DEVELOPMENT COMMITTEE
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**Disruptive Technologies and the World Bank Group –
Creating Opportunities - Mitigating Risks**

Attached is the document entitled "Disruptive Technologies and the World Bank Group – Creating Opportunities – Mitigating Risks" prepared by the World Bank Group for the October 13, 2018 Development Committee Meeting.

Disruptive Technologies and the World Bank Group

Creating Opportunities—Mitigating Risks

Development Committee Paper

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Boxes

Abbreviations

DE4A	Digital Economy for Africa
G20	Group of Twenty
GHG	Greenhouse Gas
GSMA	GSM Association
HR	Human Resources
IBRD	International Bank for Reconstruction and Development
ID4D	Identification for Development
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
MIGA	Multilateral Investment Guarantee Agency
SDGs	Sustainable Development Goals
STEM	Science, Technology, Engineering, and Mathematics
UN	United Nations
WBG	World Bank Group
WURI	West Africa Unique ID for Regional Integration and Inclusion

Executive Summary

1. **Traditional pathways to overcome critical development challenges are increasingly subject to technology-based disruptions, creating new opportunities and new risks.** Over the last 200 years, three industrial revolutions fundamentally altered the structure of economies and societies, and we are now in the midst of the fourth industrial revolution. The accelerating pace of technology diffusion, the convergence of multiple technologies, and the emergence of global platforms are disrupting traditional development models. Disruptive technologies can be defined as emerging technologies that result in a step change in the cost or access to products or services, or that dramatically change how we gather information, make products, or interact. Disruptive technologies are expanding access to global markets and changing business models. Automation and artificial intelligence are delivering enormous productivity gains. Digitization is expanding access to basic needs and services by extending finance to the unbanked. And distributed renewable energy technology is bringing affordable power to off-grid rural populations.

2. **Disruptive technologies also pose new risks—to economic and societal inclusion, and to environmental and systemic sustainability.** Technologies are reshaping the nature of work and increasing the risk of growing inequality. Shifts in the demand for labor and the types of skills that complement technology risk polarization between those with the means to access new technologies and acquire skills for the new economy—and those without. If the enabling environment to be competitive does not adapt, firms will not be able to pursue new opportunities, widening productivity differences, giving first mover advantages, and fostering growth accelerations only in certain sectors and locations. And as technology embeds itself in human and organizational relationships, it could diminish societal trust, disrupt traditional workplace dynamics, and challenge the role of governments as an intermediary.

3. **Despite the risks, failing to take advantage of the opportunities that disruptive technologies offer could be even more costly.** The economic and societal transformations brought about by disruptive technologies can dramatically accelerate progress toward the SDGs and the twin goals. But if countries cannot compete in the future global economy, they will be left behind. To harness the potential of new business models, new ways of delivering services, and shifting sources of competitiveness, countries require multisectoral and multipronged approaches to expand the opportunities and mitigate the risks.

4. **The WBG will support countries to create the opportunities and mitigate the risks associated with disruptive technologies by operationalizing the Build-Boost-Broker value proposition.** Disruptive technologies and their applications for development are increasingly being mainstreamed within existing WBG approaches. But urgent action is needed for the WBG—with its knowledge, financing, and convening power—to support countries as they transition to new pathways of sustainable, inclusive growth. Its global experience and multisectoral portfolio provide insights into the ways disruptive technologies can be applied holistically to achieve the twin goals. As a trusted advisor, it will engage governments and people, coordinate development partners, and mobilize the private sector along three pillars. To Build, it will develop the digital and physical infrastructure and regulatory foundations for sustainable, inclusive technology-enabled economies. To Boost, it will expand the capacity of institutions, communities, firms, and individuals to leverage technology-led disruption for socioeconomic dividends and greater resilience in times of change. To Broker, it will harness disruptive technology, data, expertise, and partnerships to solve development challenges and ensure that the poor share in the benefits. This approach builds on the findings in the forthcoming 2019 World Development Report: *The Changing Nature of Work*, and complements the other Development Committee papers on *Human Capital: A Project for the World* and the Bali Fintech Agenda.

5. **Build—the WBG will ensure that countries can take advantage of the new pathways of growth by having the digital and physical infrastructure and enabling environment to compete across all sectors of tomorrow's economy and the digital foundations to expand access to new opportunities.** WBG thought leadership on what is changing, why it matters, and where the new opportunities lie will help clients identify new pathways to support tech-enabled sustainable development. Such research and analysis, complemented by toolkits, can be readily applied to a range of countries or tailored to a given thematic issue. Taking policy to practice, the requisite infrastructure and regulatory frameworks for affordable broadband connectivity can help bridge the digital divide. New advances in sustainable power sources and new modes of providing transportation services offer inclusive solutions in themselves and provide important inputs to realizing the potential of the digital economy. And, bringing people online goes beyond broadband access to require digital platforms and services, such as secure identification platforms and financial services. It also requires updating regulatory frameworks to address new business models, new concerns about data privacy and cybersecurity, new forms of competition, and new roles for intangible assets.

6. **In building the foundations for sustainable, inclusive technology-enabled economies, the WBG will scale up efforts toward universal, affordable digital connectivity.**

7. **Boost—the WBG will support the concerted efforts of governments, firms, and workers to adapt to technology-enabled disruptions and to thrive in the new economy.** Providing thought leadership on how economies should respond to tech-enabled disruption can boost the capacity of individuals, firms, and institutions to form resilient societies. Investments in digital skills can empower individuals to take advantage of new opportunities, just as the Human Capital Project's emphasis on foundational cognitive and socioemotional skills can better equip them for the changing nature of work. Firms can adapt to new market opportunities by improving their capabilities to absorb disruptive technologies. And to ease the adjustment of communities to tech-enabled disruption, governments can improve the speed, reach, quality, and efficiency of public services, through digitally-enabled service delivery, and progressively move toward universal social protection.

8. **To boost the capacity of institutions, individuals, societies, governments, and businesses to leverage technology-led disruption for socioeconomic dividends, the WBG will scale up efforts to support the development of skills and capabilities for the new economy and the provision of transparent, efficient, and accountable digital government services.**

9. **Broker—the WBG will provide "disruptive" leadership in the global search for technology-enabled solutions to intractable development challenges.** Through both pilots and early-stage investment and advisory programs, the WBG will adapt emerging technologies in cross-sectoral contexts, with an eye toward scalability, sustainability, and measurable impact. It is applying new technologies to accelerate meeting existing goals—such as Universal Financial Access, Universal Health Coverage, and clean energy initiatives. It is harnessing technology to address data gaps, underscoring its role as provider and facilitator of development data through partnerships with the private and public sectors. It is also promoting policy coherence in the disruptive technology space by participating in multilateral dialogues, enhancing synergies between public and private institutions, supporting global industry standards, and addressing regulatory gaps. In seeking to be the partner of choice for governments, technology firms, and other public and private stakeholders, the WBG will ensure that it harnesses disruptive technology, data, expertise, and global coalitions to accelerate progress toward the SDGs and the twin goals.

10. **To operationalize the Build-Boost-Broker value proposition outlined here, the WBG will scale up its efforts under each of the 3 pillars and upgrade internal capabilities.** The WBG will also engage in activities that cut across the Build-Boost-Broker pillars, including supporting country diagnostics that help chart the new drivers of growth and the formulation and implementation of agile regulations for the new

economy. The WBG will also upgrade its internal capabilities agenda—improving the coordination, institutional agility, and skill mix of staff.

11. **Shareholders can support the pursuit of the priorities proposed here by increasing their advocacy for the Build-Boost-Broker value proposition in their countries and regions and by supporting the WBG's role in multilateral dialogues and in leveraging resources in the disruptive technology space.** First, the WBG asks the Development Committee to emphasize the need for countries to prioritize investments across the Build-Boost-Broker pillars and to be partners in creating an enabling environment to harness disruptive technologies as drivers of growth. Second, harnessing disruptive technologies to find new development pathways can be accelerated by supporting the WBG's role to engage in multilateral fora, convene coalitions with the private and public sectors, and contribute to global standards and address regulatory gaps. Third, the transition to sustainable development pathways will benefit from leveraging resources for the disruptive technologies agenda—including through the IBRD and IFC capital increases, the ongoing IDA18 replenishment, and the financing windows to be explored during the IDA19 replenishment.

Questions to the Development Committee

Does the committee agree with the proposed Build-Boost-Broker approach to support countries in exploiting opportunities and managing risks associated with disruptive technologies?

Does the committee agree with the proposed areas of engagement for the WBG?

I. Build, Boost, and Broker to embrace technology-enabled disruption

1. **Fast-diffusing technologies are converging to disrupt traditional development pathways.** Over the last 200 years, three industrial revolutions have fundamentally altered the structure of economies and societies, and we are now in the midst of the fourth. All technology causes change in some way, replacing the old with the new—the Blackberry replaced the 2G cellphone and the iPhone replaced the Blackberry. These were important advances, but incremental. This approach defines disruptive technologies as having an impact not just incremental, but typically characterized by a step change in the cost or access to products or services with potential to disrupt traditional pathways of economic development. The advent of widely available and affordable mobile telephony was truly disruptive because it changed the way people interact and launched a series of subsequent technological innovations. Digital payments and digital financial services are fundamentally disrupting access to finance. But this is not only about digital technologies. For example, a similar transformation is disrupting energy markets. The increasing efficiency of solar panels has made solar commercially viable to provide energy in remote locations where access to the grid is limited

2. **The economic and societal transformations brought about by the disruptive technology trends described in this paper are creating a new paradigm for development that can accelerate progress toward the twin goals and SDGs.** The World Bank Group, the development community more broadly, and governments everywhere must recognize these disruptive trends and take steps to harness them. Most countries need to build digital economies as critical for many other changes. These trends also bring risks, but for developing countries they also create tremendous opportunities. Given the potential productivity and welfare gains from disruptive technologies, the opportunity cost of not engaging is rising—and if countries cannot compete in the future global economy, they will be left behind.

3. **The World Bank Group—with its global knowledge, financing, and convening power—is uniquely positioned to help client countries harness the disruptive technologies and to help address the downside risks and impacts of disruption**. With changing business models, new ways of delivering services, and shifting sources of competitiveness, the multisectoral agenda requires a multipronged strategy. That is why the WBG proposes multisectoral cross-institutional approaches to support countries by implementing the Build-Boost-Broker value proposition. Together with the private sector and development partners, the WBG will help:

- **Build** the infrastructure and regulatory foundations to expand the diffusion of and access to new technologies.
- **Boost** the capacity of individuals, institutions, businesses, and governments to pursue new opportunities and to thrive in the face of change.
- **Broker** the use of technologies to address specific development challenges and to shape the global dialogue and standard setting associated with disruptive technologies.

4. **Building the physical infrastructure, digital infrastructure, and regulatory foundations to expand access to new technologies is essential to take advantage of the changing pathways of growth that disruptive technologies bring.** This agenda will require tough forward-looking choices, such as planning long-term infrastructure investments, as technological change makes legacy systems redundant. The digital economy will be a cornerstone for most disruptive technologies, with both physical and digital infrastructure development and regulatory reform underpinning the transition. New financial markets and services can make possible new types of transactions and business models. In the face of rapid change, more adaptive regulatory approaches will be needed to support innovation and competition and address new issues in consumer protection and privacy. Thought leadership and continuing evaluation of approaches will thus be essential to identify new pathways to support inclusive and sustainable growth.

5. **Boosting the capacity of individuals, firms, and governments to adapt to technology-led disruption will enable countries to reap social and economic dividends.** Complementing a stronger enabling environment that expands access to technologies is the growing capacity of the actors to adopt and use them to pursue new opportunities. New technologies are already changing the demand for workers and the types of skills needed across a growing set of sectors and occupations. The demand for digital skills that complement these technologies is also rising, but so too is the need for cognitive and socioemotional skills that enable people to adapt whatever the jobs of the future might be. Similarly, as individuals and firms adapt to the changing nature of work and business, governments also need to adapt social protection for inclusiveness and manage the costs. In the gig economy, for example, people are not tied to "standard" long-term contracts with a single employer. They work freelance—from grocery delivery and driving services to more sophisticated tasks like accounting or teaching—on a more flexible basis.

6. **Brokering partnerships to harness disruptive technologies, data, and expertise will enable countries to solve development's challenges.** The WBG, given its convening power, is well placed to develop broad-based partnerships with technology providers and to broker new development solutions. For example, the WBG has partnered with data providers, such as LinkedIn, to provide information on skills likely be in demand in the future. Fintech and blockchain hold the potential to bank the unbanked faster than ever before. Computer-assisted instruction, by enhancing the effectiveness of teachers, and digital platforms, by expanding access to state-of-the-art knowledge, can be game-changers for education outcomes. Mobile applications, satellite-based tools, and the use of drones, for example, are eyes on the ground in fragile and conflict settings. These technology solutions typically require shared expertise, data, and capital and will therefore benefit from partnerships between the public and private sectors. And global coalitions will pave the way for shaping global norms on fintech, data privacy, and cybersecurity.

7. **The WBG will thus support countries as they expand the opportunities and mitigate the risks associated with disruptive technologies—with the potential to do even more.** The WBG's analytical, technical, and financial offerings and its global experience and multisectoral portfolio give it unique understanding of how disruptive technologies can be applied holistically to achieve sustainable, inclusive growth. To realize the Build-Boost-Broker value proposition, the WBG will need to engage governments and people, coordinate development partners, and mobilize the private sector along the three pillars. This approach builds on the findings in the forthcoming 2019 World Development Report: *The Changing Nature of Work*, and complements the other Development Committee papers on *Human Capital: A Project for the World* and the Bali Fintech Agenda.

II. Because disruptive technologies are transforming development pathways, the WBG proposes an updated approach

The world is facing critical development challenges

8. **Despite decades of progress in boosting prosperity and reducing poverty,[1] important development challenges persist.** First, inequality of opportunity continues to be high. Around 50 percent of the world's people cannot access essential health services, and 250 million children under the age of five are stunted. Two hundred and sixty million youth are out of school, while nearly 60 percent of those in primary school fail to achieve minimum learning proficiency. These quality and coverage gaps in the building blocks of the next generation's human capital undermine future productivity. Second, crucial services are denied to many. Four of five poor people are not covered by a social safety net in the poorest

countries; around 1.7 billion adults do not have a bank account; and 3.8 billion of 7.5 billion people do not have access to the internet.

9. **At the same time, new development challenges—requiring new solution paradigms—are on the horizon.** Demographic dynamics related to shifts in the working-age population, migration, and urbanization are changing economic fundamentals and skewing the benefits of economic growth. Environmental concerns over climate change, pollution, water scarcity, and deforestation are becoming more pressing. There is also a humanitarian crisis brewing with forced displacement almost doubling over the past two decades, rising to a record-high 68 million people in 2017. Finding bold solutions to both old and new challenges is key to achieving the Sustainable Development Goals (SDGs) and the WBG's twin goals.

Traditional pathways to overcoming development challenges are increasingly subject to technology-based disruptions

10. **Overcoming these challenges will require progress across several traditional development imperatives, but technological advances will create new opportunities and risks.** Traditional development imperatives comprise a range of factors such as political and macroeconomic stability, governance structures, institutional quality, social cohesion, human capital development, connectivity, productivity, and competitiveness. The provision of global public goods—to deal with forced displacement, climate change, and major disease outbreaks—also need to be addressed. Technological change provides new opportunities to leapfrog traditional development imperative challenges, just as the rapid spread of mobile phones reduced the need for landline connectivity. But it can also introduce new risks, which necessitate greater urgency for catching up in each of these dimensions. With skill-biased technological change, for example, people lacking human capital risk being left behind.

11. **Technologically-driven disruption is not new.** The First Industrial Revolution in the early 1800s, with widespread adoption of the steam engine, established the machine as one of the main means of production, in agriculture, in transport, and in manufacturing. The Second Industrial Revolution began in the late 1800s and lasted until the 1920s as electricity transmitted the production and consumption of energy over great distances, increasing productive efficiency and enabling long distance communication. The Third Industrial Revolution, the Digital Revolution, began with the invention of the computer, replacing analog electronic and mechanical devices with digital technology, unleashing technological innovation, mobile telephony, and the internet.

12. **Driving the Fourth Industrial Revolution are emerging and disruptive technologies, starting with widespread access to the internet and mobile communications and unprecedented increases in the processing power of computers.** The exponential increase in data arising from the internet and widespread connectivity—and the expanding capacity of computers to process that data—are accelerating breakthroughs in artificial intelligence, robotics, autonomous vehicles, 3D printing, biotechnology, materials science, and energy storage.

13. **While disruptive technologies are based on different technologies, the digital economy accelerates their impact**. Data and affordable connectivity supercharge mobile finance and payments and accelerate progress toward universal financial access. Data are also driving artificial intelligence and augmented reality, which are in turn driving mechanized manufacturing, autonomous vehicles, health treatments, and gene splicing.

14. **Distinguishing the current wave of technological change are the intensity of knowledge, the accelerating pace of diffusion, and the convergence of multiple technologies.** Past technological advances creating new goods and services and transforming production processes generated enormous development impacts. But today's technological change differs in three ways. First, there is a sharp

increase in the knowledge-intensity of technology-enabled products and processes and often a decline in their labor intensity. Second, although many technologies are not new, falling costs, evolving business formats, and changing consumer preferences are fueling their adoption at a faster pace than before. Third, multiple converging technologies can be rolled out at scale, a "compound effect." While often based on digital technologies and products, they go far beyond connectivity and the potential of the internet. These include modern production methods as robotics, artificial intelligence, and the Internet of Things. They also include advances in nanotechnology and biotechnology—and such new product lines as batteries, drones, solar panels, self-driving vehicles, and exotic materials.

15. **As a result, traditional development pathways are increasingly subject to technology-based disruptions.** Disruptive technologies can be defined by those that typically result in a step change in the cost or access to products or services for individuals, companies, and governments, especially as they converge with one another, compounding their transformational impact. Five metatrends stand out as disrupting development pathways (box 1). Disruptive technologies can also be defined by emerging technologies that dramatically change how we gather information, make products, or interact.

Box 1 Technology metatrends disrupting traditional development pathways

Filtering 200 disruptive technologies for their specificity, speed of impact, and relevance to poverty reveals five meta trends that are particularly relevant for development:

Global digital platforms emerge as new means of production. Global digital platforms will consolidate value chains and allow greater interoperability. This will reduce the need for intermediaries, as knowledge, labor, and digital and physical assets flow more freely and create more opportunities. But these platforms, with their concentrated data ownership, also raise the potential for monopoly power, exclusion, privacy invasions, and cyberattacks.

Expanding access to basic needs and services. New technologies are enabling physical assets in healthcare, agriculture, energy, and water to be partially digitized, expanding potential access to basic services by changing cost and funding models. Service delivery models are also shifting, at times moving away from network solutions to distributed solutions that target specific areas or populations.

The nature of work changes and the augmented labor force emerges. Advances in machine learning, artificial intelligence, and robotics will change how we work. Routine jobs will increasingly be automated, while non-routine jobs, where human skills complement technology will increase. An augmented labor force will marry the strengths of humans and machines, and employee-employer relationships will continue to shift. Localization may develop as additive manufacturing changes supply chains, immigration, and urbanization.

New skills and learning mechanisms requirements. Demand will increase for skills that complement new technologies, including advanced cognitive skills (such as complex reasoning), socioemotional skills (such as team work), and skill combinations predictive of adaptability (such as problem solving, self-efficacy, and entrepreneurship). Individuals will need multiple opportunities to upskill and reskill themselves throughout life. To provide these opportunities, education and training systems will need to become more flexible, nimble, and responsive.

New social contracts. Digitization, new platforms, and collaborative digital business models put pressure on organizational hierarchies and change the nature of elected and appointed leadership. Non-state actors will exert considerable pressure on government, its legitimacy, and its role as a trusted intermediary with the advent of transactions on distributed ledgers. Distributed ledger technologies will have to work with governments if they need legal enforcement to function properly. The decoupling of employment status and social protection—with workers being part-time in the gig economy and changing jobs more frequently—is likely to require more universal forms of social protections.

Disruptive technologies offer new opportunities to accelerate progress toward the SDGs and the twin goals

16. **Disruptive technologies can increase the reach and inclusiveness of service delivery at lower cost with faster diffusion.** Mobile connectivity and new data-driven models of financing can "bank" the unbanked faster than ever before. Big data and artificial intelligence can reshape high-quality education and learning through precisely targeted and individually customized human capital investments. Battery storage technology holds the promise of bringing affordable and sustainable power to off-grid populations. The shared economy and e-logistics are redefining transport infrastructure and services, which will be further transformed by autonomous vehicles and drones. Mobile applications, GPS satellite systems, and unmanned aerial vehicles can monitor areas affected by conflict or natural disaster.

17. **Technology-enabled disruptions also present new productive opportunities for individuals, firms, and governments.** For individuals, new technologies transform old jobs, generate new jobs, and enhance productivity. Online platforms, for example, can expand access to income-earning opportunities for a wide range of skills by bringing buyers and sellers together. Digital technologies enable flexible work schedules, with the potential to mitigate constraints on women's economic participation related to care responsibilities, mobility limitations, and social restrictions. For firms, the rise of global online platforms can reduce search and transaction costs, enabling productivity gains thanks to competition, scale economies, and technology diffusion. For governments, technology can improve the efficiency, transparency, and accountability of public service delivery—and dramatically reduce corruption. It can also broaden the inclusiveness of social protection and help tailor programs to the precise needs of recipients, including those in the most fragile contexts.

Disruptive technologies also introduce new risks

18. **Disruptive technologies pose new societal and environmental risks.** As technology embeds itself in human and organizational relationships, trust will become more fluid, dependent on context. Technologies such as blockchain can enhance trust and even remove the need for "trusted" intermediaries. But trust might diminish because digital media can invade privacy, artificial intelligence can embed societal biases in code, and most disruptive technologies have dual-use (civilian and military) applications. Technologies may also pose new environmental risks, since distributed ledgers require more energy and the raw materials for components of new technologies have to be sourced and discarded.

19. **Disruptive technologies are reshaping the nature of work and increasing the risk of growing inequality.** With more routine tasks now automated, most jobs will require a basic threshold of human capital. With advances in machine learning and artificial intelligence, even highly-skilled routine tasks are likely to be disrupted. There will thus be a premium on skills that complement technology—not only technical skills but also socioemotional and creative skills for greater adaptability and lifelong learning. The polarization of jobs between those with the means to acquire skills for the new economy and those without may fundamentally change labor markets, reducing social cohesion.[2] With the Internet of Things, advanced robotics, 3D printing, and the like reducing the importance of labor costs in determining competitiveness, the traditional development model of labor-intensive export-led manufacturing may be less feasible. Differential access to new technologies and the capabilities to use them risks increased inequality between and within countries.

20. **The shifting basis for the competitiveness of firms has implications for job creation and productivity growth.** Digital platforms will disrupt analog business models. Some firms risk getting left behind due to the digital divide, lack of scale, paucity of know-how, stranded assets, and inadequate management.

21. **Governments could be less able to protect the poor, vulnerable, and those excluded by rapidly changing market conditions.** Increased digitization, distributed trust technologies, and new platforms will exert considerable pressure on the concept of sovereignty and the role of government as a trusted intermediary. The disruption of traditional workplace relationships, including the gig economy, will require new forms of social protection. And the ability to service markets without a physical presence and the transferability of intangible assets across jurisdictions can erode the tax base. Privacy invasions, cyber threats, illicit financial flows, and bioengineering also need to be tackled.

Urgent action is needed to create the opportunities and mitigate the risks associated with technology-led disruption

22. **Governments must step up efforts to create opportunities and mitigate risks.** The public sector has a critical role to play in helping correct market failures, ensuring a level playing field, and reducing information asymmetry. Governments can also use: i) push instruments that promote the development and supply of technologies; ii) pull instruments that create and/or expand demand for disruptive technologies; and iii) policies that provide a sound regulatory framework that encourage innovation, enhance inclusivity, and protect consumers.

23. **The WBG is mainstreaming new approaches to disruptive technologies and their applications to achieve the twin goals.** The *Forward Look* lays out a multifaceted plan for the WBG to support client countries in advancing technologies and transforming their economies. For example, by supporting regulatory reform, the WBG has been at the forefront of creating renewable energy markets. *Maximizing Finance for Development* is leveraging the private sector to address the financing gap and making innovative use of technology to help close the investment gap of US$2.5 trillion every year until 2030. The IFC's *Creating Markets Strategy* and MIGA's *2020 Strategy* are creating new market opportunities, including technology solutions that reduce search and transaction costs. The WBG will continue to produce evidence of what works through pilots and early stage investments and advisory services. WBG partnerships between IFC's early-stage investment operations in infrastructure, e-logistics, manufacturing, and financial services have enabled the diffusion of renewable energy, fintech, and electric vehicle batteries in emerging markets.

24. **The WBG's Cascade approach is harnessing the power of disruptive technology for inclusive development.** It creates opportunities for the private sector to develop original and country-tailored technology solutions to solve local problems, recognizing that technology skills and market knowledge lie primarily with firms. It focuses on building the regulatory and policy conditions that can allow disruptive businesses to thrive—by supporting smart and agile regulatory frameworks, by fostering international regulations that foster certainty and protection, and by ensuring that inclusive business models can diffuse innovations to the bottom of the pyramid.

25. **Much more is needed for the WBG to lead in supporting countries as they transition to new pathways of sustainable, inclusive growth.** The WBG's engagements will be tailored to each country's level of development (FCV, LIC, small states), screening for client commitment and capabilities. Understanding what is disruptive about particular technologies helps identify which problems they are well-suited to address, what complementary factors need to be bolstered to enable them to be effective, and what new challenges they may introduce. They are most valuable when they help people at scale with incentives and resources to produce substantial development impacts.

26. **The WBG's technical expertise, financial and advisory offerings and convening power position it as a trusted partner of choice to harness disruptive technologies for development.** The WBG's public and private sector clients have asked for support in addressing disruptive technologies and the WBG is well positioned to respond. Given the opportunities, risks, and uncertainties, the value of

WBG support for new, sustainable pathways of development lies in its ability to work at the confluence of global and local issues. It complements knowledge creation with operational financing across sectors and regions and forges partnerships with both the public and private sectors. Its public and private financing instruments are also designed to respond to changing environments and implement relevant policies. And with its convening power, neutrality in policy advice, and previous engagements to provide global public goods, it is in a unique position to leverage partnerships that use disruptive technologies to solve development challenges.

III. Building the foundations for sustainable and inclusive technology-enabled economies

27. With the right foundations, countries will be able to take advantage of the changing pathways of growth that new technologies can bring. The WBG's support to scale up opportunities and minimize potential risks can be leveraged in the following ways.

- New research, analytical work, and thought leadership will help clients identify new pathways to inclusive and sustainable growth—and understand the impact of new technologies and programs to harness them for development.
- Financing instruments and regulatory frameworks will facilitate the creation, expansion, and protection of core digital infrastructure, including connectivity, digital identification, and digital financial systems. And they will leverage new ways disruptive technologies are reshaping other physical infrastructure such as in power and transportation.
- Adapting smart and agile regulatory frameworks will promote innovation, competition, and inclusive access to new opportunities disruptive technologies bring.

28. **Providing thought leadership on what is changing and where new opportunities lie will help build the foundations for tech-enabled sustainable development.** The WBG's Global Practices are producing flagship reports, policy notes, and innovative research to disseminate lessons on approaches that work. Some are global, such as the 2016 World Development Report on *Digital Dividends,* and others are country-specific. The WBG also has frameworks to help client countries think through how to deal with the future of manufacturing and how to leverage technology and national innovation systems to drive growth, as in *Trouble in the Making? The Future of Manufacturing-Led Development* and *The Innovation Paradox*. New WBG research is quantifying the impact of automation on trade patterns and labor market outcomes as well as taxation models robust to disruption. Tech-enabled disruption has also featured prominently in identifying new sources of growth, as in *China New Drivers of Growth* and *Rwanda Drivers of Growth*. Indeed, the tech-enabled agenda drives a wide range of economies (box 2).

Box 2 Addressing "disruption" in new WBG country engagements

Each of the last three industrial revolutions gave birth to new development paths for countries to escape poverty and middle-income traps.

In this fourth industrial revolution, the diffusion and adoption of new disruptive technologies offer new growth opportunities for many WBG clients. As before, adapting quickly to new technology can allow latecomers to catch up, break out of traditional pathways, bypass development stages, and overtake established leaders. Key ingredients for disrupting traditional development trajectories include:

§ A compelling vision by country authorities, who should have a keen understanding of global disruptive trends and a scenario of a desired future.
§ Transformative leadership and accountable public institutions, which can mobilize the national elite and

interest groups and inspire societal activism.
§ Sustained high growth rates and distributions of benefits, thanks to structural reforms to support sectors essential to accelerated development.
§ Catch-up policy regimes, which accelerate sectoral change, ensure low-cost entry, and nurture local firms.
§ A vibrant private sector and entrepreneurial ecosystem, with strategic partnerships for R&D, and digital capabilities to accelerate the transfer and adaptation of technology.
§ Forward-looking system diagnostics, to identify a country's binding constraints, sources of growth, and pathways for leapfrogging.
§ Sustained science, technology, and innovation initiatives, linked to the SDGs.
§ Investments in foundational infrastructure, regulation, human capital—and in providing services and new technology to a large part of the population.
§ Financing instruments, including budget support, development impact bonds, and contingent financing instruments.
§ Regional and South-South cooperation and partnerships.

29. **WBG research and analysis, complemented by toolkits and diagnostics, will be readily applied to a range of countries and tailored to thematic issues.** Diagnostics and tools for the digital economy include a common set of indicators for connectivity, platforms, skills, financial services, and entrepreneurship and innovation.[3] To be piloted in Africa, these assessments will be scaled up to meet growing demand. Other diagnostics include toolkits for broadband strategies, digital identity, and ICT regulation. The new Public Expenditure Review for Science, Technology, and Innovation will help governments formulate policies, adopt good practices, and coordinate national innovation systems.

30. **Affordable broadband connectivity bridges the digital divide and creates the enabling environment for disruptive technologies.** Broadband access for all requires digital infrastructure in terms of connectivity and regulatory frameworks that promote investment and competition in telecoms. The WBG's *Digital Infrastructure Initiative* is coordinating telecom interventions in 11 Sub-Saharan countries by providing capital, structuring financially sustainable projects, mobilizing investors, and advising public stakeholders on relevant regulatory reforms. The *Smart Village Initiative in Niger* combines the deployment of essential infrastructure with regulatory reforms in spectrum management to bridge the urban-rural digital divide. *Digital Central Asia and South Asia* improves broadband internet connectivity among landlocked countries by catalyzing private investment in infrastructure and modernizing regulatory frameworks to promote innovation and expand affordable coverage. It also requires complementary infrastructure investments in transportation and reliable power—sectors where disruptive technologies are also contributing to lower costs and greater accessibility.

31. **Bringing unconnected people online goes beyond broadband access to include digital platforms and financial services to enable transactions to take place.** Secure digital identification platforms with appropriate data protection will likely be necessary for digital transactions. The WBG's *Identification for Development (ID4D)* initiative offers governments technical assistance to support the design of identification systems (box 4). The *West Africa Unique ID for Regional Integration and Inclusion (WURI)* is a 10-year multiphase programmatic approach operation with the ECOWAS Commission to build ID platforms that are interoperable across Benin, Burkina Faso, Côte d'Ivoire, Guinea, and Niger. This project is a good example of regional approaches to the connectivity agenda. Providing the infrastructure for digital financial services is also essential for digital exchange—to make payments and transfer money electronically, for e-commerce and e-government. As outlined in the Bali Fintech Agenda, prepared jointly with the IMF, the WBG's initial focus will be on facilitating foundational infrastructures, enabling reforms and capacity building for fintech solutions to deepen financial markets, enhance responsible access to financial services, and improve cross-border payment and remittance transfer systems. It will draw on IFC's and MIGA's growing experience in this space. The WBG's *Digital Economy for Africa (DE4A) initiative*,

in partnership with African governments and the private sector, combines all these elements of the digital connectivity ecosystem (box 3).

32. **Building the foundations for tech-enabled sustainable development also requires regulations conducive to leveraging new opportunities and managing risks.** Regulatory frameworks have to address new business models, data privacy and cybersecurity, changing employer-employee relationships, new forms of competition, and a new class of intangible digital assets. Fewer than 30 percent of countries have regulations on data relating to privacy, trust, ethics, or cyber security—even fewer have the capacity to enforce them. The WBG will support countries in understanding and mitigating legal risks associated with privacy, cybersecurity, data protection, data governance, and access to information. It will also develop a framework for addressing digital privacy and security for developing countries, building on its decade of experience in fintech. The IFC is currently developing a code of conduct for ethical use of information, especially for AI applications.

Box 3 Digital Economy for Africa—A cross-GP and cross-WBG initiative

Technological advances can drive inclusive economic growth and offer the potential to leapfrog traditional stages of development. To address those left behind, the WBG launched the Digital Economy for Africa (DE4A) initiative at the 2018 spring meetings, partnering with African governments and the private sector to realize the full benefits of digital technologies. Mobilizing a wide range of Bank Group instruments and expertise, the initiative focuses on:

- The physical infrastructure that is the backbone of a digital economy, universal in coverage and universally affordable.
- The foundational digital platforms of digital payments and transactions and digital identification that allow individuals, businesses, and governments to interact and transact with one another.
- Digital platforms such as e-commerce, digital finance, and e-government that drive usage and foster economic activity.
- Digital skills and literacy to create a digitally savvy workforce and foster competitive markets.

Currently piloted in Senegal, the initiative will be extended to other countries in East and West Africa and then to the rest of the continent.

Box 4 The World Bank Group's Identification for Development initiative

An estimated one billion people lack official proof of identity with the vast majority (81 percent) in South Asia and Sub-Saharan Africa. The international community has recognized the transformational potential of identification for a wide range of SDGs, such as those related to legal identity for all, financial inclusion, women's economic empowerment, safe and orderly migration, and effective social safety nets. Digital identification has to be coupled with comprehensive legal and regulatory frameworks that address privacy, data protection, cybersecurity, and nondiscrimination.

ID4D collaborates with other WBG initiatives (*Digital Economy for Africa*, and the IDA sub-window for refugees and host communities), the private sector, and development partners from inside and outside the United Nations system. Working across thought leadership, country and regional engagement, and convening global partnerships, ID4D has supported more than 30 countries since 2014. The *Principles on Identification*, fundamental to maximizing the benefits, have been endorsed by more than 20 public and private sector organizations.

Corporate priorities to "Build"

33. **To do more to support building the foundations of the digital economy, the WBG will:**

- **Expand universal, affordable digital connectivity.** Four hundred million people live in zones not served by a digital signal, 2.2 billion do not have a personal ICT device, 6 billion do not have access to broadband internet, and more than 1 billion do not have digital proof of identity. Extending the coverage of cellular networks and voucher programs for rural access is likely to cost US$300 per

person or US$120 billion in total for the 400 million digitally unserved. And an estimated US$12 billion is required to achieve digital identification for all. The digital connectivity agenda will require the WBG's Global Practices to join forces, with a coordinating framework that facilitates governance, ownership, expertise, and accountability. The Cascade approach will ensure that private investment is maximized, while thought leadership informs approaches to regulation.

IV. Boosting the capacities of individuals, firms, and institutions to thrive in the face of disruption

34. **To ensure that more people, firms, and institutions take advantage of new opportunities, the capacity to adopt and use technologies must be strengthened, and approaches to supporting resilience revamped.**

- For individuals, the development of digital skills and strong foundational cognitive and socioemotional skills will equip them for the changing nature of work, as technology makes investments in human capital more effective.
- For firms, technology adoption and innovation can be enhanced by fostering local entrepreneurial ecosystems, including early-stage financing instruments, start-up accelerators, and other programs that support the development of firm capabilities.
- For governments, rapid changes in traditional workplace relationships, social cohesion, and trust are redefining the state-citizen interface. Governments will thus have to change their approaches, enhance their capabilities, and support the transition to the new economy by supporting people-centered services through digitization and a new social contract that adapts social protection programs.

35. **Providing thought leadership on how economies can respond to tech-enabled disruption is the first prerequisite to boost the capacity of individuals, firms, and institutions to form resilient societies.** The 2019 World Development Report on *The Changing Nature of Work* emphasizes a new social contract centered around larger human capital investments and progressively universal social protection to boost the capacity of individuals to adapt to tech-enabled disruption (box 5). For technology skills training, the WBG has a toolkit for practitioners outlining the human, financial, organizational, and communication resources to plan, implement, monitor, and evaluate coding bootcamps. It is also piloting data initiatives to measure technology diffusion to firms to understand the drivers and constraints and the impacts on firm productivity and employment. And it will pursue further research on incentives for the adoption and use of new technologies by firms and workers.

Box 5 WDR 2019 on *The Changing Nature of Work*

Technology is changing the nature of work in two ways. First, it is changing the skills demanded in labor markets. The demand for advanced cognitive and socioemotional skills is increasing, while that for less advanced skills that can be readily automated is decreasing. Second, technology is changing production patterns. With the rise of platform marketplaces, the boundaries of a firm are blurring. There is a perceptible concentration of activities in a few large firms, which can expand at virtually no marginal cost.

Despite these two big changes, large shares of workers in developing countries remain in low-productivity employment, often in the informal sector with little access to technology or protection. Many developing countries continue to have inadequate tax bases, weak governance and administrative capacity, and high poverty rates. For such contexts, technology provides opportunities to create new jobs in old and new sectors, increase productivity in the informal economy, and deliver effective public services. Significant gains can also come from reducing tax avoidance by global corporations, especially the new platform companies.

Governments can seize the benefits of technological change through more and better investments in human capital, basic infrastructure, and social protection. Strong human capital foundations, created in early childhood and predictive of lifelong learning, are more important than ever. The Human Capital Index highlights the link between health and education investments and the productivity of future workers. Investments in human and physical capital need to be complemented by stronger social protection systems. Governments should protect people independent of how and where they work through progressive universalism, which expands coverage and emphasizes adequate support to those most in need.

36. **Investing in digital skills can empower individuals to take advantage of new opportunities.** Digital literacy is a stepping stone for more advanced technology-related skills as well as science, technology, engineering, and math (STEM) education. The WBG's lending operations have supported Bangladesh, Ghana, Mexico, and Nigeria to promote digital skills, innovation, and IT industry development. And through its *Coding Bootcamps*, the WBG has been piloting rapid technology skills training as a tool for addressing youth unemployment in emerging markets.

37. **The human capital agenda to equip individuals for the changing nature of work rests on strong cognitive and socioemotional skills.** General cognitive skills for functional literacy and numeracy are the foundation for acquiring subject knowledge. Socioemotional skills comprise beliefs, attitudes, and behaviors that allow individuals to manage emotions, set goals and plans to accomplish tasks, overcome setbacks, and deal with uncertainty. Both cognitive and socioemotional skills are essential for lifelong learning. The IFC has invested in Andela to help large companies and startups in Sub-Saharan Africa meet their demand for comprehensive 21st century skills, recruiting and retaining women in its coding bootcamps and talent pipelines.

38. **Technology-enabled solutions are facilitating more effective human capital investments.** Geo-social big data and mobile technologies can reach underserved populations. AI and digital technologies can target more precisely and customize investments to individual needs. And computer-assisted instruction and pedagogical support can greatly improve the quality of service delivery. The WBG is providing support to innovations and pilots that use technology to improve learning outcomes. The READ project in The Gambia supports the creation of digital STEM content to support low-capacity STEM teachers in classrooms and trains them in the use of interactive whiteboards with students.

39. **Firms can adapt to new market opportunities by improving their capabilities to absorb disruptive technologies.** Local entrepreneurial ecosystems can help firms identify market opportunities, develop and test new products and services, and access mentors and finance. The *Kenya Industry and Entrepreneurship Project* will improve the quality of services provided to startups through incubator and accelerator programs, boosting technology-related skills and strengthening linkages with larger firms to facilitate technology diffusion. The project also leverages the IFC's venture capital funding. *Innovate in India for Inclusiveness* facilitates innovation in biopharmaceutical products and medical devices, unlocking the capabilities of firms to create new markets for a new range of affordable yet high-quality products. These products can treat diseases that disproportionately affect the poor in India and elsewhere in the developing world.

40. **By improving the speed, reach, quality, and efficiency of public service delivery through digitization, governments can ease the adjustment of individuals and firms to tech-enabled disruptions and reduce the transition costs.** The WBG's *eTransform Ghana* project has supported the government through a series of projects to transform public service delivery through the digitization of taxation, business registration, and financial management. To digitize the citizen-state interface, the *Smart Cities Initiative* is supporting the institutional capacity of mayors and city agencies across the world, from Medellin (Colombia), to Karachi (Pakistan), and to Ho Chi Minh city (Vietnam). These initiatives are part

of the larger GovTech agenda to provide digitally enabled public services (box 6). MIGA also supported private investors providing high-tech port inspection services across 10 countries in Sub-Saharan Africa.

Box 6 GovTech—A global agenda for public sector and civic engagement transformation

GovTech has the potential to transform public sector efficiency, transparency, and performance. Citizens increasingly expect governments to deliver public services digitally, with a customer focus. Public mobilization in the age of social media platforms creates new avenues for citizen engagement. The growth of digital data—through sensors, smartphones, social media, and satellites—represents a new asset class for more efficient decision making and public sector responsiveness. Successful GovTech initiatives will need to integrate these new sources of information with core public sector management systems data, such as financial management and procurement.

Some governments have embraced the GovTech challenge and are adjusting their policies, capabilities, and service delivery models, while others are being left behind. The WBG will assist client countries in harnessing the potential of GovTech and in managing the risks of digital transformation. Partnerships between development partners, tech companies, and clients can identify good practices in digital transformation. They would build on the WBG's ability to connect a deep understanding of public sector development challenges with cutting-edge cost-effective technology solutions. The partnerships could be launched at the April 2019 spring meetings in Washington DC.

41. **Digitization can help design flexible and adaptive social protection systems to respond to shocks and crises in fragile contexts.** With the growing displacement and complexity of crises—economic shocks, natural disasters, conflict, and violence—governments can leverage technology to respond. In Zambia, 75,000 girls and women in remote areas can receive their cash transfers through a mobile wallet account or a pre-paid card. In the Caribbean small island states, new broadband solutions such as balloons and satellites could provide connectivity during times of natural disasters, enabling first responders to target people most affected.

42. **Governments can use digitized delivery systems to make social protection more universal, delinked from traditional employer-employee relationships**. Informal markets leave large portions of the population without social protection, and even in more formal markets, traditional benefits are being decoupled through reduced employer contributions and the rise of the gig economy. WBG support to social registry platforms (across a wide range of countries) connects people to public health services, social protection, and pro bono legal services. These platforms are part of Integrated Social Protection Delivery Systems to address fragmentation, poor coordination, and inefficiency.

Corporate priorities to "Boost"

43. **The WBG will focus on increasing its capabilities and the scale of its activities to:**

- **Support the development of skills and capabilities for the new economy.** Effective early childhood development and basic schooling investments that translate into learning can build strong human capital foundations. These strong foundations are highly predictive of the skills required by the changing nature of work, such as advanced cognitive and socioemotional skills. Further, education and training systems need to be flexible, adaptive, and responsive to the rapidly evolving nature of work, including skills needed by entrepreneurs in the new economy. But if solutions to upskilling and reskilling are internet-based, extensive digital connectivity, including remote or isolated communities, will be necessary to ensure access.
- **Support efficient, transparent, accountable, and inclusive government services.** Social media and sharing economy platforms create new avenues for citizen engagement, and governments are increasingly expected to deliver public services transparently, accountably, and responsively. Tech-enabled services to citizens and businesses through GovTech can help fill the gap. Digitization can also enable delivery systems for portable social protection benefits to support informal and gig economy workers, irrespective of the employer. Innovation in expanding access

to social protection is also critical to ensuring inclusion. But new taxation models will be needed to replace payroll contributions in financing social protection. And while technology platforms make it possible to reach the excluded, the lack of digital connectivity can leave behind the poor and those in remote or isolated areas.

V. Brokering disruptive technology, data, and partnerships to solve development challenges and mitigate risks

44. **The WBG can provide "disruptive" leadership in the global search for technology-enabled solutions to intractable development challenges.** Its leadership can be furthered by:

- Supporting technology-enabled solutions to address development challenges and uncover crucial data gaps, including partnerships with the public sector, private sector, and other stakeholders.
- Driving policy coherence in the disruptive technology space by building coalitions to provide new global public goods, contributing to multilateral dialogue, and shaping global industry standards and norms to address regulatory gaps.

45. **The WBG is adapting technology to solve development challenges.** Technological innovation is coming from all parts of the world. The WGB seeks to adapt this technological innovation by undertaking informed pilots to evaluate and scale up what works. For example, the WBG will work with technology partners to facilitate experimental "action labs" and test new ways to bring drinking water to communities with limited sanitation. The TechEmerge program has matched 17 global innovators with 15 healthcare systems, and more than 10 new commercial agreements were signed for wider deployment of new technologies across the healthcare market in India. Scaling up new efficient, cost-effective technology solutions in WBG operations will also support the MFD agenda through better use of scarce public resources. Given the important role of trust funds in helping the WBG support the successful adaptation of innovation, the WBG will leverage the current trust fund reform process to strengthen partnerships with current and emerging donors.

46. **The WBG is forming private sector partnerships to discover new solutions to development's challenges.** The Digital2Equal initiative will convene 15 global regional, and local platform companies to produce and define best practices for ensuring that women have equal access to benefits of the digital economy. The Famine Early Action Mechanism, a joint WBG-UN initiative, is engaging global technology firms such as Amazon, Google, and Microsoft, as well as such data providers as VanderSat, to build a coalition of the leading technology experts that will support the first AI-driven model of predicting food insecurity. All partnerships are guided by principles to ensure progress toward the WBG's twin goals, while safeguarding the WBG's reputation and respecting data privacy.

47. **The WBG is building public and private coalitions to bring technologies to scale.** The *Scaling Solar* initiative helps governments mobilize privately funded grid-connected solar projects that can be operational within two years at competitive tariffs. It has implemented auctions in Zambia and Senegal, and is engaged in five other countries. *Scaling Solar* is seeking to replicate similar initiatives to scale up other technologies such as wind and storage, as well as new business models such as minigrids for rural electrification. To support fisheries, the WBG is mainstreaming innovative technologies to improve the tracking and management of vessels at sea in Comoros, Ghana, Liberia, and Madagascar.

48. **The WBG is also harnessing technology to address data gaps, underscoring its role as provider and facilitator of development data.** It is piloting several initiatives that use technology to close data gaps (box 7). To impute poverty data in South Sudan and Liberia, satellite-based information is being used to overcome the problem of limited field access in areas facing conflict, insecurity, and logistical constraints.

For disaster risk management, unmanned aerial vehicles and drones support and validate damage needs assessments in Haiti, Sierra Leone, and the Solomon Islands. Mobile applications are collecting reliable high-frequency data cost-effectively. In Indonesia, crowdsourcing data through a mobile app generates information on a range of topics, including through non-standard forms of data—such as text, sound recordings, and videos—that can then be processed automatically using machine learning.

Box 7 Unlocking the value of new and existing data assets

With the rapid evolution in the use and capabilities of data and technology, governments are evolving into sophisticated data management organizations, and the WBG must evolve with them, making the strategic use of traditional and new data central to its operational portfolio.

The WBG has deep expertise in and privileged access to survey and administrative data worldwide. These remain the foundation for calibrating and validating new methods to improve the cost, timeliness, or granularity of data. For example, machine learning and artificial intelligence algorithms can be used in applications ranging from generating high-resolution maps of populations and simulations of economic activity to predicting the need for healthcare interventions in community health centers. But these algorithms cannot be trained or validated without access to, and deep familiarity with, "ground-truth" data from surveys and traditional sources.

But traditional data often are not well suited to being integrated with newer data sources, and privacy requirements mean they cannot be widely shared. The WBG will invest in making these existing data assets more integrable, by supporting initiatives to combine new and traditional data sources at scale, including partnering with firms to provide services to validate artificial intelligence and machine learning models against datasets they could not otherwise obtain. For example, in operational and policymaking settings, nongovernmental and commercial firms are increasingly partnering with governments to bring new approaches to the design of policy and delivery of services.

Similarly, the next generation of digital public goods, such as data for monitoring the SDGs, is expected to "Leave No One Behind" by including underrepresented populations, taking an open approach to code, methods, and data, and being widely accessible and usable in a timely manner. These expectations cannot be met unless the Bank partners with different actors and brings data from new sources into its work.

The WBG will invest in taking an integrated, multisector approach to data policy and implementation work. It will develop talent and attract staff with skills in both traditional and new approaches to the use of data and technology. And it will use its convening role and independence from political and business interests to pursue partnerships with new commercial and noncommercial actors that have pro-poor priorities at their core.

49. **Data partnerships are also driving the technology-enabled agenda.** To facilitate the use of private sector data in projects, the WBG recently established an internal data collaboratives platform to connect WBG project teams to data from partners like Mobike and the GSMA. It is also playing a leading role in mobilizing international agencies as well as donors around a data agenda. For example, the *SE4All Knowledge Hub* has created a data platform to measure progress against relevant targets for the Sustainable Development Goal for Energy. The WBG's *Ag Observatory*, in partnership with public and private sector agencies, combines big data and machine learning techniques to provide near real-time data on drought, climate shocks, and pest incidence, with pilots in Ethiopia, India, Kenya, and Pakistan.

50. **The WBG is participating in multilateral dialogue and supporting synergies between different institutions to promote policy coherence in the disruptive technology space.** The Digital Economy Task Force, established under the German G20 Presidency in 2017, is focused on the Future of Work under Argentina's G20 presidency in 2018. Digitization will likely be discussed under Japan's G20 presidency in 2019, and the WBG stands ready to support their efforts. In partnership with the UN and Japan, the WBG plans to learn from other stakeholders and bring emerging best practices to countries by helping formulate science, technology, and innovation action plans and providing the technical and financial capacity to support their implementation.[4] It will also arrange periodic South-South exchanges of

practitioners and policymakers to showcase country experiences, such as ID4D study tours from Morocco to India and from Côte d'Ivoire to Peru. The WBG will contribute to global advocacy campaigns to support the responsible and ethical deployment of technologies.

51. **The WBG is also supporting the development of global industry standards and norms to address regulatory gaps that emerge with disruptive technologies.** In digital finance, the IFC led the creation of the first global "Guidelines for Investing in Responsible Digital Finance" to implement evolving standards of the Global High-Level Principles for Digital Financial Inclusion. And it is a core member of the Financial Stability Board, which monitors the global financial system, including developing guidelines to guard against systemic threats resulting from attacks. Data-related regulations are another area where the WBG plans to partner with the G20, IMF, Partnership for AI, and various other international organizations, standards bodies, and leading governments to develop principles for the responsible, legal, and ethical use of artificial intelligence in the public sector.

Corporate priorities to "Broker"

52. **In seeking to be the partner of choice for governments, technology firms, foundations, and other public and private sector stakeholders, the WBG will ensure that it harnesses disruptive technology to accelerate progress toward existing WBG goals in the following areas.**

- **Promote universal financial access.** Innovative and low-cost financial products have given 1.2 billion people access to financial services since 2011. Going forward, mobile financial services enabled by fintech are central to the WBG's commitment to reach the Universal Financial Access by 2020 goal.
- **Improve gender equality and create inclusive markets for women.** Disruptive technologies could facilitate new access and opportunities for women in multiple domains, including information, networks, finance, and services. Online platforms provide more flexible hours, e-government requires less time and travel to secure services, and new crypto-assets could expand women's ability to access and control capital. Yet, harnessing technology to reduce gender gaps will require overcoming lower mobile phone ownership, entrenched social mores, and gender-sorting patterns across occupations and sectors differentially affected by disruptive technologies.
- **Increase the adoption of clean renewable energy, energy efficiency, smart grid technology, electric vehicles, and storage to achieve universal energy access and GHG emission reduction goals.** Collaborating with governments, the private sector, academia, and civil society to better understand how emerging technology trends can support both the design and function of new climate markets from the bottom-up. Investment services, knowledge services, capacity building and advocacy services will be important in connecting pre- and post-2020 climate markets. Pilots will demonstrate the use of disruptive technologies in driving down costs and creating climate markets.
- **Address development challenges in fragile and conflict contexts.** New technologies can generate data, implement advanced analytics, and establish monitoring and supervision mechanisms that would either be logistically difficult or too costly in inaccessible and high-risk areas. These initiatives can improve crisis response, risk mitigation, and the identification of new opportunities. Innovative solutions that use disruptive technologies to bypass traditional development imperatives might also provide opportunities for leapfrogging. Products such as MIGA's political risk insurance, or the IDA18 IFC-MIGA Private Sector Window, can improve the risk appetite for private investors looking at bringing such technology to these contexts.
- **Assume data stewardship.** The WBG will support new practices for data generation, acquisition, management, and dissemination. Scaling up the use of satellite imagery and global information system (GIS) mapping technology, the Internet of Things, detailed call records, and machine

learning/artificial intelligence to generate new data can better measure poverty and variables that matter for poverty reduction. Such big data can also be acquired from governments and the private sector. Establishing a digital platform that combines big data with traditional data could deliver a global public good and contribute to the adoption of disruptive technologies not only in WBG operations but also by partners and clients.

- **Implement the Human Capital Project.** The project will explore the use of cost-effective, context-relevant, scalable technology solutions to make service delivery more effective and responsive—and to better target and tailor human capital investments to the precise needs of the population, especially in remote, fragile, and conflict contexts. New disruptive technologies can accelerate performance on key measures tracked in the project (such as stunting, survival indicators, and learning outcomes).
- **Expand universal health coverage.** Disruptive technologies—comprising an array of innovative solutions in the health sector or applicable to the health sector value chain—hold the potential for low- and middle-income countries to leapfrog some of the most pressing health system challenges and move closer to universal coverage.
- **Improve the efficiency of environmental and social safeguards.** Adopting disruptive technology can dramatically reduce the cost and improve the efficiency of implementing the WBG's environmental and social safeguards.

VI. Working across the Build-Boost-Broker approach

Corporate priorities that support Building, Boosting, and Brokering

53. **Supporting country level diagnostics and the development of agile regulations are critical for building, boosting, and brokering.** The WBG will scale up its activities to:

- **Include tech-enabled disruption in country diagnostics.** It will leverage existing diagnostic tools and develop new tools, including the Country Private Sector Diagnostics, to emphasize linkages to disruptive technology in discussions of the micro foundations of growth and the appropriate role of public and private sector interventions to create competitive and well-functioning markets. This suite of tools will enable a flexible approach to decide country-by-country how to raise awareness and do targeted experiments. The WBG will also increase the use of benchmarking exercises, such as Digital Business Indicators, to assess the readiness of the country regulatory environment for the digital economy.
- **Support the formulation and implementation of agile regulations for the new economy.** Given the accelerating pace of technology diffusion, the formulation, adoption and revision of regulations must be accelerated to keep up. Amid the rising concentration across industries and increasing profit margins, in large part due to data ownership, governments need to ensure a level playing field for companies and individuals. In addition, governments must quickly adapt to encourage the growth of new sectors created by technologies in an inclusive manner. Regulatory sandboxes and similar approaches can be scaled up.

VII. A WBG mandate to support disruptive technologies for development

54. **The WBG will operationalize the Build-Boost-Broker value proposition.** Given the pace of technological disruption, the WBG must scale up the corporate priorities outlined above. It will also upgrade internal capabilities to accelerate the WBG's ability to support clients (box 8).

Box 8 Upgrading WBG internal capabilities: Coordination, agility, and skills

The WBG can strengthen its implementation of the Build-Boost-Broker value proposition by upgrading its internal capabilities. To support countries in mitigating the risks of disruptive technologies and maximizing their potential for the poor, it must upgrade its internal capabilities agenda—improving the coordination, institutional agility, and skill mix of staff.

The WBG will ensure a coordinated, group-wide approach on internal and external messaging, alignment of unit-level approaches, strategic management of key private and public sector partners, support for knowledge sharing and collaboration, and the incubation of new initiatives or products.

The WBG will leverage the Agile Bank initiative and accelerate the modernization of existing processes to ensure that it can deliver agile solutions at speed and scale. This includes employing a disruptive lens in our country engagement model through more flexible project design and implementation, including the development of new instruments, strategic use of data in WBG projects, increased use of joint teams that cross the WBG, continued innovation in WBG and country procurement, and upgraded internal information technology capabilities.

The WBG will support group-wide training and human resource policies to ensure that staff have the skill sets to achieve the value proposition. These efforts will seek to infuse talent with the requisite skills and capabilities, build capabilities and skills within the organization, and create a culture of innovation. This will include implementing a comprehensive set of hiring decisions at mid-level, senior level, and entry roles to bring in the appropriate skills. HR learning programs will focus on developing greater adaptability and agility that enable staff to embrace change and adapt quickly as markets and technologies shift. A culture of creativity and innovation will be supported through systematic introduction of new practices, such as the President's Award for Innovation, to provide incentives and rewards for staff.

55. **Achieving goals in each Build-Boost-Broker pillar will require the support of our shareholders in the following ways:**

- **Advocate for harnessing disruptive technology to work for the poor and find new development pathways.** The WBG asks the Development Committee to encourage countries to prioritize investments to build the foundations of technology-led economies, boost the capacity of people, firms, and institutions to leverage technology-led disruption for socioeconomic dividends, and harness disruptive technology solutions to solve development challenges at scale.
- **Support the WBG's role in multilateral fora to harness disruptive technologies for development.** The national and regional plans of the WBG's shareholders around connectivity, entrepreneurship, fintech, digital skills, GovTech, and science, technology, and innovation can be accelerated through the WBG's engagement in dialogue and discussion at multilateral fora, such as the G20 and the United Nations. The WBG can convene coalitions with the private sector and other multilateral development banks and international organizations to contribute to global standards on a range of issues such as digital finance and data privacy.
- **Support the WBG in leveraging resources for this agenda.** Because significant resources will be needed to create the opportunities and mitigate the risks of technological disruption, the development resources made possible through the IBRD and IFC capital increase—in addition to continued partner support to sustain IDA at the scale of the ongoing IDA18 replenishment—will support the transition to sustainable growth paths. The WBG will also continue to innovate methods to mobilize resources at scale by extending opportunities to use existing platforms. This will include financial innovations, such as the Famine Early Action Mechanism, Creating Markets Advisory Window, and IDA18 IFC-MIGA Private Sector Window—and better leveraging existing financial WBG instruments, including IFC, IBRD, IDA financing tools, and MIGA's guarantees through Maximizing Finance for Development and other priorities.

56. **The coming IDA19 replenishment presents an opportunity for IDA to support its members to harness the opportunities and mitigate the risks that disruptive technologies present.** IDA countries are inherently more prone to the risks of disruptive technologies for economic growth and stability. However, these technologies, if properly harnessed, also hold promise for IDA countries to leapfrog in their development. In the context of the ongoing efforts by the World Bank Group and the implementation of the IMF-World Bank digital finance agenda, IDA seeks to support the adoption of disruptive technologies for development and capacity building for its member countries in line with the Build-Boost-Broker approach. Specific options to provide support will be explored during the replenishment discussions.

Questions to the Development Committee

Does the committee agree with the proposed Build-Boost-Broker approach to support countries in exploiting opportunities and managing risks associated with disruptive technologies?

Does the committee agree with the proposed areas of engagement for the WBG?

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[1] Between 1990 and 2013, the year of the latest comprehensive data on global poverty, the number of people living below the international poverty line of US$1.90 per person per day more than halved, to around 767 million.

[2] The emphasis on tech skills may exacerbate the gender divide as evidence suggests that men are almost eight times as likely as women to work in ICT jobs in 30 emerging markets (WDR 2016).

[3] This assessment takes a holistic approach and thus has a large focus on the foundational building blocks, but also includes dimensions of the "boost" pillar such as skills and digital entrepreneurship.

[4] The UN has set up a Technology Facilitation Mechanism to facilitate the development, transfer, and dissemination of technologies relevant for achieving the SDGs.