

## TERMS OF REFERENCE FOR CONSULTANTS

### A. Selection Profile: Lead Economist

|                                |   |                            |                               |
|--------------------------------|---|----------------------------|-------------------------------|
| <b>Department/ Division:</b>   | Southeast Asian Development/ Indonesia Resident Mission, IRM (SERD) |                            |                               |
| <b>Project:</b>                | TA 51343-001-INO: Supporting Technological Transformation           |                            |                               |
| <b>Expertise:</b>              | Economist   | <b>Expertise: Group</b>    |                               |
| <b>Consultant type:</b>        | Individual  |                            |                               |
| <b>Method of Selection:</b>    | Individual Consultants Selection (ICS)                              |                            |                               |
| <b>Engagement Period:</b>      | 5 Person-months (March 2018 – June 2019)                            | <b>Budget</b>              | <b>Est./Max.</b><br>\$110,000 |
| <b>Source:</b>                 | International   | <b>Type:</b>               | Intermittent                  |
| <b>Est. Shortlisting Date:</b> | January 2018  | <b>Est. Commence Date:</b> | March 2018                    |
| <b>Professional Group:</b>     | To be decided   | <b>Job Level:</b>          | To be decided                 |

### B. Project Background

1. The digital economy is disrupting and transforming production, consumption, governance and societal interactions. Indonesia holds large potential to benefit from digital transformation. Indonesia is among the fastest growing internet markets in the world, with Southeast Asia the fastest growing region. The potential benefits of digitization for Indonesia's economy is estimated to be about \$150 billion by 2025; and the multiplier effect will likely be substantially larger. The benefits of disruptive technology accrue from increase in participation of nonproductive and partially active workforce as well as improvements in labor productivity.

2. At the same time, disruptive technologies also pose important risks for Indonesia in the form of loss of jobs in certain sectors and potential increase in inequality. For instance, about 60% of salaried workers in the manufacturing sector in Indonesia are potentially at risk from automation. In the absence of effective policies, the economics of the internet tend to favor natural monopolies and lead to concentration of markets and polarization of benefits.

3. The Government has developed '2020 Go Digital Vision', which entails Indonesia emerging as the largest digital economy in the ASEAN region by the year 2020. The Government's 14<sup>th</sup> economic reform package included a roadmap for promoting e-commerce. However, there is a critical gap in knowledge on the country-specific impact on Indonesia of disruptive technologies, which in turn limits the development of enabling policies as well as a clear business case for public investments.

4. To address this knowledge gap, the study will analyze the implications of disruptive technologies for Indonesia. The study will cover both economy-wide impacts as well as the impacts on selected sectors and sub-sectors (such as manufacturing, finance, energy, e-commerce, and urban). The analysis will seek to model the effects on the Indonesian economy,

which are likely to be transmitted and amplified through global value chains and examine the broader implications for industrialization, employment prospects and inequality.

### **C. The Project Implementation Arrangement**

5. To support the implementation of activities, five international experts and a national firm/research institute will be recruited. ADB's Indonesia Resident Mission (IRM), in coordination with ADB's Economic Research and Regional Cooperation Department and other relevant departments, will be responsible for providing overall research guidance and consolidating the research outputs. Wherever possible, the IRM staff will also engage in collaborative research with the consultants.

### **D. Objective / Purpose of the Assignment**

6. The study will seek to answer the following question: (i) what are the implications for economic productivity, jobs and inequality, and (ii) what needs to be done to leverage the benefits and mitigate the risks. The latter will identify policies and investment required for increasing Indonesia's competitiveness, capability and connectedness. Social concerns (e.g. impact on poverty and gender) will be integrated as cross-cutting themes. The current body of literature on the topic will be used to map technology and its relevance to the sector/sub-sector. The topics covered by the TA will include analysis around: disruptive technologies, macroeconomic management and public services; financial technologies (e.g. blockchain) and banking; Robotics, 3-D printing and manufacturing; 'Internet of Things' and smart cities (urban); 'Artificial Intelligence', e-commerce and private choices (retail); and, energy storage (battery) and utilities (energy).

7. The analysis will employ quantitative methods grounded on relevant economic theory. As relevant, enterprise surveys will be conducted. Qualitative case studies will be used to increase the granularity of the analysis. Sex disaggregated data, where available, will be prioritized to inform the likely gender impacts. Data availability and limitations will be taken into consideration when refining the methodology.

### **E. Scope of Work**

8. The Lead Economist will provide overall research guidance to the consultants, review analysis and reports, and structure and compile the individual reports into a single flagship study.

### **F. Detailed Tasks**

9. The Consultant shall be tasked to undertake the following specific responsibilities, but not limited to:

- i. Develop the analytical framework ensuring linkages between the macroeconomic and sector level analysis.
- ii. Identify appropriate methodology for each analysis.
- iii. Provide cross-country comparative experience and perspectives.
- iv. Develop the structure and outline for the flagship publication and reports.
- v. Develop an economy wide index for future monitoring and policy development.
- vi. Provide guidance to the consultants under the TA and ensure quality of individual outputs.
- vii. Prepare TA inception, mid-term and final reports.
- viii. Undertake other related tasks as may be required by the ADB project team leader.

## G. Qualification

10. The consultant will have the following qualifications:
- i. at least master's degree in economics or related field;
  - ii. working experience of at least 15 years;
  - iii. substantial knowledge of and work experience in Indonesia;
  - iv. experience in leading major knowledge products and a track record of publications in related topics;
  - v. excellent proficiency in English (oral and writing);
  - vi. able to work independently under minimum supervision; and
  - vii. good analytical skills, interpersonal and teamwork skills.

## H. Project Implementation Schedule, Output and Reporting Requirement

11. The consultant is expected to have the following inputs:

| City and Country             | Working Days | Estimated Start Date | Estimated End Date | Other Details      |
|------------------------------|--------------|----------------------|--------------------|--------------------|
| Home Office<br>(5 days/week) | 90           | 01/03/2018           | 10/06/2019         |                    |
| Field<br>(6 days/week)       | 20           | To be decided        | To be decided      | Jakarta, Indonesia |

12. The consultant will deliver the following milestones:
- (i) Overall report structure.
  - (ii) Identification of research methodology and survey instruments.
  - (iii) Policy briefing papers.
  - (iv) Draft macroeconomic and sector analysis.
  - (v) Final report.

## I. Selection Profile: International Experts

|                              |   |                         |                               |
|------------------------------|---|-------------------------|-------------------------------|
| <b>Department/ Division:</b> | Southeast Asian Development/ Indonesia Resident Mission, IRM (SERD)                         |                         |                               |
| <b>Project:</b>              | TA 51343-001-INO: Supporting Technological Transformation in Indonesia                      |                         |                               |
| <b>Expertise:</b>            | Robotics, Artificial Intelligence, FinTech, Battery (Renewable Energy), Internet of Things. | <b>Expertise: Group</b> | Disruptive Technologies       |
| <b>Consultant type:</b>      | Individuals   |                         |                               |
| <b>Method of Selection:</b>  | Individual Consultants Selection (ICS)  |                         |                               |
| <b>Engagement Period:</b>    | 8 Person-months (March 2018 – June 2019)  | <b>Budget</b>           | <b>Est./Max.</b><br>\$176,000 |
| <b>Source:</b>               | International   | <b>Type:</b>            | Intermittent                  |

|                                |               |                            |               |
|--------------------------------|---------------|----------------------------|---------------|
| <b>Est. Shortlisting Date:</b> | To be decided | <b>Est. Commence Date:</b> | To be decided |
| <b>Professional Group:</b>     | To be decided | <b>Job Level:</b>          | To be decided |

## **J. Project Background**

13. The digital economy is disrupting and transforming production, consumption, governance and societal interactions. Indonesia holds large potential to benefit from digital transformation. Indonesia is among the fastest growing internet markets in the world, with Southeast Asia the fastest growing region. The potential benefits of digitization for Indonesia's economy is estimated to be about \$150 billion by 2025; and the multiplier effect will likely be substantially larger. The benefits of disruptive technology accrue from increase in participation of nonproductive and partially active workforce as well as improvements in labor productivity.

14. At the same time, disruptive technologies also pose important risks for Indonesia in the form of loss of jobs in certain sectors and potential increase in inequality. For instance, about 60% of salaried workers in the manufacturing sector in Indonesia are potentially at risk from automation. In the absence of effective policies, the economics of the internet tend to favor natural monopolies and lead to concentration of markets and polarization of benefits.

15. The Government has developed '2020 Go Digital Vision', which entails Indonesia emerging as the largest digital economy in the ASEAN region by the year 2020. The Government's 14<sup>th</sup> economic reform package included a roadmap for promoting e-commerce. However, there is a critical gap in knowledge on the country-specific impact on Indonesia of disruptive technologies, which in turn limits the development of enabling policies as well as a clear business case for public investments.

16. To address this knowledge gap, the study will analyze the implications of disruptive technologies for Indonesia. The study will cover both economy-wide impacts as well as the impacts on selected sectors and sub-sectors (such as manufacturing, finance, energy, e-commerce, and urban). The analysis will seek to model the effects on the Indonesian economy, which are likely to be transmitted and amplified through global value chains and examine the broader implications for industrialization, employment prospects and inequality.

## **K. The Project Implementation Arrangement**

17. To support the implementation of activities, five international experts and a national firm/research institute will be recruited. ADB's Indonesia Resident Mission (IRM), in coordination with ADB's Economic Research and Regional Cooperation Department and other relevant departments, will be responsible for providing overall research guidance and consolidating the research outputs. Wherever possible, the IRM staff will also engage in collaborative research with the consultants.

## **L. Objective / Purpose of the Assignment**

18. The study will seek to answer the following question: (i) what are the implications for economic productivity, jobs and inequality, and (ii) what needs to be done to leverage the benefits and mitigate the risks. The latter will identify policies and investment required for increasing Indonesia's competitiveness, capability and connectedness. Social concerns (e.g. impact on poverty and gender) will be integrated as cross-cutting themes. The current body of literature on

the topic will be used to map technology and its relevance to the sector/sub-sector. The topics covered by the TA will include analysis around: disruptive technologies, macroeconomic management and public services; financial technologies (e.g. blockchain) and banking; Robotics, 3-D printing and manufacturing; 'Internet of Things' and smart cities (urban); 'Artificial Intelligence', e-commerce and private choices (retail); and, energy storage (battery) and utilities (energy).

19. The analysis will employ quantitative methods grounded on relevant economic theory. As relevant, enterprise surveys will be conducted. Qualitative case studies will be used to increase the granularity of the analysis. Sex disaggregated data, where available, will be prioritized to inform the likely gender impacts. Data availability and limitations will be taken into consideration when refining the methodology.

#### **M. Scope of Work**

20. The international experts will provide, on intermittent basis, super-specialist knowledge on selected disruptive technology, advice on the application and relevance to the sector/sub-sector and their implications for Indonesia. The international experts will also provide guidance on the research work, particularly on the methodology, and review the sector analysis as well as the final report.

#### **N. Detailed Tasks**

21. The consultants shall be tasked to undertake the following specific responsibilities, but not limited to:

- i. Advise on the development of the analytical framework and identification of appropriate methodology for sector level analysis of the implication of financial technologies on Indonesia.
- ii. Provide cross-country comparative experience and perspectives on disruptive technologies (Robotics, Internet of Things, Artificial Intelligence, Battery, etc) and its broader development implications.
- iii. Produce a sector specific briefing papers and presentations on disruptive technologies and their relevance to Indonesia.
- iv. Provide inputs in the drafting of the flagship study.
- v. Undertake other related tasks as may be required by the ADB project team leader.

#### **O. Qualification**

22. The consultants will have the following qualifications:
- i. at least master's degree in engineering, economics, finance or related field;
  - ii. working experience of at least 10 years;
  - iii. globally and/or regionally recognized as experts in their respective sectors;
  - iv. high quality and impact publication track record;
  - v. experience of providing policy advice to the Government and private sector;
  - vi. excellent proficiency in English (oral and writing);
  - vii. able to work independently under minimum supervision; and
  - viii. good analytical skills, interpersonal and teamwork skills.

#### **P. Project Implementation Schedule, Output and Reporting Requirement**

23. The consultants are expected to have the following inputs:

| City and Country             | Working Days | Estimated Start Date | Estimated End Date | Other Details      |
|------------------------------|--------------|----------------------|--------------------|--------------------|
| Home Office<br>(5 days/week) | 128          | 01/03/2018           | 10/06/2019         |                    |
| Field<br>(6 days/week)       | 48           | To be decided        | To be decided      | Jakarta, Indonesia |

24. The consultant will deliver the following milestones:
- (i) Briefing paper and presentation
  - (ii) Review of the sector/sub-sector analysis.

**Q. Selection Profile: National Researchers**

|                                |   |                            |                               |
|--------------------------------|---|----------------------------|-------------------------------|
| <b>Department/ Division:</b>   | Southeast Asian Development/ Indonesia Resident Mission, IRM (SERD)                     |                            |                               |
| <b>Project:</b>                | TA 51343-001-INO: Supporting Technological Transformation in Indonesia                  |                            |                               |
| <b>Expertise:</b>              | Macroeconomics, Finance, Manufacturing, E-Commerce, Energy, Urban, Gender, Labor Market | <b>Expertise: Group</b>    |                               |
| <b>Consultant type:</b>        | National firm/Research Institute  |                            |                               |
| <b>Method of Selection:</b>    | Consultants' Qualification Selection  |                            |                               |
| <b>Engagement Period:</b>      | 21 Person-months (March 2018 – June 2019)   | <b>Budget</b>              | <b>Est./Max.</b><br>\$261,700 |
| <b>Source:</b>                 | National  | <b>Type:</b>               | Intermittent                  |
| <b>Est. Shortlisting Date:</b> | January 2018  | <b>Est. Commence Date:</b> | March, 2018                   |
| <b>Professional Group:</b>     | To be decided   | <b>Job Level:</b>          | To be decided                 |

**R. Project Background**

25. The digital economy is disrupting and transforming production, consumption, governance and societal interactions. Indonesia holds large potential to benefit from digital transformation. Indonesia is among the fastest growing internet markets in the world, with Southeast Asia the fastest growing region. The potential benefits of digitization for Indonesia's economy is estimated to be about \$150 billion by 2025; and the multiplier effect will likely be substantially larger. The benefits of disruptive technology accrue from increase in participation of nonproductive and partially active workforce as well as improvements in labor productivity.

26. At the same time, disruptive technologies also pose important risks for Indonesia in the form of loss of jobs in certain sectors and potential increase in inequality. For instance, about 60% of salaried workers in the manufacturing sector in Indonesia are potentially at risk from

automation. In the absence of effective policies, the economics of the internet tend to favor natural monopolies and lead to concentration of markets and polarization of benefits.

27. The Government has developed ‘2020 Go Digital Vision’, which entails Indonesia emerging as the largest digital economy in the ASEAN region by the year 2020. The Government’s 14<sup>th</sup> economic reform package included a roadmap for promoting e-commerce. However, there is a critical gap in knowledge on the country-specific impact on Indonesia of disruptive technologies, which in turn limits the development of enabling policies as well as a clear business case for public investments.

28. To address this knowledge gap, the study will analyze the implications of disruptive technologies for Indonesia. The study will cover both economy-wide impacts as well as the impacts on selected sectors and sub-sectors (such as manufacturing, finance, energy, e-commerce, and urban). The analysis will seek to model the effects on the Indonesian economy, which are likely to be transmitted and amplified through global value chains and examine the broader implications for industrialization, employment prospects and inequality.

## **S. The Project Implementation Arrangement**

29. To support the implementation of activities, five international experts and a national firm/research institute will be recruited. ADB’s Indonesia Resident Mission (IRM), in coordination with ADB’s Economic Research and Regional Cooperation Department and other relevant departments, will be responsible for providing overall research guidance and consolidating the research outputs. Wherever possible, the IRM staff will also engage in collaborative research with the consultants.

## **T. Objective / Purpose of the Assignment**

30. The study will seek to answer the following question: (i) what are the implications for economic productivity, jobs and inequality, and (ii) what needs to be done to leverage the benefits and mitigate the risks. The latter will identify policies and investment required for increasing Indonesia’s competitiveness, capability and connectedness. Social concerns (e.g. impact on poverty and gender) will be integrated as cross-cutting themes. The current body of literature on the topic will be used to map technology and its relevance to the sector/sub-sector. The topics covered by the TA will include analysis around: disruptive technologies, macroeconomic management and public services; financial technologies (e.g. blockchain) and banking; Robotics, 3-D printing and manufacturing; ‘Internet of Things’ and smart cities (urban); ‘Artificial Intelligence’, e-commerce and private choices (retail); and, energy storage (battery) and utilities (energy).

31. The analysis will employ quantitative methods grounded on relevant economic theory. As relevant, enterprise surveys will be conducted. Qualitative case studies will be used to increase the granularity of the analysis. Sex disaggregated data, where available, will be prioritized to inform the likely gender impacts. Data availability and limitations will be taken into consideration when refining the methodology.

## **U. Scope of Work**

32. The national firm/research institute will undertake survey to collect primary data as well as analysis focusing on the macroeconomy, selected sector/sub-sector and labor market. The

firm/institute will also host seminars and workshops with relevant Government departments for soliciting inputs into the research work as well as knowledge sharing.

## V. Detailed Tasks

33. The firm/institute shall be tasked to undertake the following specific responsibilities, but not limited to:

- i. Assist the team leader in designing the studies required for economic modeling and impact analysis.
- ii. Update the existing economy-wide model to analyze the impact of selected technological transformation on selected sectors and sub-sectors.
- iii. Develop a detailed module to assess the employment and poverty implications of the technological transformation of any transformation scenarios analyzed.
- iv. Undertake survey focusing on the impact of disruptive technologies on the following sectors: manufacturing, financial, commerce, energy and urban.
- v. Compile and analyze the data.
- vi. Develop index for future monitoring purposes.
- vii. Use national statistics as well as data compiled by the TA in analyzing the impact of disruptive technologies on the labor market in Indonesia.
- viii. Assess the differentiated impact on women, men and other vulnerable groups, and compile detailed case studies to validate and ground the statistical analysis.
- ix. Prepare briefing note and presentations based on the findings from the data analysis.
- x. In collaboration with the lead economist and the international experts, produce final sector report.
- xi. Work with the lead economist to prepare related working papers and policy notes and to present it to other invited participants for review and comment at a workshop.
- xii. Undertake other related tasks as may be required by the ADB project team leader.

## W. Qualification

34. The firm/institute will have the following qualifications:
- i. experience in undertaking surveys and analysis of high quality;
  - ii. researchers with quantitative and qualitative analytical skills;
  - iii. prior research experience on the topic;
  - iv. track-record of high quality publication as well as knowledge sharing;
  - v. ability to put together and lead research consortium/network;
  - vi. experience of providing policy advice to the Government and private sector; and,
  - vii. excellent proficiency in English (oral and writing);

## X. Project Implementation Schedule, Output and Reporting Requirement

35. The consultant is expected to have the following inputs:

| City and Country       | Working Days | Estimated Start Date | Estimated End Date | Other Details      |
|------------------------|--------------|----------------------|--------------------|--------------------|
| Field<br>(6 days/week) | 462          | March, 2018          | June, 2019         | Jakarta, Indonesia |

36. The firm/institute will deliver the following milestones:
- (i) Survey.

- (ii) Macroeconomic impact assessment.
- (iii) Sector/subsector implication analysis.
- (iv) Impact analysis on the labor market using gender perspective.
- (v) Policy recommendations on improving competitiveness, capability and connectedness.
- (vi) Final single report.