

File 931-0138001001  
 TA/OST  
 REPORT U-445  
 PD-AAH-292

PROJECT APPRAISAL REPORT (PAR)

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1. PROJECT NO 931-11-995-138	2. PAR FOR PERIOD 12/1/71 TO 8/27/75	3. COUNTRY Worldwide	4. PAR SERIAL NO.
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5. PROJECT TITLE:  
 Adaptation of Industrial and Public Works Technology to the Conditions of the Developing Countries

6. PROJECT DURATION: Began FY <u>72</u> Ends FY <u>77</u>	7. DATE LATEST PRO- 6/71	8. DATE LATEST RFP 9/71	9. DATE PRIOR PAR
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$900,000	b. Current FY Estimated Budget: \$	c. Estimated Budget to completion After Current FY: \$
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME Massachusetts Institute of Technology	b. CONTRACT, PASA OR VOL. AG. NO. 211(d) grant csd 3360
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I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION NO.			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
MIT	AID *	HOST		
	X		Take a decision on a 2 year extension to the MIT Grant	4/30/76
X			Prepare a work plan if grant extension is approved.	5/14/76
	X		Process PIO/T if grant extension and work plan are approved.	5/28/76

*Evaluation MIT 211(d) grant. TAB memo 3/29 and termination current grant 12/76. W*

D. REPORTING REQUIREMENTS

REVISED OR NEW:  PROP  RFP  PRO AC  PRO T  PRO C  PRO P

E. DATE OF MISSION REVIEW

8/75

PROJECT MANAGER: TYPE NAME, SIGNED INITIALS AND DATE

Clint Stone

MISSION DIRECTOR: TYPE NAME, SIGNED INITIALS AND DATE

Henry A. Arnold

AA/TA, Mr. Curtis Farrar  
 THRU: TA/PPU, Mr. Carl Fritze  
 TA/OSI, Henry A. Arnold

March 4, 1976

MIT 211(d) Grant

This grant, due to expire in December 1976, has involved one of the world's most renowned technical universities in the problems of development in a substantial manner. Across a broad segment of the University, it has generated sensitivity to and enthusiasm for solving the problems of developing nations as well as a better understanding of the social, economic and political impacts upon the technology transfer process. In the first four years of the grant:

- (a) More than 30 senior faculty members and an equal number of graduate students from the Departments of Civil, Mechanical, Electrical, and Aeronautical Engineering, Architecture, Political Science, Management Science, Economics, Urban Studies and Planning, and Nutrition and Food Science were involved.
- (b) Over 50 papers, theses and reports on development problems were published.
- (c) Forty symposia, workshops and fact-finding missions were carried out.
- (d) 20 courses dealing with technical, economic or social aspects of technology adaptation were instituted or expanded.

Eighteen months ago, MIT re-oriented its 211(d) program in response to new AID policy directives toward collaborative working relationships with LDC institutions and long term involvement in technical assistance projects having direct relevance to AID priorities and mandates. During this period:

- (a) Six collaborative projects were identified and started with Los Andes and other universities in Colombia.
- (b) Intensive discussions with AID/Cairo and the University of Cairo have resulted in a plan for joint MIT/Egyptian identification and solving efforts with the Egyptians -- to be mission funded.

In the 1976-77 year, MIT plans to offer a new, special program leading to a Master of Science in Technology Adaptation. Four schools, seven departments, 75 professors or associate professors and the Energy Laboratory provide a broad interdisciplinary faculty. Subject to availability of funds, this program will be supplemented by research assistantships, graduate fellowships, development of new subjects, visits by foreign scholars, workshops, seminars, conferences and the collecting of pertinent reference materials on technology adaptation.

Collaborative research and problem solving with Colombia will continue. There is strong indication of support from USAID/CAIRO. The attached letters from Quito and Caracas are examples of incipient non-AID support for this program.

If this program can be supported by AID for two more years, it should be well enough established to attract subsequent support elsewhere. If it cannot be supported, there is a strong probability that the project work in Colombia will dwindle to a subcritical level, the educational program will atrophy and the faculty will move to areas of greater financial support despite their interest in development.

The evaluation committee has recommended a 2 - 3 year extension of the 211(d) grant to consolidate the new curriculum and demonstrate cooperative programs in Colombia, Egypt and at least one of the least developed countries.

In accordance with earlier budget decisions, no funding has been included in the FY 76 T.O. or FY 77 budget requests and an extension of this grant has been generally discouraged. Nevertheless, I believe that the objectives of AID and the US will be well served by insuring that this interest and unique capability in a university respected throughout the world is institutionalized. To this end I recommend a two year extension of the 211(d) grant (\$200,000 the first year and \$100,000 the second). Funds budgeted for FY 76 projects but not obligated by mid-June might be used or, alternatively, additional funds might be requested in the T.O. OST would request the second bunch of \$100,000 in the FY 78 budget.

Attachment:

1. R.J. Ballantyne memo of Feb 18, 1976
2. Comprehensive Review of MIT 211(d) Grant with four attachments
3. Ltr of Feb 4, 1976 to Professor Moavenzadeh from Hernan Escudare Martinez
4. Letter of Feb 9, 1976 to Professor Moavenzadeh from Humberto Calderon Berti
5. MIT Brochure on Technology Adaptation Program  
Tom Elliot, PPO w/o attachments  
GA Stone, ST w/o attachments  
Robert Ballantyne, ARA-IA/BR w/o attachments  
Marjorie Belcher, w/attachments

COMPREHENSIVE REVIEW  
MIT 211(d)

The Adaptation of Industrial and Public Works  
Technology to the Conditions of Developing Countries

## Background

The 211(d) grant, Adaptation of Industrial and Public Works Technology to the Conditions of Developing Countries, was awarded to MIT in December, 1971 to "develop a broadly-based body of expertise concerned with the exploitation of technology for public works and industrial development in developing countries, to achieve better understanding of the processes that enable technology to contribute to industrialization in the less developed countries and to concentrate on those areas of broad interest to both MIT and the developing countries ...". Course and curriculum development, workshops and conferences, fellowships and student stipends, library and resource materials, linkages with LDC institutions, travel, research and faculty development were the eight program elements proposed to build the MIT response capability on development problems.

MIT was chosen as grantee on the basis of the Institute's pre-eminence in technological education and research, a history of engagement in the relationship of technology to development and an expressed commitment to long-term involvement in the development process. The number of LDC students, particularly graduate students, attending MIT was known to be high (800 in 1970-71, over 10 percent of the total student body), and the largest number of these seek advanced degrees in the Schools of Engineering or Science.

Research projects were selected by the MIT Steering Committee from individual proposals submitted by faculty members. Grant funded research covered a range of technical topics embraced by the broad title and purpose of the grant and included both "hard" and "soft" research. Course and curriculum development focused initially on the addition of development perspectives to existing courses. These modified courses were taught as part of the regular curriculum. Training and student development was provided in part through student participation in the research projects. Details of these grant activities are contained in the MIT Mid-term Report, August 1975 (Attachment A).

The 46 months between grant award and this comprehensive review encompassed a number of changes pertinent to the evaluation of MIT past performance. AID enunciated policy guidance on aspects of science and technology for the first time in 1973 (PD-51). Management responsibility for all 211(d) grants was transferred within TAB in 1974. This action was preceded by a succession of AID Grant Liaison cum Grant Project Officers assigned to the MIT grant. A one-day review was carried out at MIT by an AID team on November 20, 1974 (Attachment B) at which time the reviewers noted that this grant ante-dated by a considerable margin the 1974 guidelines for 211(d) grants (PD-62 of October 30, 1974) and that "it would not be fair to evaluate MIT's performance against the new guidelines." At the same time, the reviewers recommended that future work under the grant be more narrowly focused in light of PD-62.

A two-day comprehensive review of the MIT grant was held by an AID panel (Attachment C) on the MIT campus August 26-27, 1975. This report presents the findings, issues and recommendations reached by the AID panel.

## Findings

The August 1975 panel determined, during the review that:

(1) MIT had initially pursued course development and research activities through the use of seed monies. A significant portion of the grant expenditures in the first three years were in support of 38 individual projects (Attachment A, pp 30-50) covering a range of topics. These projects, selected by an MIT Steering Committee from proposals submitted by faculty members, established a new level of interest in development problems on the part of faculty members and of the graduate students working on the projects.

(2) The diversity of projects carried out under the grant in its initial stages did not result in a coherent effort with strong ties to LDC institutions and LDC problems (Attachment B). In some cases the level of project funding was inadequate for the project goals.

(3) The extent to which MIT had incorporated material relating to underdeveloped countries into its existing curriculum was quantitatively and qualitatively significant (Attachment A, pp 71-82). A new, interdisciplinary course specifically directed to development issues is now taught once a year. Transfer and Adaptation of Technology in Developing Countries (Course 1.183J) includes economic, engineering and political science inputs from three professors teaching concurrently. The initial offering in 1975 was well received.

(4) As a result of the recommendations made by the earlier AID review panel mentioned above, activities under the project had been considerably narrowed during the ensuing months and serious effort had been made to relate the work at MIT with counterpart institutions in several of the more advanced LDCs. MIT had appointed a new administrator of the grant, reconstituted the MIT Steering Committee and attached the grant program to the Office of the Provost. These management changes were calculated to strengthen the utilization of developed skills, improve internal review and increase grant visibility within MIT.

(5) The MIT faculty and students have certain characteristics that affect the design of 211(d) activities at MIT and the ultimate utilization of the capabilities developed. At MIT, more than some other universities, the development of courses and research programs are at the initiative of individual professors, not departments or schools. Many students from LDCs come to MIT by preference and on their own or government financing. Thus the influence of LDC adaptation elements in courses and research is far more pervasive than can be seen from any analysis of AID-financed participants or MIT country involvement. The grant design should provide adequate incentives for innovative faculty members to enter the development field and impinge on a significant portion of the available cadre of LDC students.

(6) MIT has changed the emphasis of the grant activities as a result of the 1974 review and in the light of AID objectives expressed in PD-62. Focus has been placed on an interdisciplinary systems approach to analytical and tradeoff methodologies which should underlie the selection and adaptation of technology in developing countries. These skills are especially applicable to the decision making process for major developmental and public works projects which in one way or another affect the rural poor.

(7) Efforts have been made to develop cooperative research programs with LDC institutions. Topics have been selected in the context of item (6) above which have high national priority. In Colombia, MIT working with the relevant ministries, COLCIENCAS and the University Los Andes has identified 8 projects 4 of which have been initiated (see Attachment D). The GOC is providing funding for the local participants. Preliminary discussions indicate that a similar cooperative effort may also be possible in Egypt.

(8) The MIT grant administrator together with his faculty colleagues has defined a broad based plan for more firmly establishing a permanent activity at the Institute. Briefly stated, the plan includes; increased student participation through stipends to 10-20 graduate students, creation of an M.S. degree in development\*, extension of the cooperative research efforts to one or two additional LDCs, and the addition of visiting (LDC) faculty, workshops and seminars. This could entail annual expenditures of \$500,000 to \$800,000.

(9) Coordination with other AID-supported activities in the same and allied fields had been carried out on a very informal basis and the dissemination of information on grant activities and results to broad segments of AID as well as to the international community had been lacking.

### Issues

(1) Technology transfer takes place at a variety of levels and through a number of channels. In its dealing with counterpart institutions in foreign countries it is axiomatic that MIT will be working with the more sophisticated elements of those countries. While MIT has concentrated on countries that may be approaching "graduate" status as concessional assistance recipients and which have a proportionately higher number of sophisticated counterparts, such elements can and do exist in the universities of many other LDCs. The issue is whether the MIT skills need be tested in a less developed country to demonstrate to this class of nations the value of the MIT resource.

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\* Subsequent to the comprehensive review the degree was approved by the MIT Curriculum Committee and appears in the 1976-77 catalogue.

(2) The scope of the program envisioned by MIT to fully establish "development" as an integral and recognized educational function, both teaching and research, at MIT would require support exceeding AID capabilities under any circumstance. Should AID actively support MIT efforts to obtain non-AID funds with which to build upon the base of activity provided in the past by the 211(d) grant?

(3) MIT has made a concerted effort to develop interactive programs with LDC institutions. In so doing they have closely approached the utilization mode by working with government agencies to select problems with recognized priority. Study results are likely to have measurable impact. Remaining funds in the existing grant permit this approach to be carried out in one country, Colombia. Projects initiated in Colombia had not progressed to the point of evaluation at the time of this review. The issue is whether a later evaluation could provide sufficiently important additional information to warrant a time extension with an explicit determination on continuation at a later date.

(4) This grant serves as a focus of activity within a world-renowned technical center around which diverse members of MIT's highly innovative faculty can draw together. By MIT standards the grant is small, but nonetheless faculty interest has been deep, if narrow, and is spreading within MIT. AID continues to need external resources to assist in carrying out its mandate. In view of the effort being expended at MIT, variously noted above, to be responsive to AID concerns, an issue is the range of possible influences of a negative recommendation on a grant extension.

### Recommendations

The Review Team recommends that:

(1) TA/OST should provide MIT with a listing of AID-supported activities relevant to the span of grant activities and ensure that contact and coordination ensue.

(2) MIT be encouraged to develop a brief but descriptive overview of the grant suitable for wide distribution. Effective dissemination of an overview and of project reports requires a targeted audience. TA/OST should provide tailored mailing lists to MIT with a view to uncovering possible latent demand for the competence being created by 211(d) support.

(3) AID approve a two to three year extension or follow-on grant which recognizes the limited availability of AID resources and which has two main objectives:

- (a) A clear demonstration of the utilization of the MIT competence and approach through cooperative programs in one or two countries in addition to Colombia. The desirability of operating in a less developed country should be considered; and

(b) The consolidation of the curriculum and student development activities in an organized plan to achieve permanent status for development education at MIT. The project design should include indicators and evaluation plans to measure the success in reaching these objectives.

(4) MIT and USAID/Cairo be encouraged to explore fully with the Egyptians the possibilities for a utilization project based upon the grant but conducted and supported outside an extension if one is forthcoming. This would provide additional and separate verification of the utility and validity of the MIT skills.

(5) AID should, to a reasonable extent, assist and support MIT efforts to obtain resources from other donors to enable MIT to pursue their larger plans for activities in the development area.