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**PROJECT PERFORMANCE ASSESSMENT REPORT**

**INDONESIA**

**INDUSTRIAL TECHNOLOGY DEVELOPMENT PROJECT  
(LOAN NO. 3972)**

**July 5, 2005**

*Sector, Thematic and Global Evaluation  
Operations Evaluation Department*

## Currency Equivalents (annual averages)

Currency Unit = Indonesian Rupiah (Rp)

1994	US\$1.00	2,161	2000	US\$1.00	8,422
1995	US\$1.00	2,249	2001	US\$1.00	10,261
1996	US\$1.00	2,342	2002	US\$1.00	9,311
1997	US\$1.00	2,909	2003	US\$1.00	8,577
1998	US\$1.00	10,014	2004	US\$1.00	8,939
1999	US\$1.00	7,855			

## Abbreviations and Acronyms

AFNOR	Association Française de Normalisation
BISM	Semarang Industrial R&D Institute
BMI-USA	Business Management International
BPPT	Agency for the Assessment and Application of Technology
CSIRO	Commonwealth Scientific and Industrial Research Organization
DAPATI	Technology Services Matching Grant Scheme (Dana Kemitraan Peningkatan Teknologi Industri)
FDI	Foreign direct investment
GDP	Gross domestic product
ICR	Implementation Completion Report
IEC	International Electrotechnical Commission
IRDCI	Institute of Chemical Industry
ISO	International Standards Organization
IT	Information technology
ITDP	Industrial Technology Development Project
KAN	National Accreditation Committee of Indonesia
KIM	National Metrology Center
KIST	Korea Institute of Science and Technology
LIPI	Indonesian Institute of Sciences
MOIT	Ministry of Industry and Trade
MST	Ministry of Science and Technology
MSTQ	Metrology, Standards, Testing and Quality
NATA	National Association of Testing Authorities
NCL	National Chemical Laboratory
OED	Operations Evaluation Department
PAU	Policy Advisory Unit
PMIU	Project Management and Implementation Unit
PPAR	Project Performance Assessment Report
PUSTAN	Center for Industrial Standards
R&D	Research and development
RDCAC	Research and Development Center for Applied Chemistry
SERP	Research Planning System
SMEs	Small and medium-scale enterprises
STMP	Science and Technology Management Policy
TBDO	Technology Business Development Office
TNO	Netherlands Organization for Applied Scientific Research (Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek)

## Fiscal Year

Government:	April 1 – March 31
	July 1 – June 30

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**OED Mission: Enhancing development effectiveness through excellence and independence in evaluation.**

### **About this Report**

The Operations Evaluation Department assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, OED annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by OED. To prepare PPARs, OED staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader OED studies.

Each PPAR is subject to a peer review process and OED management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

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**Relevance of Objectives:** The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). *Possible ratings:* High, Substantial, Modest, Negligible.

**Efficacy:** The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. *Possible ratings:* High, Substantial, Modest, Negligible.

**Efficiency:** The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. *Possible ratings:* High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

**Sustainability:** The resilience to risk of net benefits flows over time. *Possible ratings:* Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

**Institutional Development Impact:** The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. *Possible ratings:* High, Substantial, Modest, Negligible.

**Outcome:** The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. *Possible ratings:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

**Bank Performance:** The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

**Borrower Performance:** The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.



## Contents

<b>Principal Ratings.....</b>	<b>v</b>
<b>Key Staff Responsible .....</b>	<b>v</b>
<b>Preface.....</b>	<b>vii</b>
<b>Summary.....</b>	<b>ix</b>
<b>1. Background .....</b>	<b>1</b>
<b>2. Objectives and Design.....</b>	<b>2</b>
<i>Objectives.....</i>	<i>2</i>
<i>Components.....</i>	<i>2</i>
<i>Implementation Arrangements.....</i>	<i>4</i>
<i>Quality at Entry.....</i>	<i>4</i>
<i>Monitoring and Evaluation.....</i>	<i>6</i>
<b>3. Implementation Experience .....</b>	<b>7</b>
<b>4. Achievement of Outputs and Outcomes .....</b>	<b>9</b>
<i>MSTQ Services.....</i>	<i>9</i>
<i>SME Access to Technology Services.....</i>	<i>9</i>
<i>R&amp;D Institutions .....</i>	<i>11</i>
<i>Industrial Technology Policy.....</i>	<i>13</i>
<b>5. Ratings .....</b>	<b>13</b>
<i>Outcome .....</i>	<i>13</i>
<i>Sustainability.....</i>	<i>14</i>
<i>Institutional Development Impact.....</i>	<i>15</i>
<i>Bank Performance .....</i>	<i>15</i>
<i>Borrower Performance .....</i>	<i>16</i>
<b>6. Lessons Learned.....</b>	<b>16</b>
<b>Annex A. Key Performance Indicators.....</b>	<b>19</b>
<b>Annex B. Basic Data Sheet .....</b>	<b>23</b>

<p>This evaluation is based on a March 2005 mission by Tyler Biggs (consultant), who prepared the report; the task manager was Kris Hallberg. The report was edited by William Hurlbut, and Rose Gachina provided administrative support.</p>
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## Principal Ratings

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Satisfactory	Moderately Satisfactory	Moderately Satisfactory
Sustainability	Likely	Likely	Unlikely
Institutional Development Impact	Modest	Modest	Modest
Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

\* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate Operations Evaluation Department (OED) product that seeks to independently verify the findings of the ICR.

## Key Staff Responsible

<i>Project</i>	<i>Task Manager/Leader</i>	<i>Division Chief/ Sector Director</i>	<i>Country Director</i>
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## **Preface**

The Industrial Technology Development Project (ITDP, Loan 3972-IND) in the amount of US\$47.0 million was approved on December 21, 1995, and made effective on March 18, 1996. Because of the Asian financial crisis, the Government of Indonesia launched a series of debt portfolio restructurings which affected all IBRD loans. As a result, the loan was reduced to US\$38.5 million after partial cancellation. At the time the project closed on December 31, 2001, the loan had disbursed US\$32.63 million, 84.7 percent of the reduced loan amount.

This evaluation is based on reviews of the Implementation Completion Report, the Staff Appraisal Report, legal documents, project files, discussions with Bank staff involved with the project, and interviews with relevant stakeholders in Indonesia (government officials, public R&D institutes, representatives of the private sector, and project beneficiaries).

An OED mission to Indonesia to carry out an evaluation of ITDP took place March 15-30, 2005, several years after the project has closed, to provide input to OED's upcoming review of the Bank's support for small-and-medium-scale enterprises. It was expected the evaluation would impart valuable lessons for governments and donors in developing technology support institutions and policies and in promoting innovative business development services for small enterprises.

As part of the data-gathering exercise in Indonesia, a brief telephone survey was conducted of a sample of recipients of the ITDP matching grants scheme to assess the impact of this component of the project. Extensive interviews were also conducted with managers of public R&D institutes and other Government agencies involved in ITDP. In addition, detailed discussions were held with representatives of the private sector that were targeted as the primary beneficiaries of the project, including local consulting firms that provided services to the matching grants scheme. The mission appreciates the courtesies and support given by the R&D institutes and Government agencies in this evaluation. Following standard procedures, copies of the draft PPAR was sent to relevant government officials for their review and comments. No comments were received.



## Summary

The Industrial Technology Development Project (ITDP), supported by an IBRD loan of \$38.5 million, was approved on December 21, 1995, and closed on December 31, 2001. The overarching objective of the project was to enhance the competitiveness of Indonesian industry, especially small- and medium-scale enterprises (SMEs). Specific project objectives were to (a) provide public and private technology services, in particular through an improved system of industrial metrology, standards, testing, and quality (MSTQ); (b) facilitate the access to public and private technology service providers, particularly by SMEs, through a matching grants program; (c) strengthen public technology support institutions, in particular by increasing the self-financing of public research and development (R&D) institutions; and (d) improve the formulation and coordination of industrial technology policies.

While the objectives of ITDP were *substantially relevant*, several design problems reduced the project's ability to realize these objectives. First, the Government's plan to increase the commercialization of public R&D institutions was hampered by budgetary restrictions placed on these institutions. Second, it was a mistake to tack on support for SMEs to the work of these general-purpose R&D institutions, whose principal clientele is larger, more sophisticated firms. Third, the design of the project's matching grants program was not in accord with the basic principles required for successful implementation of such public subsidy schemes, and therefore had little chance of realizing the objective of raising technology transfer investment to more economically optimum levels.

The output collapse caused by the Asian financial crisis in 1998 led to a restructuring of the overall Bank portfolio in Indonesia. Despite the crisis, activities under the MSTQ, R&D management, and institutional strengthening objectives of the project were implemented as planned. Implementation problems did arise under the matching grants component, as firms were struggling to survive in the crisis, which often meant less attention to and fewer resources for technological upgrading. The matching-grants scheme also had implementation problems caused by inadequate supervision of the scheme.

Outcomes varied across objectives, but taken as a whole, the overall **Outcome** of the project was **Moderately Satisfactory**.

- The objective of improving Indonesia's system of industrial MSTQ was *substantially* achieved. Project performance indicators show that the number of calibration labs at the Institute of National Metrology accredited doubled and the percent of calibration labs showing acceptable inter-comparison tests increased substantially. The Center for Industrial Standards also managed to get four of five labs internationally recognized and into conformance with ISO requirements. However, only 27 out of the targeted 40 SMEs slated for ISO 9000 certification under the Center's subcomponent for quality systems improvement were certified.
- The achievement of the objective of facilitating SME access to technology services was *negligible* due to problems with the design and implementation of the matching grants scheme. The scheme failed to generate the requisite economic benefits, including indirect market-development benefits. It would appear that this public subsidy scheme did not create enough economic benefits to justify its public costs.

- The achievement of the R&D management objective was *modest*. Self-financing ratios of supported R&D institutions show increases in two institutions and substantial declines in two others. Failure to realize projected levels of self-financing can be attributed in large part to government legal restrictions on budgets of the R&D institutions, which reduced incentives to do business with the private sector.
- The objective of improving industrial and technology policy formulation was only *modestly* achieved. The Master Plan and studies that ITDP supported were completed, but limited capacity was left behind to carry on this work in the future.

The **Institutional Development Impact** of the project was **Modest**. Supported R&D institutions did gain from their relationships with various twinning partners in terms of leadership development, improving IT management and communication systems, and strengthening research planning during the years of the project. MSTQ institutes also upgraded their labs.

**Sustainability** of project benefits is **Unlikely**. The IT management systems supported by the project are not being maintained; in some cases, scientific equipment procured under the project cannot be repaired or replaced for lack of resources. The laboratories that were supposed to become internationally accredited have not continued their international accreditation program. And innovative research planning practices set up under ITDP have been continued in very few institutions. Similarly, outreach centers under the MSTQ objective are no longer being adequately funded and extension agents to run these centers are not being trained. Finally, the outcome of support to the Ministry of Industry and Trade to strengthen its Policy Advisory Unit was also short-lived because the unit was disbanded.

**Bank Performance** was **Satisfactory**. The main deficiencies – shortcomings in supervision, especially for the matching grant scheme – were not severe enough to warrant a lower rating. **Borrower Performance** was also **Satisfactory**. The only area where the government failed to perform effectively was in setting a good policy environment for project outcomes.

Project experience offers the following lessons:

- Industrial technology development projects aimed at commercializing public R&D institutions should be undertaken only in environments where the budgets of these institutions are not restricted by Government regulations.
- It is a mistake to add support for SMEs to the mandate of general R&D institutions whose principal clients are larger, more sophisticated enterprises.
- Matching grant schemes should be designed to maximize returns to public resources invested in them, under the same principle that applies to any public investment.
- Projects to develop public R&D institutions should pay closer attention to recurrent costs, as the benefits quickly diminish if the Government cannot meet future maintenance and repair costs.

Ajay Chhibber  
Acting Director-General  
Operations Evaluation

## 1. Background

1.1 By 1996, Indonesia had experienced 25 years of rapid economic growth and a fifteen-fold jump in per capita income, placing it in the ranks of middle-income countries. The manufacturing sector had been a leading contributor to this extraordinary rise in GDP along with the country's oil exports. Stimulated by a series of "deregulation packages," introduced to dismantle restrictions put in place during the previous period of import substitution, a significant expansion in manufacturing investment and rapid growth in non-oil exports occurred in the late 1980s and early 1990s, which helped to diversify the economy away from a heavy dependence on oil. An important element of this investment boom was a large increase in foreign direct investment (FDI) from the East Asian newly-industrializing countries. FDI rose from almost nothing in 1983 to about \$40 billion in investment approvals by 1996, bringing with it a large increase in technology transfer from more advanced countries. The structure of manufacturing shifted from being inward-oriented and capital intensive to being export-oriented and labor intensive. Manufactured exports grew 30 percent annually over the period, unemployment fell substantially, and poverty declined.

1.2 Despite this impressive performance, significant problems remained in the manufacturing sector that jeopardized future growth prospects. Manufactured exports remained concentrated at the low end of the market, industry structure continued to be immature, and average productivity was low. Substantial progress had been made in acquiring technological capabilities in public sector "strategic industries" such as aircraft manufacturing, shipbuilding, electronics, telecommunications equipment, and steel, but the science and technology spending that went to these strategic industries had little impact on the technological development and competitiveness of the country's main export sectors. Thus, the main challenges facing the country were to further diversify manufactured exports into more skill-intensive product areas and to raise enterprise productivity through management improvements and technology upgrading.

1.3 International markets were increasingly requiring firms to compete on more than just low labor cost advantages. Product development capabilities, fast delivery, and total quality – including the ability to meet customers' rigorous quality standards and obtain ISO 9000 certification – were becoming important determinants of competitive advantage. The experience of the newly industrializing Asian countries showed that effective, government-supported systems of metrology, standards, testing and quality control (MSTQ), technology extension services, and applied research and development (R&D) were key to enhancing industrial competitiveness.

1.4 There was a need to reorient the work of Indonesia's public technology institutions to better support the private sector in upgrading its technological capability to improve competitiveness and to make a faster transition into more skill-intensive exports. The major priorities were to focus the public R&D institutions more on transferring and diffusing best-practice technologies required by industry, strengthen MSTQ services, and improve the coordination of technology and industrial development policies and programs.

## 2. Objectives and Design

### OBJECTIVES

2.1 The overarching objective of the ITDP was to enhance the competitiveness of Indonesian industry, especially small- and medium-scale enterprises (SMEs). Specific project objectives were to (a) provide public and private technology services, in particular through the system of industrial metrology, standards, testing, and quality (MSTQ); (b) facilitate the access to public and private technology service providers, particularly by SMEs, through a matching grants program; (c) strengthen public technology support institutions, in particular by increasing the self-financing of public research and development (R&D) institutions; and (d) improve the formulation and coordination of industrial technology policies.

2.2 Project objectives were of *substantial relevance* to Indonesia's development priorities. As noted above, firms had a real need to improve productivity to compete at home and abroad. The private sector was poised to significantly increase capital accumulation, following the reforms in trade and investment policies of the 1980s and early 1990s. Finally, Indonesia had a public R&D infrastructure that needed reform. To make an effective contribution to increased industrial productivity, public R&D institutions needed to become more private sector oriented and demand driven. These development needs were recognized in the Bank's 1995 Country Assistance Strategy, which highlighted the goal of productivity improvement, and emphasized more private provision of supporting infrastructure and technical services to assist in this process.

### COMPONENTS

2.3 The ITDP had four main components, corresponding to the four objectives of the project:

- **Improving MSTQ** (appraisal estimate \$4.4 million, revised estimate \$3.07 million, actual cost \$3.07 million).
  - Technical assistance to the National Metrology Center (MST-KIM) in the form of a twinning arrangement with Australia's primary metrology center (CSIRO) to build its management and institutional capacity, as well as laboratory equipment to upgrade the technical proficiency of its calibration laboratories under the National Calibration System (JKN).
  - Technical assistance to the Center for Industrial Standards (MST-PUSTAN) to hold quality-awareness seminars for SMEs, develop outreach centers in eight regions of the country, train staff in Ministry of Industry and Trade (MOIT) R&D institutes as MSTQ extension agents, and develop a cooperative program with the Indonesian Chamber of Commerce (KADIN) to conduct programs in quality awareness (including ISO 9000 certification).

- Technical assistance to PUSTAN from an internationally accredited laboratory to improve the performance of five MOIT standards-testing laboratories by upgrading their management capability and their ability to conduct inter-comparison testing, with the objective of gaining international recognition and accreditation.
- **Facilitating SME access to technology services** (appraisal estimate \$8.4 million, revised estimate \$5.04 million, actual cost \$1.34 million). ITDP provided funds to establish a matching-grants scheme to subsidize the purchase of new technology by SMEs and increase their awareness of buying technology consulting services from the market. The scheme was originally designed to provide grants to 600 SMEs.
- **Improving R&D management and increasing self-financing of R&D institutions** (appraisal estimate \$29.9 million, revised estimate \$26.26 million, actual cost \$26.60 million). This component provided technical assistance to:
  - the Agency for the Assessment and Application of Technology (BPPT), the Indonesian Institute of Sciences (LIPI), and MOIT to increase the commercialization of Indonesia's R&D institutions (i.e., external earnings in the form of research contracts and science and technology services) and to upgrade the quality of their services to SMEs.
  - LIPI and BPPT through twinning arrangements with internationally reputed contract research institutions (CSIRO-Australia, KIST-Korea, BMI-USA, NCL-India, AFNOR-France, and TNO-Netherlands). The objective was to improve research planning, priority setting, and business management systems by computerizing human resource management, financial management, and project management.
  - Selected R&D laboratories, including LIPI's Research and Development Center for Applied Chemistry (RDCAC), and MOIT's R&D Institute of the Chemical Industry (IRDCI) and the Semarang Industrial R&D Institute (BISM). These laboratories were to be restructured to improve their delivery of services to SMEs.
- **Improving industrial technology policies** (appraisal estimate \$4.40 million, revised estimate \$4.09 million, actual cost \$4.09 million). This component provided technical assistance to:
  - the MOIT Science and Technology Management and Policy Unit, and the Agency for Industrial Research and Development.
  - the Science and Technology Policy Unit of BPPT to improve industrial and technology formulation and monitor the impact of technology programs.
  - the Policy Advisory Unit of the Agency for Industrial R&D (BPPIP) to design collaborative programs with the private sector for strengthening industrial

competitiveness, and to prepare the next phase of the Government's deregulation program.

2.4 The output collapse caused by the Asian financial crisis in 1998 caused the Bank to restructure the overall loan portfolio in Indonesia. For the ITDP, this resulted in three restructurings, with a cumulative cancellation of \$8.5 million. Scaling down the loan, however, left the objectives and components in place, as the cuts were made across the board.

### **IMPLEMENTATION ARRANGEMENTS**

2.5 The agencies responsible for implementing the project -- BPPT, LIPI, and MOIT - each established a Project Management and Implementation Unit (PMIU). A Central PMIU was also established to ensure coordination and collaboration among the project components. This Central PMIU reported to a Steering Committee of representatives of each of the implementing agencies and the private sector and was chaired by the Indonesian Planning Commission (BAPPENAS). The National Metrology Center (managed by LIPI) and the Center of Industrial Standards (managed by MOIT) were responsible for implementing the MSTQ component. MOIT was responsible for implementing the matching grant scheme. MOIT, BPPT, and LIPI were in charge of implementing the activities involved in strengthening public R&D institutions. And MOIT and BPPT were responsible for the activities to improve industrial technology policies.

### **QUALITY AT ENTRY**

2.6 While the objectives of the project were substantially relevant, there were several problems that reduced the project's ability to achieve these objectives, and achieve them efficiently. First, a central objective of the ITDP was to commercialize Indonesia's public R&D institutions by increasing self-financing through private research contracts and sales of technology services to the private sector. To accomplish this, the Government planned to (i) give the public R&D institutes the necessary incentives to become more demand driven and commercially oriented, and establish self-financing targets; (ii) reduce government controls to encourage R&D institutions to be more agile in responding to the private sector; (iii) encourage the management of R&D institutions to become more results oriented; and (iv) encourage more competition among public and private technology providers.

2.7 Unfortunately, any chance of increasing self-financing was hampered by the budgetary restrictions the Government placed on these institutions, reducing their incentive to seek private funding. As far back as the Dutch colonial period, the Government had restricted the activities and budgets of public agencies, limiting their ability to interact with the private sector. A special exemption, known as *Swadana*, was granted to some research institutes and universities to exempt them from complying with these official budgetary restrictions. At the inception of the project, public R&D institutes operated under Government Decree 27, which allowed them to work directly with the private sector, but, unlike public R&D institutions in any other part of the world, they



were required to (i) deposit all funds obtained from private activities with the Ministry of Finance, (ii) anticipate and plan for these earnings a year in advance, (iii) define in advance their budget needs under which these earnings could be spent, and (iv) seek prior permission to make any changes in these plans. The Ministry of Finance had the right to reduce any self-financing plans and targets of R&D institutes, and there were some cases when it did.

2.8 The Government's budgetary restrictions were known to the Bank when the loan was appraised. In fact, according to knowledgeable sources interviewed in Indonesia, the Bank delayed the loan for many months during which discussions ensued trying to persuade the Government to change these restrictions.<sup>1</sup> The Bank also sponsored a 2002 International Workshop on Science and Technology (after ITDP was closed) to raise the awareness of high government officials on the importance of *Swadana* for the public R&D institutions by showcasing successful international experience in this area. It is not clear why the workshop was not held before the ITDP to raise official awareness about the importance of *Swadana*. It is also not clear why ITDP went ahead in the presence of these budget restrictions or why the Bank did not make the loan conditional on changing them. Many people in Indonesia interviewed for this PPAR asked these questions. As one official put it, "Why didn't the Bank use its leverage when the ITDP loan was being made to change these budgetary restrictions? Removing these restrictions would have made a real difference."

2.9 A second issue was the inconsistency between the target population of the ITDP - SMEs -- and the usual clientele of public R&D institutes. The presumption behind the ITDP was that SME access to technology services could be enhanced by re-orienting the public R&D institutes towards serving their interests and by providing subsidies (via the matching grant scheme) for SMEs to purchase these services. However, studies of public R&D institutions around the world (mostly done by the Bank and available at the time the ITDP was designed<sup>2</sup>) emphasize that it is a mistake to append support for SMEs to the work of these general R&D institutions, whose principal clientele is larger, more sophisticated firms. Most SMEs have different needs and lack the technical personnel to communicate effectively with sophisticated technical staff of public R&D institutions. Specialized institutions that focus on SMEs are needed, which have dedicated services that expose these small companies to the benefits of change and give advice to solve business problems. It was unanimous among the staff of public R&D institutions interviewed for this evaluation that most SMEs had limited demand for their services, with the exception of some testing and training.

2.10 Finally, the matching grant scheme in the ITDP had several design defects. The objective of this component was to increase technology transfer investments made by

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1. In the end, the restrictions were not changed and remain to this day. In 2001, a new law was passed giving more financial flexibility to R&D institutions, but the Ministry of Finance has refused to officially recognize the new law and implement it.

2. See for example Goldman, M. "Institutions and Policies for Technology Development," World Bank 1995, and Goldman, M and Ergas, H "Technology Institutions and Policies: Their Role in Developing Technological Capability in Industry," World Bank 1996.

SMEs to more economically optimum levels.<sup>3</sup> In a technology subsidy scheme like the ITDP matching grants program, successful implementation, as in any public investment program, crucially depends on the ability to select projects that give the biggest economic (social) return for the public dollar. To do this requires selecting projects with large economic (social) returns to the country, and funding only those projects that would not otherwise find private funding.

2.11 The criteria for selecting grant recipients did not explicitly set out these necessary and sufficient conditions for successful implementation. There was no mention of the importance of not crowding out private sector funding, and no mention of the importance of establishing a clear distinction between the private benefits to firms and the broader economic benefits to society. The only explicit criteria for grant approval, apart from certain size, sector, and ownership requirements, were that grants be “demand driven” and selected on a first-come-first-served basis. There were different levels of subsidy for firms in particular locations and for innovative projects, which might have increased the economic impact, but the demand-driven, first-come-first-served instruction diminished these possibilities substantially.

2.12 It is the job of the designers and managers of publicly-funded subsidy schemes, such as ITDP, to develop and apply eligibility criteria that make it possible to elicit the “right” projects from firms and then to select from among these projects the ones with the highest potential social benefits to society. Moreover, just as funding the “right” projects is important for getting the biggest return for the public dollar, so also is funding the “right” firms. At a minimum, firms must have a modicum of planning, technical, and financial capability to use public subsidies productively. There is no mention of this issue in the ITDP matching grants scheme.

## **MONITORING AND EVALUATION**

2.13 Several types of performance indicators were identified in the beginning of ITDP to monitor implementation progress and to evaluate project outcomes, and these indicators were tracked in each year of the project (Annex A). The most important reported performance figures were checked and confirmed in interviews in Indonesia during the PPAR mission. For the MSTQ component of the loan, indicators were set up to measure changes in the quality of MSTQ institutes under the Institute of National Metrology (KIM-LIPI), as well as changes in the quality of their services. The Center for Industrial Standard’s (PUSTAN) implementation progress under the MSTQ component was also tracked by measuring indicators such as the number of firms receiving ISO certification and the number of extension agents trained for the Outreach Centers. In the

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3. The market often fails to support the socially optimum level of technology transfer investment in developing countries as there are market imperfections that cause private firms to under-invest in these activities. As with most public goods, a significant portion of the benefit of technology transfer cannot be captured or “appropriated” by the firm engaged in the initial transfer activity. The benefits of one firm’s technology transfer investment “spill over” to others that, without investing in the new technology, nevertheless learn about its results. Because of such “spillovers,” the economic (social) benefits of technology transfer are greater than the returns to an individual firm that undertakes them. In this case a subsidy (for example, in the form of a matching grant scheme) is required to bring technology transfer up to more economically optimum levels.

case of the public R&D institutes, indicators measured changes in self-financing ratios and various components of these ratios. And finally, for the matching grants scheme, indicators tracked the number of grants disbursed.

2.14 In general, the project's performance indicators were useful in evaluating important aspects of implementation progress and project outcomes. The exception is the information provided for the matching grants scheme. The number of grants disbursed reveals something about whether internal project implementation targets were met, but provides no information about outcomes. The contractor's final report on the scheme provides detailed data on the types of grants disbursed and characteristics of the firms that received them. It also contains limited information on the firm's self-assessment of the impact of the grant. However, there were no follow-up studies of the matching grant scheme's impact. In any case, unless there had been directives to pay heed to additionality and economic benefits in making grants, the studies would not have focused on assessing these outcomes.

### **3. Implementation Experience**

3.1 The Asian financial crisis in 1998 created significant problems for implementation across all components of the project. As noted earlier, the project was restructured, with some project activities cancelled or scaled back. Delays in implementation also ensued on account of the crisis, as there was a period of inactivity in the country that slowed progress in some activities. And the sharp devaluation of the *rupiah* in the wake of the crisis also adversely affected the cost of some activities, causing budget shortfalls and delays in implementing agencies.

3.2 The crisis played a part in hindering the implementation of the matching grant scheme. Firms faced a large decline in aggregate demand and a significant depreciation of the *rupiah* in 1998 as the scheme got underway. In many cases, SMEs found it difficult to come up with the resources to finance their share of the matching grant and/or to fund the investments necessary to complement the work of the technical consultant funded by the scheme.

3.3 A lack of understanding on the part of implementing agencies of the Bank's procurement guidelines, as well as the procurement plan for the project, also hindered implementation of the project. Many unnecessary steps were taken and there were delays in procurement resulting from weak procurement skills. There was confusion over differences in the National Procurement Law (Keppres 16/1994) with the procurement arrangements in the Loan Agreement and the Bank's Procurement Guidelines. Following the Indonesian National Procurement Law, procurement was often conducted under national shopping and national competitive bidding, without prior consultation with the Bank.

3.4 There were delays in implementation of the matching grant scheme. The management contractor was not hired until September 1997, more than a year after the loan became effective. In April 1998, the first five grant proposals were submitted for

approval to the scheme's Steering Committee and to the Bank, together with the contractor's assessments of the proposals. Interviews in Indonesia with Government, Bank staff, and people involved in managing the matching grant scheme indicate that it took the Bank eleven months to approve these five initial grant proposals.<sup>4</sup> It was not until February 1999, that the first technology project could start – almost a year after the scheme was officially launched. By this time, one of the firms that had requested these grants had withdrawn its application. In addition, half of the other grant applications that had gone through the contractors' vetting process during the eleven-month delay were withdrawn by frustrated SMEs. The long delay in getting these approvals had badly hurt the image of the scheme.

3.5 Interviews in Indonesia revealed that the managers of the scheme had difficulties during implementation with the target group of firms selected for the program. Smaller enterprises did not have the resources (or in some cases the desire) to pay their share of the cost-sharing grant for a technical consultant. More generally, these enterprises had much less technical and financial capability to acquire new technology and to work with an expert technical consultant. The Bank's new eligibility requirements of March 1999, which specified three years of audited financial accounts or tax returns, made it even more difficult to work with these enterprises, as many small firms did not have audited accounts or tax returns. In October 1999, the management contractor requested that the firm-size ceiling for grant eligibility be raised to Rps 15 billion in annual sales (about \$1.5 million at the current exchange rate). According the management contractor, opening up the scheme to these higher-end, medium-sized firms not only increased the number and quality of project applications, but also helped to increase the success rate of grant completion.

3.6 Disbursement problems also complicated implementation. The management contractor could not establish its own disbursement system for paying grants. Disbursement had to follow Government rules and payment processing had to go through a government organization. The Government changed this organization three different times during the project (from the Treasury Office to the Directorate of Budget and back to the Treasury Office) and each time there were major delays in getting grants paid. Many documents had to be filed in each case to get payment, which took service providers and scheme administrative time, and processing and payment took, on average, five to six weeks. There were also disputes about whether taxes should be paid on World Bank grants, which caused more delays. The Bank could have avoided such problems by working out arrangements with Government before the program began, for example with an arrangement for the MOIT project manager or the management contractor to have a special account in the Central Bank and the authority to disburse grant payments.

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4. The management contractor and the steering Committee of the scheme wrote several letters to the Bank and got no answer. The management contractor even sent the Director of the firm to the Bank's headquarters in Washington to see what the problem was, and was told that approvals for the five grant proposals would be forthcoming.

## 4. Achievement of Outputs and Outcomes

### MSTQ SERVICES

4.1 **Outputs.** All activities under ITDP'S objective of improving MSTQ services were completed as planned. Technical assistance, via a twinning arrangement with CSIRO, Australia's primary metrology center, was provided to the National Metrology Center (KIM) to develop its management and institutional capacity, and new laboratory equipment was procured to upgrade the technical proficiency of its calibration laboratories under the National Calibration System (JKN). Interviews with Indonesian Institute of Sciences (LIPI) officials, the parent institution of KIM, and project monitoring data indicate that the twinning arrangement and the new lab equipment succeeded in raising the capacity of KIM in the area of calibration.

4.2 More than 3000 SMEs participated in PUSTAN's quality awareness seminars and about 700 firms were trained in documentation procedures for adopting ISO 9000. Outreach centers were established in eight regions of the country, and 64 extension agents were trained to run these centers. More than 1700 SMEs were assisted in quality management at these centers. In addition, technical assistance was made available to PUSTAN to improve the performance of five MOIT standards-testing laboratories to gain international recognition and accreditation. By the end of the project, the five labs were able to achieve national accreditation by the National Accreditation Committee of Indonesia (KAN), but not international accreditation

4.3 **Outcomes.** ITDP's objective of improving MSTQ quality was *substantially* achieved. Project performance indicators show a doubling in the number of KIM calibration labs accredited locally (although not internationally), and the share of calibration labs showing acceptable inter-comparison results increased from 50 percent to 80 percent. The Center for Industrial Standards (PUSTAN) succeeded in getting four of five labs internationally recognized, and brought them into conformance with ISO/IEC Guide 25/DSN01.

4.4 Only 27 of the targeted 40 firms obtained ISO 9000 certification under PUSTAN's sub-component for quality systems improvement. Interviews in Indonesia indicate that part of the reason was that small, domestically-oriented SMEs had no immediate need for ISO 9000 because they were not direct exporters. The thirteen SMEs that received ITDP-funded assistance to prepare for ISO 9000, but failed to obtain certification, were not exporters. In the end, they did not want to pay out of their own pockets for final certification because they said it was not needed to do business.

### SME ACCESS TO TECHNOLOGY SERVICES

4.5 **Outputs.** Under the matching grant scheme, the target number of grants was reduced from the original 600 to 300 during a March 1999 supervision mission and further to 200 during the October 1999 mission. In the end, the scheme was able to make only 144 grants that were fully completed before it closed in 2001. The total value of these grants was US\$516,450; the average grant size was about US\$5000. Forty percent

of ITDP matching grants were made in the Jakarta region and the remaining sixty percent were spread over three other areas in the country (Bandung, Surabaya, and Semarang). Exporters received 30 percent of the grants, and 70 percent went to companies focused on domestic markets in engineering (33 percent), agro-business (26 percent) and others (11 percent). More than 65 percent of grants went to medium-sized firms with sales of more than Rps 1 billion (\$100,000), and 30 percent of these went to firms with sales of Rps 2 to 5 billion. Technology training seminars on various subjects were also conducted in Jakarta, Semarang and Medan.

4.6 **Outcomes.** The achievement of objectives of the matching grants scheme was *negligible* because of defects in its design and because of implementation problems. As noted earlier, the criteria for selecting grants did not explicitly set out the necessary and sufficient conditions for successful implementation of a public subsidy scheme. There was no mention of the importance of not crowding out private sector funding and no mention of the importance of establishing a clear distinction between the private benefits to firms and the broader economic benefits to society (via spillovers or “demonstration effects”).

4.7 Implementation problems decreased the scheme’s outcome potential further. The long delays in getting started and in execution reduced any possibility that the scheme could meet its target number of 600 grants. In the end, the final tally of 144 grants fell short of the twice-reduced target of 200 grants. The small number of grants handed out by the scheme meant that total administrative cost per grant would be high and that potential benefits of the scheme would be limited. At the end of the day, it cost \$826,007 to hand out subsidies to SMEs of \$516,450.<sup>5</sup> Assuming that a dollar’s worth of subsidies generated a dollar’s worth of benefits, the resulting benefit-cost ratio of the ITDP scheme is much less than one (.63), indicating negligible efficiency.

4.8 It might be possible, however, that a dollar’s worth of the scheme’s subsidies generated more than (less than) a dollar’s worth of benefits. The Staff Appraisal Report listed the following expected positive benefits from the scheme: (a) improvements in SME productivity (b) increase in the number of business service providers and (c) greater willingness of SMEs to use consulting services.

4.9 With respect to SME productivity improvements, the final report of the management contractor and the ICR make the case that many of the grants generated positive productivity improvements or increased sales revenue. However, this “before and after” analysis does not consider the counterfactual, i.e., what would have happened to productivity without the project.

4.10 The small number of grants awarded did not have much impact on widening the market for consulting services. In a large country like Indonesia, a relatively small, temporary subsidy scheme does not provide enough of a sustained market for service

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5. The cost figure is only the cost paid to the management contractor for managing the scheme. It does not include the Bank’s and the Government’s design costs or supervision costs, which would make the total costs of the scheme much higher.

providers to expand or to enter. This has been confirmed in studies of matching grant schemes in other countries.

4.11 To investigate possible increases in willingness to pay for consulting services by SMEs, the OED mission conducted a survey of 35 randomly-selected SMEs that used consultants for the first time under the ITDP (the 35 firms accounted for 25 percent of grants awarded). None of the SMEs surveyed used consultants again four years after the ITDP. Half stated that they only considered using such services because they were subsidized under the project and they did not think the benefits were large enough to pay for them without such subsidies. The other half said that their consulting experience was useful, but they could not afford such services now. Either way, there appeared to be no demand in this group for consultants today.

4.12 The OED survey of 35 grant recipients and reviews of project completion reports found that only about 30 percent of the grants had potential economic benefits in the form of technology spillovers. Many grants were for ISO 9000 preparation and certification (25 percent of projects) – a management improvement system widely known in Indonesia. Since ISO 9000 certification was being accomplished anyway by many private firms in Indonesia at the time of ITDP, the spillover or demonstration effects generated by grants in this area were small. The next largest number of grants went for troubleshooting small production problems that were specific to the firms (23 percent of projects). Further down the line were grants for product design improvements, again mostly specific to the firms (15 percent of projects). And finally there were grants for small quality control improvements that were generally well known in the industrial community in Indonesia (15 percent of projects). Few projects could be said to have transferred new technology into the economy or to have diffused new technologies to SMEs.

4.13 In sum, the available information on the matching grants program shows that the scheme failed to generate enough social benefits, including indirect market-development benefits, to raise the low benefit-cost ratio. It would appear that this public subsidy scheme did not create enough economic benefits to justify its public costs.

## **R&D INSTITUTIONS**

4.14 **Outputs.** The LIPI management systems strengthening program was implemented as planned by the close of the project. The leadership development program trained 47 managers, many of whom are now in Levels I/II management positions. The program formulated new business development guidelines which included procedures for research planning and priority-setting, communication strategies, accounts management, and standardization of contracts.

4.15 The project's IT program at LIPI developed computerized systems using CSIRO software and consulting services. The human resources IT system was fully completed during the project and is currently operational for all LIPI centers. By 2004, 80 percent of LIPI centers were using the financial IT system. The project management IT system was only 25 percent completed during the project, but LIPI was able to get the funds from the Government to complete it after the project closed. The project also created an internal

IT network that connects all of LIPI's centers and a website for external communication with research institutes around the world. On the whole, however, LIPI had a somewhat difficult experience with institution-wide implementation of the IT systems component of the project because of the reluctance of some managers to switch over from manual to computerized systems.

4.16 BPPT activities -- a twinning arrangement with Battelle Memorial Institute in the United States, training, and procurement of computer equipment -- were completed by the close of the project. Technical assistance helped build BPPT's capability in the areas of business development, contract management, public relations and communications, and intellectual property management. Standard contracts were developed and a contract tracking system was installed.

4.17 LIPI's R&D Center for Applied Chemistry (RDCAC) was selected to receive support under ITDP as a test case in improving the ability of R&D centers to increase their self-financing. A planning system for setting research priorities was initiated, which included external reviewers from the private sector. A twinning program with KIST-Korea was also arranged. These efforts resulted in an increase in training programs, chemical analysis, and testing programs with industry, as well as the spin-off of a company in fermentation technology which will earn royalties for RDCAC.

4.18 The Semarang Institute (BISM) was supported with training programs and equipment procurement under ITDP, and these activities were completed by 2001. Training opportunities abroad allowed BISM staff to assess and compare market opportunities outside of Indonesia, and as a result BISM's work with industry increased at home and abroad. In MOIT's Institute for R&D for Chemical Industry (IRDCI), a twinning arrangement with India's National Chemical Laboratory (NCL) helped to develop better project management skills and marketing know-how. IRDCI's packaging division also received assistance via a twinning arrangement with France's AFNOR to improve its laboratory management practices and testing services and to learn about new technology in packaging. This work was completed as planned by 2001.

4.19 Finally, ITDP supported an IRDCI arrangement with NATA of Australia for a laboratory accreditation program. The program was meant to help IRDCI obtain accreditation and international recognition in its packaging, chemical, microbiology, waste water, and calibration laboratories. Because of administrative delays and political problems in Indonesia, which caused security problems that kept NATA staff from visiting the country before the project closed, the program was not completed. IRDCI has not had the resources to pursue completion of this international accreditation program. However, the laboratories have been nationally accredited by KAN.

4.20 **Outcomes.** The achievement of improved self-financing in public R&D institutes was *modest*. A review of project performance data for the selected LIPI and MOIT laboratories receiving ITDP support shows improvements over the period in the self-financing ratios of two institutes and deterioration in self-financing ratios in two others. Projected changes in self-financing ratios in the Staff Appraisal Report ranged from 50 percent to 200 percent, depending on the institution. Actual changes, measured in the final year of the project, ranged from a -56 percent decline to a 160 percent increase:



RDCAC-LIPI increased its ratio from 27 percent to 43 percent, BSIM-MOIT showed a decline in its ratio from 85 percent to 57 percent, IRDCI-MOIT declined from 57 percent to 25 percent and TBIS-BPPT increased from 5 percent to 13 percent. It should be noted that, while the figures show declines over the years of the project in some cases, the final self-financing ratios of all these selected institutions are still higher than the average for other public R&D institutions in Indonesia.

4.21 Interviews in Indonesia with staff of the R&D institutions point to some of the reasons for the variation in self-financing performance. First, legal restrictions on budgets of the R&D institutions severely reduced incentives to do business with the private sector. Second, the positive impact of ITDP on the self-financing ratio of an institution like RDCAC can be attributed, in part, to the fact that RDCAC earns much of its revenues from testing, analysis, and training -- services more easily sold to the private sector than research contracts and new technologies. Third, declining self-financing ratios in BISM and IRDCI were undoubtedly affected by the Asian financial crisis.

4.22 The effect of public R&D institutions' technology and services on SMEs, the target group of ITDP, was *negligible*. Besides the fact that SMEs are not the natural clientele of these institutions, most of them continue to be isolated from the private sector more generally. Until R&D institutions become independently functioning organizations, responding to the demands of the private sector rather than to the Government for their normal operating expenses, such exercises will continue to come up empty.

## INDUSTRIAL TECHNOLOGY POLICY

4.23 **Outputs.** The project provided a small amount of support to MOIT to strengthen its Policy Advisory Unit (PAU). Technical assistance and financial resources were used to complete the Industrial Master Plan and Policy, Electronics Sub-Sector Study, and a Study on Restructuring of Agro-Based Industry. Funds also went to BPPT's Science and technology Management Policy Group to complete a study on the assessment of current technology policies.

4.24 **Outcomes.** The achievement of the objective to improve industrial and technology policy was *modest*. Although studies were completed under the project, limited capacity was left behind to carry on this work in the future, as evidenced by requests on the PPAR mission for technical assistance and financial resources to do almost identical studies.

## 5. Ratings

### OUTCOME

5.1 Taking into account relevance, efficacy, and efficiency of the four ITDP objectives (Table 1), the overall **Outcome** of the project was **Moderately Satisfactory**.

- The objective of improving Indonesia's system of industrial MSTQ was *substantially* achieved. Project performance indicators show that the number of calibration labs at the Institute of National Metrology accredited doubled and the percent of calibration labs showing acceptable inter-comparison tests increased substantially. The Center for Industrial Standards also managed to get four of five labs internationally recognized and into conformance with ISO requirements. However, only 27 out of the targeted 40 SMEs slated for ISO 9000 certification under the Center's subcomponent for quality systems improvement were certified.
- The achievement of the objective of facilitating SME access to technology services was *negligible* due to problems with the design and implementation of the matching grants scheme. The scheme failed to generate the requisite economic benefits, including indirect market-development benefits. It would appear that this public subsidy scheme did not create enough economic benefits to justify its public costs.
- The achievement of the R&D management objective was *modest*. Self-financing ratios of supported R&D institutions show increases in two institutions and substantial declines in two others. Failure to realize projected levels of self-financing can be attributed in large part to government legal restrictions on budgets of the R&D institutions, which reduced incentives to do business with the private sector.
- The objective of improving industrial and technology policy formulation was only *modestly* achieved. The Master Plan and studies that ITDP supported were completed, but limited capacity was left behind to carry on this work in the future.

**Table 1. Ratings for Achievement of Project Objectives**

Objective	Relevance	Efficacy	Efficiency
Provide public and private technology services by improving the MSTQ system	Substantial	Substantial	Modest
Facilitate SME access to technology services	Substantial	Negligible	Negligible
Strengthen public technology support institutions by increasing the self-financing of public R&D institutions	Substantial	Modest	Modest
Improve the formulation and coordination of industrial technology policies	Modest	Modest	Not applicable
<b>Overall Ratings</b>	<b>Substantial</b>	<b>Modest</b>	<b>Modest</b>

## SUSTAINABILITY

5.2 **Sustainability** of project benefits is **Unlikely**. In the area of MSTQ, the eight outreach centers established under the project have been folded into division of local governments as part of the Governments' decentralization policy. Many of these centers are now having financial problems, and some have closed. Many of the public standards testing laboratories that were accredited under ITDP were also handed over to provincial governments and are suffering the same fate as the outreach centers. PUSTAN is still assisting in the area of ISO 9000 certification for SMEs, but only maintenance of certification for firms that already have it.

5.3 The sustainability of the impact of ITDP support on the capacity of R&D institutions also appears unlikely. It is clear that the supported R&D institutions gained from their relationships with various twinning partners, and some of these relationships remain today. For example, LIPI is still interacting and communicating with CSIRO-Australia: five scientists from LIPI go to CSIRO annually for two months on a continuing exchange program. But most of the twinning relationships in other institutions have been reduced to periodic communications.

5.4 The IT management systems in human resources and finance, in institutions such as LIPI, are getting old and are not being maintained. Unfortunately, there is currently a lack of Government funds to make these changes. In some cases, scientific equipment procured under ITDP is broken and cannot be repaired or replaced for lack of resources. Some of the laboratories that were supposed to become internationally accredited under ITDP have not continued their international accreditation program with NATA-Australia. And innovative research planning practices set up under ITDP have been continued in very few institutions. All in all, it appears that four years after ITDP has closed benefits of the loan have already begun to fade substantially in the R&D institutions.

5.5 Finally, the outcome of the project's support to the Ministry of Industry and Trade to strengthen its Policy Advisory Unit was also short-lived because the unit was disbanded.

#### **INSTITUTIONAL DEVELOPMENT IMPACT**

5.6 The **Institutional Development Impact** of the project was **Modest**. As described above, supported R&D institutes did gain from their relationships with various twinning partners in terms of leadership development, improving IT management and communication systems, and strengthening research planning during the years of the project. MSTQ institutes also upgraded their labs. But the objective of commercializing public R&D institutes was only partially achieved, and these organizations failed to reorient their services toward the target population of SMEs.

#### **BANK PERFORMANCE**

5.7 Overall **Bank Performance** was **Satisfactory**. The ITDP identified an important problem that needed to be addressed in the Indonesian economy and that fit with the Government's development priorities. However, the quality at entry was variable across the components of the project, as described above. Design flaws affected the achievement of outcomes particularly in the R&D management and matching grant components.

5.8 Supervision was moderately satisfactory. There were a sufficient number of supervision missions over the six years of the project. Bank staff worked well with Government and implementing agencies and provided them with helpful technical advice. However, staff in the R&D institutions noted that Bank's supervision missions could have been longer in order to deal with all the complexities of the project. They felt that there was often not enough time for adequate discussion and problem solving in particular areas.

5.9 There was an important supervision failure in the case of the matching grant scheme. The Bank took eleven months to give its approval to five initial grants required to begin implementation of the scheme. This held up implementation and severely reduced outcomes in terms of the final grant tally and scheme benefits. The ICR notes this delay in start up of the matching grants program, but fails to mention the Bank's supervision failure. Interviews in Indonesia and discussions with Bank staff suggest that the real cause of the delay was that the original Bank task manager left to take up another position in the Bank and there was a period where no one was responsible for following through on these approvals.

## **BORROWER PERFORMANCE**

5.10 Overall **Borrower Performance** was **Satisfactory**. Government officials and staff of implementing agencies worked closely with the Bank in designing and implementing ITDP. When implementation issues arose in the course of the project, the project management implementation units were receptive to suggestions from the Bank and took remedial actions. For example, when procurement problems arose, the Governments organized intensive training on procurement procedures which effectively addressed these problems. Project reports were also submitted to the Bank on schedule, which assisted in monitoring ITDP and assessing progress against program targets.

5.11 Despite changes in administration and the problems that arose during the Asian financial crisis, Government maintained its commitment to ITDP. The Government also worked with the Bank to restructure the loan so that the substance of the program was maintained when financial cuts had to be made.

5.12 Where the Government failed to perform effectively was in the area of setting an appropriate policy environment for project outcomes. The fact that the restrictions on budgets of R&D institutions were kept in place over the years of the project severely impeded the self-financing goals of the Government's plan to commercialize public R&D institutions.

## **6. Lessons Learned**

6.1 **Industrial technology development projects aimed at commercializing public R&D institutions should only be undertaken in favorable regulatory environments.** Legal restrictions on the ability of R&D institutions to retain and accumulate their revenues from work with the private sector and on their flexibility in determining the use of these earnings can severely hamper efforts to commercialize their activities. Ultimately, there is no substitute for independently functioning public R&D institutions that respond to market demands and look to their private sector clients rather than Government for their normal operating finances. The way government finances and controls the activities of these institutions plays an important role in realizing this objective.

6.2 **It is a mistake to append support for SMEs to general-purpose R&D institutions whose principal clients are larger more sophisticated enterprises.** SMEs have different needs and lack the technical personnel to communicate effectively with sophisticated technical and scientific staff of most R&D institutions (hi-tech firms are different). Dedicated, specialized institutions, which are decentralized, are needed to serve SMEs that focus on training, providing advice, and solving problems brought to them.

6.3 **Matching grant schemes should be designed to maximize returns to public resources invested in them, under the same principle that applies to any public investment.** To achieve this goal, scheme managers must succeed at two tasks: selecting projects with large economic (social) returns to the country and funding only those projects that would not otherwise find private funding.

6.4 **Projects to develop public institutions, such as the public R&D institutions targeted by ITDP, should pay closer attention to recurrent costs.** Four years after ITDP closed, investments in IT management systems and expensive scientific equipment are showing signs of deterioration because of a lack of resources to maintain, repair, or replace hardware and software. Some donor agencies have begun to include funds for such recurrent costs in their projects to address this problem.



## Annex A. Key Performance Indicators

<b>Outcome/Impact Indicators</b>										
<b>Indicator Matrix</b>	<b>Projected in Last PSR</b>					<b>Actual/Latest Estimate</b>				
<b>I. INSTITUTE OF NATIONAL METROLOGY (KIM-LIPI)</b>	<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>		<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>	
1. No. of measurement fields of KIM-LIPI registered in BIPM Global MRA					2					
2. No. of qualified assessors (cumulative)		30	30	30		27	29	29	29	
3. No. of calibration labs accredited to ISO/IEC Guide 25 or ISO 17025 (cumulative)		25	30	30		17	20	25	40	
4. % of calibration labs showing acceptable inter-comparison results		80%	90%	90%		50%	59%	65%	80%	
5. Longest delivery time of calibration at KIM-LIPI (weeks)		4	3	3		5	5	4	3	
<b>II. R&amp;D CENTER FOR APPLIED CHEMISTRY (RDCAC-LIPI)</b>	<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>	<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>
1. Self-financing Ratio	43.7%	49.4%	30%	35%		26.5%	26.6%	22%	16%	43%
2. Number of new clients contacted	15	18	30	35		16	34	28	285	376
3. Number of contracts signed:										
• Research contracts	6	7	8	10		7	11	9	11	9
• Consultancy	4	6	8	10		2	3	4	1	2
• Training	12	12	12	12		6	11	9		
• Material analysis	75	75	25	25		32	34	26		
4. No. of contracts successfully completed:										
• Research Contracts	5	7	8	10		6	7	9		
• Consultancy	4	6	8	10		2	5	4		
• Training	12	12	12	12		6	11	9		
• Material analysis	75	75	25	25	25	32	34	26		
5. Revenue generated from tech services	2300	2900	1500	2000		890	1217	1156	844	1616
6. Overall income to expenditure ratio	0.43	0.49	0.30	0.35		0.26	0.26	0.21	0.17	0.28
7. Number of technologies licensed	1	2	2	2		1	1	1		
8. Revenue generated from technology licensing	150	300	15	50		15	15			
9. Value of production from commercialized laboratories	480	510	200	100				80	15	15
10. Number of laboratories accredited			1	2				2	2	

Indicator Matrix	Projected in Last PSR						Actual/Latest Estimate					
	96/97	97/98	98/99	99/00	'00	'01	96/97	97/98	98/99	99/00	'00	'01
<b>III. MANAGEMENT SYSTEM STRENGTHENING (MSS-LIPD)</b>												
1. Self-financing Ratio	11%	8%	11%	13%	15%	18%	11%	8.2%	8.2%	10%	10%	11%
2. Number of companies directly contacted	25	25	75	250	300	400	-	14	75	200	300	500
3. Number of proposals submitted	10	5	10	20	29	40	-	2	12	5	21	11
4. Number of contracts signed	5	10	2	8	9	16	-	-	2	1	5	6
5. Number of companies informed	250	400	400	1000	1125	1500	-	62	258	700	850	1500
<b>IV. SEMARANG INSTITUTE – MOIT</b>		<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>		<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>'00</b>	<b>'01</b>
1. Self-financing Ratio		58%	63%	57%	57%	57%		85%	71%	64%	92%	57%
2. No. of New Clients		30	45	60	70	80		52	46	38	60	120
3. No. of contracts actually signed (design engineering, testing, technology development, consultancy)		70	85	100	110	120		145	355	293	350	410
4 No. of contract successfully completed		70	85	100	110	110		145	264	53	40	390
5. Revenue generated (million rupiahs)		1156	1491	2003	2074	2100		1949	1393	1299	1554	1687
6. Total expenditure (million rupiahs)		1981	2431	2853	3001	3359		3032	2450	1912	1912	2316
7. Income Expenditure Ratio		0.58	0.63	0.57	0.69	0.63		0.66	0.57	0.68	0.68	0.72
8. No. of technology licensed			1	1	1	1						
9. Revenue generated from technology licensing (million rupias)			10	10	10	10						
10. No. of patents filled in nationally			1	1	1	1						
11. No. of laboratories accredited nationally			1	1	1	1						2



Indicator Matrix	Projected in Last PSR		Actual/Latest Estimate			
	98/99	99/00	98/99	99/00	'00	'01
<b>V. CENTER FOR INDUSTRIAL STANDARDS (PUSTAN) – MOTT</b>						
(a) Quality Awareness						
1. No. of companies in quality awareness program	3000	3000	3163	3163	C*	C
2. No. of companies implementing quality programs	600	600	672	672	C	C
3. No. of companies seeking ISO9000 certification through ITDP-supported KAN Program	40	40	40	40	C	C
(b) Training of Extension Agents & Establishing Outreach Centers						
1. Market Study completed/outreach program planned	Done		Done			
2. MSTQ Extension Agents trained	Done		Done			
3. No. of SMIs assisted by agents Management & Intercomparison Testing	800	800	865	891	C	C
(c) Upgrading Laboratory Management & Intercomparison Testing						
1. Preparation of strategic plans for 5 labs	Done	All 5	Done	All 5	C	C
2. No. of labs within acceptable limits of inter-comparison	All 5	All 5		All 5	C	C
3. No. of labs in conformity with ISO/IEC Guide 25/DSN01	3	All 5		All 5	C	C
4. No. of labs internationally recognized and/or accredited		5		C	C	C
5. No. of labs nationally recognized and/or accredited		5		4	C	C

\*C=completed



## Annex B. Basic Data Sheet

### INDONESIA INDUSTRIAL TECHNOLOGY DEVELOPMENT PROJECT (LOAN No. 3972)

#### Key Project Data (amounts in US\$ million)

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
IDA Loan	47.00	38.50	81.90
Government	7.70	3.17	41.20
Co-financing	6.20	0.30	4.80
Total project cost	60.90	41.97	68.90

#### Cumulative Estimated and Actual Disbursements (US\$ million)

	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03
Appraisal estimate	7.28	21.56	33.44	40.56	44.90	47.00	47.00	47.00
Actual	1.00	4.13	13.29	18.07	25.75	32.02	32.63	32.63
Actual as % of estimate	13.7	19.1	39.7	44.5	57.3	68.1	69.4	68.4
Date of final disbursement:								

#### Project Dates

	<i>Original</i>	<i>Actual</i>
Appraisal		April 15, 1995
Board approval		December 21, 1995
Effectiveness		March 18, 1996
Mid-Term Review	November 1, 1998	October 15, 1999
Closing date	December 31, 2001	December 31, 2001

#### Staff Inputs (staff weeks)

	<i>Actual/Latest Estimate</i>	
	<i>N° Staff weeks</i>	<i>US\$US\$('000)</i>
Identification/Preparation	124.3	310.8
Appraisal/Negotiation	82.8	207.2
Supervision	96.2	240.0
ICR	9.6	4.8
Total	312.9	806.0

## Mission Data

	<i>Date (month/year)</i>	<i>No. of persons</i>	<i>Specializations represented</i>	<i>Performance rating</i>	
				Implementation status	Development objectives
<b>Identification/ Preparation</b>	October 1993	3	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Research & Development Specialist		
	April 1994	3	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Research & Development Specialist		
	November 1994	4	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Research & Development Specialist, Consultant		
	February 1995	5	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Research & Development Specialist, Consultants (2)		
<b>Appraisal/ Negotiation</b>	June 1995	5	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Research & Development Specialist, Consultant, Operations Officer		
<b>Supervision</b>					
Supervision 1	June 1996	4	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Procurement Specialist, Project Implementation Specialist	S	S
Supervision 2	November 1996	3	Policy and Institutional Issues Specialist, Metrology and Standards Specialist, Project Implementation Specialist	S	S
Supervision 3	February 1997	2	Policy and Institutional Issues Specialist, Project Implementation Specialist	S	S
Supervision 4	November 1997	4	Team Leader, RSI Sector Coordinator, Research and Development Specialist, MSTQ Specialist	S	S
Supervision 5	March 1999	4	Financial Specialist, RSI Sector Coordinator, Research and Development Specialist, MSTQ Specialist	U	S
Supervision 6	October 1999	5	Financial Specialist, Procurement Specialist (2), Research and Development Specialist, MSTQ Specialist	S	S
Supervision 7	August 2000	4	Financial Specialist, Research and Development Specialist, Procurement Specialist, Disbursement Analyst	S	S
Supervision 8	June 2001	4	Financial Specialist, Procurement Specialist, Disbursement Analyst, Research and Development Specialist	S	S
<b>ICR</b>	March 2002	6	Task Manager, Research and Development Specialist	S	S

Helen Phillip

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