Asia’s Knowledge Economies: Next Policy Agenda
ABBREVIATIONS

ADB – Asian Development Bank
DMC – developing member country
ICT – information and communication technology
KBE – knowledge-based economy
KEI – Knowledge Economy Index
OECD – Organisation for Economic Co-operation and Development
R&D – research and development
RSDD – Regional and Sustainable Development Department
TA – technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Type – Research and development technical assistance (RDTA)
Targeting classification – General intervention
Sectors – Multisector—education; public sector management; transport, and information and communication technology
Themes (subthemes) – Economic growth (knowledge, science, and technological capacities); capacity development (institutional development)
Location (impact) – National (high), regional (high)

NOTE

In this report, “$” refers to US dollars.

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In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.
I. INTRODUCTION

1. As one of the main drivers of competitiveness, knowledge is profoundly shaping patterns of economic growth and development. Developing countries that fail to transform effectively into knowledge-based economies (KBEs) will fall further behind more advanced countries, widening the disparities between developed and developing economies. The critical role of knowledge and innovation in enhancing productivity and growth was underscored in the flagship publication of the Asian Development Bank (ADB), *Asia 2050: Realizing the Asian Century*.1 The report concludes that pursuing a development process driven by effective creation, dissemination, and application of knowledge will be essential for countries in Asia to avoid the middle-income trap.

2. In the past, robust growth rates of Asian economies were largely attributable to increases in physical capital and labor inputs; knowledge, innovations, and entrepreneurship played a smaller role. However, policy makers and academics increasingly agree that sustaining Asia’s growth and dynamism will require knowledge-based development. The proposed research and development technical assistance (TA)2 will focus on what developing Asian countries must do—in terms of policy reforms and investments in knowledge infrastructure—to become KBEs. The TA will analyze key attributes of KBEs in the context of developing Asia for promoting inclusive and sustainable growth, avoiding the middle-income trap3, and rising further up the value chain of manufacturing and global trade. The design and monitoring framework is in Appendix 1.

II. ISSUES

3. The term KBE usually refers to an economy that produces, disseminates, and applies knowledge to drive competitiveness and achieve environmentally sustainable and inclusive growth. The KBE measure used by the Organisation for Economic Co-operation and Development (OECD) covers three elements: information and communication technology (ICT); science, technology, and innovation; and skills, education, and knowledge-based employment.4 The World Bank’s Knowledge Economy Index (KEI) has four pillars: economic incentives and institutional regime, education and human resources, the innovation system, and ICT infrastructure. Evidence indicates that countries that score higher on the KEI have higher levels of economic development and vice versa.5 Higher KEI values are also associated with higher rates of future economic growth. Taipei, China; Hong Kong, China; Japan; the Republic of Korea; and Singapore score high on the KEI. However, a large number of countries in developing Asia are yet to embark on a full-scale knowledge-driven development process and have lost ground in the KEI. Given the region’s high growth rates, this could imply that knowledge has not kept pace with advances in manufacturing in developing Asia.

4. Driven by rapid growth, many developing countries in Asia are at or are approaching middle-income levels. If developing Asia is to maintain its high growth rates, its knowledge economies need to advance, diversify, and lead to the commercially successful application of science, technology, and innovation. Productivity-driven growth based on more and better knowledge will enable middle-income countries to avoid the middle-income trap and low-income

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2 The TA first appeared in the business opportunities section of ADB’s website on 10 July 2012.
3 The middle-income trap occurs when countries are unable to compete with low-income, low-wage economies in manufactured exports and with advanced economies in high-skill innovations. Such countries cannot make a timely transition from resource-driven growth with low-cost labor and capital to productivity-driven growth.
countries to climb faster to middle-income levels. Knowledge needs to be put to work in Asia as (i) a driver of competitiveness and productivity growth, (ii) a facilitator of welfare and development, and (iii) an enabler of better institutions and good governance.

5. To transition to KBEs, developing Asia must have advanced ICT infrastructure, a highly educated workforce, dynamic research and innovation programs, and a supportive regulatory environment. The following key issues need answering:

(i) What do middle-income countries need to do to upgrade their industries based on knowledge-intensive sectors, and thus avoid the middle-income trap?

(ii) What do low-income countries need to do to leverage knowledge-based development in order to leapfrog onto a faster growth path?

(iii) What kind of investments in knowledge assets are required for countries at different stages of development to augment production, dissemination, and use of knowledge?

(iv) What are the most promising avenues for using knowledge as a tool to promote inclusive growth?

6. While the issue of what constitutes a KBE has been sufficiently analyzed, it would be useful for developing Asia to know more about the policies and interventions needed to advance systematically on the knowledge frontier. The heterogeneity of those countries requires a differentiated analysis of knowledge-based development in low-income and middle-income economies. An analysis is also needed of how investments in knowledge assets and policy reforms can be successfully sequenced by developing countries with different contexts, endowments, and competitive strengths. The TA will enable a systematic analysis of the most promising avenues for developing Asian countries to advance knowledge-based development to avoid the middle-income trap, rise faster up in the global value chain, and facilitate inclusive and sustainable growth.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

7. The impact will be the adoption of effective policies and investments by developing member countries (DMCs) toward advancing as KBEs. The outcome will be improved knowledge of DMCs on policy, regulatory, and institutional reforms, and financing requirements and options for KBEs.

B. Methodology and Key Activities

8. The TA will help DMCs to put in place policies, regulatory regimes, and incentive structures that will accelerate knowledge-based development. The TA will facilitate the evaluation of new paradigms for knowledge economies that can advance economic growth and inclusive and environmentally sustainable development in Asia. The study will shed light on the right combination of policy, strategy, and investment choices appropriate for countries at different stages of development. The study will analyze the pillars of KBE: (i) education and training, (ii) information infrastructure, (iii) regulatory regimes, and (iv) innovation.

9. Education and training. A society of skilled, flexible, and creative people with opportunities for quality education is essential to advance knowledge economies. Of the top 50

engineering and technology universities in the academic year 2011–2012, 10 are in Asia—the People’s Republic of China; Hong Kong, China; Japan; the Republic of Korea; and Singapore—all of which are on top of the World Bank’s KEI Asia list. The study will analyze the opportunities and expected returns from expanding the base of centers of excellence in tertiary education and promoting university–industry partnerships to transform science into market-relevant innovation.

10. **Information infrastructure.** The penetration of mobile and wireless technologies is enabling Asian economies to leapfrog on the technology frontier. Mobile data traffic is expected to grow at a cumulative average growth rate of 78% from 2011 to 2016. Asia and the Pacific and Western Europe will account for more than half of global mobile traffic by 2016. The next frontiers of ICT need to be analyzed for affordable and dispersed applications, along with an e-inclusion strategy to mitigate the digital divide.

11. **Regulatory regime.** Policies and regulatory regimes related to industry, competition, and intellectual property rights can encourage or impede knowledge economies. Predictable policies allow firms to generate, adapt, and adopt new know-how and technologies. The study will examine how governments can encourage firms to invest more in research and development, or act as an angel investor (an investor who provides financial backing for small startups or entrepreneurs). The study will also explore how Asia’s fast-growing economies can strike the right balance between public and private sector roles in industry, financing, and research and development.

12. **Innovation.** Future economic growth must increasingly be sustainable and inclusive, and be derived from innovation-induced productivity growth. A robust science and technology base is crucial for innovations to flourish. From serving the elite few, innovations now need to be directed at products and services that can reach underserved mass markets. The study will therefore explore opportunities for inclusive innovation.

13. Key activities will include the collection of primary and secondary data, empirical analysis of the data, and the development of policy recommendations based on the analysis. Case studies of advanced countries that have successfully become KBEs will be documented and disseminated for developing Asia. While drawing on relevant international experience, the study will focus on solutions specific to developing Asian economies at different levels of development by providing practical policy and investment recommendations. Workshops will be held to discuss the main findings that emerge as the research project proceeds to better articulate policy recommendations for DMCs.

14. The TA will improve DMCs’ knowledge of the options for policy, regulatory, and institutional reforms and financing solutions for advancing KBEs in Asia. Ministries of finance, planning, education, and labor, as well as educational institutions and science and technology bodies, will become aware of best practices to strengthen KBE development processes.

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15. The primary output of the TA will be a strategic report comprising (i) thematic chapters on enabling conditions and success factors for KBEs, and specific policy recommendations to DMCs on advancing KBEs; (ii) country chapters for a few selected developing countries and case studies of successful applications of policy and practice for KBEs in developed countries; and (iii) policy recommendations on the way forward for developing Asia.

16. The secondary outputs of the TA will be a high-level strategic seminar for the dissemination of the findings and recommendations to policy makers of DMCs and other key stakeholders in the region, and a communication plan for taking forward the findings of the study. An international seminar is planned at the 46th Annual Meeting of the ADB Board of Governors in 2013 to discuss the preliminary findings and recommendations of the study. Thereafter, the study report will be finalized, with a communication package to be presented at a final workshop.

17. The primary assumptions include (i) accurate and up-to-date data and information available for analysis, (ii) effective communication of key findings and recommendations, and (iii) sufficient commitment from governments and stakeholders. The main risks include (i) insufficient engagement of key stakeholders in government, business, and academia with the study; (ii) insufficient sharing of data and information; and (iii) exogenous shocks that shift the focus and priority on knowledge economies.

C. Cost and Financing

18. The TA is estimated to cost the equivalent of $1,000,000, and will be financed on a grant basis by ADB’s Technical Assistance Special Fund (TASF-IV). The financing will cover the remuneration and travel expenses of international and national consultants and resource persons, workshops and conferences, publications and knowledge products, and miscellaneous administration expenses. The cost estimates and financing plan are in Appendix 2.

D. Implementation Arrangements

19. ADB will be the executing agency of the TA. The TA will be implemented jointly by ADB’s Regional and Sustainable Development Department (RSDD) and Economics and Research Department in coordination with other key departments. An ADB interdepartmental working group co-chaired by the director general, RSDD and the chief economist will be established to provide a forum for discussion on the implementation of the project and to review interim and final outputs. The working group will include participants from the ADB’s regional departments, the Office of Regional Economic Integration, and Strategy and Policy Department. A team of ADB staff from RSDD and the Economics and Research Department will oversee the research and analysis to be conducted by international and national consultants, and will lead the preparation of the report. ADB staff will also contribute to the writing of sections or chapters of the report. RSDD will lead overall project coordination and management.

20. A high-level panel will be established under the TA, comprising eight internationally recognized experts, to provide strategic guidance to the research study and to develop a set of critical policy recommendations appropriate to DMCs at different levels of development. Drawn predominantly from Asia, the members will bring expertise in economics, finance, trade, industry, the corporate sector, and regulatory frameworks. External members of the high-level panel will be engaged as resource persons for 10 person-days each.
21. International and national consultants will be recruited. The individual consultants will include (i) an international innovation policy and technology expert and team leader (4 person-months); (ii) an international knowledge economy specialist (5 person-months); (iii) an international ICT expert (3 person-months); (iv) an international education, science and technology, and industry expert (3 person-months); (v) national thematic experts in specific disciplines (11 person-months) and national research assistants (11 person-months); and (vi) local consultants for administrative support (15 person-months). Local consultants will provide administrative support. Individual consultant recruitment is proposed for all positions to select the best combination of thematic experts in the shortest time. The outline terms of reference are in Appendix 4.

22. Consultants will be engaged in accordance with ADB’s Guidelines on the Use of Consultants (2010, as amended from time to time).

23. Disbursements under the TA will be in accordance with ADB’s *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).

24. The TA will be implemented in two stages. During the first stage in September–October 2012, ADB and the international consultants, with guidance from the high-level panel, will prepare a detailed design for the study—finalizing the scope, thematic areas, country coverage, methodology, and implementation plan. Based on the detailed study design, the terms of reference and areas of expertise of the national experts will be finalized. The second stage of the study will be from October 2012 to September 2013, with dissemination activities until December 2013. Fieldwork will not start in a DMC unless a no-objection letter has been obtained from the government. The outline of the draft report in Appendix 3 is indicative.

25. In addition, strategic partnerships with relevant institutions, such as the Republic of Korea’s Knowledge Sharing Program, will be pursued during implementation. The objective of these partnerships will be to learn firsthand from successful cases in the region.

IV. THE PRESIDENT’S DECISION

26. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of $1,000,000 on a grant basis for Asia’s Knowledge Economies: Next Policy Agenda, and hereby reports this action to the Board.
## DESIGN AND MONITORING FRAMEWORK

<table>
<thead>
<tr>
<th>Design Summary</th>
<th>Performance Targets and Indicators with Baselines</th>
<th>Data Sources and Reporting Mechanisms</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
</table>
| Impact DMCs adopt effective policies and investments toward advancing KBEs | KBEs included as a priority in national development plans and policies  
KBE-related investments initiated | Official policy and planning documents and investment plans  
Consultations with stakeholders | Risk  
Exogenous shocks shift government priorities and constrain resources |
| Outcome Knowledge of DMCs (ministries of finance and planning; key institutions for education, science and technology) on options for policy, regulatory, and institutional reforms, and financing solutions to advance KBEs in Asia improved | Citation of the study in DMC policy documents  
Policy recommendations of the study are reflected in some form in documents related to innovation policy and science and technology policy | Studies and policy documents related to knowledge economy  
Country level policy and plan documents | Assumption  
Effective communication of key findings and recommendations |
| Outputs  
1. Strategic report comprising thematic and country chapters on success factors for KBEs and specific policy recommendation prepared | 1. Report and country studies published by Q4 2013  
2. A seminar at the 2013 Annual Meeting of the ADB Board of Governors to discuss study findings held.  
3. A communication package with a summary of the report for dissemination to target audiences in DMCs prepared and media events held from March to September 2013 | TA reports  
Media coverage and seminar and workshop reports | Assumptions  
Accurate and up-to-date data and information available for analysis  
Sufficient commitment and buy-in from the government |  
Risk  
Lack of sufficient engagement by knowledge-based institutions such as research and scientific institutions |
**Activities with Milestones**

1.1 Formation of the eminent persons group and engagement of international knowledge economy expert/team leader (by August 2012)

1.2 Finalization of detailed study design, covering scope, country coverage, methodology, and implementation plan (by October 2012)

1.3 Preparatory consultations in selected countries (October–December 2012)

1.4 Consultations with stakeholders, data collection, and preparation of reports in line with the detailed study proposals (December 2012–March 2013)

1.5 Preparation of initial study findings for discussion at the ADB Annual Meeting in May 2013 Seminar (May 2013)

1.6 Finalization of research outputs and workshop to discuss findings and policy recommendations (July–August 2013)

2.1 Preparation of dissemination plans (September 2013)

2.2 Organization of dissemination workshops and events (September–December 2013)

2.3 Publication of final report (October 2013)

3.1 Preparation of communications plans (September 2013)

3.2 Preparation of policy briefs and summary of the study (September–December 2013)

3.3 Organization of one regional workshop on knowledge economies (September–December 2013)

**Inputs**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount ($’000)</th>
</tr>
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<tbody>
<tr>
<td><strong>ADB (TASF-IV): $1,000,000</strong></td>
<td></td>
</tr>
<tr>
<td>Remuneration and per diem of consultants and resource persons (15 person-months of international consultants; 11 person-months of national experts; 11 person months of research assistants; 80 person-days of resource persons) and 15 person-months of local consultant</td>
<td>$681,920</td>
</tr>
<tr>
<td>Travel</td>
<td>$133,400</td>
</tr>
<tr>
<td>Workshops, conferences, and dissemination</td>
<td>$79,430</td>
</tr>
<tr>
<td>Publications</td>
<td>$30,000</td>
</tr>
<tr>
<td>Contingencies</td>
<td>$75,250</td>
</tr>
</tbody>
</table>

ADB = Asian Development Bank, DMC = developing member country, ERD = Economics and Research Department, KBE = knowledge-based economy, Q = quarter, RSDD = Regional and Sustainable Development Department, TA = technical assistance, TASF = Technical Assistance Special Fund.

## COST ESTIMATES AND FINANCING PLAN

($'000)

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asian Development Bank</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>1. Consultants</td>
<td></td>
</tr>
<tr>
<td>a. Remuneration and per diem</td>
<td></td>
</tr>
<tr>
<td>i. International consultants</td>
<td>383.88</td>
</tr>
<tr>
<td>ii. National consultants</td>
<td>203.00</td>
</tr>
<tr>
<td>iii. Resource persons (high-level panel)</td>
<td>95.04</td>
</tr>
<tr>
<td>b. International and local travel</td>
<td>133.40</td>
</tr>
<tr>
<td>2. Workshops, seminars, and conferences&lt;sup&gt;b&lt;/sup&gt;</td>
<td>79.43</td>
</tr>
<tr>
<td>3. Publications and knowledge products&lt;sup&gt;c&lt;/sup&gt;</td>
<td>30.00</td>
</tr>
<tr>
<td>4. Contingencies</td>
<td>75.25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,000.00</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Financed by the Asian Development Bank’s Technical Assistance Special Fund (TASF-IV).

<sup>b</sup> Includes travel costs of Asian Development Bank staff acting as resource persons.

<sup>c</sup> Includes the cost of engaging manuscript and copy editors.

Source: Asian Development Bank estimates.
OUTLINE OF THE DRAFT REPORT
(This is a tentative plan to be refined and elaborated upon during the first phase of project implementation.)

A. Part I

1. Theory and measurement of knowledge-based economies (KBEs), literature review, and contemporary comparisons of Asia
2. Role of knowledge economies in supporting Asia’s structural transformation for greater productivity-based growth and going beyond middle-income levels—key issues and perspectives
3. Avenues for promoting world-class scientific and technological capability in Asia with a vibrant science and technology program
4. Exploring the role and contribution of Asia’s centers of excellence in tertiary education in advancing KBEs in the region
5. Key recommendations on regulatory and governance reforms, and incentive structures needed for accelerating progress toward KBEs
6. Role of information and communication technology and dissemination of knowledge—exploring the next frontiers in technological development and leveraging of new technologies for improved service delivery
7. Scaling up knowledge for inclusive and grassroots innovation for reducing inequalities, social exclusion, and promoting greater social well-being—opportunities for Asian countries
8. Financing of KBEs—alternative scenarios and avenues for developing countries of Asia

B. Part II

1. Country chapters—recommendations for selected countries on advancing KBEs
2. Case studies of advanced economies

C. Part III

The way forward—investment priorities and knowledge partnerships, including financing for KBE partnerships that strengthen the performance of key sectors of importance to the Asian Development Bank (energy, water, and infrastructure)
OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Resource Persons (8 individuals, maximum 10 person-days each)

1. The resource persons will serve as members of the high-level panel. The panel will provide overall strategic guidance for the design of the study and finalization of the detailed study proposal as well as the methodology, and will review the interim reports and final report. Panel members may also selectively participate in a developing member country (DMC) workshop or conference.

B. International Consultants

1. International Innovation Policy and Technology Expert (4 person-months, intermittent)

(i) Undertake review and analysis of theoretical, empirical, and policy-oriented aspects of innovation and knowledge creation in developing countries of Asia compared with countries that have performed very well as knowledge economies.

(ii) Undertake an analysis of key determinants of successfully leveraging innovation for structural transformation and inclusive growth, and the role of innovation in current and future scenarios of structural transformation of Asian economies to avoid the middle-income trap.

(iii) Analyze and compare public and private policies in innovation in developing countries of Asia with advanced countries, including areas such as industry and trade, and provide insights into the type of knowledge and policies needed to generate productivity increases and sustained growth.

(iv) Analyze and elaborate on specific demand- and supply-side instruments of innovation policy and practice for advocating to DMCs of the Asian Development Bank (ADB), based on empirical evidence.

(v) Analyze the future prospects of strengthening innovation-based growth, which enables developing countries to move up the value chain in global manufacturing and specific investments, and measures that need to be undertaken.

(vi) Elaborate on policy instruments and investments to promote inclusive innovation that leverages frontier technologies for the benefit of the masses.

3. Deliverables. These include contribution to an inception report at the end of phase I (third quarter [Q3] 2012), specific chapters for the interim report on (tentative titles) innovation surveys or other research carried out at country level; public and private financing of innovation; regulatory and incentive structures for innovation, issues of translating research and development (R&D) into marketable innovation. Q1 2013), finalized chapters for the final report (Q3 2013), and policy briefs (or inputs to them) on knowledge economy tools and indicators to be used by developing countries (Q3 2013).
2. **International Knowledge Economy Expert** (5 person-months, intermittent)

4. The expert will be an economist of international stature and will have proven expertise and publications on the role and contribution of knowledge for development and knowledge economies. Relevant experience in Asia and the Pacific is required. The expert will have in-depth knowledge of key aspects of KBEs, particularly the enabling and regulatory framework for KBEs and financing of KBE initiatives. The knowledge economy expert will be responsible for delivering the sections of the report pertaining to education and competencies, R&D, and innovation policies and institutions. The specialist will also be responsible for supervising the inputs of national consultants engaged for the education component of the TA. The terms of reference will include, but not be limited to, the following:

(i) Analyze the role of knowledge production and dissemination in Asia in comparison to other parts of the world, and emerging issues.

(ii) Review and assess the contribution of knowledge-based development in strengthening the competitiveness of Asian economies in global markets for higher order manufacturing and higher value-added products and services that are traded internationally.

(iii) Review and analyze the regulatory and incentives regime for advancing knowledge economies—addressing, among others, issues relating to industrial, competition, and intellectual property rights policies that impede or encourage KBEs.

(iv) Review and recommend policy instruments and practices that promote knowledge-based development processes, addressing both public and private sector domains.

(v) Review and recommend policies and investment promotion that encourage firm-level innovation and knowledge accumulation; and enable firms to generate, adapt, and adopt new know-how and technologies.

(vi) Compare and contrast the developments in knowledge-based development in selected countries in Asia to identify promising policies and practices.

(vii) Review and assess the role of government in ensuring an appropriate regulatory framework and incentives for R&D to flourish, and identify the required governance policies and structures for knowledge-based development processes to be strengthened.

(viii) Provide thematic chapters and country chapters to the final report of the study.

(ix) Coordinate and synthesize different chapters of the study, including guidance to contributions from national experts, to ensure a high-quality final output.

(x) Lead the research and writing, with substantive policy recommendations to be discussed with DMC governments and stakeholders, by preparing a final report

(xi) Prepare materials such as policy briefs and summaries that may be easily disseminated to large audiences across DMCs through a communication plan, to take forward the outcomes of the study.

5. **Deliverables.** These include an inception report comprising the detailed study methodology and the benchmarking of developing countries on KBE and methodology for country studies (Q3 2012); specific chapters for the interim report on (tentative titles) regulatory and incentive structures, the economics of knowledge economies, tools and instruments to measure and monitor progress in knowledge economies (Q1 2013), finalized thematic chapters for the final report (Q3 2013), country chapters and policy briefs (or inputs to them) on knowledge economy tools and indicators to be used by developing countries (Q3 2013).
3. **International Information and Communication Technology Expert**  
   (3 person-months, intermittent)

6. In addition to technical expertise in information and communication technology (ICT), the expert will have substantial research experience in ICT and economic development; and in promoting ICT policies, institutions, and infrastructure for improved service delivery and inclusive growth. Relevant experience in Asia and the Pacific is required. The expert will be responsible for delivering the sections of the report pertaining to ICT development and related investments. The terms of reference will include, but not be limited to, the following:

   (i) Analyze data and trends on the spread and use of computers, internet, and wireless technologies as means for both knowledge advancement and knowledge dissemination.
   (ii) Present case studies on successful and promising initiatives and trends on how such technologies have helped to create value addition at the bottom of the pyramid.
   (iii) Analyze and present policy options on how Asian economies can leverage wireless and mobile technologies, including the needs of people at the grassroots level.
   (iv) Analyze and identify opportunities for developing countries of Asia to leapfrog on the technology frontier.
   (v) Identify opportunities and constraints to extensive and widespread application of smart technologies to improve the quality of public services.
   (vi) Provide thematic chapters and country chapters to the final report.

7. **Deliverables.** These include a contribution to the inception report (Q3 2012); specific chapters for the interim report on (tentative titles) next-generation ICT policy and practice, the determinants of establishing a high-quality information infrastructure for knowledge economies, key policies and investments required to harness ICT effectively (Q1 2013); finalized chapters for the final report (Q3 2013); and policy briefs (or inputs to them) on ICT for advancing knowledge economies, to enhance service delivery and promote high technology absorption and higher value-added manufacturing (Q3 2013).

   (3 person-months, intermittent)

   (i) Assess the quality of higher education institutions, including R&D institutions, in the countries covered to advance KBEs.
   (ii) Identify and analyze the prospects of higher education institutions in developing countries of Asia to achieve the potential for becoming global or regional centers of excellence, and the policies and instruments needed for this.
   (iii) Analyze key policies and practices that higher education and science and technology institutions need to adopt to ensure a critical mass of highly skilled human capital base with a strong propensity for innovation-induced and knowledge-based growth.
   (iv) Analyze and present actions and investments needed to facilitate the role of Asian economies in exporting knowledge globally.
   (v) Analyze and recommend key policy options in promoting high-impact scientific R&D in Asia and the Pacific to serve KBEs.
   (vi) Analyze and recommend policies for industry–university partnerships, learning from successful models of business incubators and allied instruments, and
Appendix 4

policies for tripartite cooperation between the public and private sectors and academia.

(vii) Review and recommend modalities to leverage higher rates of private sector finance and venture capital for science and technology investments that serve the needs of Asia.

8. Deliverables. These include a contribution to the inception report (Q3 2012); specific chapters for the interim report on (tentative titles) science and technology and education policy for KBEs; promoting science, technology, mathematics (STEM) investments at all levels to create a knowledge-oriented human resource base; industry–academia partnerships and the creation of university or knowledge parks (Q1 2013); finalized chapters for the final report (Q3 2013); and policy briefs (or inputs to them) on education and training investments and infrastructure, and the science and technology base for advancing knowledge economies, to create a highly skilled and innovation-oriented human capital base in Asia for high-technology-oriented and knowledge-based competitive economies (Q3 2013).

C. National Experts (about 11 person-months in total) and National Research Assistants (about 11 person months in total)

9. The specific areas of expertise and deliverables required from the national experts (most likely in the form of theme chapters) will be finalized at the end of the first phase of the project in October 2012. The national experts will be based in three or four countries in the region, and will be responsible for collaborating with the international consultants in (i) engaging with stakeholders in the country; (ii) writing theme papers in their area of expertise; (iii) reinforcing the work of international consultants by supporting survey, research, and analysis; and (iv) conducting in-country workshops, where necessary. The national research assistants will support the national experts and international consultants in data collection and compilation.

D. National Project Coordinator(s) (15 person-months, intermittent)

10. The national project coordinator/s will have a university degree in economics, education, or a related subject. S/he will have at least 3 years experience in assisting a research project of similar nature, with several experts in different subjects and different locations. The project coordinators’ terms of reference will include, but not be limited to, the following:

   (i) Administrative support for the coordination within ADB and between ADB and the high level panel, consultants, DMC governments and stakeholders for the effective implementation of the study
   (ii) Liaising and ensuring effective communication among panel members and the international and national consultants.
   (iii) Facilitating coordination among all parties to ensure timely delivery of TA outputs.
   (iv) Facilitating meetings of the high-level panel with ADB and TA consultants.
   (v) Ensuring timely coordination between international consultants and national experts in the work of the project and research support for the study and
   (vi) Assisting in the organization of conferences and seminars.