

Approach Paper

Mobilizing Disruptive and Transformative Technologies for Development: An Assessment of the World Bank Group's Readiness

May 31, 2019

1. Background and Context

1.1 The world is experiencing a technological revolution with far reaching implications for developing and developed countries. Technological disruption is not new, but the speed at which new technologies are emerging is unprecedented, and so is their diffusion across the global economy. Disruptive technologies are already reshaping the way goods and services are produced and consumed, with profound implications for the functioning and dynamics of the global economy.¹ The digital economy – which has been a major source of disruption so far – accounted for about 15.5 percent of global GDP in 2016 and is expected to grow to 24 percent by 2025.²

1.2 Disruptive technologies can transform development – in both positive and negative ways – and result in new paradigms for poverty reduction and boosting shared prosperity. Today's disruptive technologies phenomenon has implications not only for products and services, but also for business processes, competitiveness, and productivity growth, as well as for many aspects of social interactions. Disruptive technologies (defined in Box 1.1) have the potential to improve people's lives and transform economies, governments, and societies. They can do so by, for example, enhancing connectivity among people and markets across the globe, opening-up new jobs and sources of livelihood, and improving the delivery of both social and financial services. At the same time, disruptive technologies can create challenges by, for example, concentrating market power in the hands of digital and data service providers (giving rise to new policy and regulatory issues concerning market power, accountability, data security and privacy, and taxation). Also, robotics and automation have implications for the future labor force and the nature of jobs, and thus, for the distribution of income and wealth.

1.3 Recognizing these positive and negative implications, and with a sense of urgency to position itself to help client countries mobilize disruptive technologies for their development, the Bank Group has adopted a new approach. The Bank Group outlined its new approach in a 2018 Development Committee paper *"Disruptive Technologies and the World Bank Group: Creating Opportunities—Mitigating Risks"* (henceforth called the 2018 Development Committee paper), and which it details further in a 2019 Development Committee paper *"Mainstreaming the Approach to Disruptive and*

Transformative Technologies at the World Bank Group” (henceforth called the 2019 Development Committee paper). In its 2018 Development Committee paper, the Bank Group stated its ambition of becoming a partner of choice for technology and development. The new approach aims to harness the opportunities and mitigate the risks of disruptive technologies to accelerate progress toward the Sustainable Development Goals and the Bank Group’s twin goals of ending extreme poverty and boosting shared prosperity. It builds on previous Bank Group strategies to help clients adopt and adapt to Information and Communication Technologies (ICT).

1.4 **This evaluation has a two-fold purpose:** first, to assess the Bank Group’s readiness in helping clients harness the opportunities and mitigate the risks posed by disruptive technologies; and second, to inform the implementation of the Bank Group’s new approach to disruptive technologies and its efforts to become a “partner of choice” in mobilizing disruptive technologies for development. The evaluation will use the same definition of disruptive technologies as adopted in the 2018 and 2019 Development Committee papers. The latter replaced the term “disruptive technologies” by “disruptive and transformative technologies,” but did not change the definition. Accordingly, this Approach Paper uses the two terms interchangeably.

Box 1.1. Terminologies Relating to Technology Used by the Bank Group

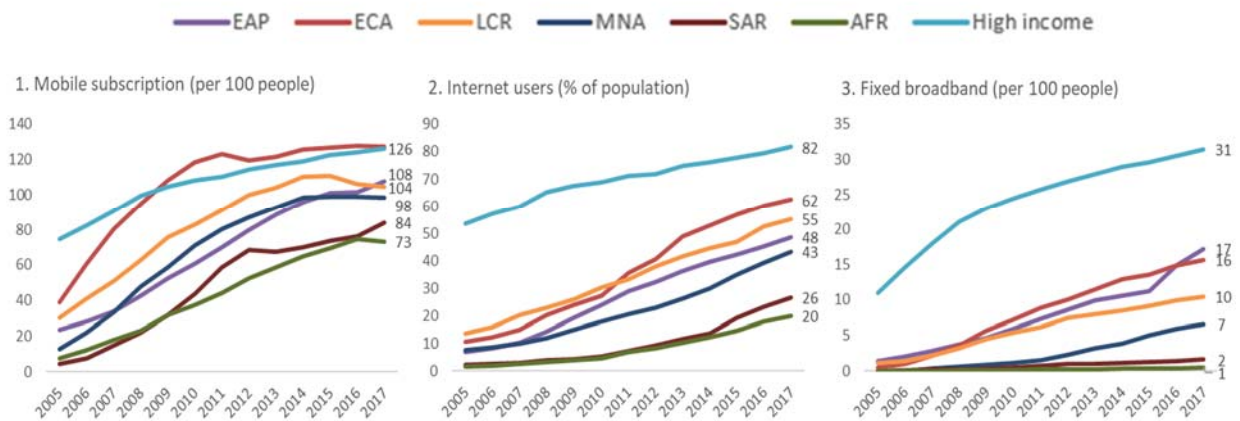
The Bank Group first formally laid out its approach to disruptive technologies in its 2018 Development Committee paper, replacing the term “disruptive technologies” by “disruptive and transformative technologies,” in the subsequent 2019 Development Committee paper, but with no change in the definition. Disruptive technologies were defined as those that result in a step change in the access to products and services, and dramatically alter how we gather information, make products, and interact. Disruptive technologies can often be transformative in accelerating progress toward the Bank Group twin goals and the SDGs, but they also pose risks such as rising inequality, job loss, exclusion, data privacy, security, and a loss of societal trust. According to this definition, the key distinguishing aspect of disruptive technologies is the “step-change” which can occur regardless of the type of technology; it can thus entail disruption due to a novel application of conventional technologies or due to emerging technologies. However, the Bank Group does not define the magnitude of the step change that makes a technology qualify as disruptive. By including among its five corporate priorities for disruptive technologies support for things such as agile regulations and skills and capabilities for the new economy, the Bank Group definition, in effect, also covers enabling environment or “response” types of support (not just support for technology itself). Examples of disruptive technologies provided by the Bank Group include robotics, artificial intelligence, the Internet of Things, Big Data, blockchains, nanotechnology, bio-engineering, 3D printing, energy storage, drones, and self-driving vehicles.

Sources: 2018 Development Committee paper; 2019 Development Committee paper; and “Information & Communication Technology Sector Strategy Paper of the World Bank Group” (April 2002).

Evaluation Context and Issues

1.5 A ‘digital divide’ exists between and within countries and among social groups, and there are concerns that without action, this divide could grow. Developing countries made up roughly a quarter of the global digital economy, a modest share compared to that of their global GDP (48 percent). Internet access across all regions has increased (Figure 1.1), with Africa tripling its digital connectivity from 7 percent in 2011 to 20 percent in 2017. Yet, internet penetration in Africa remains the lowest of any region and well below the 46 percent global average. South Asia (SAR) at 26 percent and the Middle East and North Africa (MENA) at 43 percent are also below the global average. Moreover, in broadband Internet connection, all three regions (Africa, SAR, and MENA) are below 10 percent. Reliability and Internet speed are also low³. In addition, women are less likely than men to use or own digital technologies. Gaps are even larger between youth (20 percent of whom use or own such technologies) and people over 45 years (among whom penetration is just 8 percent).

Figure 1.1. Internet and Mobile Phone Usage in Developing Countries



Source: International Telecommunications Union (ITU).

1.6 New technologies may reduce job opportunities for the less skilled. Growth fueled by disruptive technologies is expected to shift demand for labor toward higher skills. In developing countries, returns to education are highest among people with upper secondary and tertiary education, and they are higher and rising faster in ICT-intensive occupations. People without such skills will need to seek work in lower paid, less steady occupations,⁴ and, according to the Bank Group, people with low-level skills are likely to face increased competition. Developing countries are running out of low-skilled manufacturing opportunities sooner and at much lower levels of income compared to the experience of early industrializers.

1.7 New technologies also create new challenges for governments. As well as developing appropriate regulations to contain the adverse equity effects of tech-strong

corporate monopolies, governments need to become more agile in fending off threats to data security and privacy. Well-established employment patterns — based on steady wages, defined hours, clear definition of employer and employee roles, and a fixed point of retirement—may become less prevalent.⁵ The growing demand for social protection puts a strain on fiscal resources. At the same time, the increasingly digital nature of business creates new challenges for effective taxation and resource mobilization, as the generation of revenue by new kinds of firms or from new kinds of assets, such as user data or online advertisements, leaves it increasingly unclear how or where value is created for tax purposes.⁶ Furthermore, the rise of data-driven technologies has also fueled concerns about the responsible collection and use of such data by governments. Finally, the social sensitivity of technological disruption and its impact on democracy and human rights may also create new challenges.

1.8 Harnessing the benefits of technology for poverty reduction and shared prosperity will require complementary investments in skills, physical infrastructure, business environment, governance, and effective partnerships. Developing nations must upgrade their educational systems and technical training, strengthen logistics and transport networks, improve the business environment, and governance.⁷ Digital development presupposes a solid foundation of ‘analog development’.⁸ Access is not enough: many of those with smart phones do not use the full range of services available. In seven countries in Africa and South Asia, just 30 percent of cell phone users had a connection to the internet and a mere 22 percent had used the phone to access financial services.⁹ Without education and training, the full potential of technology will not be realized. The biggest strides in cognitive capacity are made until the age of three; but most developing countries underinvest in early childhood development. Furthermore, as the 2016 WDR indicates, the right business environment allows firms to leverage the internet to compete and innovate for the benefit of consumers, while good governance can ensure that all stakeholders can benefit from digital development. The complexity of the global marketplace and technological landscape also necessitate effective partnerships across governments, private sector, donors, and other stakeholders.

The Bank Group’s Role and Contribution

1.9 Many recent Bank Group corporate and sector strategies have emphasized the importance of (disruptive) technologies for achieving outcomes. In its FY19 Strategy and Business Outlook Update (IFC 3.0), IFC acknowledges the cross-cutting nature of disruptive technologies to support its focus sectors. The Fintech paper (2012) and subsequent updates (2018) note that Fintech is disrupting the world of financial services and threatening the traditional business model of banks. The ability of Fintech to provide financial services for hundreds of millions of unbanked people in the developing world is a result of the revolution in connectivity and mobile

communications. The Bank Group’s Climate Change Action Plan (2016) notes the importance of new technologies to achieve deep reductions in carbon emissions. The Bank Group Sustainable Energy strategy (2013) also relies on disruptive (non-digital) technologies such as renewable energy off-grid solutions, which are identified as the most rapid means of providing cost-effective energy services in rural, remote and isolated areas. The Bank Group’s Education 2020 strategy highlights that technological advances are changing job profiles and skills needed in the new economies, while offering possibilities for accelerated learning.

Box 1.2. The Bank Group’s Role and Corporate Priorities for Disruptive and Transformative Technologies

The 2018 Development Committee endorsed the new Bank Group approach to disruptive technologies. It posits that the Bank Group will support countries to create opportunities and mitigate risks associated with disruptive technologies by operationalizing the Build-Boost-Broker value proposition:

The Bank Group will help **Build** digital infrastructure, physical infrastructure, and the regulatory foundations to expand the diffusion of and access to new technologies for helping country clients take advantage of the changing pathways of growth that disruptive technologies bring.

The Bank Group will help **Boost** the capacity of institutions, communities, firms, and individuals to leverage and adapt to technology-led disruption by developing digital skills, foundational cognitive and socio-emotional skills, and social protection for inclusiveness for enabling country clients to reap social and economic dividends and greater resilience in times of change.

The Bank Group will **Broker** partnerships between public and private sectors (including technology providers) and support global coalitions to harness disruptive technologies, data, and expertise for solving development challenges and shaping global norms on fintech, data privacy, and cybersecurity. Its goal is to become a partner of choice for governments, technology firms, and other stakeholders to ensure that disruptive technologies are harnessed for accelerating progress toward the SDGs and the twin goals.

Building on the Build-Boost-Broker framework, the 2019 Development Committee paper identifies five corporate priorities, sectoral and regional programs, and programmatic approaches (such as the “Digital Economy for Africa Moonshot”) through which the Bank Group intends to mainstream its approach to disruptive technologies:

1. Support country diagnostics that help chart the new drivers of growth;
2. Support formulation and implementation of agile regulations for the new economy;
3. Scale up universal, affordable digital connectivity;
4. Support the provision of transparent, efficient, and accountable digital government services; and
5. Support the development of skills and capabilities for the new economy.

Source: 2018 Development Committee paper, pp. iii, 1-2; and 2019 Development Committee Paper.

1.10 Building on previous technology strategies, the Bank Group’s 2018 approach articulated in the Development Committee paper represents a marked change in the Bank Group’s ambition toward technology and development. It is more comprehensive in scope, focusing on broader opportunities and risks from technological disruption and their implications for advancing toward the SDGs and twin goals. It emphasizes the need for complementary investments in physical infrastructure and the capacity and capabilities of individuals, firms and governments to harness the opportunities from technologies. Inter alia, it highlights the need for broader human capital investments beyond digital skills to also encompass foundational cognitive and socioemotional skills and implications for social safety nets and jobs. It spells out the objective of the Bank Group becoming the partner of choice for governments, technology firms, and other stakeholders through thought leadership on the nexus of development and technology, and the brokering of partnerships between the public and private sectors and of global coalitions (see Box 1.2). Appendix C summarizes the evolution in the Bank Group’s technology strategies and approaches.

1.11 Over the past two decades, the Bank Group has used World Development Reports (WDR) to inform its technology strategies and sought to position itself as a thought leader on the importance of technology for development. The 1998/99 WDR argued that low income, inadequate human capital, and weak competitive and regulatory environments slow down the adoption of new technologies in developing countries. The 2016 WDR argued that digital development depended on “analog complements” that entailed strengthening regulations and adapting workers’ skills. The 2019 WDR considers how advances in technology will change the nature of work and argues for a new social contract to smooth the transition and guard against rising inequality. This calls for lifelong investments in human capital, and new systems of social protection.

1.12 Several IEG evaluations have examined the Bank Group’s role in supporting the adoption and diffusion of technology, notably *Capturing Technology for Development* (2011). Appendix B summarizes relevant previous IEG evaluations. This evaluation will draw on the findings that have a bearing on the Bank Group’s current and future corporate readiness.

2. Purpose and Audience

2.1 As noted above, this evaluation has a two-fold purpose: (i) to assess the World Bank Group’s readiness to play a key role in contributing effectively to client countries’ efforts to mobilize disruptive technologies for development; and (ii) to inform the implementation of the World Bank Group’s new approach to disruptive technologies and its efforts to become a “partner of choice” in helping clients harness disruptive

technologies for development. To ensure that the findings inform the Bank Group's new approach in a timely manner, IEG is designing this evaluation as a real time evaluation with intermediate products (see section on expected products below).

2.2 The findings of this evaluation will be of relevance both to audiences within and outside the Bank Group. Internally, the Bank Group's Board of Executive Directors and its Committee on Development Effectiveness, Bank Group senior management, and Bank Group operational staff should find them of direct relevance. External audiences include other multilateral and bilateral agencies and industry experts, as well as government officials and practitioners in developing countries.

3. Evaluation Questions, Scope, and Conceptual Framework

Evaluation Questions and Scope

3.1 The evaluation will seek to answer the following main evaluation question:

- How well-prepared is the Bank Group to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?

3.2 This evaluation question will be answered through two sub-questions:

- How and to what extent does the Bank Group bring its competencies, processes, instruments, and partnerships to bear at the *corporate level* to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?
- How and to what extent does the Bank Group bring its competencies, processes, instruments, and partnerships to bear at the *intervention level* to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?

3.3 The evaluation will thus focus on the Bank Group's support to help clients harness the opportunities and mitigate the risks posed by technology (rather than on the Bank Group's adoption of technology for its own processes and functions).

3.4 The evaluation will conduct its assessment for the Bank Group's five corporate priorities identified in the 2018 and 2019 Development Committee papers. The evaluation will be limited to assessing readiness in these corporate priority areas identified by the Bank Group using the Build-Boost-Broker framework, which include: (i) support country diagnostics that help chart the new drivers of growth; (ii) support formulation and implementation of agile regulations for the new economy; (iii) scale up universal, affordable digital connectivity; (iv) support the provision of transparent,

efficient, and accountable digital government services; and (v) support the development of skills and capabilities for the new economy.

3.5 The evaluation will seek to review corporate readiness issues for specific groups such as women and for different client segments – MICs, LICs, and situations of fragility, conflict and violence. The aim will be to shed light on how well-prepared the Bank Group is to adjust or adapt its approach based on the differential impacts of disruptive technologies on men and women, or underserved regions, and on the differing characteristics of each client segment (e.g., low capacity in IDA or FCV countries).

Conceptual Framework

3.6 The evaluation’s conceptual framework (presented in Figure 3.1) draws on the organizational effectiveness literature, and is based on the Bank Group’s new approach to disruptive technologies and its mainstreaming. As stipulated in the Build-Boost-Broker framework, this new approach is premised on the Bank Group’s view that disruptive technologies can “dramatically accelerate progress toward the SDGs and the twin goals,” that “if countries cannot compete in the future global economy, they will be left behind,” and that “disruptive technologies also pose new risks – to economic and societal inclusion, and to environmental and systemic sustainability” which need to be mitigated (2018 Development Committee paper). The evaluation will assess the Bank Group’s corporate readiness to help clients harness the opportunities and also mitigate the risks.

3.7 The evaluation’s conceptual framework shows how the evaluation will assess the Bank Group’s corporate readiness to help clients harness the opportunities and mitigate the risks posed by disruptive technologies. The evaluation will distill evidence regarding readiness in the five priority areas at two levels: (i) overall, at the level of the Bank Group (corporate level) and (ii) selectively, at the intervention level. At these two levels of analysis, the evaluation will test the dimensions of corporate readiness identified *a priori* (see para. 3.10 below).

3.8 The quality, relevance, and effectiveness of the Bank Group’s support to clients will influence – and be influenced by – how the various corporate readiness dimensions play out in each of the five priority areas at the corporate and intervention level. Importantly, the Bank Group’s support to clients will also be influenced by client demand for support to harnessing the opportunities and mitigating the risks posed by disruptive technologies, and the activities of other institutional actors (e.g., partners, other donors, and the private sector). The Bank Group’s set-up for understanding client demand will be particularly critical. While this conceptual framework is not designed to allow for an assessment of outcomes and intended impacts

of the Bank Group’s new approach, the framework is expected to yield insights on the extent to which the Bank Group will be able to deliver on its corporate priorities.

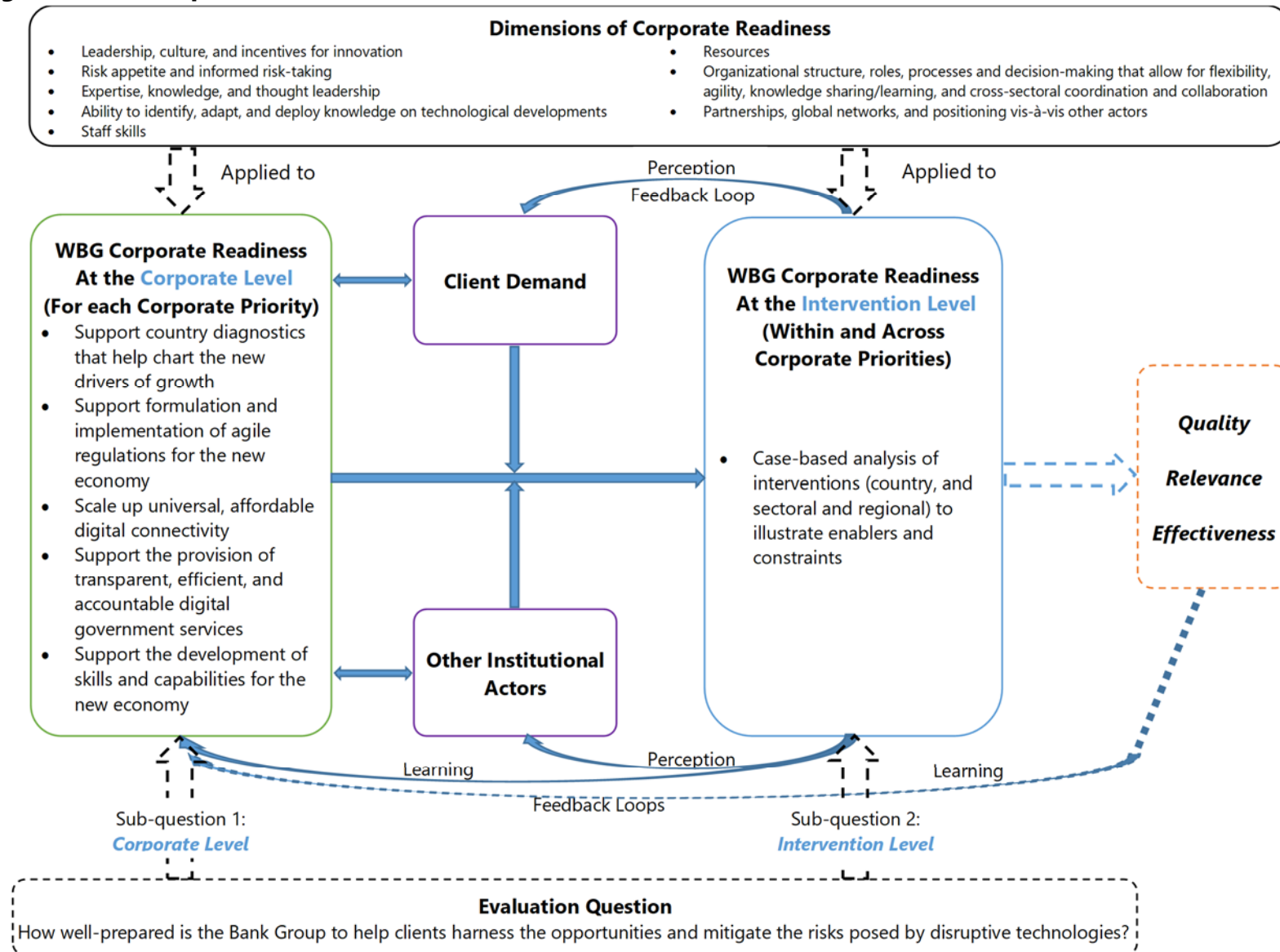
3.9 Building on Christensen’s work on disruptive innovation, the organizational effectiveness literature¹⁰ points out critical capabilities that organizations must have to be able to adjust under conditions of uncertainty. These competencies include: (1) a leadership that can build a culture of openness and create incentives for change; (2) staff with a skill mix that emphasizes creative thinking and strategic analysis skills; (3) flexibility and agility in decision making and planning, including ability to work across corporate silos; (4) a capacity to absorb and manage new knowledge; and (5) a willingness to partner, based on a clear sense of the organization’s comparative advantage relative to other organizations. This literature indicates that readiness is less a function of a particular organizational structure than it is of the incentives, processes, and organizational culture—features that may resist any amount of mere structural change (i.e., shuffling the boxes in the organigram).

3.10 Accordingly, several internal and external dimensions of corporate readiness will be explored to answer the main evaluation question and the two sub-questions. Specifically, IEG has identified *a priori* the following readiness dimensions (reflecting the Bank Group’s competencies, processes, instruments, and partnerships referred to in the sub-questions above) from a preliminary review of the organizational effectiveness literature, and previous IEG technology and corporate evaluations:¹¹

- Leadership, culture, and incentives for innovation;
- Risk appetite and informed risk taking;
- Expertise, knowledge, and thought leadership;
- Staff skills;
- Resources;
- Organizational structure, roles, processes and decision making that allow for flexibility, agility, knowledge sharing/learning, and cross sectoral coordination and collaboration;
- Ability to identify, adapt, and deploy knowledge on technological developments; and
- Partnerships, global networks and positioning vis-à-vis other actors.

3.11 The evaluation will test and refine, and likely add to, these corporate readiness factors through iteration, and triangulating findings from different data sources.

Figure 3.1. Conceptual Framework of the Evaluation



4. Evaluation Design

4.1 As indicated above, drawing on the conceptual framework for the evaluation presented in Figure 3.1, this evaluation will conduct its analysis at two levels: **Corporate Level and Intervention Level**. The corporate readiness dimensions identified *a priori* will be applied to each corporate priority (corporate level), and case-based analysis of selected country, and sectoral and regional interventions will be conducted within and across the corporate priorities (intervention level) – see Figure 3.1. The case-based analysis will allow for a more concrete assessment of the organizational enablers and constraints for harnessing opportunities and mitigating risks posed by disruptive technologies.

4.2 At the intervention level, interventions for case-based analyses will be selected based on interviews and a documents and database review. Interventions will be selected to ensure that they are recent enough to allow conclusions to be drawn about the Bank Group’s current (rather than past) corporate readiness. Both internal and external dimensions of corporate readiness will be examined. The data collection and analysis methods at the two levels are described below. An evaluation design matrix is presented in Appendix A.

Corporate Level

4.3 At the corporate level, the evaluation will distill findings based on a structured literature review, a review of documents and databases, semi-structured interviews, and crowd-sourcing of stakeholder views.

- **Structured Literature Review:** The review will draw on relevant Bank Group and non-Bank Group literature on, e.g., organizational effectiveness, managing for disruption, and behavioral economics. The purpose of the structured literature review will be to distil corporate readiness dimensions and identify good practice organizational capabilities for dealing with change, uncertainty, innovation, risk, and other features of disruptive technologies.
- **Documents and Database Review:** The review of documents will encompass Bank Group country and regional diagnostics, regional program documents (e.g., Digital Economy for Africa Moonshot), advisory services and analytics (ASAs), project approval, supervision and closing or evaluation documents, and IEG project and higher-level evaluations. Relevant non-Bank Group documents will also be reviewed (e.g., peers, donors, partners and governments). The database review will cover Bank Group databases such as for human resources, budgets, skills mix, incentives and rewards. The purpose of the documents and database review will be to gain insights into the Bank Group’s current corporate readiness

for corporate priority areas and for implementing related sectoral and regional programs. The documents and database review will also be used to validate the choice of interventions for case-based reviews aimed at illustrating organizational enablers and constraints for harnessing opportunities and mitigating risks posed by disruptive technologies.

- **Semi-structured Interviews:** Semi-structured interviews will be conducted of: (i) Bank Group headquarters staff in the Global Practices and Regions and the four Bank Group institutions, i.e., IBRD, IDA, IFC, and MIGA; (ii) Bank Group country office staff covering the four Bank Group institutions (including through selected country visits); (iii) in-country stakeholders such as Bank Group clients, government, private sector, civil society organizations, and academia (through selected country visits); and (iv) peers, donors, partner agency staff, and private sector companies. The purpose of the semi-structured interviews will be to gain insights into what Bank Group staff, clients and external stakeholders perceive as organizational enablers and constraints within the Bank Group for harnessing opportunities and mitigating risks posed by disruptive technologies. The interviews of country clients will also aim to determine the extent and nature of client demand for Bank Group support for disruptive technologies considering the need to calibrate its support to client demand and capacity. The interviews of peers, donors, and partner agencies, and private sector companies will aim to identify organizational good practices in specific areas that the Bank Group can benefit from. In particular, any good practices of international donors, partner agencies, and private sector companies for results measurement and monitoring and evaluation that allow continued adaptation to an uncertain and fast-evolving technological landscape will be documented. The interviews will also explore enablers for beneficial partnerships with external organizations or companies.
- **Crowd-sourced Stakeholder Views:** The usefulness of crowd-sourcing stakeholder views using mobile phones and social media will be explored with guidance from IEG's methods advisor. The purpose will be to gather perspectives from a wider range of stakeholders on the Bank Group's corporate readiness and areas for improvement going forward.

Intervention Level

4.4 At the intervention level, the evaluation will use case-based analysis comprising semi-structured interviews and a review of documents and databases.

- **Semi-structured Interviews:** Semi-structured interviews will be conducted of: (i) Bank Group headquarters staff in the Global Practices and Regions covering the four Bank Group institutions, i.e., IBRD, IDA, IFC, and MIGA; (ii) Bank Group country office staff also covering the four Bank Group institutions (including through

selected country visits); and (iii) peers, donors, and partners. The purpose of the interviews will be to identify specific (country, and sectoral and regional) interventions for case-based analysis and distill organizational enablers and constraints for harnessing opportunities and mitigating risks posed by disruptive technologies. The evaluation will also explore the Bank Group’s comparative advantage in disruptive and transformative technologies.

- **Documents and Database Review:** All relevant Bank Group and non-Bank Group documents and databases pertaining to the selected interventions that shed light on corporate readiness dimensions will be reviewed, including ASAs, project approval, supervision, and closing/evaluation documents, and IEG evaluations. The review of documents and databases will help to distill contextualized findings from case-based analysis to illustrate specific dimensions of corporate readiness, and to explore the Bank Group’s comparative advantage in disruptive and transformative technologies.

Design Limitations

4.5 **Engagements that are relevant to the Bank Group’s new approach to disruptive technologies cannot be easily identified** because of: (i) the lack of a precise definition of or coding in the Bank Group for “disruptive technologies;” (ii) an absence of activities related to the “response to technological disruption” in the Bank Group’s sector and thematic classifications; and (iii) the need to include trust-funded innovations and pilots, partnerships and initiatives that may not be covered in the Bank Group’s financing support and analytical work databases. Given these limitations, the evaluation team will rely on Bank Group staff interviews to identify disruptive technology engagements with continued relevance to distill findings for this evaluation.

4.6 **Other challenges include the need for a robust sampling approach to conduct interviews of stakeholders.** The team will carefully nuance conclusions that may not be generalizable across the entire Bank Group. Additionally, the evaluation will face attribution challenges –these challenges will be addressed through conducting careful analysis to underpin any conclusions attributing Bank Group successes or failures to the Bank Group’s corporate readiness.

5. Quality Assurance Process

5.1 **This evaluation will be subject to IEG’s standard quality assurance process.** The Approach Paper was peer reviewed by: Sonia Bashir Kabir (Managing Director for Microsoft Bangladesh, Vice President and Co-founder of Bangladesh Women in Technology); Romain Murenzi (Executive Director, The World Academy of Sciences (TWAS) for the Advancement of Science in Developing Countries; Former Rwandan Science Minister); and Vivek Wadhwa (Distinguished Fellow, Harvard Law School, Labor and Work-life Program; and Distinguished Fellow and professor, Carnegie

Mellon University Engineering, Silicon Valley). For the evaluation report, the team will identify an additional peer reviewer to provide perspective on corporate readiness.

6. Planned Consultation, Expected Products and Dissemination Strategy

Planned Consultation

6.1 **Regular stakeholder interaction will be sought to enhance the evaluation’s influence**, including with the Bank Group team working on the implementation and mainstreaming of the approach to disruptive technologies to ensure the relevance and currency of the findings. IEG will also coordinate with the Internal Audit Department (IAD) on the work that IAD is planning on digital technologies. IEG’s stakeholder interaction will include formal and informal interaction with relevant Bank Group staff throughout the evaluation, experts, and external stakeholders as well.

Expected Products and Dissemination Strategy

6.2 **IEG is designing this evaluation as a real time evaluation**. In order to ensure that the findings inform the Bank Group’s efforts to mainstream disruptive technologies in a timely way, IEG will prepare one or more intermediate outputs or briefings to the Board’s Committee on Development Effectiveness (CODE), and Bank Group management and relevant staff in calendar year 2019. A final product containing the main findings and recommendations will be submitted to CODE and published and disseminated both internally and externally (see Timeline below).

6.3 **In addition to outreach during the evaluation process, IEG will implement a dissemination plan once the evaluation is completed**. IEG will launch the report in Washington, DC, and present its findings to external audiences at relevant international conferences. The efforts will target key stakeholders, including staff at headquarters and country offices, development practitioners, donors, client government authorities, private sector, and civil society organizations.

7. Resources

Timeline

7.1 While at least one intermediate product will be released this calendar year, the final evaluation product will be submitted to CODE in the third quarter of fiscal year 2020.

Team and Skills-Mix

7.2 The evaluation will be led by Soniya Carvalho (IEGHC) and Stephan Wegner (IEGFP) and include a team of IEG staff and consultants. The team will draw on additional staff and consultants with special expertise, including in organizational effectiveness and technology and development. IEG's Methods Advisor, Jozef Vaessen, will provide overall methodological guidance. The Approach Paper was written under the supervision of Emanuela Di Gropello (IEGHC Manager) and direction of Auguste Tano Kouamé (IEGHE Director). The evaluation will be conducted under the supervision of the incoming IEGHC Manager and direction of the incoming IEGHE Director, and Alison M. Evans, Director General and Vice President, Evaluation.

¹ Dobbs, Richard, James Manyika, and Jonathan Woetzel. 2015. *No Ordinary Disruption: The Four Global Forces Breaking All Trends*. McKinsey and Company; McKinsey Global Institute. 2017. *A Future That Works: Automation, Employment, and Productivity* (<https://www.mckinsey.com/featured-insights/digital-disruption/harnessing-automation-for-a-future-that-works>); Brynjolfsson, E., and A. McAfee. 2014. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W.W. Norton.

² Huawei Technologies Ltd., and Oxford Economics. 2017. *Digital Spillover: Measuring the True Impact of the Digital Economy*.

³ Akamai Technologies. 2017. *State of the Internet Report*.

⁴ Goldin, Claudia, and Lawrence Katz. 2007. "The Race between Education and Technology: The Evolution of U.S. Educational Wage Differentials, 1890 to 2005." NBER Working Paper 12984, National Bureau of Economic Research, Cambridge, MA; Acemoglu, D., and P. Restrepo. 2018. "The Race between Machine and Man: Implications of Technology for Growth, Factor Shares and Employment." *American Economic Review*, 108 (6):1488-1542.

⁵ WDR 2019.

⁶ WDR 2019.

⁷ Rodrik, D. 2018. "New Technologies, Global Value Chains, and the Developing Economies." Pathways for Prosperity Commission Background Paper Series; no. 1. Oxford. United Kingdom.

⁸ WDR 2016.

⁹ Pathways for Prosperity Commission. 2018. "Digital Lives: Meaningful Connections for the Next 3 Billion." Blavatnik School of Government, Oxford University, United Kingdom.

¹⁰ Christensen, C.M. 1997. *The Innovator's Dilemma*, Harvard Business School Press, Boston, MA; Christensen, C.M. and Overdorf, M. 2000. "Meeting the challenge of disruptive change", *Harvard Business Review*, Vol. 78 No. 2, pp. 66-77; Christensen, C.M. and Raynor, M.E. 2003. *The Innovator's Solution*, Harvard Business School Press, Boston, MA; Christensen, C.M., Anthony, S.D. and Roth, E.A. 2004. *Seeing What's Next*, Harvard Business School Press, Boston, MA; Hatum, A., et al., 2006. "Determinants of organizational flexibility: a study in an emerging economy." *British Journal of Management*, 17 (2), 115–137; Kevin Burnard & Ran Bhamra. 2011. "Organisational resilience: development of a conceptual framework for organisational responses," *International Journal of Production Research*, 49:18, 5581-5599; Sheffi, Y., 2007. *The resilient enterprise: overcoming vulnerability for competitive advantage*. Boston, MA: The MIT Press.

¹¹ Prior IEG evaluations include: *Capturing Technology for Development* (2011), *World Bank Group Support for Innovation and Entrepreneurship* (2013), *Learning and Results in World Bank Operations: Toward a New Learning Strategy* (2015), *Supporting Transformational Change for Poverty Reduction and Shared Prosperity* (2016), *Knowledge Flow and Collaboration Under the World Bank's New Operating Model* (2018).

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Appendix A. Evaluation Design Matrix

How well-prepared is the Bank Group to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?

Key Questions	Information Required	Data Collection and Analysis Methods
1. How and to what extent does the Bank Group bring its competencies, processes, instruments, and partnerships to bear at the corporate level to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?	For each of the five corporate priorities, information will be gathered on the following corporate readiness dimensions: leadership, culture, and incentives for innovation; risk appetite and informed risk taking; expertise, knowledge, and thought leadership; staff skills; resources; organizational structure, roles, processes and decision making that allow for flexibility, agility, knowledge sharing/learning, and cross sectoral coordination and collaboration; ability to identify, adapt, and deploy knowledge on technological developments; and partnerships, global networks and positioning vis-à-vis other actors. Internal information on Bank Group human resources, budgets and skills mix, incentives and rewards will be collected as also external information relating to perceptions of partners and other donors regarding the comparative advantages of the Bank Group vis-à-vis other players in the five corporate priority areas.	Structured Literature Review; Documents and Database Review; Semi-structured Interviews; Crowd-sourced Stakeholder Views.
2. How and to what extent does the Bank Group bring its competencies, processes, instruments, and partnerships to bear at the intervention level to help clients harness the opportunities and mitigate the risks posed by disruptive technologies?	Within and across each corporate priority, and at the level of specific interventions (country, and sectoral and regional), two kinds of information will be gathered: (i) information on favorable organizational features (relating to the corporate readiness dimensions noted above) that enabled the Bank Group to help clients harness the opportunities and mitigate the risks posed by disruptive technologies; and (ii) information on unfavorable organizational features (also relating to the corporate readiness dimensions noted above) that constrained the Bank Group's ability to help clients harness the opportunities and mitigate the risks posed by disruptive technologies.	Semi-structured Interviews; Documents and Database Review.

Source: IEG

Appendix B. Relevant Previous IEG Evaluations

Several IEG evaluations provide findings relevant for this evaluation. *Capturing Technology for Development* (FY11) examined the impact of mobile telephony, broadband connectivity, high-speed internet access, and ICT applications and the Bank Group's role and effectiveness in enabling these technologies. The evaluation found that the Bank Group's role was critical in sector reforms and in private investment for mobile telephony, especially in difficult and high-risk environments and in the poorest countries. In other priority areas, such as ICT applications and skills development, the Bank Group's contributions were more limited. Targeted efforts to increase access beyond what was commercially viable were also largely unsuccessful.

The evaluation recommended that the Bank Group continue the shift toward supporting broadband and Internet access and skills development and strengthen its capacity to respond to client demands for ICT applications, including improving project design and implementation. IEG further recommended that the Bank Group ensure its organizational structure for ICT enables effective coordination and improves procurement outcomes for ICT projects and components. The evaluation further emphasized gaps in broadband internet, diffusion of ICT in business, services, and government, which needed to be addressed. Going forward, the evaluation called for important shifts in the Bank Group's support: reforms for an enabling environment for private participation, updating regulatory frameworks, and preserving competition; a selective role for effective targeted interventions to increase access; and a focus on ICT applications and skills.

The Bank Group's implementation of actions related to this evaluation has lagged in important aspects. These aspects have included the need to strengthen the capacity of the Bank Group for supporting digital applications. The Bank Group has also lagged in instituting an effective mechanism for ensuring institutional coherence in addressing client needs for technology solutions that could act as a connector between client demands and outside expertise from public and private sectors.

Other relevant evaluations include the following:

- *Innovation and Entrepreneurship* (FY14) assessed how much Bank Group interventions fostered innovation and entrepreneurship. The evaluation concluded that the Bank Group's contribution was broadly positive but insufficiently strategic. The Bank Group financed start-ups and helped improve business models through technology upgrades or skills development. IEG found that technology diffusion was vital for building the capability of firms. The local context—including consumer preferences and the political economy—decisively influences the pace of technology transfer.

- *Financial Inclusion—a Foothold on the Ladder toward Prosperity (FY15)* assessed the Bank Group’s relevance and effectiveness in boosting the quality of financial services and increasing the poor’s access to them. The evaluation found that the Bank Group’s support to technology upgrades, business models, and the digitalization of cash transfers had increased access to retail banking. Better sequencing of service delivery models could further expand financial inclusion but needed to consider local needs and constraints.
- *Microfinance: A Critical Literature Survey (FY16)* found that digital payments services can reduce risks and costs for payers and payees, increase transparency of payment flows and induce traditional payment service providers to innovate to stay price-competitive.
- *Jobs and Competitiveness (FY16)* examined the Bank Group’s support in enhancing industry-specific productivity and competitiveness, focusing on ICT, manufacturing, tourism, and agriculture sectors in FY08 – FY14. Technology upgrades and skills development make firms more competitive. IEG recommended that the Bank Group strengthen its support for inclusive, sustainable industrialization.
- *Bank Group Support to Electricity Access (FY16)*, found that Bank Group financing of physical infrastructure was effective but national electricity access plans needed synchronizing while more integration of and grid and off-grid electrification was called for. Off-grid expansion was enhanced by solar home systems and off-the-shelf products, which could be deployed quickly and cost-effectively in remote locations. These systems and products can charge mobile phones and light homes without kerosene or candles, filling a gap until grid extension provides a fuller range of services to underserved populations.
- *Higher Education for Development (FY17)* noted a positive relationship between education and economic growth, particularly those that take into account the quality of education. About 40 percent of projects focused on science, technology, engineering, and mathematics (that is, STEM) fields. However, the results of these interventions have been mixed, and the gender divide in the STEM field persists. Thus, the evaluation called for “policies to expand the pool of women who pursue careers in science and technology.”
- *Transformational Engagements (FY17)* found that scaling-up technological innovations has helped Bank Group clients solve development challenges.
- *Data for Development (FY17)* examined Bank Group support for statistical capacity building involving improved data sharing, collection, and usage. The evaluation made a case for integrating big data and traditional data in Bank Group operations.

Appendix C. Evolution of Bank Group Strategies Related to Technologies

While the Bank Group's technology engagements have been broad, encompassing support to science and technology, research and development and innovation, specific strategies covering technology have existed mainly for the telecommunications and ICT sectors. These strategies have evolved over time. The pre-2002 approach emphasized expanding communications infrastructure and services and the role of the private sector in unleashing investments in infrastructure, while the public sector would put in place appropriate regulation to promote competition and ensure access. The 2002 ICT strategy reinforced these aspects with a broader mandate for the public sector to support institutional and sectoral reforms. Also, for the first time, it identified support for ICT applications and use *in other sectors*, and for ICT skills. The 2012 strategy retained focus on earlier priorities but elevated the emphasis on using technology to transform the functioning of governments and service delivery. It also shifted focus from mobile telephony toward broadband access. And it introduced a new pillar to promote innovation and technology entrepreneurship among the private sector, which also subsumed enhancing ICT skills. Figure C1. illustrates the evolution of Bank Group strategies related to technology.

Figure C.1. Evolution of Bank Group Strategies Related to Technologies

