TRINIDAD & TOBAGO

GLOBAL SERVICES PROMOTION PROGRAM

(TT-L1038)

ECONOMIC ANALYSIS ANNEX

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Contents: Cost-Benefit Analysis

I. Introduction

This report contains the economic evaluation of the impact of the Trinidad & Tobago Global Services Promotion Program (TT-L1038). The economic viability of the Program was assessed through a Cost-Benefit Analysis.

The objective of the program is to position Trinidad & Tobago as a world renowned location for global provision of IT-enabled services (ITeS). The primary benefits are expected to be increased export revenues and creation of attractive employment in the knowledge economy.

II. Assumptions and Methodology

In line with the project objectives to increase ITeS exports and employment, this analysis focuses on the impact of the human capital development, sector promotion, and business climate improvements on the productivity of the sector's firms and workers. Expected productivity gains as a result of the project activities are estimated for both of the primary groups of beneficiaries – students and owners of ITeS firms. In addition, the project is expected to generate revenues for the government of Trinidad and Tobago (GOTT) through two mechanisms: revenues from rental of the physical space and technology and fees from training services of the Global Services Internationalization Hub (GSI Hub); and additional tax revenue attributable to gains in revenues among ITeS firms. The methodology for the calculation of each of these benefits is described as follows.

Benefit: Human Capital Productivity Gains

The value to the economy of increasing employment in the ITeS sector is that the jobs are high value added, as reflected in the relatively high wages. Finishing school participants, including students, the unemployed, and underemployed, are expected to increase their wage earning in line with increases to their productivity as a result of the finishing school trainings in Component I. The increased productivity for each trainee in year n is estimated as the change in salary $(w_1 - w_0)$ resulting from the training, multiplied by the ratio of gross value added to salary for the sector $(\frac{GVA}{S})$. This product is multiplied by the number of graduates of the program in that year (L_n).[1] It is assumed that the productivity gain will be realized in the year following the training, and will last for three years. This timeframe is consistent with the typical duration of certification of IT skills.

Benefit b_1 is thus estimated as follows for year n:

$$b_{1n} = (w_1 - w_0) * (\frac{GVA}{S}) * \sum_{n-3}^{n-1} L_n$$

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[1] The number of qualifying graduates per year (L_n) was derived from the unmet demand for hiring of qualified workers expressed by the private sector in a survey conducted for the GSI Hub feasibility report.

The ratio $(\frac{GVA}{S})$ used is the estimate for the information technology outsourcing (ITO) sector as assessed in preparation of IDB global services loan CO-L1094. Salary estimates were obtained through private sector consultation.

Benefit: Efficiency Gains of SMEs

The project is expected to increase the exports of ITeS by firms in Trinidad & Tobago. The increased exports by these firms are expected to result from: i) access to qualified workers as quantified above (b_1); and ii) efficiency gains to the firm as an outcome of their participation in the export readiness trainings and services of Component I (b_2). Efficiency gains by local SMEs[2] are of direct benefit to the economy. These gains are expected to follow from capacity building and adoption of best practices by participating firms in the thematic areas detailed in the Proposal for Operation Development (POD).

The benefit b_2 for project year n is estimated as follows:

$$b_{2n} = \Delta GVA * E_{n-1}$$

where ΔGVA is the change in gross value added of the participating companies, calculated as $(GVA_0 * g)$ and E is the number of distinct SMEs participating in the trainings and services. GVA_0 was estimated through private sector consultation, and the increase g was estimated in the economic analysis in preparation for IDB global services loan CO-L1094. It is assumed that the knowledge transfer will accrue benefits in the year following the training, and that GVA_0 will increase each year at a rate equal to estimated annual revenue growth with the project (f_1).[3] The simplifying assumptions are that training one or more executive of an SME has the same impact on efficiency, and that annual growth of gross value added would grow at a rate equivalent to annual revenue growth.

Benefit: Revenue from Rentals and Trainings

The GSI Hub as envisaged is anticipated to host global services firms in both a long term (lease) and short term (shared workspace and technology) capacity. Further, the trainings and workshops for both students and exporting firms at the center are expected to produce income through nominal fees designed to increase participant buy-in and secure attendance. The revenue from these services is a benefit to the project that partially offsets its costs. Note that the benefit of this income may be underestimated as the revenues are expected to be reinvested in the activities of project Component I, which would further enhance the expected benefits of the program.

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[2] The majority of firms in the sector are SMEs (<25 employees), as indicated by a study conducted for the feasibility report of the proposed GSI Hub, as described in the Proposal for Operation Development (POD).

[3] The revenue growth rate without the project (f_0) was estimated in consultation with the private sector based on experience from the prior three years. Revenue growth rate with the project (f_1) was derived from the hiring needs for export-led growth expressed by the private sector in a survey completed for the GSI Hub feasibility report.

In the case of finishing schools (benefit b_1), a productivity gain for the economy is generated if the student graduates with a passing score, and the qualifying graduates in year n are represented by the variable L_n.[4] Since there is revenue generated from the nominal course fee regardless of the qualification of the student, for the purposes of revenue the relevant student population is represented by the number of qualifying students (L_n) divided by the expected passing rate (p) from similar programs of this type. The total revenue for each year is thus indicated by the course fee per student (R_1) multiplied by the number of enrolled students for the year ($\frac{L_n}{p}$).

Revenue from fees collected for export readiness training and services is calculated for year n as the average annual revenue per participant (R_2) multiplied by the annual number of participants in these services (C_n). Demand for export readiness training and services was assessed through private sector survey for the GSI Hub feasibility study conducted in preparation of the POD. Estimated course fees per participant (R_1 and R_2) are nominal, as indicated in the POD, and the reasonableness of their estimated values were validated by private sector consultation.

For year n, the rental income is equal to the annual revenue per square foot of rented office space (R_3) multiplied by the number of square feet leased in that year (t_n), plus average annual rental fees for flexible workspace (R_4) multiplied by the number of expected users per year (H_n).[5]

These income streams (b_3) for year n are thus estimated as follows:

$$b_{3n} = (R_1 * \frac{L_n}{p}) + (R_2 * C_n) + (R_3 * t_n) + (R_4 * H_n)$$

Note that rental revenues are included only for the duration of the 5-year project; if the Hub purchase option (as described in the POD) is utilized prior to the end of the project, the benefits to be accrued from rental revenues are likely underestimated.

Benefit: Marginal Tax Revenue Gains

An additional benefit to the economy from the increased exports by beneficiary SMEs are the marginal tax revenues collected. Export-led growth is expected to increase the profitability of the beneficiary SMEs, as a direct result of project activities including training, promotion and branding activities, and improvements to the business climate. To quantify this increase, the taxes that would be collected without the project are subtracted from the potential taxes collected with the implementation of the project.

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[4] The number of qualifying graduates per year (L_n) was derived from the unmet demand for hiring of qualified workers expressed by the private sector in a survey conducted for the GSI Hub feasibility report.
[5] Assumptions regarding the real estate rental fees (R_3) and square footage rented (t_n) are based on the feasibility report of the GSI Hub. Rental rate inputs are from the Trinidad & Tobago Association of Real Estate Agents, and demand for use of space was estimated by private sector survey.

This benefit (b_4) is calculated for year n as follows:

$$b_{4n} = \propto * \Delta f_n * E$$

where Δf_n is the incremental increase in tax base as a result of the program, $\propto$ is the proportion collected in tax, and E is the number of SME beneficiaries of the program.[6]

The average growth rate expected without the project (f_0) was estimated by private sector consultation on recent growth. The projected growth rate with the project (f_1) is a conservative estimate taking into account the increased employment projections derived from the private sector demand study undertaken in preparation for this program, assuming that the new hires are driven by export-oriented growth. It is expected that the marginal increase to revenues will be realized starting in year 2 of the project.

The improved business climate as a result of the project is also expected to attract new foreign direct investment (FDI) in the sector. Note that a benefit from marginal tax revenue generated through new foreign direct investment is not captured in this analysis. This is because foreign firms are expected to benefit from tax incentives including free trade zones for export-oriented services companies. However, the benefit of FDI is accounted for in the higher quality jobs created, and thus through the benefit of the productivity gains, as captured in b_1 above.

III. Economic Benefits

Annex I indicates the inputs used to model the expected economic benefits of the project. The benefits were estimated over a horizon of eight years in order to capture the productivity gains estimated to last three years following project activities, as described in the methodology above. The four categories of expected benefits are estimated as indicated in the following table.

Table 1
Expected Economic Benefits from the Project
(in thousands of US dollars)

Year	1	2	3	4	5	6	7	8
Human Capital Productivity	-	862	2,155	4,166	5,889	7,268	5,257	2,672
Efficiency Gains of SMEs	-	522	577	637	704	778	860	950
Rental and Training Revenues	179	310	330	346	349	-	-	-
Marginal Tax Revenue	-	38	83	137	200	274	360	460
Subtotal	179	1,732	3,145	5,286	7,142	8,320	6,477	4,082

The total expected benefits over the 8-year time horizon total US$ 36,363,849. Using a 12% discount rate, the expected benefits of the project have a net present value of US$ 19,985,045.

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[6] The number of distinct firms participating in export readiness training and services (E) was estimated from private sector survey data obtained in preparation of the GSI Hub feasibility study.

IV. Economic Costs

The project is financed by a US$ 18 million loan. It will be disbursed over 5 years as indicated below. While terms of the loan are not known at the time of analysis, the 5 year project is expected to be followed by a 6-month grace period and subsequent semi-annual payments over 25 years at an interest rate tied to Libor. At the time of analysis, the interest rate is estimated to be 1.17%.

While principal payments are accounted for in the analysis in the year of disbursement so as to reflect the net cash flow in relation to benefits in the respective project year, interest costs are accounted for in the year in which they are to be paid.

Total economic costs of the project are therefore estimated as follows:

Table 2
Expected Costs
(in thousands of US dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6-31
Project Budget	4,447	3,252	2,507	5,728	2,065	-
Interest Expense	-	-	-	-	-	2,813
Total Cost	**4,447**	**3,252**	**2,507**	**5,728**	**2,065**	**2,813**

The total cost of the project including estimated interest expense is US$ 20,812,878. Using a discount rate of 12%, the net present value of the total cost is US$ 13,816,880.

V. Economic Returns

With a discount rate of 12%, the project has a net present value of US$ 6,168,165.

Table 3
Economic Return of the Program
(in thousands of US dollars)

Year	1	2	3	4	5	6	7	8	9 to 30
Benefits	179	1,732	3,145	5,286	7,142	8,320	6,477	4,082	-
Costs	(4,447)	(3,252)	(2,507)	(5,728)	(2,065)	(105)	(205)	(198)	(2,305)
Net Benefit	(4,269)	(1,520)	638	(442)	5,077	8,215	6,272	3,884	(2,305)

Net Benefit	Benefit	Costs	ERR
6,168	19,985	13,817	33%

VI. Sensitivity Analysis

Since the analysis focuses on impacts to worker and firm productivity, the model was tested with a sensitivity analysis making adjustments to key assumptions for both worker productivity and firm efficiency. Because tenancy levels at the GSI Hub are also subject to variability, analysis was also run to assess the impact of tenancy on the net benefit of the program. Each of these scenarios was also run utilizing varied discount rates. As the following table indicates, the net economic return of the project was positive under all scenarios.

Sensitivity Analysis

(in thousands of US dollars)

Table 4a: Training impact on worker salaries[7]

Net Present Value	salaries -5%	base case	salaries +5%
Discount rate = 14%	1,465	5,163	8,860
Discount rate = 12%	2,112	6,168	10,225
Discount rate = 10%	2,848	7,309	11,770
ERR	20%	33%	44%

Table 4b: Training impact on SME efficiency[8]

Net Present Value	Δ GVA -100 basis points	base case	Δ GVA +100 basis points
Discount rate = 14%	4,749	5,163	5,577
Discount rate = 12%	5,717	6,168	6,620
Discount rate = 10%	6,815	7,309	7,803
ERR	31%	33%	34%

Table 4c: GSI Hub tenancy[9]

Net Present Value	tenancy -20%	base case	tenancy +20%
Discount rate = 14%	4,999	5,163	5,327
Discount rate = 12%	5,995	6,168	6,341
Discount rate = 10%	7,127	7,309	7,492
ERR	32%	33%	33%

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[7] The ±5% salary variability reflects the expected range of entry level ITeS salaries expressed in consultation with the private sector.

[8] ΔGVA was estimated for a comparable program implemented in Colombia (CO-L1094). A decrease of 100 basis points represents a worst-case scenario where the activities do not have the same impact on firm productivity as would be expected in other contexts. A 100 basis point improvement would imply a measurable increase in program effectiveness over comparable programs.

[9] Tenancy rates were estimated from results of a private sector demand survey conducted for the GSI Hub feasibility study. Rates are assumed to vary up to 20% in either direction in response to features and specifications of the Hub, the demand for which is indicated in the feasibility study. Tenancy can be maximized by incorporating as many of the characteristics in demand by the private sector as possible in the location selection and outfitting design of the Hub.

VII. Conclusions

Based on rather conservative assumptions underlying the benefits of the project, the economic return was found to be positive. Furthermore, the sensitivity analysis performed showed that there is room for the economic return of the project to remain positive following adverse changes in key assumptions. Therefore, the project team recommends that the Bank fund the proposed program.

Annex I. Inputs to Economic Analysis

Variable	Value	Description
w_0	18,000	Annual salary of an entry-level IT worker without specific training (USD)
w_1	22,200	Annual salary of a worker with ITeS sector-specific training (USD)
GVA/S	1.71	Ratio of gross value added to salary in ITO sector
L1	120	Number of qualifying graduates of Finishing School training in Year 1
L2	180	Number of qualifying graduates of Finishing School training in Year 2
L3	280	Number of qualifying graduates of Finishing School training in Year 3
L4	360	Number of qualifying graduates of Finishing School training in Year 4
L5	372	Number of qualifying graduates of Finishing School training in Year 5
p	75%	Passing rate among workers trained
R_1	150	Revenue generated per trainee (USD)
GVA_0	60,000	Gross value added of the participating companies before the project (USD)
ΔGVA	6.2%	Increase in gross value added of the participating companies after the project
α	25%	Trinidad & Tobago standard corporate income tax rate
f_0	8.5%	Growth rate of companies' revenues without project
f_1	10.5%	Growth rate of companies' revenues with project
C	100	Annual number of participants in internationalization training programs and services
E	127	Number of distinct SMEs participating in internationalization training programs
R2	50	Average annual revenue per participant in internationalization training programs and services (USD)
R3	15	Annual revenue per square foot of tenant space (USD)
t_1	10,000	Tenant space utilized in Year 1 (sq. ft.)
t_2 ($=t_3=t_4=t_5$)	18,000	Tenant space utilized in Years 2-5 (sq. ft.)
R_4	120	Annual revenue per user of flexible work space and technology (USD)
H_1	75	Users of flexible work space and technology in Year 1
H_2	100	Users of flexible work space and technology in Year 2
H_3 ($=H_4=H_5$)	200	Users of flexible work space and technology in Years 3-5
r	12%	Discount rate