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PROJECT STATEMENT

Date: May 13, 1974

A. PROJECT SUMMARY

1. Statistical

Project Title:	"Evaluation Framework for Transportation Planning in Developing Countries"
New or Extension:	New
Contractor and Address:	Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, Massachusetts 02139
Principal Investigator:	Dr. Fred Moavenzadeh Professor of Civil Engineering
Duration:	Three Years
Total Estimated Cost:	$435,450.00
Project Monitor:	Mr. John Fry Office of Science and Technology Agency for International Development

F. Moavenzadeh

F. Moavenzadeh, Professor of Civil Engineering

P.O. Roberts

P.O. Roberts, Director, Center for Transportation Studies

G.H. Dummer, Director - Office of Sponsored Research

2. Narrative

The goal of this proposed research is to assist developing countries and those who would help them to understand better the relative merits of alternative possibilities for highway construction, taking into account certain social and national cost/benefits as well as the more conventional economic factors. The specific objective is to develop an evaluation framework for LDC use in analyzing and assessing the consequences of various highway projects and alternatives available to them. The work will focus on one developing country. Emphasis will be placed on the identification, clarification, and resolution of major issues of highway planning, programming, and budgeting in the chosen country. To the extent possible, costs and benefits will be quantified and results will be generalized for broader application.

The research will be directed toward the refinement, modification, expansion, and application of computer-based models which have been developed in recent years for evaluating highway projects. The emphasis will be on exploring and enhancing the applicability and utility of existing models in a real situation.

In addition to the usual technical and economic factors, specific issues to be considered in developing this evaluation framework will include: scarcity of resources, factor pricing, returns from investment, time staging, and potential for using appropriate technology.

A three year research program consisting of three phases is proposed. Phase one will be concerned with: a) further refinement, modification, and adaptation of a highway link evaluation model known as the Highway Cost Model (HCM)* developed at M.I.T. for the International Bank for Reconstruction and Development (IBRD); b) identification of a developing country and collection of necessary data for calibration of the HCM in that country; identification of individuals in local ministries and highway agencies and establishment of working relationships with them; c) development of the framework for a network analysis model; and d) assessing the possibility of developing relevant planning, programming, and budgeting systems (PPBS) for integrated transport projects.

Phase two will be concerned with: a) the application of the refined HCM; b) application of the time staging and network analysis model; c) development of the PPBS and its components; and d) continuous collaborative work with personnel of the LDC.

Phase three will emphasize implementation of the integrated framework in the LDC and demonstration of its application to certain projects.

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* The HCM has been used in six different countries and its results have compared well with the results of some engineering feasibility studies in those countries. The basic logic of the model has been tested in Kenya by the British Road Research Laboratories under sponsorship of the World Bank.

In addition, selected personnel from the LDC will be trained, and the findings will be generalized for application in other LDC's.

The study will be conducted by personnel of the M.I.T. Center for Transportation Studies, under the supervision of Dr. Fred Moavenzadeh and Dr. Paul O. Roberts. Additional technical inputs will be provided by faculty members of other departments of the Institute.

B. EXPANDED NARRATIVE STATEMENT

1. Project Description and Background

This three-year research project is designed in three phases to develop a framework, appropriate for use in developing countries, for decision making related to highway planning and design. During this period, existing models will be refined, unified, and tested, and utilization will be demonstrated in one LDC. Results of the research will be generalized in useful form for widespread LDC utilization.

The lack of adequate transportation is often cited as a major factor impeding rapid and orderly growth in lesser developed countries (1,2). Transportation facilities are not only critical in permitting the movement of people and goods to and from otherwise inaccessible areas, but also serve to encourage response to economic opportunity and thus to improve the environment for growth.

Investments in transport require diversion of a country's scarce resources from other sectors of the economy. A transportation project is undertaken with the assumption, too seldom explicitly stated, that within the context of overall development goals of a nation, such investment is preferred to investment in hospitals, schools, housing, communication, or other areas.

The preferrence decision is a difficult one to make, for transport facilities are largely what is termed social overhead. Social overhead projects provide infrastructure, means to other ends, rather than serving themselves as productive resources. The benefits from transport investment are therefore difficult to quantify, even when they are understood.

Ideally, an investment decision would be made through conscious consideration of possible alternatives and rational selection from among these possibilities. This ideal requires a clear knowledge, first of all, of the needs of the country and the relative importance of these needs, and secondly, of the investment possibilities for meeting these needs. Unfortunately, the knowledge available is by no means perfect. The overall needs and goals of developing countries are changing. And the knowledge of possible alternatives generally becomes clearer only after initial investment decisions have been made, after some of the resources allocated to a sector are used to explore various possibilities through planning and design analysis.

Such issues as the conservation of foreign exchange or the use of labor-intensive technologies to alleviate under-employment are frequently omitted from a project selection. The difficulty and expense of analyzing such factors by existing methods often makes such omission virtually mandatory. This proposed research work is concerned primarily with the development of a framework, that is, an unified set of models, whereby the investigation of a greater range of issues can be made practical.

An increased scope of investigation will also yield additional benefits in national planning, beyond greater choice. With improved analytical techniques, it becomes practical to explore the mutual impact of such issues and the project upon one another. If, for example, foreign exchange costs are to be minimized, the project may be compared with that which would minimize total cost, giving the planner an indication of what this particular goal is costing in this situation. Thus, success of the proposed research would not only permit consideration of additional variables and exploration of additional alternative courses of action, but would also provide a means of better determining social and national consequences. These objectives are discussed more fully in paragraph 3, "Relation to Existing Knowledge."

2. Significance to AID Objectives

As indicated in the FY 1974 program presentation to the Congress, "Many countries still need substantial national resources to provide adequate roads ... Africa has been chronically short of transportation and the landlocked areas of Central Africa have a particular problem ... AID is continuing to help finance projects designed to develop transportation networks which will serve the internal requirements of particular African countries, open up remote areas of the continent and facilitate the movement of agricultural, mineral, forest and other products to new markets. AID is also heavily involved in transportation projects in Indonesia, where the Government has placed strong emphasis on the rehabilitation and expansion of the country's infrastructure as an essential first step in mobilizing agricultural and industrial resources and increasing investment and economic growth".

During the past five years, AID has allocated $273 million to transport projects in developing countries. Other donors and the developing countries themselves have invested even larger sums. Now, however, development assistance agencies are beginning to question conventional criteria for lending in the transportation sector. If transport development is to go beyond serving established traffic needs and reinforcing existing patterns of economic activity and income distribution, and to become more useful in solving the serious problems of unemployment and geographic or sectional income inequalities, then a better understanding of each project's dynamic effects on the economy as a whole is needed. Additional research and development is needed to improve the effectiveness of the large investments being made in the transportation sector.

To maximize the effectiveness of future investments in LDC transportation projects, these resources should be allocated to projects which

will not only meet traffic demands, but will have a known and quantifiable impact on broader development and human needs. To select such projects, new methodologies are required for use by developing countries and development assistance agencies in transportation sector analysis and programming. The proposed research is expected to contribute an important advance in these respects.

3. Relation to Existing Knowledge

Transport planning can be approached at three levels: (1) project analysis, whereby the expected costs and returns of a particular transport link are treated in great detail, often carried out in conjunction with full-scale design and economic studies; (2) network analysis, whereby alternative transportation networks are analyzed for optimal conditions of traffic flow; and (3) consequence analysis, whereby computer-based models of network traffic flows are used to predict the effects of a transport system on the national economy.

These three approaches to analysis incorporate decreasing levels of detail as the scope of interest broadens. Ideally, the three levels should complement each other in an interactive way that permits each level of analysis to have as input the best information available from preceding levels. The broader, consequence analyses should include national or regional policies and guide project level studies to concentrate on those transport links most beneficial to overall national goals. Likewise, the detailed results of individual project design and economic analysis should influence future higher level planning and analysis, particularly in regard to changing national needs and reallocation of resources.

In LDC's, this interactive process seldom occurs. Detailed and expensive project studies are not guided by overall national or regional policy and systematic evaluation of alternatives, but rather by rules-of-thumb, guessing, or not infrequently, political porkbarreling and favoritism. Likewise, the inability of the planning system to provide meaningful information on costs and timing of investments to the regional and national levels starves any convincing arguments for more efficient and timely allocations of resources by national and international agencies. Some of these issues and their implications are listed below:

1. Scarcity of Resources: Capital is scarce in most developing nations, and sometimes labor is relatively plentiful. How can the efficient application and timing of these and other resources be improved?

2. Varieties of Cost: Costs in LDC's are distributed among users, government agencies, and international donors and lenders. Payments are made partly in local and partly in foreign currency. The distribution of these costs and payments is sometimes important in LDC transport investment decisions. How do various transport alternatives affect this distribution?

3. Returns from Transportation Investments: A successful trans-

portation facility justifies its investment through reduced user costs and increased opportunity for economic development. On the other hand, increased use of this facility accelerates its deterioration, thereby raising costs (or reducing benefits). How may the overall economic and social benefits be maximized?

4. Staged Construction: A sometimes neglected but promising strategy in LDC's is staged construction, whereby construction of part of the total facility is deferred until user demands increase sufficiently to justify further expenditures. What economic and social benefits may be realized in LDC's by better staging construction for efficient allocation of resources?

5. Selection of Preferred Projects: Rational decisions on transport projects require criteria which clarify the impact of alternative actions upon achievement of a nation's development goals. Given the number and complexity of the issues involved, how may these criteria be formulated?

4. Relation to Other Research

The three levels of transport analysis were discussed earlier: (1) detailed project studies; (2) network studies; and (3) overall regional and national studies. Transport planning today is usually addressed at the most detailed level, on a project-by-project basis. Extensive research over the years has greatly improved understanding of how to perform adequate project level studies (7).

During the 1960's the Brookings Institution, supported by the U.S. Agency for International Development, sponsored a program on the role of transportation in economic development. This work included studies of transport and economic integration (8), network structure (9), transport finance, and the impact of transport investment on development (10). It also covered the transport and development experience of various countries (11). The investigations culminated in a review and evaluation of various techniques for assessing transport projects (12). The conclusions were that these techniques, treating projects as independent decisions, had serious drawbacks; they had their place in the overall process, but in many cases they tended to give a distorted picture of the system as a whole.

More recent research has shown how transportation planning can be accomplished at the system-wide level (4). Work on capital budgeting and project programming has only recently begun (6). A major advance was realized with the development of techniques for large-scale analysis of a transport system and its interactions with the economy (13). For cases in which there is a high degree of interdependence between projects or between the transport sector and the balance of the economy, this approach is the only way in which these interdependencies can be traced out and the overall impact of alternative plans assessed. What is still lacking, though, is a framework in which these techniques may be combined and adapted for use in more generalized and comprenensive transport sector planning. Such a framework, along with its demonstrated use in

case studies, would constitute a major advance to professional understanding of transportation network planning in developing countries.

The principal investigators proposed for this research project were responsible for development of the Harvard-Brookings study for Colombia and the Highway Cost Model (HCM) for the World Bank. The Harvard-Brookings study developed an analytical model to evaluate network consequences of investment projects at a national level. The Highway Cost Model took the first step toward providing a satisfactory decision-making framework useful at the project level to determine optimum design standards for low-volume roads in developing countries.

While these models are regarded as important tools in transport planning in developing countries, they have major limitations in use for transport investment and programming decisions at a national level. For example, no formal mechanism exists to incorporate the output of the HCM model into existing capital budgeting models. A significant effort in the proposed research will be devoted to development of a framework for transport evaluation at the regional and national level. This framework will attempt to integrate important accomplishments of previous transportation research in a comprehensive and useful set of guidelines for LDCs.

5. Proposed Work Plan

a. Scope of Work

The scope of this work includes the development of an evaluation framework for LDC use in analyzing the consequences of various highway investment alternatives available to them. The work will focus on, but not be limited to, one developing country. Emphasis will be placed on the identification, quantification, and resolution of major issues facing highway project evaluation and planning in this developing country. Results will be synthesized in the form of guidelines for highway planning, programming, and budgeting in other developing countries.

Specifically, the project will modify and adapt existing models for the evaluation of highway projects and the determination of consequences of time stagings. In addition, it will structure a framework for integrating the planning phases of highway transportation with the programming and scheduling phases along with the budgeting process of allocating funds to alternative projects.

b. Program of Work

A three phase program is planned. The following sections discuss the specific tasks which will be undertaken in each phase. Since the extent of activities in Phases II and III are mostly dependent upon the findings of Phase I, their corresponding tasks are presented in a rather brief form.

Phase I (Year 1):

Task 1: Recommendation to TA/OST of an LDC in which the research project is to be implemented. The recommendation will be based on an on-site evaluation of available resources within the LDC, and will include the following considerations:

Technical Factors

a. Availability of appropriate data encompassing existing or ongoing highway projects, future undertakings, and overall development plans outlining regional or national goals.

b. Commitment of LDC planning and transport ministries and highway departments and availability of qualified and cooperative personnel.

c. Potential for extrapolation of findings to other LDCs.

d. Range of potential highway technologies available.

Logistic Factors

e. Availability of reasonable transportation and communications to and within the LDC.

f. Availability of computer facilities and their compatibility with existing and planned models.

g. Existence of related studies by consultants, agencies, others.

h. Availability of administrative support.

i. Ability to speak a common language.

Administrative Factors

j. Concurrence of USAID and the steering committee.

k. Ability of host LDC to support local cooperating personnel. (No provisions for supporting local LDC personnel, travel, etc., have been included as part of this offer.)

TA/OST will present the recommendation and selected alternatives to a project steering committee, composed of representatives of SER/ENG, IBRD, TA/UD, and MIT, for final selection of the project country. TA/OST will chair the steering committee.

Task 2: Identification of case studies for application of the highway cost model (HCM) in the host country and calibration of the HCM to local conditions. Where possible, case studies will be selected to include a spectrum of road types and levels, various levels of maintenance policies, a typical mix of vehicles, and representative user costs.

Task 3: Modification of the HCM to better reflect local conditions and to extend its capability related to the choice of technology and time staging investments in road construction. In making these modifications, significant reliance will be placed upon data currently being made available by IBRD from the TRRL - IBI study in Kenya.

Task 4: Development of a framework for evaluating network road construction. This task will be concerned with adapting a computer program to evaluate multiple alternatives for road links in a network to determine both the optimal period and scale of construction. This task is to be completed within one year of date of contract. The progress report to be submitted on completion of Tasks 1-4 will include a definite logistical plan, developed in collaboration with the host country, for completing the research and explicitly considering appropriate economic, social, and environmental aspects of LDC highway investments. The final report for Phase I will be submitted by TA/OST, through TA/RIG to AID's Research Advisory Committee for information and comment.

Specific considerations within this task are:

Technical Aspects

1. Surveying of appropriate models and strategies;
2. Identification of LDC technical input;
3. Adaptation of the appropriate model to the LDC.

Socio-Economic Aspects

The identification and incorporation of appropriate parameters reflecting LDC regional or national goals (market prices, appropriate shadow prices, opportunity costs, foreign exchange, wage rates, materials and supplies costs, and so forth).

Environmental Aspects

1. Definition of environmental objectives and guidelines involves a broad consideration of many areas of the physical and life sciences and engineering. Treatment of these issues cannot be incorporated in an analytic model in a general way. The scope of this work will therefore focus on creating a decision framework in which environmental factors can be evaluated by the model user in parallel with his evaluation of the model results.

2. Environmental effects of a highway project may be considered at two levels: (a) the environmental effects of the facility itself (runoff and drainage, clearing of land, etc.), and (b) the environmental effects resulting from changes in local/regional conditions brought about by use of the new facility (e.g., a new road spurs new settlement in undeveloped areas, causing increased traffic, sewage, demand for fresh water, etc.). The second level, very broad in scope, could itself be the subject of a study. This research project will focus on

the first level only.

3. Much of the work in this area has arisen through the preparation and evaluation of environmental impact studies in the United States. While environmental considerations in LDCs may be different from those in the United States, there are no doubt similarities in technical arguments, logic, and methodology which could be drawn. Therefore, in preparing the framework outlined in 1, above, appropriate information from U.S. environmental impact studies will be used wherever possible.

Phase II (Year 2):

Task 5: Demonstration of the refined HCM on a current host country project. Results of model runs will be compared with project studies already prepared by the country, to validate modifications made in Task 3.

Task 6: Preparation of a time staging and network analysis model adapted for use with the output of Task 4. This new model, unlike the HCM, will be able to consider several possible highway links in dimensions of both location and time and options associated with deferred construction.

Task 7: Combination of the HCM and network analysis models to form a single model capable of assessing highway transportation projects at both the policy and planning level and the detailed design level. The combined model will be applied to an actual host country project, illustrating data selection and input, interpretation of results, selection of optimal strategy, and project design.

Task 8: Development of an evaluation framework for integrating the combined model developed and tested in Task 7 with capital budgeting techniques.

Phase III (Year 3):

Task 9: Application of the evaluation framework developed under Task 8 to selected transport investment problems in the host country. Results of Task 4 will be used to refine the evaluation methodology as necessary to enhance its effectiveness. The contractor will also instruct and train host country counterparts in continuing implementation of the model.

Task 10: Submission of a comprehensive final report. The report will describe the theoretical basis for the research, the inherent assumptions for utilization, and required inputs for the evaluation framework in generalized form to make it most readily adaptable and useful in LDCs. A complementary documentation manual to facilitate widespread LDC utilization will also be prepared. In addition, a regional utilization conference will be held in the host country near the end of Task 10 to disseminate results of the research to transpor-

tation officials from other LDCs and encourage broader utilization.

c. Duration of Services: Three (3) years

d. Logistical Support: Office space and travel within cooperating country to be provided by cooperating country.

e. Reports (All reports in English):

1. Two hundred (200) copies of a comprehensive progress report of the research undertaken will be submitted at the end of the first and second years of work.

2. Two hundred (200) copies of a final report for the complete project will be submitted at the end of the third year.

3. Drafts of all reports will be submitted for optional comment thirty (30) days prior to the end of each reporting period.

4. The format for all reports will conform to COSATI Guidelines to Format Standards for Scientific and Technical Reports Prepared by and for the Federal Government.

5. Additional oral and/or written interim reports will be presented as may be requested by AID. Meetings with the project steering committee (which will be organized by AID) will be held for consultation quarterly or as may be requested by the committee.

f. Level of Participation Expected from Host Country

The host country will be expected to make available in their highway department, one full time technical person as a counterpart for the MIT investigators. The LDC counterpart will be responsible for the LDC contributions to the research effort. In addition, it is expected that at least two junior engineers in the LDC will be assigned to work part time in cooperation with the MIT team. These individuals will spend part of their time at MIT to become familiar with operation and application of the several analytical models.

6. Research Methodology

To accomplish the foregoing, we propose to use the inter-disciplinary team identified below to collect and analyze data, formulate case studies of typical LDC situations, and apply appropriate analytic methods to their analysis. Through the use of this interdisciplinary team, we expect to counteract any tendency toward assuming a narrow and highly specialized viewpoint, thereby significantly increasing the probability of identifying all critical factors and enhancing the reality and validity of the descriptions of their nature and interrelationships.

The case study research approach will be used to: identify data

requirements; collect and structure data in an useful way; and facilitate the documentation and presentation of the total systems view as well as the different, and often conflicting, views of various disciplines, people, and institutions. By exposing the consequences of decisions in these cases, we expect to be able to define and anlayze fundamental processes of the research team.

7. Research Competence

The proposed work will be supervised and conducted by Professors Fred Moavenzadeh and Paul Roberts of the Civil Engineering Department of M.I.T. They will be assisted by other faculty members of the Institute, graduate and undergraduate students of M.I.T., and LDC personnel. The detailed biographies and bibliographies of Professors Moavenzadeh and Roberts are attached to this proposal. Another attachment describes briefly the transportation related activities within the Department of Civil Engineering and the Center for Transportation Studies.

Professor Moavenzadeh has been involved in research on highway transportation in developing countries for the past five years. He has supervised research in this area under sponsorship of the International Bank for Reconstruction and Development, Office for Policy and International Development of the U.S. Department of Transportation, and the AID Technology Adaptation Program. He is currently working with the engineering division of AID to implement his highway cost model for evaluation of road projects submitted to AID by developing countries. This effort will be benefited by findings of the proposed work. He has travelled in both Africa and Latin America and is currently a consultant to the Ministry of Public Works in Venezuela and to the International Bank for Reconstruction and Development.

Professor Roberts is Director of the Center for Transportation Studies and Head of the Transportation Systems Division in the Department of Civil Engineering. He has had extensive experience in research and consulting related to transportation and development. He has been responsible for development of a macroeconomic transport model for Columbia University. He has travelled extensively and is consultant to numerous agencies involved with transportation problems in developing countries.

List of Faculty Participants

Name	Area of Interest
Fred Moavenzadeh Professor of Civil Engineering	Highway Transportation in Developing Countries
Paul O. Roberts Professor of Civil Engineering	Transport Systems Analysis
Marvin Manheim Professor of Civil Engineering	Urban Transportation and Decision-Making Process
Richard Eckaus Professor of Economics	Economics of Development
Wayne Pecknold Assistant Professor of Civil Engineering	Modeling and Network Analysis
Ralph Gakenheimer Associate Professor of Civil Engineering	Mass Transportation

8. Contribution to Institution Building

The project will contribute to institution building in three ways:

-- involvement of M.I.T. graduate and undergraduate students from developing countries in data collection and analysis and participation in project activities:

-- direct collaboration with LDC transportation planning officials concerning construction and use of the evaluation framework for transportation sector analysis; and

-- improved understanding of transportation officials from other developing countries related to utilization of new methods for transport analysis to improve investment decisions in this sector of infrastructure development.

The involvement of these students and officials in these ways will contribute to the performance of the organizations they represent.

9. Utilization Plans

The project will incorporate the training of LDC graduate and undergraduate students and LDC personnel in the use of new methods for transport investment analysis. It will set the stage for regional conferences to broaden understnading of LDC transportation planning and

management officials in utilization of results of the research in assessing national highway construction and maintenance needs and priorities within a national and regional framework.

During the final year of the project, an utilization conference will be conducted in the host country participating in the project, to disseminate results of the research to transportation officials from neighboring countries and to encourage utilization of the results in dovetailing national systems within a regional transportation network. In addition, the handbook for transportation sector analysis developed under this project will be widely distributed to developing countries and national, regional, and international development assistance agencies.

10. Budget Analysis

The budget plan for the project is presented below; items for the second and third year may be modified from experience in the first year:

A. Salaries and Personnel	Man-Months of Effort 1	2	3	Requested Funds 1	2	3
1. Senior Personnel						
a) Principal Investigator F. Moavenzadeh	4	4	4	8,000	8,000	8,000
b) Co-Investigator P.O. Roberts	3	3	3	6,000	6,000	6,000
c) Faculty Participants Equivalent	6	6	6	12,000	12,000	12,000
d) Full-time Research Engineer	12	12	12	15,000	15,000	15,000
2. Other Personnel						
a) Graduate Students	24	24	24	14,000	14,000	14,000
b) Secretary	12	12	12	8,000	8,000	8,000
c) Undergraduate Students	24	24	24	7,000	7,000	7,000
B. Staff Benefits						
18.4% of 1(a), 1(b), 1(c), 1(d), 2(b)				9,016	9,017	9,017
C. Total Salaries, Wages, and Staff Benefits (A & B)				79,016	79,017	79,017

		Requested Funds		
		1	2	3
D.	Expendable Supplies	1,300	1,300	1,300
E.	Travel			
	1. Domestic	1,000	1,000	1,000
	2. Foreign	10,000	4,000	6,000
	3. Allowance @ $35/day	4,200	6,300	7,350
F.	Publication Costs	500	1,000	2,000
G.	Computer Costs	2,500	5,000	3,000
H.	Total Direct Costs (C through G)	98,516	97,617	99,667
I.	Indirect Costs (66.5% of A 1 plus A 2)	46,550	46,550	46,550
	TOTAL	$145,066	$144,167	$146,217

11. Internal and External Reviews

The concept of this transportation research project was first presented and endorsed by a multidisciplinary external advisory panel considering programs for reducing costs of LDC public works at Cornell University in May 1973. Thereafter, a project statement was prepared, endorsed by IBRD, and submitted for RIGC consideration. The proposal was discussed at RIGC meetings October 11, October 18, and November 8, when it was returned to TA/OST for redesign with the assistance of concerned offices of AID/W. Subsequently, two meetings were convened by TA/OST with representatives of these offices and Dr. Moavenzadeh of M.I.T., the proposal was rewritten by Dr. Moavenzadeh, and specific comments from SER/ENGR and AFR were incorporated in the revised proposal for final editing and resubmission to RIGC. The proposal has also been reviewed by Dr. Clell Harral, Director of Transportation Research at the World Bank and Dr. Wilfred Owen of the Brookings Institution. Their comments are attached.

12. Proposing Office General Evaluation

The Office of Science and Technology recommends this project for approval and implementation. In view of the very large investments in LDC transportation infrastructure by development assistance agencies and by the developing countries themselves, continuing efforts to improve the state-of-the-art for LDC and development agency investment decisions in the transportation sector clearly deserve emphasis. As noted by Dr.

Owen, the proposed research "should bring a large marginal return in further practical application of transport decision-making models."

A steering committee will be established to advise TA/OST and help to guide M.I.T. performance. The proposed work will complement and reinforce technical transportation advisory services by M.I.T. to the Pan-African Institute for Development under Africa Bureau auspices and comparison of highway cost model results with feasibility studies for several road construction projects for SER/ENGR. The project will be managed and closely monitored by the Office of Science and Technology, with the assistance of the steering committee. It will be implemented by M.I.T., through the multi-disciplinary Center for Transportation Studies. On the basis of existing technical competence, proven performance in the field of LDC transportation research, and understanding of and interest in development processes, we believe M.I.T. is best qualified to undertake this work.

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