to be set the resource costs of running the programme, at US\$ 5 070 per capita, leaving a net benefit to the economy and society of US\$ 2273 per capita.

Table 4. Benefits and Costs per participant, Job Corps, USA (1977 dollars)

Component	Participants (1)	Rest of Society (2)	Whole Economy (1) (2)
Benefits			
Output produced by members	3 397	1 255	4 653
Dependence on transfers	- 1 357	1 515	158
Criminal Activity	- 169	2 281	2 112
Drug and alcohol use	0	30	30
Utilisation of alternative services	- 49	439	390
Other benefits	+	+	+
Total benefits	1 823	5 520	7 343
Costs			
Operating expenditures	- 1 208	5 351	1 449
Opportunity cost of participant Labour	728	153	881
Unbudgeted Expenditures	- 185	231	46
Total costs	- 665	5 736	5 070
Net benefits			
Net present value (benefits less costs)	2 485	- 214	2 271
Benefit-cost ratio	1.82	0.96	1.45

SOURCE: Grubb & Ryan, 1999:65

Cost-benefit analysis estimates the effects of training upon economic efficiency. When the criterion of a positive present value of net benefits is satisfied, a programme is judged to yield to the economy benefits in excess of its costs, and as such to represent a worthwhile use of scarce resources.

An important ingredient is the comparison of benefits to costs. That is, a programme may be effective, in the sense of creating economic and non-economic benefits for participants, but these effects may not be worthwhile if they are less than the costs involved. The criterion that benefits should outweigh costs is an application of the concept of economic efficiency; thus a programme may be *effective*, in the sense of creating net benefits for participants, but not *efficient* if its costs outweigh the benefits.

The use of multiple benefit categories and the comparison to costs make cost-benefit analysis more meaningful than the 'single-outcome' evaluations (e.g. the effects of a training programme on earnings) that dominate the academic evaluation literature.

3.1.3 Limitations of CBA

It is important to understand that CBA is not a substitute for the political system as a mode of making collective decisions. According to Schmidt (1989), CBA is at best a tool to aid in making comparisons between policies and in estimating the results of various policies.

The limitations of cost-benefit analysis itself must also be recognised. At the practical level, major empirical problems arise in such areas as: identifying a suitable range of outcome categories and estimating effects within each; finding suitable 'shadow prices' with which to value benefits, particularly those measured in physical units (e.g. employment rates, crime rates); identifying displacement and externalities; establishing the appropriate discount rate to use to

aggregate across time; and establishing and valuing the costs associated with the intrinsic uncertainty of project outcomes (conceived, for example, as the potential variability of net benefits around 'best estimates'). An appropriate response to this range of problems is not to ignore them, but rather to bring to bear on them whatever information is to hand (e.g. using the resource costs of imprisonment as a guide to the value of reductions in criminality) and, when that information is particularly weak, to estimate the sensitivity of net benefits to alternative assumptions about key imponderables, such as the social discount rate or shadow prices for non-economic benefits, rather than either making unique arbitrary assumptions or excluding them altogether. Other limitations of CBA are described below.

a) Results condensed to one number

A common complaint about cost-benefit analysis is that it collapses a large and intricate story into a single number, such as the internal rate of return (IRR), or the net present value (NPV). There is truth in this criticism, even though the use of such a summary indicator is simply another way of saying "yes" or "no", which analysts and advisers must ultimately do.

Nonetheless, decision makers who base their judgements solely on a reported rate of return may well deceive themselves. The rate of return or the net present value is a relative statement of a project's merit, not an absolute one. Such measures may sometimes be quite sensitive to the way in which the alternative solutions compared have been defined. Decision makers should also understand the nature of the information used, the degree of confidence that can be placed on it, and the basic approach used in the evaluation of costs and benefits in the first place (Anandarup; 1990).

b) Availability of data

Cost-benefit analysis is aimed at decision-making in respect of projects to be undertaken in the future and therefore involves projections and assumptions regarding future developments. It is therefore crucially dependent on the availability of reliable data.

However, CBA can still be useful in programs and projects where it is difficult to measure costs and benefits due to the absence of reliable data. Although it could be difficult to judge a project's merits with much confidence, CBA could provide indications of what the maximum costs and the minimum benefits should be for the project to be acceptable.

c) Narrow-based tool

CBA falls within the ambit of partial equilibrium analysis and is a technique that in its standard form takes into account only the direct impact on the immediate sphere of influence of the project. As discussed in later sections, General Equilibrium analysis as embodied in Input-Output models and Social Accounting Matrices, is more efficient to evaluate the broader consequences of projects or programs.

d) Distributional issues

A further objection to cost-benefit analysis runs along these lines: economic efficiency is all very well, but training should be assessed on other criteria as well. Alternative objectives include the distributional, the educational and the fiscal. For example, a training programme may help the disadvantaged even if it is a loss for the economy as a whole, and this may be regarded as a

sufficient merit for it to be supported. Or, training may contribute to personal development by encouraging young people who would otherwise have left school to stay on, learn more and enjoy more and better personal development, quite apart from any associated economic benefits. Or, again, a training programme's effect on public revenues, local activity, etc., may be politically important even when it has no efficiency or equity effects to speak of.

The need to expand the range of evaluation criteria is important. To some extent, cost-benefit analysis can deal with the need, to some extent it cannot. The area of its competence overlaps with distributional issues, while the area of its unsuitability concerns educational ones. Cost-benefit analysis has found no ready way to include purely educational objectives and outcomes; and it excludes strictly political objectives from consideration.

Cost-benefit analysis can in practice accommodate consideration of the distributional effects of training in two ways. The first is to calculate net benefits for different groups of participants. For example, cost-benefit analysis of training programmes in the US has found that net benefits were highest for adult males, followed by adult females, while net benefits for youth were actually negative.

More pertinent is the degree to which the programme has at least benefited its participants, whether or not it has benefited the economy as a whole. Cost-benefit analysis addresses that issue by distinguishing benefits to participants from those to the rest of the economy. In the case of the JobCorps evaluation in Table 4 above, columns 1 and 2 reflect the division of the programme's overall costs and benefits between participants and other members of society – with the latter comprising both the taxpayers who fund the programme and other public services, and, in this case, the citizens who suffer from the criminal activity that the programme reduces.

Other members of society are seen to gain more from the JobCorps, in terms of gross benefits, than do participants. Non-participants enjoy benefits from: 1) the higher output of ex-participants, by way of the latter's increased income tax payments; 2) the reduced requirement for public spending on income support and other services to participants; and 3) the lower criminal damage done to them by participants. But as non-participants have to pay the taxes required to set up and run the programme, they lose marginally from it overall (US\$214 per participant), and the net benefits of the programme accrue primarily to participants (US\$ 2 485 each).

It is worth noting that in a cost-benefit accounting framework such as that in Table 4, some benefits to non-participants are treated as transfers from participants, as those benefits lack any equivalent from the standpoint of the economy and society as a whole. For example, the loss to participants arising from reduction in their welfare income (US\$ 1357 per head) is closely paralleled by the gain in income (US\$ 1515) attributed to non-participants, resulting from their correspondingly lower tax requirements. The difference between the two, US\$ 158, represents the savings in resource costs arising from the reduction in welfare transfers – and only that part is relevant to the efficiency assessment (column 3, Table 4).

The distinction between participants and non-participants matters from the distributional standpoint primarily for public programmes of remedial training that are targeted on disadvantaged groups, as participants can then be taken to be poorer than non-participants. For training more generally, the distinction between the two groups is of secondary or no importance for distributional concerns, and other methods must be used.

In the best of all possible worlds, publicly funded training programmes provide net benefits to both participants, in the form of future earnings, and to taxpayers, in the form of enhanced future taxes and decreased social costs (of crime and the like). In practice, different programmes produce different mixes of efficiency and distributional effects.

3.2 CBA METHODOLOGY

This portion of the document is rather technical and is therefore attached separately as Annex A. The methodology explained in this annex is very much in line with the status quo of CBA in South Africa as being used by institutions such as the Development Bank of Southern Africa and the Department of Water Affairs and Forestry.

3.3 COST-BENEFIT ANALYSIS AND THE NATIONAL SKILLS DEVELOPMENT STRATEGY

The costs and benefits of a SETA Programme can be defined as follows:

3.3.1 Costs

While the calculation of training costs is relatively easy; it is more difficult to decide which cost items to include in the analysis, as there is still no generally accepted procedure for determining costs that are easy to use and likely to be accepted.

The costs of a particular SETA Programme may be defined as the total funds that are paid by the Department of Labour and by businesses in a specific time period to a specific SETA. These costs therefore include the overheads to operate the SETA, the direct cost to present the various training courses the compensation for the participants and the extra costs incurred by business in order to comply with the new payroll tax and the SETA Programme. From the perspective of business, costs would be seen as the cost of the new tax, plus other costs of compliance (see Exhibit 1).

The acquiring of capital assets by a SETA, for instance, buildings, furniture and computers should be costed according to normal accounting practices to include, for instance, the depreciation of assets.

3.3.2 Benefits

The benefits of the SETA Programme should be similar to the benefits of human resource programs in general. The benefits of training are gained by individuals, by enterprises in particular and by society in general.

Individual benefits include increased earnings, improved prospects for occupational mobility and non-monetary satisfaction.

According to Billet's (1998) study of the economics of training in 15 OECD member states, the majority of enterprises believed or acknowledged that staff training does bring returns in the areas of

- Productivity improvements;
 - Greater workforce flexibility;
 - Savings on material and capital costs;
 - A more motivated workforce; and
- Improved quality of the final product or service.

Exhibit 1. Cost Associated with Training

<p>According to Robinson and Robinson (1989), five categories of expenses can be identified in any training program:</p> <p>Direct costs</p> <p>These are costs directly associated with the delivery of the learning activities. They include course materials (reproduced or purchased), institutional aids, equipment rental, travel, food and other refreshments, and the instructor's salary and benefits. Such costs are so directly tied to the delivery of a particular program that if the program were cancelled the day before it was planned to conduct it, such costs would not be incurred.</p> <p>Indirect costs</p> <p>These costs are incurred in support of learning activities, but cannot be identified with any particular program. Even if the program were cancelled at the last minute, such costs could not be recovered. Examples would be costs for instructor preparation, clerical and administrative support, course materials already sent to participants, and time spent by the training staff in planning the program's implementation.</p> <p>Development costs</p> <p>All costs incurred during the development of the program are included in this category. Typically, they include the development of videotapes and computer-based instructional programming, design of program materials, piloting of the program, and any necessary redesign. This category also</p>	<p>includes the cost of the front-end assessment, or that portion of the assessment directly attributed to the program. In addition, the costs of evaluation and tracking are included.</p> <p>If a program is to be implemented for a few years, the cost is often amortised over that period. For example, one-third of the development cost may be charged off in the first year of implementation, one-third in the second year, and one-third in the last year. Otherwise, there is a real "bulge" in the budget, because of development costs during the first year.</p> <p>Overhead costs</p> <p>These costs are not directly related to a training program, but are essential to the smooth operation of the training department. If audio-visual equipment has been purchased specifically for a department, there is a cost to maintain that equipment. Some portion of that annual cost should be charged to the various training programs. If classroom space is available, there is an overhead cost for supplying heat and lighting. The cost of supporting that space for days when the classroom is used for particular courses should be charged to those programs.</p> <p>Compensation for participants</p> <p>These costs comprise the salaries and benefits paid to participants for the time they are in a program. If the program is two days long, salaries and benefits for participants for those two days are costs of the program.</p>
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For purposes of CBA the benefits of training programmes can be considered in three categories:

- Increased revenue;
- Decreased or avoided expenses; and
- Intangible benefits.

Increased revenue benefits include increased output. Decreased or avoided expenses include improved quality measured by reduction of absenteeism, inaccuracy, accidents and wasted time or materials.

Intangible benefits are those benefits that are of value but are very difficult to quantify such as employee flexibility and improved morale.

There is ample evidence that training in the workplace also contributes to the well-being of the community at large. For instance, a general benefit accrues to the community from a better-educated workforce in the form of:

- Greater Social Cohesion;
- Enhanced environmental awareness;
- Improved health; and
- Improved quality of life for individuals.

A summary of the benefits and costs for the various stakeholders in the economy is provided in Table 5.

Table 5. Benefits and Costs of a Training Program

	Individual	Business	Others	Total Society
Benefits				
1. Increase in after-tax remuneration	✓			✓
2. Future increase in income tax			✓	✓
3. Increase in net profits after tax:				
Increased revenue		✓		✓
Decrease or avoided expenses		✓		✓
Intangible benefits		✓		✓
4. Future increase in company tax			✓	✓
5. Benefits to community:				
Greater social cohesion			✓	✓
Enhanced environmental awareness			✓	✓
Improved health			✓	✓
Improved quality of life			✓	✓
Costs				
6. Direct costs		✓		✓
7. Indirect costs		✓		✓
8. Development costs		✓		✓
9. Overhead costs		✓		✓
10. Compensation for participants		✓		✓

According to Billet (1998), studies that have addressed the question of a direct cost-benefit analysis overwhelmingly concur that accounting for all the variables, which influence return on investment, is either impractical or impossible. Thus, only those benefits that can be easily identified and quantified should be included in a CBA.

According to Robinson and Robinson (1989) the determination of training benefits is very difficult, because the methods for computing benefits vary greatly from one situation to another. For a sales training program, one may calculate the change in sales volume, the size of an average sale, or the number of new accounts; but for a management-development program, those indicators would be meaningless. In that case, one might need to determine the benefits by calculating the change in productivity, the decrease in production costs, or the increase in output. For a customer-relations workshop, the primary benefit may be a reduction in the number of customer complaints, or the amount of repeat business obtained.

Obviously, each type of training (and even each specific course) will dictate what operational benefits one may be monitoring. Thus part of the front-end work of determining operational

benefits from training is to identify the specific operational indicators that are both related to the training effort and possible to monitor.

When benefits can be computed in terms of Rand, one has to go through the process of adding up the derived benefits, including the increase in sales, the decrease in production costs, and so on. That Rand amount is then divided by the total Rand cost of the program. The result is the cost-benefit ratio for the course.

For example, if the total benefits of a program were R50,000 and the total costs were R20,000, then the cost/benefit ratio would be 2:5. Some analysts might prefer to say that the total return of the program was R50 000, while the investment was R20,000, so the return on investment was 2:5. However, the formula is expressed, the company would have received R2.50 for every Rand spent on the training program.

The total benefits of a SETA training programme can be determined by the random selection of a sample of training courses of a SETA and then raising the results calculated for these courses to the total program or universum. The introduction of these calculated benefits in a CBA, can be explained as follows:

For any individual (i) in a given year (t), the benefits of having training in a particular SETA course (j) are measured by subtracting, from earnings (y_{ij}), what he or she would have earned without having undergone training (y_{i0}). The present value of these yearly benefits, for any individual (i), is:

$$B_{ij} = \sum_{t=1}^N (y_{ij} - y_{i0}) / (1 + r)^t,$$

Where N is the productive life of the individual and r is the discount rate.

3.3.3 Econometric Evaluation of Training Programs

Until now the discussion on the benefits of a training program have concentrated on the direct measurement of program benefit. The benefits of training programs can, however, also be obtained by using econometric evaluation techniques.

The most common of these techniques is multiple regression analysis. Multiple regression analysis indicates that there is more than one variable that affects the outcome of an equation.

Regression analysis can be used to determine the increase in income of a trainee, as follows (Gramlich, (1981):

$$Y_i = a_0 + a_1X_i + a_2Z_i^1 + a_3Z_i^2 + \dots + a_nZ_i^n$$

where i refers to the i th subject; Y_i the outcome variable, say discounted earnings of the subject over some period after the program; X_i a variable indicating whether the individual was in the program or not; and each Z_i variable (Z_i^1 , Z_i^2 , etc.) refers to a quantifiable controlling variable such as the individual's age, race, sex, and family background information. The parameter a_0 is the intercept of the regression or expected value of Y_i when all other independent variables are zero, and the other " a " parameters are the regression coefficients, or partial derivatives, for the other independent variables.

The easiest way to interpret X_i is as a binary variable that takes on a value of zero if the individual is not in the treatment group and 1 if the individual is in the treatment group. Its coefficient then measures the partial derivative of Y with respect to X , so if we change X by 1 unit by putting somebody in the program, the coefficient a_1 will measure the gain in discounted income as a result of the training program.

In this calculation the additional discounted income that the trainee received, is linked to the increase in productivity of the trainee in the workplace. This amount can be regarded as the minimum advantage that the employer will receive from the training program. The total advantage to the employer will however be a factor higher than the discounted income of the trainee. This will allow for the profit margin on the employer's cost structure.

Econometric evaluation techniques of training programs such as multiple regression analysis may, however, give misleading results. In a pioneering article, La Londe (1986) found that the econometric estimates often differ significantly from experimental results based on longitudinal data. Moreover, even when the econometric estimates pass conventional specification tests, they still fail to replicate the experimentally determined results.

The study by La Londe (1986) yields several other findings that may help researchers evaluate other employment and training programs. First, the non-experimental procedures produce estimates that are usually positive and larger than the experimental results for the female participants, and are negative and smaller than the experimental estimates for the male participants. Second, these econometric procedures are more likely to replicate the experimental results in the case of female rather than male participants. Third, longitudinal data reduces the potential for specification errors relative to the cross-sectional data.

Notwithstanding the problems experienced with cross-sectional analysis and other econometric techniques to measure the benefits of a training program, it is still important that a CBA should still be performed to analyse the financial and econometric net benefits of the SETA Programme.

It may not give a precise answer on the results of such a program but it will provide enough evidence about whether to proceed or discontinue with the program or portions of the program.

4. Macroeconomic and Distributional Analysis

4.1 INTRODUCTION

As indicated in the previous section, cost-benefit analysis can be regarded as relatively narrow-based. In other words, its impact on the benefit streams, for example; only take into account its direct sphere of influence. In the case of a training programme, it will normally only involve the business enterprise where the program is being implemented (including, of course the workers/trainees). The only other beneficiaries that can be brought into the equation are the government for receiving additional taxes and levies, and shareholders, for receiving more dividends.

Projects or programs such as the NSDS, however, have effects on the incomes of households, firms and government, not only directly through the additional value added produced by the projects or programs, themselves, but also by inducing additional output through inter-industry linkages and expenditures out of the extra incomes accruing to its direct beneficiaries. This is sometimes called the “multiplier” or “downstream” effects of a project. These multiplier effects of the project have been recognised in the literature on social cost-benefit analysis (Blitzer, Little and Squire: 1978)

More recent literature on CBA has been concerned with the question of how to deal effectively with these multiplier effects of projects, and with the derivation of indirect impact coefficients which capture all such effects in full. If these indirect impact coefficients are correctly calculated, so it is asserted, then adjusting a project’s direct inputs and outputs with these coefficients will give an appropriate measure of its social profitability.

In recent years it was found to be more practicable and realistic to use certain macroeconomic analytical tools to assess “ripple” (secondary and tertiary) effects on the economy of the region or nation (Bell and Devarajan; 1979). These tools, known as “general equilibrium” models, attempt to capture the interactions of a project’s direct and indirect impacts throughout the economy.

Three analytical tools are normally used for the quantitative analysis of macroeconomic and regional impacts, namely Input-Output models, Social Accounting Matrices, and computable General Equilibrium models.

4.2 THE VARIOUS GENERAL EQUILIBRIUM MODELS

4.2.1 Input-Output Models

A modern Input-Output Table is an economic tool by which a system of national accounts is extended, classified and depicted in a tabular format. The basic structure of an Input-Output Table is based on the same framework as Leontief’s (1936) original statistical Input-Output Table.

The Input-Output Table serves as the basis for a broad and rapidly developing economic practice called Input-Output analysis. Currently, different variations of the standard table are

applicable to different situations. In most instances an official authority compiles and publishes a standard Input-Output Table for a particular country. In the case of South Africa, this is done by Statistics South Africa (SSA). Researchers usually remodel the official Input-Output Table for specific purposes. Input-Output Tables can be compiled in relation to either a national or a regional economy.

The function of an Input-Output Table is twofold. Firstly, the table presents a descriptive framework of the economic structure of a country by showing the interrelationships between sectors and other important economic aggregates by means of the transactions table. It is an extension of the Macro-National Accounts level. The detailed nature of the Input-Output Table is determined by the availability of data, government disclosure regulations and available research funds rather than by a rigid set of rules.

Secondly an Input-Output table serves as an economic model. Van den Bogaerde (1972) pointed out that an economic model involved the exposition of the relationships between economic variables in the form of equations. These equations are then combined to form a complete model. An economic model can thus be defined as a set of equations that show mutual dependence or interrelationships of economic variables. As an Input-Output Table's formal exposition complies with these requirements, it can be considered as a model, which is useful for analytical purposes.

An Input-Output model as an analytical tool is pre-eminently suitable for measuring the effects of autonomous movements in the economy. Given specific assumptions with regard to the nature of the production function, the Input-Output model can be generally utilised for the above-mentioned purposes, on account of its mathematical features. The matrices which can be derived from the Input-Output model, are used as instruments for economic analysis. This is done by means of the so-called technical input coefficients' matrix and the Leontief inverse matrix. The technical coefficient matrix illustrates the direct effects while the Leontief inverse matrix shows the direct and indirect effects.

4.2.2 Social Accounting Matrices

Social Accounting Matrices (SAMs) are another tool for understanding linkages between aggregate production in an economy and its composite elements (i.e., aggregate demand, incomes). SAMs differs from Input-Output models and other general equilibrium approaches because their focus can be more tailored to examining impacts on social rather than economic entities (e.g., commodities, markets). For example, different household and consumer groups can construct SAMs with an emphasis on disaggregating national income, consumption, and wealth, allowing a better understanding of equity issues.

Viewed in broad terms, the SAMs are to a large extent an extension of the conventional Input-Output Table which has been compiled and published by SSA for a number of years. Besides the information on the interdependence of the different sectors of the economy contained in the Input-Output Table, the SAMs also contain detailed information on income and expenditure patterns of households on a regional as well as population group basis.

Similar to the Input-Output Table the SAMs can also be transformed into economic models. However, due to the fact that final demand sectors are disaggregated by income group and many other social classifications, SAMs are a more effective tool for examining distribution impacts than the Input-Output Table. (SSA has just released an updated SAM for the South African economy.)

4.2.3 Computable General Equilibrium (CGE) Models

Computable General Equilibrium (CGE) models use the same framework and data as Input-Output Tables and in some cases even SAMs. However, unlike Input-Output Tables, CGE models incorporate more realistic consumer and producer behaviour. That is, these models account for the reactions of consumers and producers to changes in economic conditions (e.g., price). These specifications make CGE models more effective for purposes of policy analysis.³⁾ A recent alternative to the specification approach is econometric estimation, which allows for a more sophisticated incorporation of consumer and producer behaviour in the CGE model than is normally possible through specification techniques.⁴⁾ However, econometric estimation requires a consistent set of multi-sector time-series data that are typically not available in developing countries.

4.2.4 Limitations of Macroeconomic Models

The critical limitations of macroeconomic models are as follows:

- Constructing macroeconomic types of models is time-consuming, data intensive and costly, but they are the only way to comprehensively address the secondary economic impacts of projects.
- A shortcoming of both Input-Output models and SAMs is that they provide only a “snapshot” view of the economy for the time period that data were gathered and the model constructed. Thus, these models do not typically account for changes in technology that are likely to result from changing market conditions.
- While CGE models can be useful tools for policy analysis, model development may in many instances not be feasible due to data requirements and the high costs involved. In addition to developing an appropriate Input-Output matrix, CGE models require a considerable amount of data on national accounts, trade, and other factors that must also be collected.

4.2.5 The Applicability of Macroeconomic Models to the SETA Programme

In the discussion of the three relevant macroeconomic models and CBA, it might seem as if the analyst has a choice of completely different models, each with its individual advantages and disadvantages. However, these models are not independent, but to a large extent are extensions or variations of each other. The models are in some instances also linked in that the output of one model forms the input of the other. In order to ensure that the eventual results of the analysis would present the full economic impact of the project, these models should therefore be used in a complementary manner where possible. A cost-benefit analysis is indispensable to such

³⁾ For more information on the development and application of computable general equilibrium models, see Kemal Dervis, Jaime de Melo, and Sherman Robinson, (1982); and Ginsburgh, Victor and Michiel Keyser, *The Structure of Applied General Equilibrium Models*, Cambridge, MA: MIT Press, (1997).

⁴⁾ For more information on econometric estimation approaches, see Jorgenson, (1998).

macroeconomic models as it will indicate the basic financial and economic parameters and viability of the program or project.

Due to the complexity, the data intensiveness and the expertise needed to develop the macroeconomic models, it is probably not advisable that these models should be developed in the initial stage of the appraisal of the SETA Programme. It is therefore advisable that preference should be given to standard social cost-benefit analysis as an economic tool to evaluate the effectiveness of the NSDS.

5. Performance Indicators

5.1 MACROECONOMIC PERFORMANCE INDICATORS

In Section 1, an indication was provided of the causal relationship that exists in the economy between important policy/structural parameters and the ultimate outcome of economic performance levels. In the labour field it was shown that certain minimum levels of labour productivity/efficiency, expressed in terms of, for instance, the ratio of highly skilled labour/total employment; and ratio of cost of labour/cost of capital, are required to attain certain minimum levels of employment and income growth.

A macroeconomic model consists of a range of statically estimated equations and coefficients, depicting the relationships between a multitude of dependent (exogenous) and independent (endogenous) economic variables, simulating the actual developments in practice. Based on these clearly quantified relationships, it is possible to single out the impact of the variances in the levels of skills inputs on the performance levels of the production processes. Education and training can be regarded as an exogenous input into the economic production and distribution processes, and it is therefore possible to model such relationships using econometric methods.

In practice, over a period of time, the impact of the NSDS should be measurable in some macro and sectoral economic variables. These indicators which will be referred to as performance indicators can be monitored over time to measure the progress of the NSDS. A target could also be set, that will serve as a yardstick for these performance indicators on a national and/or sectoral levels, to determine to what extent, certain objectives are being met.

Taking into account specifically the availability of data, it is foreseen that in the initial stage the following macroeconomic performance indicators could be used to track the impact of the NSDS:

1. Increases in Productivity.
2. Increases in Production
3. Increases in Employment levels.

At a later stage a “competitiveness” performance indicator could probably be created, where the changes in various elements of the cost structure of the various sectors are monitored and compared with the general economy and possibly to overseas competitors. Logically, the role played by any skills enhancement programme should be singled out.

Most of the data required for the initial performance indicators are available from SSA on a sectoral basis and are published annually.

Increase in Productivity:

By making use of the Quarterly Bulletin of the South African Reserve Bank productivity indexes can be worked out for labour as well as capital for the national economy as well as for the main

sectors of the economy. The National Productivity Institute (NPI) also estimates a multi productivity index from time to time.

Increase in Production and Employment

It is well known that labour productivity, unit labour costs, overall competitiveness, and the ratio of capital costs/to labour costs, all ultimately impact on the economy's potential to grow and create employment.

The SSA publishes on a regular basis (quarterly and monthly), production and employment indices for various sectors.

5.2 INSTITUTIONAL EFFICIENCY / EFFECTIVENESS INDICATORS

In the previous section, proposals were made on how to monitor the impact of a skills development programme on the broader economic and social objectives of such a policy initiative. It was also suggested that to improve the effectiveness of such a monitoring exercise, it is preferable to move down to sectoral or even micro (enterprise) levels.

In an international context, there are obviously numerous methods applied to monitor the effectiveness and efficiency of sectorally driven workplace training schemes. A few examples will illustrate the essence of such monitoring systems. Obviously, every country has its own unique circumstances, and consequently, a suitable framework would have to be created for the South African situation.

The monitoring system can be divided into two broad categories viz: horizontal and vertical.

a) Horizontal

A monitoring system on a horizontal basis is important to effect inter-sectoral comparison on a standardised basis. For example for each of the 25 SETAs, the following elements of the training effort can be monitored.

- Targeting Small enterprises
- Targeting export orientated firms.
- The range of occupations that are benefiting from the scheme, for example:
 - Administrative
 - Executive and Professional
 - Supervisory
 - Skilled workers
 - Semi-skilled workers
 - Unskilled workers
- Percentage of firms eligible for training assistance not participating.
- Age distribution of workers actually benefiting from the
- Scheme.
- Income distribution of workers participating/benefiting from the training assistance.

b) Vertical

Under the definition "Vertical" the following aspects of the workplace training programme can be monitored.

SETA Level

The effectiveness/efficiency of each SETA can be continuously monitored on the basis of the following performance criteria: [These are only examples, and could be extended depending on the purpose of the performance criteria].

1. *Technical Indicators*

- Total number of trainees
- Number of trainees per course
- Number of trainees per province

2. *Effectiveness of Seta*

- Success rate in total
- Success rate per course
- Success rate per province
- Number of repeaters per course per annum
- Number of trainers per course
- Number of courses per SETA

3. *Financial Indicators*

- Overhead and operating cost
 - Per trainee
 - Per course
 - Per trainer
 - Per staff member of SETA
- Turnover per SETA (Revenue)

4. *Membership*

- Number of members
- Size of members
 - Per turnover
 - Per number of staff
- Nature of membership
 - Per province
 - Per economic sector

5. *Profile Of Trainees*

- Age
- Sex
- Formal training
 - School
 - Grade 6
 - Grade 8
 - Grade 10
 - Grade 12 (matric –m)
 - Technical
 - m + 2
 - m + 3

- $m + 4$
- $m + 5$
- $m + 6$
- University Education
 - $m + 3$
 - $m + 4$
 - $m + 5$
 - $m + 6$
- Physically Disabled

Enterprise Level

It is essential that the efficiency and effectiveness of specific training programmes are evaluated and monitored on a continuous basis. In broad terms this would involve determining the cost-benefit of a particular training programme in a particular firm. This performance monitoring is often referred to as “operational tracking”. It is important to note, however, that it is sometimes necessary to go beyond a pure cost-benefit (return on investment exercise, and look at other, more “intangible” benefits. Examples are:

- Have customer complaints declined after training?”
- To what extent has wastage been reduced?
- Has worker morale increased?

An important aspect of operational tracking programmes, is the meticulous preparation for the procedures. The key is to articulate a clear purpose for the tracking effort. The Human Resource Development professional and the client must identify objectives in specific terms. It is also crucial that the HRD professional and the client establish beforehand a clear link between; on the one hand the lack of certain skills in the organisation, and the performance levels, on the other.

6. Summary/Conclusion

This document provides the results of a research study which initially required an investigation into the use of social cost-benefit analysis (CBA) as a method to gauge the effectiveness/efficiency of the skills development programme of Department of Labour (DoL). The ultimate outcome of the study provides not only a CBA-methodology tailored for this human investment initiative, but also includes macro and distributional analysis plus performance indicators that can be used to monitor the performance of the programme to inform policy implementation.

6.1 MAIN FINDINGS

International and local experience have proven that although CBA is an appropriate method to evaluate the efficiency of a training programme, it is narrowly based. The policy maker may require knowledge of the broader social/economic impacts of training programmes. Hence, it was established that CBA as well as other quantitative economic methodologies should be investigated to provide the client with a “package” of methodologies, which range from a narrowly based CBA to a wider economic and distributional analysis. The scope of this report thus concentrated on three different ways to establish the economic “net worth” of a training programme; from its narrowest to its broadest dimension possible.

6.1.1 Social Cost-Benefit Analysis (CBA)

The pros and cons of applying CBA techniques in the context of the National Skills Training Programme are extensively debated in this report. The main conclusion, also based on international experience, is that at the enterprise level, a CBA of training programmes does produce acceptable results. It is, however, much more difficult to quantify all the benefits flowing from a training programme, compared to its costs.

Notwithstanding the problems experienced with CBA, it is still imperative that it be performed as a first step in the evaluation and monitoring process. It is also shown in section 3.3.3 that use can be made of regression analysis to supplement standard methods of calculating direct programme benefits in the context of CBA.

6.1.2 Macro-Economic and Distributional Analysis

It was indicated in the report that CBA (par. 3.1.3) as an analytical tool, has a few drawbacks that need some attention. These are:

- It is a narrow -based tool
- It does not handle the distributional issue very well.

These “deficiencies” in CBA can be reasonably supplemented by using three well-known macro-economic tools viz.:

- Input-output models (I/o's).
- Social accounting matrices (sams) and
- Computable General Equilibrium Models (CGEM's)

It was mentioned in the report that these models are to a large extent extensions or variations of one another. Further, it is important to remember that these models are complicated in nature, are heavily data intensive and time consuming to construct and to operate.

In view of these findings, it is not recommended to start off with these macro-econometric methodologies to evaluate the economic contribution of the workplace-based training programme. It is advisable to begin with the traditional narrow-based CBA-approach to measure the net financial and economic contribution of the training programmes.

6.1.3 Performance Indicators (par. 5)

Econometric models are used to simulate actual developments in the economy. This is possible due to the interrelated and inter-dependent nature that the economy displays as well as its tendency to restore equilibrium once disequilibrium occurs in one part of its holistic system. This is exactly how things work in reality in the economy. Based on this truism, it is possible to glean from the multitude of interdependent equations of a macro model, specific ones that would reflect the contribution made by the investment in workplace skills training programmes.

Examples given in the report (par. 5.1) are the possible impact of workplace training programmes on the productivity, production and employment of the economy in total or of specific sectors (SETA-levels). It is also indicated that these equations require relatively less data and time to construct, compared to for example, a Computable General Equilibrium Model (CGEM).

6.1.3.1. Monitoring Institutional efficiency

The last part of the report deals with the setting up of system framework to monitor the efficiency/effectiveness of SETA Programmes on an ongoing basis. This is represented at two levels, viz., horizontal and vertical.

Horizontal (par. 5.2(a))

On the horizontal side, proposals are made on how to identify key variables that should be monitored. Examples are: the percentage of small firms being targeted; the range of occupations that benefit most; the effect on the income distribution of workers participating, etc. Information on these issues is readily available and should be built into application forms up-front.

Vertical (par. 5.2(b))

On the vertical side, it is important that each SETA puts in place appropriate norms and criteria against which to monitor its own "management efficiency". In this report a wide range of possible criteria are given that should provide a clear overview of the extent to which a particular SETA utilises its scarce resources (money and personnel). It should also not represent too large a problem to set up the necessary databases and computerised analytical capabilities.

6.1.4. Conclusion/Recommendations

The main conclusion reached in this report is that it is necessary and practical to set up a CBA system to monitor and evaluate the NSDS of the DoL at national, sectoral and work place levels.

The CBA system should, however, be supplemented by the setting up of a range of performance indicators suited to national and sectoral (SETA) levels.

Even though the CBA exercise is narrowly based and probably also better equipped at enterprise/programme level, it is recommended that, initially, consideration not be given to the setting up and running of macro and distributional models to cater for the wider more indirect effects of a training programme.

6.2 IMPLEMENTATION OF MONITORING SYSTEMS

It is important to conduct a CBA as soon as a specific SETA is fully operational. Initially, CBA-analysis should only be conducted at a micro-training level. All aspects of individual courses should be audited. However, a CBA should form the focus of the audit in order to ascertain its net value in monetary terms. In the micro-analysis, the benefits of a course will be measured in a practical way. For example, the effectiveness of a sales training program will be measured by calculating the change in sales volume, the size of an average sale or the number of new accounts opened.

To obtain a sense of the feasibility of a SETA in its totality, a random sample of different courses could be analysed where the average of the results could serve as an indication of the effectiveness of such a SETA.

Secondly, when a SETA has reached an advanced stage, more advanced econometric techniques such as multiple regression analysis could be used to determine the increase in income of the workers that have taken part in the training program relative to those workers that have not attended the program.

Parallel to the implementation of CBA, it is important that SETAs institute performance indicators. To implement meaningful macro- and sectoral performance indicators, the SETAs would have had to be in operation for a period of time. However, immediate steps could be implemented to monitor the effectiveness of the various SETAs. It will be important to set up a system for each SETA to capture primary information through its normal administrative process.

It is foreseen that DoL or the individual SETAs will have to use external expertise to conduct cost-benefit analyses of the SETAs. Expert assistance will also be needed to set up initial management information systems to monitor the effectiveness of the SETA as a normal business unit. However, it will probably be in the SETAs' interest to obtain in-house capabilities in the long run to operate the management systems. For this purpose, it will be important to ensure that the necessary computer infrastructure be installed to operate these management information systems effectively.

Annex. CBA Methodology

NATURE OF CBA

Overview

The term “cost-benefit analysis” (CBA) refers to the systematic comparison of the relative economic advantages and disadvantages of a project. In CBA, the basic criterion for the acceptability of a project is the present value of its net benefits – the benefits and costs being defined in incremental terms as compared to the situation without the project. CBA therefore collapses a large and intricate account of a project into a single number for decision-making purposes. This number is usually the so-called net present value (NPV) which expresses the net stream of benefits and costs at their current value. The basic rules in CBA are that the NPV should not be negative and that it must be higher than, or at least as high, as the NPV of mutually exclusive project alternatives.

CBA focuses on the economic contribution of a project for a defined community or interest group. It is wider in its application than an analysis of a project’s financial feasibility (in other words, CBA is concerned with more than the investor’s welfare), but typically excludes macroeconomic analysis (where the principles of CBA may break down due to the inherent difficulty of quantifying macro effects). CBA is therefore typically used as a project evaluation tool by public decision-makers, wishing to optimise limited budgets in promoting the welfare of a specific area or sector.

Discounting present and future consumption

If all costs and benefits arose in the instant that the chosen option was started, there would be no difficulty in combining the values identified by analysis, as the positive and negative values will simply be added together.

However, costs that are immediately incurred and benefits that are gained in the present are judged differently by the community from costs and benefits that materialise over a period of time. The community would prefer to receive a benefit today rather than in the future, while deferred costs are more attractive than immediate payment. Therefore the money value of costs and benefits over time cannot simply be added together and the time preference of the community has to be taken into account through the use of a weighting process. This weighting by the community is done with the aid of a rate that reflects the value of a benefit or cost over time. It is known as the *social discount rate*.

Suppose b_0, b_1, \dots, b_n are the project benefits in years 0, 1, 2, ..., n and c_0, c_1, \dots, c_n are the costs in years 0, 1, 2, ..., n, respectively, and i is the social discount rate. The present value of the benefits is then given by

$$b_0/(1+i)^0 + b_1/(1+i)^1 + \dots + b_n/(1+i)^n$$

and the present value of the costs are given by

$$c_0/(1+i)^0 + c_1/(1+i)^1 + \dots + c_n/(1+i)^n$$

Division of consumption between contemporaries

A further important objective of economic policy is that of equity. In this case it is necessary for the planner to assign weights to the value that consumption holds for different individuals, normally grouped into certain income-groups and/or regions. The weights can be derived from the principles underlying the policy and do not necessarily have to be quantified. For example, progressive taxation systems reflect the greater weight that the planner assigns to the lower-income groups relative to the higher-income groups.

Project choice can serve as an instrument of income distribution in that both the geographical situation and the labour-intensity of the project are related to the redistribution possibilities of the project. In studying the distributive aspects of a project, the first problem is to determine the net benefit of a project by geographical region. Thereafter weights are assigned to the consumption that is generated in different regions, with the aim of valuing the consumption generated in poorer areas higher than that in more affluent areas. Project choice also has an influence on income-distribution in that projects that depend heavily on labour (relative to capital), promote the redistribution of income over the short run.

Financial, Economic and Social CBA

A comprehensive cost-benefit analysis should include the following:

- The financial assessment, to determine a project's need for funds and also whether the project is viable from a financial point of view;
- The economic analysis, to determine the scarcity value of goods and services used in the project and that arise from the project - this is mainly based on opportunity-cost considerations; and
- The social analysis, which is an investigation into the effect of the project on the distribution of welfare and other social circumstances.
- To understand the need for an economic and social CBA instead of only a financial analysis of a project, it is important to differentiate between the role of both the private and public sectors in the economy.

The private enterprise is concerned only with the interest of its owners or shareholders when profits are being calculated, while the interest of the community at large is the focus of the public sector. The result is that a much wider spectrum of costs and benefits has to be considered by the public sector than in the case of the private sector where pure profit determination is at stake.

a) The financial analysis

The term "financial analysis" can, depending on the context in which it is used, refer to one or more accounting techniques, e.g. cash-flow analysis, profit determination, or the analysis of the source and application of funds. "Financial analysis" as used in this document refers to a cash-

flow analysis from which present and future expenditure and income are calculated to determine the financial feasibility of a project. The calculations are done at current prices. In the case of public projects such an analysis normally gives an indication of the pressure the project will place on the exchequer and the degree of subsidisation it will require.

b) The economic analysis

By economic analysis is meant that the project is re-evaluated at prices which reflect the relative scarcity of inputs and outputs. The economic analysis normally follows the analysis of the source and application of funds, which is done at market prices. In the economic analysis prices actually represent opportunity costs and reflect the actual economic value of inputs and outputs. The opportunity cost is the value of the best alternative application of an input or an output of the project. The market price of land, for example, does not necessarily reflect the opportunity cost of the land. Thus, when a price has to be determined, for example, for a piece of agricultural land used for maize farming but on which an airport is planned, the opportunity cost of the land is the discounted net output from the maize. The economic analysis is done in real prices.

c) The social analysis

With the help of this analysis the consequences of a project for the distribution of welfare in the community can be analysed and an evaluation can also be made of the effects of other social factors such as security, equity and the aesthetic values of the community. This analysis is best performed if government gives an indication of the relative value that is attached to different groups and social factors in the economy. The analysis is done by attaching certain weights to the costs and benefits of all the stakeholders involved (directly or indirectly) in the program.

Value Determination in CBA

Since resources are limited, an important consideration in their application is to find optimal combinations of resources through which the net community benefit can be maximised. The value of inputs and outputs depends to a large degree on the level of sophistication of the economy in which prices are determined. Market prices of products and services often do not reflect the actual value (scarcity value) of products and services, since governments interfere in the operation of product and service markets through, for example, tariff protection, taxes or subsidies. To assess the economic effectiveness of the application of resources within projects, it is essential that the prices of inputs and outputs indicate their scarcity (economic value).

Scarce resources are traded at specific prices, namely market prices. Provided certain conditions are met, prices are the best criterion upon which the allocation of resources for specific uses can be based. The assumption is that markets are perfectly competitive and that supply and demand determine the prices of inputs and outputs. When the free operation of the markets is interfered with, for example by the restriction or stimulation of either supply or demand or by price interference, market prices do not reflect economic scarcity values and the use of shadow prices becomes necessary.

An economy is distorted if market prices and shadow prices do not coincide. John D. MacArthur, in Colin, Kirkpatrick and Weiss (1996) identifies seven factors which are sources of distortion of the market prices and which should be rectified:

- Indirect or income taxes.
- Uncorrected externalities
- Quantity controls
- Controlled prices
- Tariffs and trade control
- Oligopoly
- Imperfect information, transaction costs and missing markets.

Market prices

Market prices are those perceived prices at which products and services trade, irrespective of interference in the market, e.g. the market wages of labour, the price of 2 kg of maize meal, the price of 1 kilowatt-hour of electricity, the fee for 1 study course, etc.

Shadow prices

Shadow prices are the opportunity costs of products and services when the market price, for whatever reason, does not reflect these costs. Examples are shadow wages of labour, where the fact that minimum wages are fixed is taken into account, a shadow price for fuel, where taxes and subsidies are excluded, the marginal cost of generating 1 kilowatt-hour of electricity, etc.

Principles in the calculation of Shadow Prices

There are a number of important approaches relating to the way in which shadow prices ought to be calculated. The first can broadly be called the world price approach (Little and Mirrlees, 1969) and the second the opportunity cost approach (UNIDO and World Bank)⁵. A third important approach rests on the willingness of the community or groups in the community to pay for goods or services. The first two approaches form the basis of shadow price calculation while the willingness-to-pay approach is recommended only as a method of calculating surrogate prices under certain circumstances, e.g. in the valuation of externalities. No detail discussion is therefore devoted to this principle.

World price approach

The world price approach takes into account world prices of products and services, especially with regard to those goods that are freely traded on international markets. Important examples are mineral and agricultural products for which active free international markets exist. Where local market prices are distorted the world price serves as a shadow price after adjustments have been made for costs in the import and export of goods. This approach is not always reliable, however, because governments often peg currencies at artificial levels that do not reflect their scarcity value. Adjustments are then required in the value of the currencies. However, not all inputs and outputs can necessarily be converted to currency value. For example, labour is one of the most important inputs in less developed countries, but there is no free international market making it possible to attach a currency value to surplus labour.

⁵ UNIDO; Manual for evaluation of Industrial Projects; New York: UNIDO.

Opportunity Cost Approach

The opportunity cost approach uses as the shadow price of inputs the production that is given up elsewhere by withdrawing these inputs from alternative use. On the other hand for the shadow price of outputs the additional incremental benefit achieved by undertaking the project relative to the situation had the project not been undertaken is used. In this way an attempt is made to accentuate internal considerations in order to find a reliable measure of the acceptability to the community of projects.

Since international trade considerations, e.g. exchange savings, are also important in project assessment, internal prices will not reflect all the community advantages and disadvantages. Therefore it was decided to combine the two approaches, the world price approach and the opportunity cost approach, in order to calculate shadow prices for project assessment more accurately. The approach is that where projects substitute imports or promote exports the world price approach is adopted. Locally purchased inputs are valued at international prices where the possibility exists that they could be imported or exported. The inputs for which no international prices exist are valued at local opportunity costs. This approach largely eliminates the individual disadvantages of each of the world price and opportunity cost approaches.

Key Shadow Prices for South Africa

The following key shadow price factors are generally used for South Africa:

a) Petrol and Diesel Fuel

The shadow prices of petrol and diesel are their pump prices minus levies and taxes that do not directly benefit the fuel consumers.

An example of the shadow price factor for petrol and diesel are as follows: (1999 Cents)

	<u>Petrol (93)</u> <u>Cents</u>
Pump price	268,0
Less: Total taxes (included):	94,6
Fuel taxes	90,6
Customs and excise	4,0
Plus: Taxes as user charges:	
Exp. on roads	22,0
Shadow price	195,4
Shadow factor	<u>0.729</u>

b) Imported Machinery and Equipment

The source for a relevant import tariffs is the Jacobson's Harmonized Trade Tariff Book.

Since 1994 the liberalisation of the South African trade tariffs has caused a large number of these items to be imported free of duty. However, for some items, tariffs between 10 and 20 % still apply.

It is recommended that an average of 10 % on all relevant imported items is used. However, as not all machinery and equipment will have to be imported (± 50 % is imported) it is recommended that a shadow price factor of 0.95 is applied.

The formula is as follows:

$$\begin{aligned} & (1 - (0,5 \times 0,1)) \\ & = 0,95 \end{aligned}$$

c) *Electricity*

Electricity tariffs are based in part on historical costs, and hence do not necessarily reflect fully the opportunity cost that will be entailed in providing electricity to water augmentation schemes. Consequently it is necessary to calculate a shadow price.

Electricity tariffs are comprised of generation transmission and distribution costs. Currently there is an oversupply of capacity in terms of generation. However, over time, user demand is expected to increase, and new generating plants will have to be constructed. This will cause a considerable increase in the current generating cost.

Taking into account the current market price of Eskom electricity, a shadow price 1,094 is to be used.

d) *Unskilled Labour*

Labour differs in many respects from other production factors. In South Africa, for example, it is possible that there can simultaneously be a shortage of skilled labour and a surplus of unskilled labour. At the same time factors exist in the labour market which result in the labour wage not reflecting relative scarcity.

The employment of unskilled labour will entail little or no opportunity cost specifically where the unemployment rate is very high. The classic position has been that this labour should have a shadow wage of zero (Sassone and Schaffer, 1978:69) or close to zero (Dasgupta and Pearce, 1972:105). UNIDO⁶⁾, 1978: 38-39 suggests, however, that a positive shadow wage is likely to be more appropriate because:

- A worker's caloric intake needs to be higher than that of an unemployed person;
- Some minimum "reservation wage" must be paid to induce someone to work at all; and
- The market wage paid will induce increased consumption, reducing the resources available to other consumers.

It is further suggested that "if better information is lacking, the shadow wage of unskilled labour may be taken as roughly the equivalent of three kilograms of grain per day" – this figure being "often quoted as a world-wide average".

The equivalent price in rand, which has been calculated as

$$3 \text{ kilograms of maize meal at } R1,43/\text{kg} = R4,30/\text{day} = R30,10/\text{week} = R1565,00 \text{ per annum.} \quad R1$$

⁶⁾UNIDO. 1978. Guide to practical project appraisal: social benefit-cost analysis in developing countries. Written by Hansen JR. New York: United Nations.

By using the statutory minimum wage for unskilled labour, the shadow price for unskilled labour for 1998 at an hourly rate of R5,16 is R12 074 per annum.

Shadow price factors:

$$\frac{1565}{12074} = 0.129$$

e) *Foreign Exchange Rate*

Although CBA is normally undertaken at constant prices, it is necessary that relative price changes (specifically with regard to international trade) be taken into account. The fluctuation in the foreign exchange rate is normally a factor of the difference between the domestic inflation rate and the inflation rates of South Africa's most important trading partners. If the fluctuation in the exchange rate differs from this, it implies that relative prices have changed. This means that prices of imports and exports are to be adjusted.

The exchange rate does not reflect the true change in import and export prices. After analysis of historic data, it is foreseen that a weakening of 1,5 % p.a. in addition to the effect of what is referred to as the purchasing power parity theory can be expected. Calculated over a period over 20 years, foreign trade prices of South Africa should be adjusted with a shadow price factor of 1.17.

Valuation Issues

a) *Externalities*

Externalities are the effect of a project on the environment, ecology or general standard of living of a community that are not reflected by the prices of inputs or outputs. If, for example, a manufacturing plant emits smoke that pollutes a town and causes its citizens to get lung cancer, there is a social cost to the operations of the firm that will not be felt by the firm and will not influence its price or quantity supplied. On the other side, if a firm were to sell a product that benefits uninvolved outsiders, such as emission-free engines, the firm would not capture all of the benefits of its production in its selling price.

Externalities are difficult to include in project assessment because they are not directly allocable to the project and furthermore are hard to quantify. The requirement that prices of products and services should reflect their relative scarcity value on the basis of all costs and benefits continues to apply, however, and therefore externalities should be considered in the analysis of a project. Thus, for example, the opportunity cost of polluted air can be approached by using the degree to which government is prepared to bear the cost of eliminating air pollution as a measure of the community's willingness to pay for clean air. Where it is suspected that a project will produce some form of externality, this aspect should be carefully investigated.

b) *Inflation*

The object of a cost-benefit analysis is to measure community advantages and disadvantages after the relative scarcity value of project inputs and outputs have been taken into account. However, inflation, the continued rise in general price levels, makes the determination of relative scarcity

values more difficult. Inflation is not taken into account in the economic analysis and all evaluations are done in base year prices with allowance for relative price shifts. (The financial results of profit-orientated projects viewed in nominal terms, on the other hand, are affected by the inflation rate, and the internal yield rate will have to be at least equal to, but preferably higher than the inflation rate to ensure that the project continues in existence. Alternatively the net present value of the project must be positive when costs and benefits are discounted with the aid of the inflation rate.)

c) Indirect taxes and subsidies

Taxes and subsidies influence the optimal application of production factors and the analyst will have to take these into account indirectly when he forecasts the combination of inputs that will apply after the implementation of the project. It is not, however, simple to deal with indirect taxes and subsidies in cost-benefit analysis.

From the point of view of the economy as a whole, indirect taxes and subsidies are transfer payments, and when new inputs that have to be taxed or subsidised are looked at in the national interest, the value is calculated from the point of view of the producer by subtracting taxes and adding subsidies. When the effect of a project on a particular area is considered, however, the effect of indirect taxes and subsidies on the local economy has to be taken into account. In such a case the market prices, including the taxes and after subtracting the subsidy, indicate the social marginal value of the input or benefit. The tax saving or subsidy loss of the region should be shown as a redistribution effect from or to the overall authority respectively.

It must be kept in mind that "taxes" charged on prices should be taken into account as part of the project cost. An example is the component of the oil price used to safeguard the oil supply.

Sometimes confusion arises as a result of taxation that is levied for a specific purpose, which in reality serves as a consumer charge. The general point of departure here is that in circumstances where tax would normally be subtracted, all taxation, even taxes that serves as user charges, is subtracted from market prices to calculate the scarcity value, and that a cost-element is added for the use of the input: Where it is very difficult to impute the value, the analyst can consider keeping the tax in the price as an estimate of the user charge, for example, part of the tax on petrol would serve as a user charge for the use of roads. The analyst can consider not subtracting this tax from the price of petrol so that it can serve as an estimate of the damage to existing roads that result from a project.

All direct taxation (e.g. income tax) and indirect taxation is included in the financial analysis, but direct taxation is not taken into account in the economic analysis and indirect tax is dealt with as set out above.

d) Project Life

The project life is equal to the expected economic life of the project, which means that the analysis period will vary from project to project. Any assets that may remain at the end of the economic life of the project should appear as a residual item either as a benefit or a cost, depending on whether they are removal costs or externalities.

CRITERIA FOR PROJECT ASSESSMENT

The Choice of a Social Discount Rate

It has been explained previously that to compare costs and benefits of a project that do not materialise at the same time they should be first made comparable. This is done by discounting the cost and benefit streams to a specific point in time, by using a social discount rate.

The determination of a suitable social discount rate for a country, has caused many theoretical debates in the past. The points of departure in the literature can be divided broadly into three schools, namely those who argue that the discount rate should be equal to the marginal return on capital (opportunity costs of capital), those whose argument rests on long-term real interest rates (cost of funding to the state), and those who advocate a social time preference rate.

Aspects of importance in deciding on a suitable rediscount rate are the following:

- The discount rate should not be influenced by business cycle conditions and policy, since the preferences that find expression in this rate are aimed at the extension of the long-term welfare structure.
- A low discount rate generally favours projects with a high initial capital cost and low current costs, while the opposite applies to high discount rates. Since labour costs are part of current expenditure, a high discount rate favours the employment of labour.
- If the real social discount rate is lower than the real implicit discount rate in the private sector, then investment by the public sector will be encouraged at the expense of investment by the private sector. The larger the gap between the two, the stronger the effect.

Without entering the debate on what theoretical base a social discount rate for South Africa should be chosen or the absolute level of this rate, it should be noted that most of the major development agencies such as the World Bank use a 10 percent real discount rate. In the past an 8 percent discount rate was used for public sector capital projects in South Africa.

In the light of the objectives of employment creation and the expansion of the private sector, it is probably more correct that a real social discount rate of 10 percent per annum be adopted for public investment projects in South Africa.

Net Present Value Method

According to this method the difference between the benefits and costs (the net benefit) in the specified year is discounted to the present by using the social discount rate. The discounted use of all these net benefits over the economic project life is defined as the net present value (NPV). In terms of the terminology set out above.

$$NPV = \sum b_j / (1 + i)^j - \sum c_j / (1 + i)^j$$

The criterion for the acceptance of a project is that the net present value must be positive; in other words, funds will be voted for a project only if the analysis produces a positive net present value.

The Internal Rate of Return

The internal rate of return (IRR) is the discount rate at which the present values of cost and benefits are equal. It is therefore the value of the discount rate r , which satisfies the following equation:

$$\sum b_j / (1 + r)^j - \sum c_j / (1 + r)^j = 0.$$

Only projects with an internal rate of return higher than the social discount rate, which forms a lower limit, will be considered for funding. The internal rate to return must be handled carefully, because there are situations in which the mathematical solution of the above equation is not unique. This happens when the stream of net benefits over the assessment period changes sign more than once.

The Discounted Benefit-Cost Ratio

The discounted benefit-cost ratio (BCR) is the ratio for the present value of the benefits relative to the present value of the costs, i.e.

$$BCR = \{ \sum b_j / (1 + i)^j \} / \{ \sum c_j / (1 + i)^j \}$$

In practice it is probably more common to compute the benefit-cost ratio using the present worth of the net benefit with the present worth of capital costs.

A project will be considered for funding only if the benefit-cost ratio is greater than 1.

Appendix 1A. Contacts For International Review of Skills Development

Country	Organization	Contact	Comments / Status
Australia	Australia National Training Authority (ANTA)	Dr. Kaye Bowman Bowmank@anta.govt.au	5/2: Lindsay Falkov contacted Dr. Bowman for information. 6/8: Mr. Peter May responded on behalf of Dr. Bowman. He sent a description of the VET system, and a literature review relating to the Training Guarantee.
	Australia National Training Authority (ANTA)	Simon Wallace WallaceS@anta.govt.au	Referred Edward Brooke to Kaye Bowman.
	National Centre for Vocational Education Research (NCVER)	(61-8) 8333-8400 (tel.) (61-8) 8331-9211 (fax)	5/1: Edward Brooke ordered 2 books, <u>Quality assurance in VET: Review of research</u> and <u>Dimensions and effectiveness: Towards performance indicators</u> . They are being sent to Brooklyn Lodge, and will be held for someone to pick up
	Vocational and Education Training Authority	train@cit.act.edu.au	5/5: Lindsay Falkov asked staff for more information about the experience of VETA's monitoring and evaluation system (successes and failures). Asked for reasons why the training guarantee system in Australia failed. No response ever received. 5/14: Lindsay Falkov followed up with another email asking specific questions in relation to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS.
	Office of Post Compulsory Education, Training and Employment (PETE)	gftp hotline@edumail.vic.gov.au mccarthy.peta.j@edumail.vic.gov.au ring.peter.p@edumail.vic.gov.au	5/5: Lindsay Falkov asked staff for information on PETE. No response ever received. 5/14: Lindsay Falkov followed up with another email asking specific questions in relation to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS. Lindsay Falkov asked for information on PETE. No response ever received. Lindsay Falkov asked Peter Ring for information. He responded and recommended three websites.
	Group Training	gtagnt@squirrel.com.au	5/5: Lindsay Falkov e-mailed Mr. De Medici asking for information about the Group Training Schemes. No response was ever received. 14/5: Lindsay Falkov followed up with another email asking specific questions in relation to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS. 15/5: Mr. De Medici responded to Lindsay Falkov and provided some information on funding. He said he would put something together for Lindsay Falkov to review.
	NCVER/VOCED	kb@lwa.au.com	5/5: Lindsay Falkov asked Kath Brewer for her report "Maximising Outcomes: Monitoring and Evaluation of Workplace Based Training: by Linda Wyse and Association on behalf of NCVER -VOCED. 5/8: Ms. Brewer faxed the report to Lindsay Falkov.

Country	Organization	Contact	Comments / Status
Australia	Department of Employment, Training and Industrial Relations	web@detir.qld.gov.au	5/4: Lindsay Falkov asked staff for information on experience of implementing the skills development programme. No response ever received. 14/5: Lindsay Falkov followed up with another e-mail asking specific questions relating to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS
	Australian Industry Group, Employment, Education and Training	gail@aigvic.airgroup.asn.au	5/4: Lindsay Falkov contacted Ms. Arnall inquiring about monitoring and evaluation systems in Australia. Ms. Arnall referred Lindsay Falkov to several websites. 5/15: Lindsay Falkov followed up with Ms. Arnall and asked six very specific questions concerning strategic planning, performance indicators, monitoring systems, evaluation, MIS, and Performance/Management Contracts. Ms. Arnall never responded to these questions.
	Training Information Centre	INFORMATION@AFH.training.wa.gov.au	5/4: Lindsay Falkov asked Clive Timms for information on implementing skills development training in Australia. 5/9: Mr. Timms referred Lindsay Falkov to several websites.
	Small Business professional Development Office of Vocational Education and Training	Andrew.Dare@Central.tased.edu.au	5/5: Lindsay Falkov asked Mr. Dare for information on lessons learnt from the small business development best practice programme in Australia and for the 1999 Evaluation Report. Mr. Dare said he would mail the 1998 report as the 1999 report was not yet ready. Lindsay Falkov never received the report.
	Framing the Future/TAFE	Brian.cramond@regency.tafe.sa.edu.au	5/5: Lindsay Falkov asked Mr. Cramond for information on monitoring and evaluation systems for skills development in Australia. Mr. Cramond sent Lindsay Falkov the 1998 evaluation and referred Lindsay Falkov to several websites. 5/14: Lindsay Falkov sent Mr. Cramond another e-mail with specific questions relation to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS.
	Group Training, Australia	gta@gtaltd.com.au	5/4: Lindsay Falkov asked for information or contact names of those involved in the monitoring and evaluation of group training in Australia. No response was ever received.
		Jack.Cunningham@almitab.org.au	5/5: Lindsay Falkov asked for information on the experience of implementing the skills development programme in Australia. 5/14: Lindsay Falkov followed up with another e-mail asking specific questions in relation to strategic planning, performance indicators, monitoring systems, evaluation, performance/management contracts and MIS. 5/15: Mr. Cunningham responded that he has the information we requested but had to first check with his manager.
Botswana	Department of Labour	Ms. Seemule, Assistant Commissioner (267)361-1500 (Tel.) vseemule@hotmail.com	She did not respond to follow-up calls/messages after first phone call and e-mail message. Internet research indicates that Botswana does not have comparable programs.
Chile	Embassy of Chile, South Africa	(012) 342-1511 (Tel.) (012) 342-1658 (Fax)	Staff did not respond to any faxes/phone messages requesting information or contacts for similar programs in Chile.

Country	Organization	Contact	Comments / Status
Colombia	Embassy of Colombia, South Africa	(012) 342-0211 (Tel.)	Staff did not know of any programs in Colombia comparable to those in South Africa.
	Asesora Particular	Sonia Prieto soniaprieto@hotmail.com 57-1 5301580 (Tel.) (Bogotá)	
	SENA	Diego Martínez Arango Ex-funcionario SENA hdmartin@multi.net.co 57-1 6220964 (Bogotá) (Tel.)	Provided information on the SENA program
	SENA	Cecilia Romero SENA 57-1 2170177 (Bogotá) (Tel.)	Provided information on the SENA program
	Asociacion Nacional De Industriales (ANDI)	Gladys Turriago ANDI 57-1 2810600 (Bogotá) (Tel.)	Provided information on ANDI.
Czech Republic	Embassy of Czech Republic, South Africa	(012) 430-2328 (Tel.)	Staff did not know of any programs in Czech Republic comparable to those in South Africa.
Denmark	Centre for Labour Market and Social Research (CLS), University of Aarhus	Mr. Nils Westergaard, Research Director (45) 8942-2352 (direct line) (45) 8942-2350 (general #) (45) 8942-2365 (fax) nwn@cls.dk	4/30: He indicated willingness to help answer questions. Edward Brooke sent e-mail with analytic framework, and Nils' secretary confirmed receipt. 5/5: Mr. Westergaard asked that project team call him on Monday May 8 for discussion. 5/8: Lindsay Falkov called Mr. Westergaard twice, however he was not available. Lindsay Falkov sent him a fax with a number of questions. He never responded.
	University of Aarhus	Prof. Bo Sandemann Rasmussen, Department of Economics (45) 8613-6334 (Tel.) (45) 8942-1590 (Fax) brasmussen@eco.aau.dk	Referred Edward Brooke to Mr. Nils Westergaard

Country	Organization	Contact	Comments / Status
Dominican Republic	Association for Development	Emanuel Castillo Angel Rosario Fernando Capellan Can be contacted through: Kevin Murphy J.E. Austin Associates 703-841-9841 (Tel.) 703-841-9847 (Fax) KXMURPHY@aol.com	Provided information on INFOTEP
Honduras	Asociacion Honduran De Maquiladores	Henry Fransen Can be contacted through: Kevin Murphy J.E. Austin Associates 703-841-9841 (Tel.) 703-841-9847 (Fax) KXMURPHY@aol.com	Provided information on INFOP.
Hungary	Embassy of Hungary, South Africa	(012) 430-3030 (Tel.)	Staff did not know of any programs in Hungary comparable to those in South Africa.
Latin America		Claudio Castro 202-623-3767 (Tel.)	Provided information on training programs in education in Latin America.
		Caroline Fawcett fawcett@american.edu 301-951-9286	Provided overview of Latin American skills development programs.
		German Castillo Bernal c0castia@colseguros.com alejocastillo@hotmail.com (57) 1 257-0736 (57) 1 619-7770	Provided overview of Latin American skills development programs.
		Ruth Anne Deutch 202-623-2406 (Tel.)	Provided overview of Latin American skills development programs.

Country	Organization	Contact	Comments / Status
Latin America		Andrew Morrison 202-623-1763 (Tel.)	Provided overview of Latin American skills development programs.
		Bill Savedoff 202-623-1932 (Tel.)	Provided information on training programs in health in Latin America.
Malaysia	Human Resources Development Group	Mr. Yau-De Piyau (Mr. Yau) (60-3) 258-4800 yau@hrdnet.gov.my	5/2: Edward Brooke sent e-mail with analytical framework. 5/5: Edward Brooke had short conversation with Mr. Yau, who said he would look into the availability of studies of Malaysia's skills development programs. He did not respond to later calls/e-mails.
	University of Leicester	Dr. David Ashton Professor of Sociology and Director of the Centre for Labour Market Studies Univ. of Leicester 0116 252 5950 (Tel); 0116 252 5953 (Fax) david.ashton@leicester.ac.uk	4/27: Dr. Ashton a photocopy of a graduate student's study of Malaysian skills development for an "administrative charge" of 300 pounds. We did not take him up on this offer, as the cost of the study exceeded its worth.
	Lancaster University	Geraint Johnes 44 1524 594215 (Tel.) 44 1524 594244 (Fax) G.Johnes@lancaster.ac.uk	Referred us to his colleague, Zafiris Tzannatos with whom he wrote an article on East Asian Skills Development
	World Bank	Zafiris Tzannatos (Tel.) 202-473-3280 ptzannatos@worldbank.org	Did not respond to e-mail inquiry on his work on skills development in East Asia.
Namibia	Ministry of Higher Education, Vocational Training, Science & Technology	M. Ndjoze, Director of Vocational Training Mndjoze@mhevtst.gov.na (264-61)270-6245/ 270-6223	They have been considering a skills development program, but to date nothing has been agreed on or implemented.
New Zealand	New Zealand Qualifications Authority (NZQA)	Brent Richardson (64-4) 802-3045 BrentR@nzqa.govt.nz	5/1: Said he is willing to help. He has received our analytical framework and will send us relevant information.

Country	Organization	Contact	Comments / Status
New Zealand	Skill New Zealand	<p>Margaret Griffin (64-4) 382-2850 margaret.griffin@skillnz.govt.nz</p> <p>Anna Pasikale anna.pasikale@skillnz.govt.nz</p> <p>Alistair Stewart alistair.stewart@skillnz.govt.nz</p> <p>Vivienne Boyd vivienne.boyd@skillnz.govt.nz</p>	<p>4/30: Anna Pasikale gave a basic description of how Skill NZ is set up. Edward Brooke sent her an email asking for details on contract between Skill NZ and Ministries of Education and Employment.</p> <p>5/14: Lindsay Falkov asked them for information on specific questions in relation to strategic planning, performance indicators, monitoring systems, evaluation, performance management contracts and MIS.</p>
	New Zealand Association for Training and Development	ellicon@xtra.co.nz	4/5: Lindsay Falkov asked Phillippa Elliott for information on experience of implementing the skills development programme.
Romania	Embassy of Romania, South Africa	<p>Mr. Florin Barbu (012) 346-1564 (Tel.) (012) 460-6947 (Fax) florinbarbu@usa.net romembsa@global.co.za</p>	4/15: Said that there was nothing similar in Romania.
Slovak Republic	Embassy of Slovak Republic, South Africa	<p>Office of the Ambassador (012) 342-2052 (Tel.) (012) 342-3688 (Fax)</p>	4/15: No response, but research indicated that there have been no comparable programs in Slovak Republic.
Sweden	IFAU	<p>Sara Martinson sara.martinson@ifau.uu.se</p>	<p>5/1: She responded to email from Edward Brooke. She is willing to talk about Swedish skills development generally or in IT training, which is her specialty. Edward Brooke sent her our analytic framework and needs to follow up.</p> <p>5/5: She sent information on skills development programs in the IT sector.</p>
United Kingdom	Oxfordshire Adult Basic Skills Unit	<p>Ms. Joya Banerjee, County ESOL Adviser (01865) 778827 (Tel.) adultbsu@rmpc.co.uk</p>	Had little information to offer. Explained how the county level training centers didn't keep track of data for national skills development. She didn't know who would have data on skills development at a national level.

Country	Organization	Contact	Comments / Status
Zambia	World Bank	Amit Dar Human Resource Network Special Programs Vocational Training (Tel.) 202-473-3430 Adar@worldbank.org	He sent us an unpublished copy of research on Zambia's skills development programs for our own reference.
Worldwide	USAID/Washington	Robert McClusky Rm 3.09-081, G/HCD, USAID 1300 Pennsylvania Ave., NW Washington, D.C. 20523-3901 (Tel) 202-712-5414; (Fax) 202-216-3229 rmcllusky@usaid.gov	Sent us copies of case studies of about 20 skills development and training programs worldwide.
	World Bank	Mr. Hong Tan Private Sector Development Business Environment 202-473-3206 htan@worldbank.org	Sent us copies of case studies of skills development and training programs worldwide, and a World Bank publication on Malaysian skills development.

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