ADB

Report and Recommendation of the President to the Board of Directors

INTERNAL

Project Number: 55063-001
November 2022

Proposed Loan
Republic of Indonesia: Promoting Research and Innovation through Modern and Efficient Science and Technology Parks Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 7 November 2022)

Currency unit	=	rupiah (Rp)
Rp1.00	=	$0.0000640
$1.00	=	Rp15,614
$1.00	=	¥147.90

ABBREVIATIONS

ADB	–	Asian Development Bank
COVID-19	–	coronavirus disease
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GDP	–	gross domestic product
IPB	–	IPB University
MOECRT	–	Ministry of Education, Culture, Research, and Technology
OP	–	operational priority
PAM	–	project administration manual
PIU	–	project implementation unit
PMU	–	project management unit
R&D	–	research and development
RPJMN	–	Rencana Pembangunan Jangka Menengah Nasional (National Medium-Term Development Plan)
STP	–	science and technology park
TRL	–	technological readiness level

NOTES

(i) The fiscal year of the Government of Indonesia and its agencies ends on 31 December.

(ii) In this report, “$” refers to United States dollars.

Vice-President	Ahmed M. Saeed, Operations 2
Director General	Ramesh Subramaniam, Southeast Asia Department (SERD)
Deputy Director General	Winfried Wicklein, SERD
Directors	Ayako Inagaki, Human and Social Development Division (SEHS), SERD
	Jiro Tominaga, Indonesia Resident Mission (IRM), SERD
Team leaders	Fook Yen Chong, Senior Social Sector Specialist (Skills Development), SEHS, SERD[a]
	Sutarum Wiryono, Senior Project Officer (Education), IRM, SERD
Team members	Meenakshi Ajmera, Principal Safeguards Specialist, Office of the Director General (SEOD), SERD
	Arndt Christoffer Husar, Senior Public Management Specialist (Digital Transformation), Digital Technology for Development Unit, Sustainable Development and Climate Change Department (SDCC)
	Keiko Koiso; Senior Procurement Specialist; Procurement Division 2; Procurement, Portfolio, and Financial Management Department (PPFD)[a]
	Naning Mardiniah, Senior Safeguards Officer (Resettlement), IRM, SERD
	Veronica Mendizabal Joffre, Senior Gender and Social Development Specialist, SEOD, SERD
	Luvette Anne Miclat, Associate Operations Analyst, SEHS, SERD
	Antoine Morel, Principal Environment Specialist, SEOD, SERD
	Suma Pollard, Counsel, Office of General Counsel
	Myra Ravelo, Financial Management Specialist, Public Financial Management Division, PPFD
	Arghya Sinha Roy, Principal Climate Change Specialist (Climate Change Adaptation), Climate Change and Disaster Risk Management Division, SDCC
	Suharyani, Senior Procurement Officer, IRM, SERD
	Paul Vandenberg, Principal Economist, Economic Analysis and Operational Support Division, Economic Research and Regional Cooperation Department
	Maria Angelica Vivar, Project Analyst, SEHS, SERD
	Jian Xu, Senior Education Specialist, Education Sector Group, SDCC
Peer reviewer	Sunhwa Lee, Principal Social Sector Specialist, Human and Social Development Division, South Asia Department

[a] Outposted to the Indonesia Resident Mission.

CONTENTS

PROJECT AT A GLANCE

1. Basic Data — **Project Number:** 55063-001

Project Name	Promoting Research and Innovation through Modern and Efficient Science and Technology Parks Project
Country	Indonesia
Borrower	Republic of Indonesia
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=55063-001-CEI
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=55063-001-PortAtaGlance
Department/Division	SERD/SEHS
Executing Agency	Ministry of Education, Culture, Research and Technology

2. Sector

	Subsector(s)	ADB Financing ($ million)
✓ **Education**	Tertiary	138.520
	Total	**138.520**

3. Operational Priorities

- ✓ OP1: Addressing remaining poverty and reducing inequalities
- ✓ OP2: Accelerating progress in gender equality
- ✓ OP3: Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability

Climate Change Information

GHG reductions (tons per annum)	96
Climate Change impact on the Project	Medium

ADB Financing

Adaptation ($ million)	2.430
Mitigation ($ million)	8.800

Cofinancing

Adaptation ($ million)	0.000
Mitigation ($ million)	0.000

Sustainable Development Goals

SDG 1.5
SDG 4.3, 4.7
SDG 5.5, 5.a, 5.b
SDG 9.5
SDG 10.2
SDG 13.a

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

Poverty Targeting

General Intervention on Poverty ✓

4. Risk Categorization: Low

5. Safeguard Categorization **Environment:** C **Involuntary Resettlement:** C **Indigenous Peoples:** C

6. Financing

Modality and Sources	Amount ($ million)
ADB	**138.520**
Sovereign Project (Regular Loan): Ordinary capital resources	138.520
Cofinancing	**0.000**
None	0.000
Counterpart	**14.280**
Government	14.280
Total	**152.800**

Currency of ADB Financing: Yen

Note: The project is estimated to cost ¥22,599,046,946.36 including a regular loan of ¥20,487,108,000.00 from Asian Development Bank ordinary capital resources ($1.00= ¥147.90).

Source: Asian Development Bank

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Republic of Indonesia for the Promoting Research and Innovation through Modern and Efficient Science and Technology Parks Project.

2. The project will support the government's strategy to commercialize research and development (R&D) and improve the success rate of start-up incubation of four science and technology parks (STPs). These four STPs operate under the public higher education institutions of Bandung Institute of Technology in Bandung, West Java; Gadjah Mada University in Yogjakarta; IPB University (IPB) in Bogor, West Java; and University of Indonesia in Jakarta. The project will assist the four STPs by upgrading R&D and start-up incubation facilities; providing grants to conduct applied research and incubate start-ups; and upgrading the expertise of STP researchers and the capability of research administration staff. The project will support each STP to focus on various disciplinary fields that are aligned with Indonesia's priority economic sectors. The project will also strengthen public–private R&D collaboration; increase workforce competitiveness and productivity, particularly as new technologies are developed and adopted; and promote youth entrepreneurship and job creation.

II. THE PROJECT

A. Rationale

3. **Development context.** Indonesia is the world's fourth most populous nation with more than 270 million people and the 10th largest economy in terms of purchasing power parity.[1] Indonesia's annual gross domestic product (GDP) growth has averaged 5.0% from 2015 to 2019.[2] However, because of coronavirus disease (COVID-19) pandemic restrictions, GDP contracted by 2.1% in 2020 and grew at a slower rate of 3.7% in 2021. Although Indonesia's economy has rapidly recovered since December 2021 and is projected to grow by 5.4% in 2022,[3] sustaining this recovery will require Indonesia to safeguard health and human development, reopen the economy, create jobs, boost consumption, and pursue broader and deeper structural reforms to raise productivity and growth.

4. Indonesia's proportion of population living below the national poverty line was estimated at 9.5% in March 2022[4] and the proportion of population living on less than $1.90 per day per capita (based on 2011 purchasing power parity) was 2.2% in 2021.[5] Income inequality continued to be moderate, with the Gini coefficient of 0.38 in 2022, down from 0.41 in 2014 (footnote 4). The COVID-19 pandemic has compounded persistent challenges and reversed gains in reducing poverty. In 2020, Indonesia's poverty rate increased to 10.2% from 9.2% in 2019, its highest level since 2017, with 27.55 million persons falling into poverty (footnote 4). COVID-19 also affected about 63 million in vulnerable employment[6] who lost their incomes, particularly the self-employed, casual employees, and unpaid workers who are not covered by employment protection legislation. The pandemic also impacted women disproportionately, as women were more likely than men to

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[1] Asian Development Bank (ADB) and Government of Indonesia, Ministry of Finance. 2020. *Innovate Indonesia: Unlocking Growth Through Technological Transformation*. Manila.
[2] ADB. 2020. *Asian Development Outlook (ADO) 2020.* Manila.
[3] ADB. 2022. *Asian Development Outlook (ADO) 2022 Update.* Manila.
[4] Statistics Indonesia. Poverty and Inequality (accessed 18 October 2022). Indonesia's poverty line of Rp505,469.00 (March 2022) is the income level deemed necessary to keep a minimum acceptable standard of living in Indonesia.
[5] ADB. Key Indicators Database (accessed on 18 October 2022).
[6] World Bank. World Development Indicators Database (accessed on 22 October 2022).

exit the labor market and increase unpaid care work.[7] Inclusive growth, human capital development, and advancement in and improved access to technology are among the keys to addressing remaining poverty and inequality in the country.

5. **Importance of research and development and innovation.** Before the pandemic, the main factor constraining economic growth was a flat productivity rate partly attributed to limited technological sophistication in industries.[8] There was also a lack of absorptive capacity for technology and innovation among Indonesia's workforce. Innovation and new technologies are crucial as they allow industries to become more productive through better use of resources, creation of new products, and expansion to new markets. Post-pandemic, the increased application of technology and R&D will accelerate productivity and drive Indonesia's transition to become a knowledge economy that generates high-quality employment opportunities. Adoption of new technologies could add 0.55 percentage points to annual average GDP growth over the next 2 decades, pushing Indonesia's economy into the high-income group (footnote 1).

6. **Government's strategy.** Indonesia's policy on science and technology and innovation is framed under the National Medium-Term Development Plan (RPJMN), 2020–2024,[9] —especially pillar 1, which emphasizes human development and mastery of science and technology.[10] Indonesia has taken important steps to strengthen its innovation system through new fiscal incentives for R&D, large investments in digital infrastructure, and new funding mechanisms to support research. The Ministry of Education, Culture, Research, and Technology (MOECRT) is mandated to formulate policies in science and technology and coordinate implementation of these policies among higher education institutions.[11] Each institution is required to undertake the three pillars (*tri dharma*) of higher education comprising education, research, and community service. Large higher education institutions classified as *Perguruan Tinggi Negeri Badan Hukum* have the autonomy to manage the allocation of research funds received from the government and other sources, select research proposals, and usually have their own innovation units, such as STPs, to support downstream R&D and innovation.[12]

7. **Science and technology parks.** The development of STPs is a government strategy to promote commercialization of R&D and innovations in priority economic sectors. The project supported STPs (para. 2) are managed under their respective universities to (i) serve as a platform for continuous R&D cooperation among tertiary institutions, R&D institutions, and industry; (ii) facilitate growth of innovation-based companies through incubation and spin off; and (iii) provide value added and quality learning services. The RPJMN, 2020–2024 prioritizes the development of STPs at these four project universities and Sepuluh Nopember Institute of Technology in Surabaya.[13] Under the project, Bandung Institute of Technology will focus on engineering (transport and energy including energy storage), information and communication technology, disaster prevention, and food and health technology; Gadjah Mada University will focus on health and pharmaceuticals, agro-industry, and renewable energy; IPB will focus on agro-processing, food technology, and natural cosmetics and pharmaceuticals; and University of Indonesia will focus on medical device technology, drugs food innovation, and engineering

[7] Miranti, Sulistyaningrum, and Mulyaningsih. 2022. Women's Roles in the Indonesian Economy during the COVID-19 Pandemic: Understanding the Challenges and Opportunities. *Bulletin of Indonesian Economic Studies*. 58 (2).
[8] Technology sophistication means using more advanced technologies with extensive R&D.
[9] Government of Indonesia. 2020. *National Medium-Term Development Plan, 2020–2024*. Jakarta.
[10] Government of Indonesia, Ministry of National Development and Planning. 2019. Vision of Indonesia 2045. Jakarta.
[11] Law no. 12 of 2012 on Higher Education defines higher education as including diploma, undergraduate, postgraduate, and doctoral programs; and professional and specialized program run by higher education institutions.
[12] The four project universities are categorized as Perguruan Tinggi Negeri Badan Hukum.
[13] ADB. Indonesia: Higher Education for Technology and Innovation Project. The project supports Sepuluh Nopember Institute of Technology on creative industry, automotive, maritime, and information and communication technology.

innovation including artificial intelligence and renewable energy. Development of the STPs will (i) increase their innovation capabilities; (ii) improve their capacity as triple-helix nodes by bringing together learning institutions, enterprises, and government agencies to strengthen cooperation in R&D, thus transforming research into innovative commercial products;[14] and (iii) increase national innovation products.[15]

8. **Constraints in research and development and innovation.** Indonesia's R&D and innovation system is developing but still generates too few R&D innovations and solutions that are relevant to the needs of industry[16] and that can fully address the country's R&D agenda in a gender sensitive and inclusive manner. As per the Global Innovation Index[17] and Global Competitiveness Index,[18] Indonesia fares poorly in R&D inputs, outputs, and quality. Both indexes show Indonesia's weaknesses in R&D and innovation performance. The underlying reasons are:

(i) **Inadequate and aging research and development and innovation facilities and equipment.** An evaluation of the four project STPs based on STP maturity criteria[19] shows that many R&D facilities are not up-to-date or equipped with fourth industrial revolution technologies.[20] Older buildings at the four project universities housing R&D and innovation facilities lack gender-sensitive and socially inclusive features such as lactation rooms and access for persons with disabilities. The joint study by the Asian Development Bank (ADB) and the Ministry of Finance has recommended long-term investment plans to upgrade laboratories and facilities for research institutes, universities, centers of excellence, techno-parks, state-owned strategic companies, testing laboratories, and start-up incubators (footnote 1).

(ii) **Inadequate mobilization of financial resources, lack of focus on demand, and inefficiency in administering research and development funding.** Indonesia's gross domestic expenditure on R&D (GERD) was 0.23% of GDP in 2018, which was low compared with Viet Nam (0.53%), Thailand (1.00%), and Singapore (1.94%).[21] The public sector shares of GERD is 84.6%, whereas the private sector shares of GERD is 7.3%.[22] Private sector shares of GERD was also low compared with Viet Nam (73.0%), Thailand (79.9%), and Singapore (59.6%). Although the law (No. 11/2019) on the National System of Science and Technology was amended in 2019 to promote demand-driven R&D and encourage private sector participation through incentives,[23] the desired results have not yet been realized. Public sector R&D tends to be academic oriented, at lower technology readiness level (TRL) and disconnected from industries' needs.[24] Indonesia also lacks a

[14] The tripe-helix model supports the development of a trilateral network of links between university, government, and industry, whereby university is the source of knowledge and helps to spread knowledge in the network.
[15] Presidential Regulation Number 106 of 2017 on Science and Technology Parks.
[16] Sector Assessment (Summary): Education (Tertiary) (accessible from the list of linked documents in Appendix 2).
[17] Global Innovation Index 2021 revealed weaknesses in institutional environment, business sophistication, and human capital and research. World Intellectual Property Organization. 2021. *Global Innovation Index 2021*. Geneva.
[18] Global Competitiveness Index 2020 pillar 12 shows weaknesses in areas such as international co-inventions per million population, patent applications per million population, R&D expenditures as percent of GDP, and trademark application per million population.
[19] STP maturity covers a broad dimension from infrastructure facilities to soft components and is assessed based on five indicators: input, process, output, outcome, and impacts.
[20] Examples of fourth industrial revolution technologies include artificial intelligence, internet of things, big data, blockchain, and cloud computing. Such technologies will lead to better accuracy and consistency in R&D results.
[21] United Nations Educational, Scientific and Cultural Organization Institute for Statistics. Science, technology, and innovation (accessed 18 October 2022).
[22] Remaining R&D is financed by nongovernment organizations.
[23] Law No. 11 of 2019 on the National System of Science and Technology.
[24] N. Huda et al. 2020. *Making Indonesia's Research and Development Better – Stakeholder Ideas and International Best Practices*. Knowledge Sector Initiative: Jakarta.

competitive and transparent public sector R&D funding mechanism, which is compounded by the rigidity of R&D grants, such as single-year financing,[25] cumbersome administrative procedures, and slow disbursement.[26]

(iii) **Shortage of qualified researchers and scientific personnel, particularly female staff.** STPs have not been able to respond to the increased demand for researchers. The RPJMN, 2015–2019 goal of setting up 100 STPs was not achieved partly because of a lack of qualified R&D talent (footnote 9). R&D personnel per million inhabitants in 2019 was 388 in Indonesia, compared with 757 in Viet Nam, 1,790 in Thailand, and 7,287 in Singapore (footnote 21). Qualified talent for R&D and innovation–especially female talent—is also lacking.[27]

9. **Strategic alignment.** The project is aligned with Indonesia's RPJMN, 2020–2024, which calls for the development of the four project STPs. It is aligned with ADB's Strategy 2030 and will contribute to these operational priorities (OPs): OP 1 (addressing remaining poverty and reducing inequalities); OP 2 (accelerating progress in gender equality); and OP 3 (tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability).[28] The project will support ADB's country partnership strategy for Indonesia, 2020–2024, by improving universities' R&D capacity, commercializing R&D outputs, and strengthening entrepreneurship.[29]

10. **Lessons.** Past and ongoing operations of ADB and other development partners (footnote 16) and continuing engagement with the government have informed project design.[30] Lessons include the need to (i) develop advanced innovation institutions to lead R&D and innovation; (ii) set up facilities to demonstrate technology in research centers and universities; (iii) adopt international best practices for funding research and increase efforts to cooperate with international universities; (iv) adopt an innovative approach such as competitive funding to encourage industry and institution collaboration; (v) create a talent pool of researchers through international scholarships, which will contribute to Indonesia's competitiveness and promote knowledge transfer; and (vi) provide flexibility in project design, so that equipment procurement is better suited to the needs of project universities.

B. Project Description

11. The project is aligned with the following impact: competitiveness of Indonesia's economy and sustained economic growth strengthened through R&D and innovation (footnote 9). The project will have the following outcome: quality and relevance of R&D and innovation system in four STPs improved.[31] The project will (i) support the four project STPs to strengthen R&D and innovation capability, including research in climate adaptation and mitigation, which will improve the quality and relevance of higher education; (ii) support employment or self-employment for graduates

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[25] Single-year financing refers to funding of R&D within 1-year budgetary period.

[26] Y. Damuri, H. Aswicahyono, and D. Christian. 2018. Innovation Policy in Indonesia. In M. Ambashi, ed. *Innovation Policy in ASEAN*. Economic Research Institute for ASEAN and East Asia: Jakarta.

[27] In Indonesia, women comprise 44.0% of R&D personnel, 37.5% of researchers in business enterprises, 38.0% of researchers in government, and 20.9% of researchers in higher education. Female researchers with doctorate qualifications stand at 36.1%, and female researchers with master's qualifications stand at 49.0%. United Nations Educational, Scientific and Cultural Organization Institute for Statistics (accessed 2 February 2022).

[28] ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

[29] ADB. 2020. *Country Partnership Strategy: Indonesia, 2020–2024—Emerging Stronger.* Manila.

[30] ADB. 2021. *Completion Report: Polytechnic Education Development Project in Indonesia.* Manila; ADB. 2018. *Completion Report: Strengthening Higher Education Project in the Lao People's Democratic Republic.* Manila; and World Bank. 2022. *Implementation Completion and Results Report: Research and Innovation in Science and Technology Project in Indonesia.* Washington, DC.

[31] The design and monitoring framework is in Appendix 1.

through technology start-up incubation programs; (iii) support enterprises in moving up the technology ladder, which will create quality jobs; and (iv) offer more opportunities for R&D training and jobs for women, and offer support to women in start-ups, such as pairing with female mentors.

12. **Output 1: Facilities for research and development and innovation at four science and technology parks upgraded.** Advanced research laboratories and product development facilities at the four project STPs will be upgraded with advanced R&D equipment enabled with fourth industrial revolution capability to improve R&D results.[32] The upgraded facilities will focus on priority sectors under the government strategy and will undergo regulatory certification.[33] R&D facilities for incubating start-up companies, with coworking spaces and fabrication laboratories for prototyping, will be scaled up with new equipment to support start-up incubation. This output will also construct a new building at IPB for halal food innovation, incorporating gender-sensitive, socially inclusive,[34] and climate-resilient features. Overall, this output will boost the maturity level of the four project STPs from madya (intermediate) to utama (advanced).[35]

13. **Output 2: The four science and technology parks' research and development administration, partnerships, and start-up incubation strengthened.** This output will provide (i) ¥4,283.18 million in grants for applied research to research teams at the four project STPs to encourage R&D that has community, commercial or industrial utility; and (ii) ¥1,507.10 million in grants for start-up incubation to students, academic staff and/or alumni, of the four project STPs to finance the development of incubation companies into financially viable companies.

14. The award of grants will be conducted through calls for proposals annually over the project lifecycle which will be guided by common eligibility requirements, evaluation criteria, and selection procedures.[36] To access an applied research grant, researchers must collaborate with either private companies, local community organizations, or international research institutions to create demand-driven R&D. All applied research involving external parties will require a partnership agreement with the project universities. Only applied research carried out in collaboration with private companies will require contribution in cash or in kind. Research involving communities will be aligned with the *tri dharma* principle of providing services to the communities (para. 6), and thus will not require any contribution or cost-sharing. Applied research with international research institutions will involve each party contributing according to its own share of the research cost. Applied research is envisioned to result in the development of 167 innovations or products; 18 strategic R&D projects involving communities, with a focus on social inclusion, gender mainstreaming, and/or climate adaptation and mitigation; and 21 joint research projects with reputable international institutions. To strengthen commercialization potential, applied research will be pegged at TRLs 5–9 and 106 R&D projects will achieve TRL 9.[37] Under the start-up incubation grants, 3,750 students will attend entrepreneurship training courses, while 470 start-

[32] As part of the upgrades, some minor works such as electrical wiring, repainting, and replacement of windows and ventilators will also be carried out.

[33] These include international standard organization (ISO) certifications such as ISO9000 and ISO14000, Hazard Analysis Critical Control Point, and Halal certifications.

[34] Gender-sensitive and socially inclusive features include lactation rooms, well-lit public areas, furniture for persons with disabilities, ramps for wheelchair access, tactile walkways, and security camera systems in public areas.

[35] An intermediate STP provides science and technology in a complete and adequate manner with good outcomes but has room to develop and grow. An advanced STP is a complete and mature ecosystem, supporting regional economic impacts in stimulating technology transfer and innovation start-up, and offers services to industry.

[36] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[37] Common Guideline of Measurement and Decision of TRL (accessible from list of linked documents in Appendix 2). TRL measures the maturity of applied research, or its readiness for commercialization. It is measured systematically in terms of adoptability by users - governments, industry, or society. TRL 9 is the highest-level R&D products/solutions, which are proven to work in real world operational environment.

up teams will be incubated. Networking and market linkages will be organized for start-ups to ensure better business sustainability. To increase women's participation in the start-up program, the start-up incubation grants will support engagement of female mentors and participation of female start-up members in marketing events, business networking, and social media campaigns.

15. **Output 3: Capacity of the four science and technology parks and the Ministry of Education, Culture, Research, and Technology strengthened.** This output will (i) enhance the capability of researchers, particularly female researchers, at the four project STPs through international post-doctorate scholarships in the priority economic sectors; (ii) train STP administrators to develop, implement, and monitor triple-helix application (footnote 14); and (iii) improve the capacity of the MOECRT and STP officials in financial management, procurement, gender mainstreaming, and safeguards monitoring through training and other hands-on support over the project lifecycle. The output will also strengthen MOECRT's monitoring and evaluation system to collate and analyze project data, including sex-disaggregated data for policy and decision-making.

C. Value Added by ADB

16. The project design has incorporated international best practices and assessment of R&D and innovation in Indonesia, such as support for R&D collaboration with industry and a focus on technology start-ups.[38] The project will deliver demand-driven R&D in collaboration with the private sector or communities and create a sustainable start-up ecosystem. To align research focus areas with national priorities and improve the R&D ecosystem, the project will create synergies with several ADB projects: (i) the Higher Education for Technology and Innovation Project, which supports the Sepuluh Nopember Institute of Technology in Surabaya to strengthen its STP through infrastructure development, financing for research and innovation, and support for start-up incubation (footnote 13); (ii) the Boosting Productivity through Human Capital Development Program, covering reforms to improve access to, and the quality and relevance of, higher education; and (iii) the Competitiveness, Industrial Modernization, and Trade Acceleration Program, covering reforms to strengthen the R&D ecosystem; upgrade technology used by micro, small, and medium-sized enterprises; and strengthen regulations for establishing techno park zones.[39] ADB brings substantial experience and knowledge in human capital development, R&D and innovation from Indonesia and across the region to add value to this project. At the same time, ADB will explore nurturing start-up incubation through its network[40] and ADB Ventures.[41]

17. **Addressing climate change.** The project promotes Indonesia's effort in supporting low carbon and climate-resilient development through R&D in relevant economic sectors as outlined in Indonesia's green growth road map,[42] low carbon development initiative,[43] and updated nationally determined contributions.[44] The new IPB building will adhere to safe, low-carbon, green, climate-resilient, and inclusive design principles as defined in relevant national building

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[38] Research and Development and Innovation Practices in Higher Education Institutions in Selected Asian Economies (accessible from the list of linked documents in Appendix 2).

[39] ADB. Indonesia: Boosting Productivity through Human Capital Development Program (Subprogram 1); and ADB. Indonesia: Competitiveness, Industrial Modernization, and Trade Acceleration Program (Subprogram 1).

[40] ADB established the Open Innovation Platform in 2019 to bring together partners from start-ups, academe, governments, accelerators, technology organizations. to co-create innovative solutions for Asia and the Pacific.

[41] ADB Ventures. The project universities will be linked up with ADB Ventures to explore financing for start-ups.

[42] National Development Planning Agency (BAPPENAS). 2020. *Accelerating P4G'S Partnerships and Indonesia's Leadership in Green Growth and 2030 Global Goals*. Jakarta. The green growth roadmap comprises of a set of actions that seek to improve green investment climate, integrate social and environmental benefits and costs in green investments, and ensure green investments are underpinned by good institutional capacity and governance.

[43] BAPPENAS. 2019. *Low Carbon Development: A Paradigm Shift towards a Green Economy in Indonesia*. Jakarta.

[44] Indonesia's Nationally Determined Contribution outlines its transition to a low carbon and climate resilience future.

codes and standards.[45] Based on climate adaptation features of the new building, climate change impact for this project is categorized as medium. Climate change mitigation R&D in vehicle electrification, renewal biomass from agriculture by-products, energy-efficient building technology, and energy storage technology will be supported. Climate change adaptation R&D projects in smart agriculture, disaster mitigation, and sustainable food production will also be supported. The project will further support climate action with R&D in renewable energy through a $9 million grant application under the Climate Investment Funds-Accelerating Coal Transition investment plan.[46] Knowledge and skill sets developed through R&D in renewable energy will support the retraining of workers in the fossil fuel energy industry who will be affected by the clean energy transition.

D. Summary Cost Estimates and Financing Plan

18. The project is estimated to cost ¥22,599.05 million (Table 1).

19. Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM) (footnote 36).

Table 1: Summary Cost Estimates
(¥ million)

Item			Amount[a]
A.	**Base Cost**[b]		
	1.	Output 1: Facilities for R&D and innovation at four STPs upgraded	10,997.48
	2.	Output 2: The four science and technology parks' R&D administration, partnerships, and startup incubation strengthened	7,100.87
	3.	Output 3: Capacity of the four STPs and the MOECRT strengthened	2,504.85
		Subtotal (A)	**20,603.21**
B.	**Contingencies**[c]		**1,570.19**
C.	**Financial Charges During Implementation**[d]		**425.65**
		Total (A+B+C)	**22,599.05**

MOECRT= Ministry of Education, Culture, Research, and Technology; R&D = research and development; STP = science and technology park.
Note: Numbers may not sum precisely because of rounding.
[a] Excludes taxes and duties of ¥2,328.50 million, which will be financed by the government through tax exemption.
[b] In mid-2022 prices as of June 2022.
[c] Includes physical and price contingencies, and a provision for exchange rate fluctuation.
[d] Includes interest, commitment, and other charges on all sources of financing to be funded by the government.
Source: Asian Development Bank estimates.

20. The Government of Indonesia has requested a regular loan of ¥20,487.11 million[47] from ADB's ordinary capital resources to help finance the project. The loan will have a 19-year term, including a grace period of 6.5 years; an interest rate determined in accordance with ADB's Flexible Loan Product; a commitment charge of 0.15% per year; and such other terms and conditions set forth in the draft loan agreement. Based on the straight-line method, the average maturity is 12.5 years, and there is no maturity premium payable to ADB.

21. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to works, goods, consulting services, applied research and start-up grants, capacity development,

[45] In accordance with Ministry of Public Works and Housing Regulations No. 14/PRT/M2017 on Ease-of-Access Requirements to Buildings and No. 02/PRT/M/2015 on Green Buildings.
[46] Climate Investment Funds (CIF) was established in 2008 with $10.5 billion donor contributions to supports low-carbon and resilient investment in 72 countries. At the G7 summit in 2021, donors announced their support to CIF funding programs for Accelerating Coal Transition Investment.
[47] ¥147.90 = $1.00 as of 7 November 2022.

and operational costs for project management. The government's contributions will cover works, goods, applied research and start-up grants, recurrent costs, taxes and duties for project-financed items, and financing charges.

Table 2: Summary Financing Plan

Source	Amount (¥ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	20487.11	90.7
Government of Indonesia	2111.94	9.3
Total	**22599.05**	**100.0**

Source: Asian Development Bank and National Development Planning Agency estimates.

22. Climate mitigation is estimated to cost ¥1,301.52 million and climate adaptation is estimated to cost ¥359.40 million. ADB will finance 100% of mitigation costs and 100% of adaptation costs.[48]

E. Implementation Arrangements

23. The MOECRT, through its Directorate General of Higher Education, Research and Technology, will be the executing agency and will have oversight responsibility for the project. It will establish a project management unit (PMU) to manage procurement, finance, monitoring, and evaluation; and to oversee the allocation process for the applied research and start-up grants. The four project universities will be the implementing agencies. A project implementation unit (PIU) will be established at each STP. The implementation agencies will be responsible for the selection of applied research and start-up grantees, administration of the grants, and financial and performance accountability, based on the grant operation guidelines (footnote 36). The MOECRT will assign a procurement committee to manage the bidding process for goods, works, and services in accordance with its regulations and the ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).[49]

24. Implementation arrangements are summarized in Table 3 and described in detail in the PAM.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	January 2023–December 2027		
Estimated completion date	31 December 2027		
Estimated loan closing date	30 June 2028		
Management			
(i) Oversight body	Project Steering Committee Chair: Director General of DGHERT, MOECRT Members: Secretary General and head of planning, MOECRT; deputy minister and director for Higher Education, Science and Technology, BAPPENAS; Director General for Fund and Risk Management, MOF; rectors of IPB, ITB, UGM, and University of Indonesia.		
(ii) Executing agency	MOECRT through DGHERT		
(iii) Key implementing agencies	IPB, ITB, UGM, and University of Indonesia		
(iv) Implementation unit	PMU at DGHERT; PIU at each STP (total of 116 staff)		
Procurement	Open competitive bidding	72 contracts	¥9,144.66 million

[48] Climate Change Assessment (accessible from the list of linked documents in Appendix 2).

[49] Government of Indonesia, MOECRT. 2022. *Decision of Secretary General Ministry of Education, Culture, Research, and Technology, Number 22/P/2022, on Working Tasks of the Implementing Unit and the Procurement Unit for Goods and Services*. Jakarta.

Aspects	Arrangements		
	Request for quotations	38 contracts	¥822.32 million
	Direct contracting	9 contracts	¥378.62 million
Consulting services	Quality- and cost-based selection	1 contract (construction supervision) (120 person-months)	¥29.58 million
	ICS (experts for PMU and STPs)	256 person-months	¥319.46 million
Retroactive financing and/or advance contracting	No retroactive financing or advance contracting planned		
Disbursement	Disbursement of the loan proceeds will follow ADB's *Loan Disbursement Handbook* (2022, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank; BAPPENAS = National Development Planning Agency; DGHERT = Directorate General of Higher Education, Research and Technology; ICS = individual consultant selection; IPB = IPB University; ITB = Bandung Institute of Technology; MOECRT = Ministry of Education, Culture, Research, and Technology; MOF = Ministry of Finance; PIU = project implementation unit; PMU = project management unit; STP = science and technology park; UGM = Gadjah Mada University.
Source: Asian Development Bank.

III. DUE DILIGENCE

A. Economic and Financial Viability

25. The economic analysis was conducted by comparing "with-project" and "without-project" scenarios. The project is expected to generate benefits through (i) revenues from sales and services of successful start-ups incubated under the project, (ii) jobs created by successful start-ups, (iii) royalties received by universities from patents and licenses, and (iv) increased employment rate and higher earnings of future graduates benefitting from the R&D facilities and start-up ecosystem established under the project. The overall economic internal rate of return (EIRR) is estimated at 15.4%, indicating that the project is economically viable as its value is above the economic opportunity cost of 6.0%. The economic net present value is estimated at ¥21,327.18 million at a discount rate of 6.0%. The sensitivity of the EIRR was tested against potential adverse scenarios such as investment and recurrent cost overruns, and lower-than-expected or delayed realization of economic benefits. In all cases, the EIRR exceeds the discount rate of 6.0%. The EIRR is most sensitive to two combined parameters—a decrease in start-up success rate and a decrease in expected revenue, which resulted in a reduction of the EIRR from 15.4% to 10.0%.[50]

26. The project's financial viability was assessed drawing on revenue and expenditure projections of the universities. The project's financial internal rate of return (FIRR) is 19.5%, with an estimated financial net present value of ¥67,865.01 million, computed at the weighted average cost of capital of 0.38%. Further analysis was carried out to examine the stability of the FIRR and financial net present value to adverse changes. In all scenarios, the FIRR was more than 7.0%, which is higher than the weighted average cost of capital, indicating the project is financially viable.[51] Fiscal impact analysis confirms that the government has adequate financial resources to fulfill its financial obligations. Operation and maintenance of facilities, including upgrades made under the project, is estimated at ¥535.05 million, averaging ¥107.01 million annually, during the project life. There is adequate budget to cover operation and maintenance of the facilities financed under the project through the regular operations budget provided by the MOECRT to the project universities.

[50] Financial Analysis and Economic Analysis (accessible from the list of linked documents in Appendix 2).
[51] Key variables such as increase in aggregated expenditure, decrease in revenues, and significant drop in revenue proceeds from sale of shareholdings in start-ups were used.

B. Sustainability

27. The government has consistently allocated at least 20% of the national budget to education (including research and innovation for higher education) for the MOECRT, the Ministry of Religious Affairs, the Ministry of Transport, and the Ministry of Industry. Sources of counterpart funding for the project include the central government's annual budget allocations to each project university, tax-free revenue from tuition, research grants from other government agencies, revenue from STP tenants, and revenue from intellectual property right licensing. With project interventions, the universities will receive increased income from (i) an increase in licensing fees from intellectual property rights; (ii) expanded services provided by STPs such as rental of upgraded facilities, laboratory testing, and product prototyping; and (iii) an increase in collection of fees from additional students' enrollment because of improved and expanded facilities financed under the project. The applied research and start-up grants will sustain beyond the project lifecycle as R&D has been mainstreamed into education budget,[52] and start-up will continue under universities start-up program.

C. Governance

28. The country's public financial management system has strengths that will ensure sound governance, reporting, and oversight: an automated financial management information system with a defined central treasury management system; consistent accounting and budgetary classifications; and convergence of national accounting and auditing standards with international standards.[53] The system is transparent and credible and ensures that financial information pertaining to use of public funds is disclosed accurately to the public. At the project level, the MOECRT and project universities have fully automated financial management systems with adequate financial reporting and oversight. These systems feature well-developed accounting systems and robust links between planning, budgeting, and accounting. The executing and implementing agencies have internal audit departments to provide oversight and are regularly audited by independent external auditors. The assessed pre-mitigation financial management risk is *moderate*. Implementing agencies lack familiarity with ADB's financial management and disbursement requirements, and the MOECRT and the universities lack capacity in preparing consolidated cash-based financial statements. To mitigate these risks, the project will (i) recruit financial management staff in addition to procurement staff for the PMU and PIUs, and (ii) prepare a financial management manual and conduct training for PMU and PIU staff on ADB's financial management requirements and disbursement procedures.

29. All procurement of ADB-financed works, goods, and consulting services will be undertaken in accordance with the ADB Procurement Policy and Procurement Regulations for ADB Borrowers. Strategic procurement planning was done to identify procurement risks, develop mitigating measures, review procurement options, and agree on fit-for-purpose procurement arrangements. The project will achieve value for money by using e-procurement to lower transaction costs and enhance transparency.

30. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and the MOECRT. The specific policy requirements and supplementary measures are described in the PAM (footnote 36).

D. Poverty, Social, and Gender

[52] R&D grants such as Kedaireka amount to Rp1 trillion was introduced in 2021.
[53] World Bank. 2018. *Indonesia Public Expenditure and Financial Accountability: Assessment Report 2017.* Jakarta.

31. To support the vulnerable and disadvantaged groups in Indonesia, the project will support 18 strategic research projects and community solutions that will have strong positive social, gender, and climate impacts. Women's participation in R&D across the public and private sectors, including in higher education institutions, and women researchers with doctorate qualifications are comparatively lower than men (footnote 27). At the four project universities, the average percentage of female researchers with doctorate qualification is 58.6% (males 64.8%); the share of female enrollment in post graduate master qualification is 50.7% and in doctorate qualification is 50.8%; 33.4% of the start-up participants are females; and 42% of the mentors for start-ups are females. The project is categorized *effective gender mainstreaming*. Gender actions include (i) strengthening the research capability of female researchers, (ii) encouraging more female students to participate in R&D and innovation, (iii) increasing representation of women working in science and technology field to support female-led technology start-ups as mentors, and (iv) incorporating gender-sensitive and inclusive features in the R&D facilities (footnote 34).

E. Safeguards

32. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[54]

33. **Environment (category C).** The project will support the procurement of equipment to strengthen R&D capacities of four STPs. It will refurbish existing STP facilities with minor renovations and construct a new building at the IPB STP for halal food innovation. Such works may potentially cause minor short-term and localized adverse environmental impacts and occupational risks during construction. A code of construction practice had been prepared to guide environmental and safety risk management during minor civil works.[55] Compliance with the code of construction practice will be verified by the relevant PIU and the construction supervision consultant, who will report to ADB through consolidated annual project progress reports.

34. **Involuntary resettlement (category C).** The project is classified category C for involuntary resettlement, as per ADB's Safeguard Policy Statement (2009). The halal business incubator building at IPB will be constructed on existing land within the university's boundaries. Involuntary resettlement is not expected, and preparation of a resettlement plan and social safeguard monitoring report is not required, as there are no people using or occupying the land.

35. **Indigenous peoples (category C).** The project is not expected to affect indigenous peoples as there are no indigenous peoples living in the project areas. Indigenous peoples safeguard requirements will not be triggered by the research and partnership activities.[56]

F. Summary of Risk Assessment and Risk Management Plan

36. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[57]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Detailed financial documentation requirements for applied research and start-up incubation grants will	The project will use established grants procedures, and payment system. The science and technology parks will limit

[54] ADB. Safeguard Categories.
[55] Code of Construction Practice (accessible from the list of linked documents in Appendix 2).
[56] Social Safeguards Due Diligence Report (accessible from the list of linked documents in Appendix 2).
[57] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Risks	Mitigation Measures
result in additional administrative burden to the grantees, resulting in delay in research and development and innovation outputs and liquidation of expenditure.	the number of grantees per fiscal year. They will use simplified reporting requirements and automated financial management systems and submit electronic records. Payments to recipients using virtual accounts and e-wallets will be monitored and reported. The implementation agencies will monitor implementation activities of grantees.
Delay in equipment procurement may increase cost because of price escalation, and potentially render specifications determined during project processing obsolete and/or require updating, as the technology rapidly advances.	Procurement plan has been prepared for the first 18 months and will be updated regularly. The project management unit will prepare the bidding packages prior to loan signing and will advertise once the loan is effective, to ensure timely procurement.
Government regulations requiring local content for procurement of goods may delay procurement and contract implementation.	The executing agency will conduct market assessments of (i) available equipment in the national market and (ii) other procurement packages, in compliance with local regulations. It will expedite the approval for importing goods.
The executing agency's and implementing agencies' use of cash basis accounting and lack of familiarity with Asian Development Bank guidelines may cause delays and misstatements in the project financial statements, leading to delays and inaccuracies in financial reporting and auditing.	A project financial management manual will be prepared to provide guidance to relevant project staff. Trainings on Asian Development Bank guidelines, loan disbursement procedures, and financial management (including rollout of the manual) will be conducted.

Source: Asian Development Bank.

IV. ASSURANCES AND CONDITIONS

37. The government and the MOECRT have assured ADB that implementation of the project shall conform to all applicable ADB requirements, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and loan documents.

38. The government and the MOECRT have agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement. The following conditions will apply for the withdrawal of loan proceeds for the first batch of applied research and start-up incubation grants: (i) agreement between MOECRT and ADB on the operating guidelines and selection criteria; (ii) MOECRT's no objection letter to the successful applicants, confirming fulfillment of the relevant selection criteria; and (iii) MOECRT's written confirmation that the total amount of successful grant proposals does not exceed ¥739,500,000.

V. RECOMMENDATION

39. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of ¥20,487,108,000 to the Republic of Indonesia for the Promoting Research and Innovation through Modern and Efficient Science and Technology Parks Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's Flexible Loan Product; for a term of 19 years, including a grace period of 6.5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan agreement presented to the Board.

Masatsugu Asakawa
President

14 November 2022

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with
Competitiveness of Indonesia's economy and sustained economic growth strengthened through research and development and innovation (National Medium-Term Development Plan, 2020–2024)[a]

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
Outcome Quality and relevance of research and development and innovation system in the four STPs improved	**By 2029:** a. The four project STPs achieved the advance STP status[b] (2021 baseline: intermediate status) (OP 1.1; OP 1.2.1) b. At least one unicorn, six Series B, and three Series C start-ups incubated at the four project STPs[c] (2021 baseline: 0) (OP 1.2.1) c. Number of intellectual properties[d] from the four project STPs used by industries increased to 230[e] (2021 baseline: 60) (OP 1.2.1)	a. STP maturity assessment by the National Research and Innovation Agency b. MOECRT annual project M&E report and STP annual reports c. STP annual reports	R: Indonesia does not mobilize adequate resources for R&D and innovation because of other pressing needs such as those arising from the COVID-19 pandemic. A: Future leadership change in each university will continue to prioritize R&D and innovation through the STP
Outputs 1. Facilities for research and development and innovation at four science and technology parks upgraded	**By 2029:** 1a. At least 35 research laboratories and product development facilities installed in the four project STPs in the priority industry sectors[f] with gender-sensitive and socially inclusive features[g] (2021 baseline: 0) (OP 1.2.1; OP 2.4.1) 1b. At least 30 new research laboratories and product development facilities are certified[h] (2021 baseline: 0) (OP 1.2.1) 1c. 59 technology start-ups and incubation facilities in the four project STPs upgraded with start-up offices and fabrication laboratories, with gender-sensitive and socially inclusive features[g] (2021 baseline: 19) (OP 1.2.1; OP 2.4.1) 1d. One new building for halal food R&D at IPB constructed, with gender-sensitive and socially inclusive features,[g] and green resilience designs [j] (2021 baseline: 0) (OP 1.2.1; OP 2.4.1; OP 3.1.3; OP 3.2.5)	1a.–1c. MOECRT annual project M&E reports and STP annual reports 1d. *Sertifkat laik fungsi*[i] issued for IPB	A: Existing experts in the STPs will spearhead the establishment of new research laboratories and product development facilities.
2. The four science and technology parks' research and development administration, partnerships,	2a. 470 teams (including students, alumni, and industry partners) qualified for start-up incubations in the four project STPs (2021 baseline: 257) (OP 1.2.1, OP 2.1.3)	2a.–2c. MOECRT annual project M&E reports and STP annual reports	A: STPs streamline administrative procedures for application, processing, and disbursement of funds for start-up and R&D programs.

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
and startup incubation strengthened	2b. At least 37.5% of start-up incubation participants are women at each of the four project STPs[k] (2021 baseline: average of the four project STPs: 33.4%; IPB: 34.0%; ITB: 30.0%; UGM: 34.0%; UI: 35.5%) (OP 1.2.1)		A: Business enterprises are ready to work with local public institutions on R&D instead of importing outside technologies or R&D.
	2c. At least 10% of start-up incubation[k] teams proceeded to acceleration phase[l] (2021 baseline: 0) (OP 1.2.1)		
	2d. 18 strategic research projects and community solutions with social and gender equality, and climatic adaptation thematic areas, completed; and studies published[m] (2021 baseline: 0) (OP 1.3; OP 2.3.2; OP 3.2.4)	2d.–2f. MOECRT annual project M&E reports, or R&D paper published in an international journal, or patent filed before project completion	
	2e. Maturity rating of technology readiness level 9 achieved by at least 106 R&D projects[n] (2021 baseline: 54) (OP 1.1)		
	2f. At least 21 joint research collaborations with international research institutions completed[o] (2021 baseline: 2) (OP 1.1)		
	2g. 167 innovation products and solutions developed (2021 baseline: 38) (OP 1.2.1)	2g. MOECRT annual project M&E reports, STP annual report, and/or agreements with industrial partners	
	2h. At least 3,750 university students participated in pre-startup training and hackathon and used the R&D and innovation facilities (Baseline: 0) (OP 1.1)	2h. MOECRT annual project M&E reports and STP annual reports	
3. Capacity of the four science and technology parks and the Ministry of Education, Culture, Research and Technology strengthened	3a. 174 researchers from the four project STPs, of whom at least 30% are women, completed post-doctorate training or fellowships in the priority areas of the relevant STP[f] (2021 baseline: for training: 0; for women participants: 0) (OP 1.1; OP 2.2.1)	3a.–3c. Training records such as certificate and attendance record; MOECRT annual project M&E report	R: Prolonged COVID-19 restrictions delays overseas training and fellowship programs
	3b. 207 staff from the four project STPs and MOECRT trained,[p] of whom at least 35% are women, and reported overall improvement in knowledge and understanding in project management; research and innovation management; procurement, contract management, and financial management (2021 baseline: for training: 0; for women participants: 0) (OP 1.1; OP 2.1.1)		A: University leadership fully supports the need for STPs to engage in economic and entrepreneurial activities to generate revenue and to become sustainable.

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
	3c. 77 staff from the four project STPs, of whom at least 40% are women, reported overall increased knowledge and competencies in enhancing STPs as a triple-helix hub for commercialization of research products (2021 baseline: for training: 0; for women participants: 0) (OP 1.1, OP 2.1.1)		

Key Activities with Milestones

1. Facilities for research and development and innovation at four science and technology parks upgraded

1.1 Develop detailed engineering design for new IPB building for research (Q4 2022)
1.2 Commence contracting for equipment and furniture for start-up incubation facilities and R&D facilities (Q4 2025)
1.3 Initiate contracting for retrofitting to upgrade start-up incubation facilities and R&D facilities (Q4 2026)
1.4 Install, test, and commission R&D and start-up incubation equipment (Q2 2027)

2. The four science and technology parks research and development administration, partnerships, and start-up incubation strengthened

2.1 Dialogue with international R&D cooperation partners and establish joint R&D agreements (Q4 2023)
2.2 Dialogue with business enterprises on R&D collaboration and conclude joint R&D agreements (Q4 2024)
2.3 Select, fund, and support teams for the start-up incubation program (Q4 2026)
2.4 Conduct outreach and promotional activities for innovation and start-up development (Q3 2027)
2.5 Conduct applied R&D activities in priority focus sectors of the project[f] (Q4 2027)
2.6 Conduct applied R&D jointly with international research institutions (Q4 2027)
2.7 Organize counselling and motivational sessions for female students in the four STPs on prospects and opportunities in applied research and start-up incubation (Q4 2027)
2.8 Design gender-specific targeting and mobilization activities (Q4 2027)

3. Capacity of the four science and technology parks and the Ministry of Education, Culture, Research and Technology strengthened

3.1 Improve M&E capacity and protocols, including for the administration of pre-training and post-training surveys and collection and analysis of sex-disaggregated data (Q4 2023)
3.2 Organize capacity-building courses for staff of the MOECRT and the four STPs on project management, procurement management, contract management, gender mainstreaming, and financial management (Q2 2027)
3.3 Promote gender mainstreaming and integration of gender throughout the R&D and innovation life cycle (Q4 2027)
3.4 Identify international and national training programs for capacity building in R&D competency (Q3 2023)
3.5 Dispatch researchers and technologists for international post-doctorate and fellowship training[p] (Q4 2025)
3.6 Implement knowledge management and communication strategy and action plan to promote project activities and achievement (Q4 2022)
3.7 Implement a digital operation system to coordinate project implementation activities (Q4 2022)

Project Management Activities

Prepare procurement documents for civil works, equipment, and consulting services
Establish the project management unit and project implementation units
Establish applied research and start-up incubation grants selection procedure, grant disbursement mechanism, and financial management arrangements
Engage project implementation consultants
Prepare quarterly and annual progress reports, gender action plan reports, and safeguards reports (as scheduled)
Conduct inception, semiannual review, midterm review, and project completion review missions (as scheduled)
Prepare and submit annual audited project financial statements
Prepare and submit project completion report

Inputs

Asian Development Bank: ¥20,487.11 million (loan)
Government of Indonesia: ¥2,111.94 million

A = assumption; COVID-19 = coronavirus disease; IPB = IPB University; ITB = Bandung Institute of Technology; M&E = monitoring and evaluation; MOECRT = Ministry of Education, Culture, Research, and Technology; OP = operational priority; Q = quarter; R = risk; R&D = research and development; STP = science and technology park; UGM = Gadjah Mada University; UI = University of Indonesia.

[a] Government of Indonesia. 2020. *National Medium-Term Development Plan, 2020–2024*. Jakarta.

[b] STP maturity considers a broad dimension from infrastructure facilities to soft components and is assessed based on five indicators: input, process, output, outcome, and impact. An intermediate STP provides science and technology in a complete and adequate manner with good outcomes but has room to develop and grow. An advanced STP is a complete and mature ecosystem, which offers services to industry and supports regional economic impacts, especially in stimulating technology transfer and innovation start-up.
[c] These targets are aggregated targets across all four project STPs. Valuations are set at $30 million–$60 million for Series B, more than $60 million for Series C, and at $1 billion for unicorns. Unicorn companies are those that reach a valuation of $1 billion without being listed on the stock market.
[d] Intellectual property filing typically refers to patents, utility models, trademarks, and copyrights.
[e] Refers to intellectual property generated and filed under the STPs. The target of 230 is based on the universities' projections using past data and taking into consideration support for private sector collaboration under the project.
[f] The priority sectors of the four STPs are: (i) for ITB—engineering (transport and energy), information and communication technology, disaster prevention, and food and health technology; (ii) for UGM—health and pharmaceutical, agro-industry, and renewable energy; (iii) for IPB—agro-processing, food technology, and natural cosmetics and pharmaceuticals; and (iv) for UI—medical device technology, drugs food innovation, and engineering innovation including artificial intelligence and renewable energy.
[g] Gender-sensitive and socially inclusive features will include lactation rooms, well-lit public areas, furniture to accommodate persons with disabilities, ramps for wheelchair access, tactile walkways, and security camera systems in public areas.
[h] Examples of certifications are International Standard Organization (ISO) certifications such as ISO9000 and ISO14000, Hazard Analysis Critical Control Point, Good Manufacturing Practice, and Halal certification. Not all research laboratories or product development facilities need to obtain certification.
[i] *Sertifikat Laik Fungsi* is a function-worthy certificate required prior to commencing operation of the entire facility.
[j] Green resilience design refers to the use of durable well insulated materials for construction (such as structural insulated panels, insulating concrete forms, recycled wood), reducing and recycling construction and demolition waste, and design features with good ventilation and support energy efficiencies.
[k] The share of self-employed women and men out of the population of employed with tertiary education is unknown in Indonesia. The average among the Organization for Economic Co-operation and Development (OECD) countries was 9.7% for women and 16.4% for men in 2017. OECD Statistics. Entrepreneurship Indicators (accessed 23 October 2022).
[l] Acceleration phase is still a start-up incubation stage. It refers to the stage where (i) start-ups are able to prove business viability and (ii) there is a sustainable source of income from business activities and customers.
[m] This will include R&D supporting the less advantaged. Previous research and study projects related to social and gender equality that have been conducted by STPs include addressing stunting in children and one village–one chief executive officer.
[n] Technology readiness level (TRL) measures the maturity of applied research, or its readiness for commercialization. It is measured systematically in terms of adoptability by users—governments, industry, or society. TRL 9 is the highest-level R&D products/solutions, which are proven to work in real world operational environment.
[o] Joint research collaboration will involve mutually reinforcing activities and benefits to the STP and the partner research institution, entailing meaningful, concrete R&D activities on the STP's priority research cluster(s).
[p] Participants will be selected and dispatched in batches annually.

Contribution to Strategy 2030 Operational Priorities

Expected values and methodological details for all OP indicators to which this operation will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 2).
Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=55063-001-3

1. Loan Agreement
2. Sector Assessment (Summary): Education (Tertiary)
3. Project Administration Manual
4. Financial Analysis
5. Economic Analysis
6. Summary Poverty Reduction and Social Strategy
7. Risk Assessment and Risk Management Plan
8. Contribution to Strategy 2030 Operational Priorities
9. Climate Change Assessment
10. Gender Action Plan

Supplementary Documents

11. Financial Management Assessment
12. Strategic Procurement Plan
13. Code of Construction Practice
14. Social Safeguards Due Diligence Report
15. Science and Technology Parks Profile and Road Map
16. Funding Schemes for Research and Development and Innovations
17. Research and Development and Innovation Practices in Higher Education Institutions in Selected Asian Economies
18. Common Guideline of Measurement and Decision of Technology Readiness Level