

TERMS OF REFERENCE

FROM INDUSTRIAL PORTS TO SMART PORTS: ADDRESSING FUTURE CHALLENGES THROUGH TECHNOLOGICAL INNOVATION

RG-T3123

PREPARATION OF A TOOLKIT TO DEVELOP SMART PORTS IN LAC

I. BACKGROUND

- 1.1 Logistics costs – e.g. cumbersome requirements and documents, or inefficient clearance of goods – and lack of good transportation infrastructure are widely singled out as some of the main obstacles to international trade. Logistics costs in Latin America and the Caribbean (LAC) are excessively high – between 18 and 35 percent of a product’s value (OECD: 8 percent) in a region where around 57 percent of exports are time-sensitive or logistics-intensive (OECD: 17 percent)¹. For small and medium-sized enterprises (SMEs), these costs can make up as much as 40% of final product value, which in turn considerably affects their capacity to compete internationally. Meanwhile, LAC countries rank low in terms of overall infrastructure quality,² with ports particularly affected by issues such as poor physical planning, low productivity, and excessive reliance on paperwork.³
- 1.2 At the same time, the adoption of information and communication technologies (ICT) is making life more digital than ever. An exponentially higher number of household and industrial devices is set to be directly connected to the Internet. The era of Big Data and connected devices – the so-called “Fourth Industrial Revolution” – is set to automate ever-growing portions of consumers’ daily life. Disruption and the speed of technological breakthroughs will reach unparalleled levels. In turn, the pace of innovations is to radically transform the way industries work, ushering significant gains in productivity.⁴ According to some estimates, the combined gains from the widespread adoption and embrace of the digital equivalents of so-called “foundational technologies” – health, energy, transport, communication, and production – could add as much as US\$ 2.8 trillion to the U.S. economy in the near future.⁵
- 1.3 Introducing some of these new digital innovations in the region’s ports and maritime sector could not only improve the region’s logistics performance, but also address challenges related to ports’ spatial constraints, sustainability, productivity, and limited fiscal space. In this context, the machine-to-machine (M2M) communications and real-time data analytics made possible by the Industrial Internet of Things (IIoT) and related technologies have the potential

¹ OECD/CAF/ECLAC, *Latin American Economic Outlook 2014: Logistics and Competitiveness for Development*, Paris: OECD Publishing, 2013.

² The Economist Intelligence Unit, *Latin American: Room for Growth*, London: The Economist, 2016. <https://www.eiuperspectives.economist.com/sites/default/files/EIU-Dubai%20Chamber%20Room%20for%20Growth%20English.pdf>

³ The Latin America and the Caribbean Economic System, *Digital Ports in Latin America and the Caribbean: Situation and Prospects*, Caracas: SELA, 2015.

⁴ Schwab, Klaus. *The Fourth Industrial Revolution*. New York: Crown Business, 2016.

⁵ Suri, Rajeev. “The Fourth Industrial Revolution Will Bring a Massive Productivity Boom”. World Economic Forum. <https://www.weforum.org/agenda/2018/01/fourth-industrial-revolution-massive-productivity-boom-good/>.

to improve reliability, automate processes, optimize the flow of information, and help efficiently manage trade flows. Furthermore, moving towards so-called “smart ports” can expand port operations and capacity without substantial new infrastructure or equipment investments – for instance, a holistic digital, connected-port strategy underpins the Port of Hamburg’s plans to double capacity without adding space.⁶ More importantly, similar initiatives would allow LAC ports – by analyzing the different, large data flows in the IIoT infrastructure – to identify and take advantage of business models based on their position in the supply chain and ecosystem.

- 1.4 Nevertheless, just as each port is different and faces a unique set of challenges and opportunities, there is no universal definition or benchmark for smart ports. In other words, there is no “one size fits all” smart port solution, and consequently the optimal level of digitization and automation in ports will have to be determined on a case-by-case basis. Likewise, current initiatives in leading ports still are still in the planning and implementation phases and need to fully capitalize on the potential of the IIoT and data-driven applications. This, in turn, complicates the crafting of a port’s digital strategy, as well as the selection and implementation of suitable technologies.⁷ Likewise, the development of smart port solutions needs to take into consideration the comparatively low connectivity levels in the LAC region – particularly in M2M communication,⁸ which forms the core of real-time data analytics solutions.

II. OBJECTIVE

- 2.1 **The general objective of this consultancy is to develop a toolkit** which allows regulatory authorities (e.g. Port Authorities, Customs) and other relevant governmental agencies, as well as port terminal operators if possible, **to benchmark their performance against best practices** in smart ports.
- 2.2 The specific objectives are to analyze good practices in smart port implementation in extra-regional ports; examine the port environment and technological solutions, as well as the inter-institutional framework and interfaces with other trade and facilitation tools; examine the relevant legal and regulatory framework for ICT and IoT technologies, as well as its application in ports and maritime transport more generally; produce a quantitative and qualitative baseline criteria; and produce a toolkit to support regulatory agencies and government Ministries, as well as port operators.

III. SCOPE OF SERVICE

- 3.1 The primary activities to be undertaken by the firm are to:

⁶ Riedl, Jens et al. “To Get Smart, Ports Go Digital”. The Boston Consulting Group. <https://www.bcg.com/publications/2018/to-get-smart-ports-go-digital.aspx>.

⁷ Deloitte Port Services. “Smart Ports: Point of View”. Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/energy-resources/deloitte-nl-er-port-services-smart-ports.pdf>.

⁸ For instance, Cisco expects M2M modules to account for 33% of all networked devices in Latin America by 2020, compared to 60% and 58% in North America and Europe, respectively. Cisco, *VNI Forecast Highlights*, https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-highlights/pdf/Latin_America_2020_Forecast_Highlights.pdf.

- (i) Develop a custom-made, actionable roadmap of technological, ICT, infrastructure, legal, and process reengineering solutions that are not only necessary or recommended, but also viable, based on their own reality and unique needs and circumstances.
- (ii) Assess their own performance in adopting, implementing, and operationalizing these solutions, as well as ascertain best ways to close existing or lingering gaps or barriers to full implementation.
- (iii) Monitor year-to-year improvements and progress.

3.2 To this end, this analysis will thoroughly examine and analyze the following aspects:

- (i) Economic or social drivers for smart port solutions by Port operators and/or Port Authorities/Customs in the most advanced model countries/ports.
- (ii) The experience of the Government and/or Port operators in identifying, implementing, and operationalizing all necessary ICT, digital, process reengineering, and other relevant solutions.
- (iii) Any required changes to their governance structure in order to carry out these plans.
- (iv) The requisite inter-institutional framework and interfaces with other trade facilitation tools and port electronic platforms – e.g. single windows and port community systems.
- (v) The relevant national legal and regulatory framework governing ICT and IoT technologies – including the use and analysis of large amounts of industrial data –, and in particular the application of said framework in the ports and maritime logistics sectors.
- (vi) In the case of any initial or lingering conflicts between the data-related demands of a smart port solution and the existing legal and regulatory framework, how these difficulties were overcome.

IV. EXPECTED OUTCOMES AND DELIVERABLES

4.1 The expected outcome is a toolkit to support countries in benchmarking their own performance against these good practices. The deliverables are:

1. Inception Report
2. Draft Toolkit
3. Final Toolkit and any methodological annexes
4. Powerpoint presentation on the toolkit

V. CHARACTERISTICS OF THE CONSULTANCY

- a) **Type of consultancy:** International Consulting Firm or academic institution
- b) **Starting date and duration:** 120 non-consecutive consultant days, to be completed within no more than six (6) calendar months.
- c) **Place of work:** Offices of the firm or academic institution
- d) **Citizenship:** The firm or institution must be located in a member state of the IDB.
- e) **Qualifications:** The firm/academic institution and the project team must have an established track record in port infrastructure and development, trade facilitation, and transport logistics. Likewise, previous experience working in e-government, data analysis and harmonization, automation, process reengineering and/or digital applications in the public sector is required.

Relevant project references in the LAC region are desirable and will be considered a plus. The team must consist of at least three (3) members: a Trade and Port Operations Specialist (Team Leader), an IT/Digitalization Specialist, and a Maritime Trade/Transport Research Assistant.

VI. SCHEDULE OF PAYMENT

- 15% upon delivery and approval of the inception report; said inception report is due within 30 calendar days of the signature of the contract.
- 50% upon delivery and approval of the draft report/toolkit; said draft is due within 100 calendar days of the signature of the contract.
- 35% upon the delivery and approval of both the final report/toolkit and the presentation.

VII. COORDINATION

- 7.1 The coordination of consultant work will be managed by Krista Lucenti (TIN/CTT).

TERMS OF REFERENCE

FROM INDUSTRIAL PORTS TO SMART PORTS: ADDRESSING FUTURE CHALLENGES THROUGH TECHNOLOGICAL INNOVATION

RG-T3123

COMMUNICATIONS AND DISSEMINATION OF TECHNICAL COOPERATION DELIVERABLES

I. BACKGROUND

- 1.1 Logistics costs – e.g. cumbersome requirements and documents, or inefficient clearance of goods – and lack of good transportation infrastructure are widely singled out as some of the main obstacles to international trade. Logistics costs in Latin America and the Caribbean (LAC) are excessively high – between 18 and 35 percent of a product’s value (OECD: 8 percent) in a region where around 57 percent of exports are time-sensitive or logistics-intensive (OECD: 17 percent)¹. For small and medium-sized enterprises (SMEs), these costs can make up as much as 40% of final product value, which in turn considerably affects their capacity to compete internationally. Meanwhile, LAC countries rank low in terms of overall infrastructure quality,² with ports particularly affected by issues such as poor physical planning, low productivity, and excessive reliance on paperwork.³
- 1.2 At the same time, the adoption of information and communication technologies (ICT) is making life more digital than ever. An exponentially higher number of household and industrial devices is set to be directly connected to the Internet. The era of Big Data and connected devices – the so-called “Fourth Industrial Revolution” – is set to automate ever-growing portions of consumers’ daily life. Disruption and the speed of technological breakthroughs will reach unparalleled levels. In turn, the pace of innovations is to radically transform the way industries work, ushering significant gains in productivity.⁴ According to some estimates, the combined gains from the widespread adoption and embrace of the digital equivalents of so-called “foundational technologies” – health, energy, transport, communication, and production – could add as much as US\$ 2.8 trillion to the U.S. economy in the near future.⁵
- 1.3 Introducing some of these new digital innovations in the region’s ports and maritime sector could not only improve the region’s logistics performance, but also address challenges related to ports’ spatial constraints, sustainability, productivity, and limited fiscal space. In this context, the machine-to-machine (M2M) communications and real-time data analytics made

¹ OECD/CAF/ECLAC, *Latin American Economic Outlook 2014: Logistics and Competitiveness for Development*, Paris: OECD Publishing, 2013.

² The Economist Intelligence Unit, *Latin American: Room for Growth*, London: The Economist, 2016. <https://www.eiuperspectives.economist.com/sites/default/files/EIU-Dubai%20Chamber%20Room%20for%20Growth%20English.pdf>

³ The Latin America and the Caribbean Economic System, *Digital Ports in Latin America and the Caribbean: Situation and Prospects*, Caracas: SELA, 2015.

⁴ Schwab, Klaus. *The Fourth Industrial Revolution*. New York: Crown Business, 2016.

⁵ Suri, Rajeev. “The Fourth Industrial Revolution Will Bring a Massive Productivity Boom”. World Economic Forum. <https://www.weforum.org/agenda/2018/01/fourth-industrial-revolution-massive-productivity-boom-good/>.

possible by the Industrial Internet of Things (IIoT) and related technologies have the potential to improve reliability, automate processes, optimize the flow of information, and help efficiently manage trade flows. Furthermore, moving towards so-called “smart ports” can expand port operations and capacity without substantial new infrastructure or equipment investments – for instance, a holistic digital, connected-port strategy underpins the Port of Hamburg’s plans to double capacity without adding space.⁶ More importantly, similar initiatives would allow LAC ports – by analyzing the different, large data flows in the IIoT infrastructure – to identify and take advantage of business models based on their position in the supply chain and ecosystem.

- 1.4 Nevertheless, just as each port is different and faces a unique set of challenges and opportunities, there is no universal definition or benchmark for smart ports. In other words, there is no “one size fits all” smart port solution, and consequently the optimal level of digitization and automation in ports will have to be determined on a case-by-case basis. Likewise, current initiatives in leading ports still are still in the planning and implementation phases and need to fully capitalize on the potential of the IIoT and data-driven applications. This, in turn, complicates the crafting of a port’s digital strategy, as well as the selection and implementation of suitable technologies.⁷ Likewise, the development of smart port solutions needs to take into consideration the comparatively low connectivity levels in the LAC region – particularly in M2M communication,⁸ which forms the core of real-time data analytics solutions.

II. OBJECTIVE

- 2.1 **The general objective of this consultancy is to customize the toolkit for the 4 pilot countries.**

III. SCOPE OF SERVICE

- 3.1 The primary activities to be undertaken by the consultant are to:
- (i) Work closely with the firm selected to do the toolkit for Smart Ports
 - (ii) Through interviews and country visits, customize the toolkit to the specific port environment for the 4 pilots.
 - (iii) Work closely with the firm selected to undertake the 4 pilot assessments
 - (iv) Support the team leader in the execution of the pilot assessments.

IV. EXPECTED OUTCOMES AND DELIVERABLES

- 4.1 The expected outcome is a more targeted and robust application of the toolkit in the 4 pilot countries. Deliverables include:

- Workplan

⁶ Riedl, Jens et al. “To Get Smart, Ports Go Digital”. The Boston Consulting Group. <https://www.bcg.com/publications/2018/to-get-smart-ports-go-digital.aspx>.

⁷ Deloitte Port Services. “Smart Ports: Point of View”. Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/energy-resources/deloitte-nl-er-port-services-smart-ports.pdf>.

⁸ For instance, Cisco expects M2M modules to account for 33% of all networked devices in Latin America by 2020, compared to 60% and 58% in North America and Europe, respectively. Cisco, *VNI Forecast Highlights*, https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-highlights/pdf/Latin_America_2020_Forecast_Highlights.pdf.

- Mission agendas
- Missions
- Customized toolkits (4)

V. CHARACTERISTICS OF CONSULTANCY

- a) **Type of consultancy:** Individual Consultant
- b) **Starting date and duration:** 100 non-consecutive consultant days, to be completed within no more than 12 calendar months.
- c) **Place of work:** Offices of the consultant.
- d) **Citizenship:** The consultant must be a national of a member state of the IDB.
- e) **Qualifications:** The consultant must have an established track record in smart ports, port and maritime infrastructure and facilitation. Prior experience in the region would be an asset. Must be able to comfortably work in English and Spanish.

VI. SCHEDULE OF PAYMENT

- 40% upon delivery and approval of the workplan; said plan is due within 30 calendar days of the signature of the contract.
- 30% upon delivery and approval of the missions and the draft toolkits.
- 30% upon the delivery and approval of the customized toolkits (4).

VII. COORDINATION

- 7.1 The coordination of consultant work will be managed by Krista Lucenti (TIN/CTT).

VIII. PAYMENT AND CONDITIONS

- 8.1 Compensation will be determined in accordance with Bank's policies and procedures. In addition, candidates must be citizens of an IDB member country.

IX. CONSANGUINITY

- 9.1 Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractuels, will not be eligible to provide services for the Bank.

X. DIVERSITY

- 10.1 The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDs status. We encourage women, Afro-descendants and persons of indigenous origins to apply.

TERMS OF REFERENCE

FROM INDUSTRIAL PORTS TO SMART PORTS: ADDRESSING FUTURE CHALLENGES THROUGH TECHNOLOGICAL INNOVATION

RG-T3123

PILOT BENCHMARKING ASSESSMENTS AND ROADMAPS

I. BACKGROUND

- 1.1 Logistics costs – e.g. cumbersome requirements and documents, or inefficient clearance of goods – and lack of good transportation infrastructure are widely singled out as some of the main obstacles to international trade. Logistics costs in Latin America and the Caribbean (LAC) are excessively high – between 18 and 35 percent of a product’s value (OECD: 8 percent) in a region where around 57 percent of exports are time-sensitive or logistics-intensive (OECD: 17 percent)¹. For small and medium-sized enterprises (SMEs), these costs can make up as much as 40% of final product value, which in turn considerably affects their capacity to compete internationally. Meanwhile, LAC countries rank low in terms of overall infrastructure quality,² with ports particularly affected by issues such as poor physical planning, low productivity, and excessive reliance on paperwork.³
- 1.2 At the same time, the adoption of information and communication technologies (ICT) is making life more digital than ever. An exponentially higher number of household and industrial devices is set to be directly connected to the Internet. The era of Big Data and connected devices – the so-called “Fourth Industrial Revolution” – is set to automate ever-growing portions of consumers’ daily life. Disruption and the speed of technological breakthroughs will reach unparalleled levels. In turn, the pace of innovations is to radically transform the way industries work, ushering significant gains in productivity.⁴ According to some estimates, the combined gains from the widespread adoption and embrace of the digital equivalents of so-called “foundational technologies” – health, energy, transport, communication, and production – could add as much as US\$ 2.8 trillion to the U.S. economy in the near future.⁵
- 1.3 Introducing some of these new digital innovations in the region’s ports and maritime sector could not only improve the region’s logistics performance, but also address challenges related to ports’ spatial constraints, sustainability, productivity, and limited fiscal space. In this context, the machine-to-machine (M2M) communications and real-time data analytics made possible by the Industrial Internet of Things (IIoT) and related technologies have the potential

¹ OECD/CAF/ECLAC, *Latin American Economic Outlook 2014: Logistics and Competitiveness for Development*, Paris: OECD Publishing, 2013.

² The Economist Intelligence Unit, *Latin American: Room for Growth*, London: The Economist, 2016. <https://www.eiuperspectives.economist.com/sites/default/files/EIU-Dubai%20Chamber%20Room%20for%20Growth%20English.pdf>

³ The Latin America and the Caribbean Economic System, *Digital Ports in Latin America and the Caribbean: Situation and Prospects*, Caracas: SELA, 2015.

⁴ Schwab, Klaus. *The Fourth Industrial Revolution*. New York: Crown Business, 2016.

⁵ Suri, Rajeev. “The Fourth Industrial Revolution Will Bring a Massive Productivity Boom”. World Economic Forum. <https://www.weforum.org/agenda/2018/01/fourth-industrial-revolution-massive-productivity-boom-good/>.

to improve reliability, automate processes, optimize the flow of information, and help efficiently manage trade flows. Furthermore, moving towards so-called “smart ports” can expand port operations and capacity without substantial new infrastructure or equipment investments – for instance, a holistic digital, connected-port strategy underpins the Port of Hamburg’s plans to double capacity without adding space.⁶ More importantly, similar initiatives would allow LAC ports – by analyzing the different, large data flows in the IIoT infrastructure – to identify and take advantage of business models based on their position in the supply chain and ecosystem.

- 1.4 Nevertheless, just as each port is different and faces a unique set of challenges and opportunities, there is no universal definition or benchmark for smart ports. In other words, there is no “one size fits all” smart port solution, and consequently the optimal level of digitization and automation in ports will have to be determined on a case-by-case basis. Likewise, current initiatives in leading ports still are still in the planning and implementation phases and need to fully capitalize on the potential of the IIoT and data-driven applications. This, in turn, complicates the crafting of a port’s digital strategy, as well as the selection and implementation of suitable technologies.⁷ Likewise, the development of smart port solutions needs to take into consideration the comparatively low connectivity levels in the LAC region – particularly in M2M communication,⁸ which forms the core of real-time data analytics solutions.

II. OBJECTIVE AND SCOPE OF WORK

- 2.1 The objective of this consultancy is to customize and apply the toolkit developed in Component I, to support pilot benchmarking assessments and roadmaps in four LAC ports.

III. SCOPE OF SERVICE

- 3.1 The primary activities to be undertaken by the firm are to:
- (i) Review the toolkit and customize it to the piloted port, in collaboration with the government and relevant port management.
 - (ii) Collaborate with the government and port management, to apply the toolkit and develop a roadmap of technological, ICT, infrastructure, legal, and process reengineering solutions based on said port’s economic reality and unique needs and circumstances. This should include national-level actions to streamline and improve relevant laws and regulations – on Big Data, ICT, logistics, and the like –, as well as existing digital infrastructure.
 - (iii) Develop an implementation plan for the roadmap, including financing mechanisms and instruments.
 - (iv) Validate measures outlined in these roadmaps through consultations and interviews with select government and industry stakeholders in the country’s maritime community.

⁶ Riedl, Jens et al. “To Get Smart, Ports Go Digital”. The Boston Consulting Group. <https://www.bcg.com/publications/2018/to-get-smart-ports-go-digital.aspx>.

⁷ Deloitte Port Services. “Smart Ports: Point of View”. Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/energy-resources/deloitte-nl-er-port-services-smart-ports.pdf>.

⁸ For instance, Cisco expects M2M modules to account for 33% of all networked devices in Latin America by 2020, compared to 60% and 58% in North America and Europe, respectively. Cisco, *VNI Forecast Highlights*, https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-highlights/pdf/Latin_America_2020_Forecast_Highlights.pdf.

- (v) Prepare an evaluation of the toolkit and provide recommendations for its improvement.

IV. EXPECTED OUTCOMES AND DELIVERABLES

4.1 The expected outcome is pilot benchmarking assessments and roadmaps in a LAC port using the toolkit developed in Component I. The deliverables are:

- Inception Report and Mission Agendas
- Missions + Mission Reports (4)
- Draft Pilot Roadmaps (4)
- Final Pilot Roadmaps (4)

V. CHARACTERISTICS OF THE CONSULTANCY

- a) **Type of consultancy:** International Consulting Firm
- b) **Starting date and duration:** 180 non-consecutive consultant days, to be completed within no more than nine (9) calendar months.
- c) **Place of work:** Offices of the firm. Trips to selected countries will be required.
- d) **Citizenship:** The firm must be of a member state of the IDB.
- e) **Qualifications:** The firm and the project team must have an established track record in port infrastructure and development, trade facilitation, and transport logistics. Likewise, previous experience working in e-government, data analysis and harmonization, automation, process reengineering and/or digital applications in the public sector is required. Relevant project references in the LAC region are desirable and will be considered a plus. The team must consist of at least three (3) members: a Trade and Port Operations Specialist (Team Leader), an IT/Digitalization Specialist, and a Maritime Trade/Transport Research Assistant.

VI. SCHEDULE OF PAYMENT

- 25% upon delivery and approval of the inception report and mission agendas; said deliverables due within 30 calendar days of the signature of the contract.
- 45% upon delivery and approval of the missions, mission reports and draft pilot roadmaps; said draft is due within 100 calendar days of the signature of the contract.
- 30% upon the delivery and approval the final report.

VII. COORDINATION

7.1 The coordination of consultant work will be managed by Krista Lucenti (TIN/CTT).

TERMS OF REFERENCE

FROM INDUSTRIAL PORTS TO SMART PORTS: ADDRESSING FUTURE CHALLENGES THROUGH TECHNOLOGICAL INNOVATION

RG-T3123

COMMUNICATIONS AND DISSEMINATION OF TECHNICAL COOPERATION DELIVERABLES

I. BACKGROUND

- 1.1 Logistics costs – e.g. cumbersome requirements and documents, or inefficient clearance of goods – and lack of good transportation infrastructure are widely singled out as some of the main obstacles to international trade. Logistics costs in Latin America and the Caribbean (LAC) are excessively high – between 18 and 35 percent of a product’s value (OECD: 8 percent) in a region where around 57 percent of exports are time-sensitive or logistics-intensive (OECD: 17 percent)¹. For small and medium-sized enterprises (SMEs), these costs can make up as much as 40% of final product value, which in turn considerably affects their capacity to compete internationally. Meanwhile, LAC countries rank low in terms of overall infrastructure quality,² with ports particularly affected by issues such as poor physical planning, low productivity, and excessive reliance on paperwork.³
- 1.2 At the same time, the adoption of information and communication technologies (ICT) is making life more digital than ever. An exponentially higher number of household and industrial devices is set to be directly connected to the Internet. The era of Big Data and connected devices – the so-called “Fourth Industrial Revolution” – is set to automate ever-growing portions of consumers’ daily life. Disruption and the speed of technological breakthroughs will reach unparalleled levels. In turn, the pace of innovations is to radically transform the way industries work, ushering significant gains in productivity.⁴ According to some estimates, the combined gains from the widespread adoption and embrace of the digital equivalents of so-called “foundational technologies” – health, energy, transport, communication, and production – could add as much as US\$ 2.8 trillion to the U.S. economy in the near future.⁵
- 1.3 Introducing some of these new digital innovations in the region’s ports and maritime sector could not only improve the region’s logistics performance, but also address challenges related to ports’ spatial constraints, sustainability, productivity, and limited fiscal space. In this context, the machine-to-machine (M2M) communications and real-time data analytics made

¹ OECD/CAF/ECLAC, *Latin American Economic Outlook 2014: Logistics and Competitiveness for Development*, Paris: OECD Publishing, 2013.

² The Economist Intelligence Unit, *Latin American: Room for Growth*, London: The Economist, 2016. <https://www.eiuperspectives.economist.com/sites/default/files/EIU-Dubai%20Chamber%20Room%20for%20Growth%20English.pdf>

³ The Latin America and the Caribbean Economic System, *Digital Ports in Latin America and the Caribbean: Situation and Prospects*, Caracas: SELA, 2015.

⁴ Schwab, Klaus. *The Fourth Industrial Revolution*. New York: Crown Business, 2016.

⁵ Suri, Rajeev. “The Fourth Industrial Revolution Will Bring a Massive Productivity Boom”. World Economic Forum. <https://www.weforum.org/agenda/2018/01/fourth-industrial-revolution-massive-productivity-boom-good/>.

possible by the Industrial Internet of Things (IIoT) and related technologies have the potential to improve reliability, automate processes, optimize the flow of information, and help efficiently manage trade flows. Furthermore, moving towards so-called “smart ports” can expand port operations and capacity without substantial new infrastructure or equipment investments – for instance, a holistic digital, connected-port strategy underpins the Port of Hamburg’s plans to double capacity without adding space.⁶ More importantly, similar initiatives would allow LAC ports – by analyzing the different, large data flows in the IIoT infrastructure – to identify and take advantage of business models based on their position in the supply chain and ecosystem.

- 1.4 Nevertheless, just as each port is different and faces a unique set of challenges and opportunities, there is no universal definition or benchmark for smart ports. In other words, there is no “one size fits all” smart port solution, and consequently the optimal level of digitization and automation in ports will have to be determined on a case-by-case basis. Likewise, current initiatives in leading ports still are still in the planning and implementation phases and need to fully capitalize on the potential of the IIoT and data-driven applications. This, in turn, complicates the crafting of a port’s digital strategy, as well as the selection and implementation of suitable technologies.⁷ Likewise, the development of smart port solutions needs to take into consideration the comparatively low connectivity levels in the LAC region – particularly in M2M communication,⁸ which forms the core of real-time data analytics solutions.

II. OBJECTIVE

- 2.1 The objective of this consultancy is to develop a communications strategy to disseminate and socialize the results of all undertaken research and consultation activities under Components I and II.

III. SCOPE OF SERVICE

- 3.1 The primary activities to be undertaken by the consultant are to:
- (i) Develop a communications strategy to disseminate and socialize the results of all undertaken research and consultation activities under Components I and II. The strategy will include the creation of working groups, on-site and online workshops, webinars, blogs, social media, among others. This also includes the production of status reports, communication with all relevant stakeholders, logistical and content-related organization of any necessary meetings and outreach activities, and any necessary supporting research for Components I-IV.
 - (ii) Help support the organization of all events specified under this technical cooperation.

⁶ Riedl, Jens et al. “To Get Smart, Ports Go Digital”. The Boston Consulting Group. <https://www.bcg.com/publications/2018/to-get-smart-ports-go-digital.aspx>.

⁷ Deloitte Port Services. “Smart Ports: Point of View”. Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/energy-resources/deloitte-nl-er-port-services-smart-ports.pdf>.

⁸ For instance, Cisco expects M2M modules to account for 33% of all networked devices in Latin America by 2020, compared to 60% and 58% in North America and Europe, respectively. Cisco, *VNI Forecast Highlights*, https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-highlights/pdf/Latin_America_2020_Forecast_Highlights.pdf.

IV. EXPECTED OUTCOMES AND DELIVERABLES

4.1 The expected outcome is a communications strategy to disseminate and socialize the results of all undertaken research and consultation activities under Components I and II. The deliverables are:

- Workplan
- Communications' Strategy
- Dissemination events

V. CHARACTERISTICS OF CONSULTANCY

- Type of consultancy:** Individual Consultant
- Starting date and duration:** 72 non-consecutive consultant days, to be completed within no more than 12 calendar months.
- Place of work:** Offices of the consultant.
- Citizenship:** The consultant must be a national of a member state of the IDB.
- Qualifications:** The consultant must have an established track record in knowledge management, communication and training. Prior experience in the region would be an asset. The consultant must have experience working on IDB operations, technical cooperation and initiatives. The consultant must also have knowledge of IDB protocols and must be able to comfortably work in English and Spanish.

VI. SCHEDULE OF PAYMENT

- 15% upon delivery and approval of the workplan; said plan is due within 30 calendar days of the signature of the contract.
- 40% upon delivery and approval of the communications strategy;
- 30% upon the delivery and approval of the workshops undertaken during the contract period.

VII. COORDINATION

7.1 The coordination of consultant work will be managed by Krista Lucenti (TIN/CTT).

VIII. PAYMENT AND CONDITIONS

8.1 Compensation will be determined in accordance with Bank's policies and procedures. In addition, candidates must be citizens of an IDB member country.

IX. CONSANGUINITY

9.1 Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractuales, will not be eligible to provide services for the Bank.

X. DIVERSITY

10.1 The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDS status. We encourage women, Afro-descendants and persons of indigenous origins to apply.