



REGIONAL POLICY FORUM (HYBRID)

TRANSREGIONAL RESEARCH ON PRIVATE SECTOR DEVELOPMENT, DIGITIZATION AND DISRUPTIVE TECHNOLOGIES PROJECT

8 September 2022

CONCEPT NOTE

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1. Introduction

The development of a competitive private sector, and the spreading of innovative technologies, are among the most valuable tools at the disposal of policymakers to fuel job creation and economic growth as well as improving service delivery. Moreover, the role of the private sector in spreading widely new technologies is central. The advent of new information and communication technologies have to some extent positively disrupted the way of doing business and economic transformation in both MENA and Sub-Saharan Africa.

2. AERC-ERF Trans Regional Research on Private Sector Development, Digitization and Disruptive Technologies

Through a generous support by Carnegie, the Economic Research Forum in conjunction with African Economic Research Consortium have conducted collaborative research on ‘**The Inter-Regional Comparison for the Implications of Digitalization and Disruptive Technologies for Sustainable Growth, Poverty, Inequality, Women and the Youth in North Africa and Sub-Saharan Africa**’. The research project used empirical evidence to examine the impact of disruptive innovation and how it has transformed the economic potential of SSA and MENA.

Disruptive technologies -in the form of the rapid digitization of economic activities by firms, households, and governments and the process of globalization- have affected economic growth and its impact on jobs at both global country levels. While information technology (IT), which is broadly represented by artificial intelligence, robotics, and machine learning, has substantially speeded up data processing and reduced number of tasks, communication technology (CT) which mainly consists of the internet and smart device/phones, has strongly overcome distances and made communication and matching easier and cheaper, thereby encouraging the division of labour. IT has resulted in concentration of economic activities on the other hand, CT has contributed to dispersion of economic forces. Given the initial endowments of emerging market and developing economies, the immediate need is in developing CT, which has been the backbone of the emergence of social media, business- consumer matching, e-payments, e-commerce, and fintech. Looking forward, the application of disruptive technologies, especially e-government, e-commerce and fintech, may rise rapidly in the face of climate related natural disasters and pandemics, such as the rapid spread of Covid-19. The IT and CT paths initially require different types of investments, as well as policy and regulatory framework, but eventually they converge and underpin a new, knowledge-based economy as both income and economic complexity rises. The need of high skilled labor is paramount for the transition process to the advancing new technologies; in response to the labor-saving and skill-biased nature of these progressive technologies, and in an effort to restrain possible dislocation of large segments of the work force. Thus, countries under project Kenya, Ethiopia, Senegal and South Africa were selected based on their characteristic of a large, educated youth population. The large, educated youth population (women and men) in the proposed countries could play an increasingly important role, by deploying new technologies (together with adequate macroeconomic and financial framework, competition policy and regulatory regime).

The research draws on regional and country specific experiences to address key themes such as potential of disruptive technologies to address existing and emerging development challenges; proven pathways

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and strategies for countries to pursue; and the implications of disruptive technologies for governance, human capital, job creation and social inclusion. This project sought to understand how countries can enhance innovation and private sector development, transparency as well as harness the power of disruptive technologies while mitigating the risks, by identifying which approaches, policies and regulation that can help ensure that disruptive technologies promote inclusive development. The research conducted answered the following pertinent questions:

- a) What are the key disruptive technologies that are affecting MENA and SSA?
- b) Are they same in both MENA and SSA?
- c) Do MENA and SSA countries have adequate social safety nets to deal with the potential dislocations the new technologies may cause?
- d) What policy steps need to be taken to help countries in MENA and SSA harness the benefits of digitalization and mitigate its risks? In which countries or sectors are additional policy actions needed?
- e) Will countries in both regions have the infrastructure and enabling environment required to take full advantage of the digital revolution?

In answering the questions above, this project explored how creating the conditions for inclusive and sustainable growth requires an understanding of how new technologies are affecting different sectors of an economy and its economic institutions and how policy, structural reforms, and the required investments in infrastructure and human capital can harness them. Various strands of research are now proposing new, knowledge-based technologies will be the most viable avenue for economic development and integration in global value chains. Moreover, applications such as broad use of new technologies in governance such as e-government, could be an important component of ongoing structural transformations and the resulting changes in social contracts. An all-out effort to create an advanced digital economy requires fundamental reforms and massive investments to enhance digital connectivity and ensure the adequacy of supporting infrastructure, such as sustainable and affordable energy and access to high-speed Internet.

To achieve the above goals, a set of interlinked activities have been undertaken including consultative workshops with experts, commissioned framework and country case study papers by lead experts, and policy engagement.

3. Expected Outcomes of the Project

The project expected to achieve the following outcomes:

1. Better macro, regulatory, and fiscal policies and better competition frameworks to foster innovation and job creation as well as more efficient deployment of capital among firms;
2. More competitive market pressure and innovation as well as more inclusive growth outcomes through more participation in global value chains and creation of decent and flexible job markets.
3. Continuous exchange of ideas, approaches, expertise and platforms through interregional collaborations with other institutions in different regions and local partners for better development policy advice and impact

4. Outputs of the Project

The project realised seven papers in which 2 framework and 5 thematic papers were realised.

Framework Papers

No	Title of Papers
1	<p>Jaime de Melo and Jean-Marc Solleder</p> <p>Structural Transformation in MENA and SSA; The Role of Digitalization</p> <p>Abstract</p> <p>The paper focuses on two challenges of digitalization for structural transformation in MENA and SSA, one particularly relevant for SSA countries, the other for MENA countries. For SSA on the way to account for half of the growth in the global labor force over the first half of the 21st century, the most pressing challenge is that automation presents a threat for employment. Digital technologies (digitech) could rob SSA from its demographic dividend enabled by rising wages in China. For MENA countries where manufacturing has largely failed to take off, the digital transformation where ‘value creation shifts from capital to knowledge’ presents an opportunity for structural transformation. Successful digitalization would then allow MENA countries to achieve a service-sector led high-productivity growth structural transformation. For countries in both regions, improving digital skills to close the growing digital gap will be necessary. Digitalization is only starting across developing countries and is barely visible in the data and estimates reported in this paper. The paper covers evidence on three aspects of digitalization.</p> <p>First, disparities in digitalization across countries in both regions may be increasing in a digital world increasingly data-driven. New technologies entering the exports of firms participating in GVCs present a threat for low-income countries through two channels. First, the new technologies are biased towards skills and other capabilities, reducing the comparative advantage of unskilled labor-abundant countries, like those in SSA. Second, this bias makes it harder for low-income countries to offset their technological disadvantage with their labor-cost advantage. Next, the paper documents the weak performance of services in SSA and MENA, a sector that has become the engine of structural transformation. SSA and MENA stand out for having registered the slowest average labor productivity growth in services across regions over 1995-2018. Great differences in the state of national data infrastructures are observed across both regions, a signal that many countries are not ready for cross-border e-commerce, an essential ingredient of the digital transformation. It reports on firm-level evidence establishing causality between exports of software-intensive services exports and the quality of data infrastructure.</p> <p>Third the paper shows that trade costs have remained higher and participation in supply chain trade lower than in most other regions. New econometric estimates suggest that an increase in telecom subscriptions is associated with a direct elasticity of GVC participation of 0.4 and an indirect effect of 0.25 through a reduction in trade costs. In sum, ‘this time may be different’ because the labor displacement effects of automation may not be accompanied by reinstatement effects observed during past episodes of widespread technological change when jobs were created to implement the new technologies. The complementarity between humans and machines observed in previous spells of technical progress may be threatened by the continued growth in automation and robots. MENA and SSA countries should also prepare for regulation of cross-border e-commerce by, among others, weighing the costs and benefits of data localization measures that can provide consumer protection and give an advantage to local firms. For African countries engaged in the AfCFTA, negotiations on protocol for e-commerce in phase III provides a unique opportunity for African countries to collectively establish common positions in e-commerce that would help guide their structural transformation.</p>

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2	<p>Izak Atiyas and Mark Dutz</p> <p>Digitalization in MENA and Sub-Saharan Africa: A Comparative Analysis of Mobile Internet Uptake and Use in Sub-Saharan Africa and MENA Countries</p> <p>Abstract</p> <p>This paper focuses on uptake and use of mobile internet-enabled smartphones as a key access technology enabling benefits from digitalization. Geographically, the paper focuses on three regions of the African continent and the Middle East, namely sub-Saharan Africa (SSA), North Africa (NAfr) and non-rich Middle East (NRME) countries. The paper documents positive causal impacts of internet availability on the probability of employment, labor force participation, and falling poverty rates. The paper provides the following new findings. First, the main constraint to the benefits arising from broader digitalization lies not in internet coverage but in too little uptake and use of internet and the range of productive technologies that are enabled by internet. The paper finds that SSA, followed by NRME, South Asia and NAfr regions have the highest uptake gaps in the world, namely the highest percentage of their populations that have no internet use even though they are covered by at least a 3G network. Second, on the demand side, the most important conditional correlates of low uptake and use include low affordability as reflected in low incomes, high data prices and higher income inequality, low capabilities as reflected in low levels of education and skills, low levels of other complementary assets (especially electricity), and low attractiveness as reflected in low perceptions of useful content. The paper finds evidence of a significant positive correlation between lower uptake and lower incomes, lower capabilities, and lower access to electricity. Third, on the supply side, given levels of demand, the offered variety, quality, and price of internet and enabled digital services are critically associated with the level of market competition. The level of competition, in turn, depends on the policy and regulatory frameworks that govern the evolution of these markets. The paper finds evidence of a significant negative correlation between uptake and the degree of concentration in the mobile market as well as the key regulatory variable of Mobile Termination Rates (MTRs). Finally, when explored in a joint regression framework that combines selected demand and supply-side variables, quantitatively the most important variable associated with internet uptake is affordability (proxied by GDP per capita), followed by skills and electricity. Regulatory stance also matters: the statistical significance of market concentration and not MTRs suggests that regulatory actions and timing, including how they affect the nature and sequencing of entry may be more important than policies focusing on MTRs.</p>

Thematic Papers

No	Title of Papers
1	<p>Alemayehu Geda</p> <p>The Growth effect of Disruptive Technology in Ethiopia: With a case Study of Digitalization in the Financial Sector</p> <p>Abstract</p> <p>Focusing on digitalization as a major disruptive technology in Ethiopia, this study found that digitalization is at a very low level of development in Ethiopia, by regional standard. Yet, a 10 percent rate of digital penetration (digitalization) is found to increase GDP growth by 0.5 percent – this being as high as 0.8 percent in the service sector. Digitalization in the financial sector is growing very fast but is still the lowest by regional standard. Major challenges for this are found to be the stifling regulatory environment from the central bank, the telecommunication infrastructure (though significantly improved lately) and the</p>

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	<p>low level of digital literacy both at national level and within the financial sector. Low investment from the board of directors of banks so as to pay high dividend, failure of executives to take risk to creatively use the IT capacity in the country, the difficult of measuring the impact of digitalization for use in board and executive decision making and coordination failure in collectively acquiring some digital technologies from global vendors at national level are some of the challenges identified in the sector. Based on these findings the study derived various policy implications that includes strengthening the regulator body and improving its working modality, acquisition of some digital technology at national level and improving the digital infrastructure, cost and reliability, among others.</p>
2	<p>Eldah Onsomu, Boaz Munga, Boniface Munene, John Macharia, Violet Nyabaro</p> <p>Role of Disruptive Technologies in Enhancing Agricultural Productivity and Economic Performance in Kenya</p> <p>Abstract</p> <p>Kenya is at the forefront of technological innovations and is often referred to as the ‘Silicon Savannah’ of Africa. Disruptive technologies in Kenya comprise of fast internet connectivity, ICT infrastructure investments, value-added services, mobile money, and mobile banking services, among others. Kenya's ICT sector, therefore, remains a key enabler to economic growth, resilience and overall economic performance across counties. Disruptive technologies in agriculture consisted of digital and technical innovations that enable farmers and agribusiness entrepreneurs to leap from current methods to increase their productivity, efficiency, and competitiveness, thereby facilitating access to markets, improving nutritional outcomes, and enhancing resilience to climate change while contributing to sustained economic growth.</p> <p>Disruptive technologies have the potential to help address the inequality challenge. Adoption of disruptive technologies, including use of innovations in the context of modern methods of farming, has contributed to improved farm productivity, marketing and incomes. The study established a positive correlation between fertilizer use and agricultural productivity. This is because small scale producers, when exposed to relevant on-farm training, benefit more from the innovation, including use of fertilizers and certified seed. The use of manufactured feed is gaining traction in commercial intensive production systems such as poultry and had a positive and significant effect on productivity.</p> <p>Key enablers for effective adoption of disruptive technologies include access to power, education and skills, and affordability of disruptive technologies in given sectors. Going forward, to harness the benefits of the disruptive technologies requires strong digital ecosystem and exploiting synergies at the national and county levels and across sectors of ICT, training and agriculture. There is need to leverage public private partnerships to mobilize long-term ICT infrastructure development across all the counties. Further, digital sector investments should be matched with enhanced investments in training, digital literacy, building communities of learning, and innovations.</p>
3	<p>Thierno Malick Diallo, Tsambou Andrè Dumas, Fomba Kamga Benjamin</p> <p>Impact of Digital Technology Adoption on Employment in Senegal</p> <p>Abstract</p> <p>The future of developing countries depends essentially on the rise of digital technologies. Although new technologies are disrupting the existence of old technologies with possible effects on employment in the various sectors of activity, the empirical analysis of this relationship remains limited. This work fills this gap by examining the effect of digital technology adoption on labour market outcomes and job dynamics in the manufacturing and services sector in Senegal.</p>

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	<p>This work uses on the one hand the Survey on "Improving Employment Policies (EAPE)" conducted in 2018 among 2746 individuals in Senegal and the method of matching propensity scores, to assess the effect of digital technologies on young people's knowledge of public employment programs and on their access to employment. On the other hand, this work also uses the survey on "The Determinants of Business Performance in Francophone Sub-Saharan Africa: Case of Senegal" conducted in 2014 among 723 companies and the method of instrumental variables, to assess the effect of digital technologies on employment dynamics in manufacturing and service companies. The interest of this study is to provide policy makers with guidance on measures to help young people entering the labour market as well as private sector companies to benefit more from the diffusion of digital technologies in Senegal. On the one hand, the results show that the adoption of digital technologies helps the unemployed to participate in solidarity contract programmes and continue their active job search efforts but does not reduce their unemployment time. On the other hand, it appeared that the adoption of digital technologies within Senegalese companies has a positive and significant impact both on the share of total employment and on the share of qualified employees and that of less qualified employees. The adoption of digital technologies by a company increases the share of skilled employees by 2.12% while that of less qualified employees increases by 2.64%, which shows that digital technologies influence less qualified employees by 0.52% more than those qualified.</p>
4	<p>Elvis Korku Avenyo and Jason F. Bell</p> <p>Digital Technology Adoption and Performance in South African manufacturing Firms: Early Evidence for Policy</p> <p>Abstract</p> <p>The Fourth Industrial Revolution (4IR) is changing while also adding increased complexity to the global manufacturing landscape. The global transformation in manufacturing is offering new prospects for sustained industrial development in developing countries through increases in productivity, value creation, and efficiency gains as well as employment creation avenues. Digitalisation and the adoption of disruptive digital technologies are viewed as crucial to these transformations. However, there are limited research into the current state of disruptive technologies' adoption, digital skills, and capabilities in developing countries, particularly South Africa. This paper examines the effect of adoption of disruptive digital technologies on the performance of South African manufacturing firms. Using novel data from the South African digital skills survey and econometric analyses, our results highlight the importance of the adoption of disruptive digital technologies for the performance of manufacturing firms in South Africa. The policy implications of our results are discussed considering national policies on the Fourth Industrial Revolution (4IR).</p>
5	<p>Lukasz Grzybowski</p> <p>Disruptive technologies in South Africa and Sub-Saharan Africa: The Case of Mobile Telecommunications Services</p> <p>Abstract</p> <p>In this report we address the following questions with respect to the impact of mobile phones and Internet services on markets in South Africa and Sub-Saharan Africa. First, we analyze adoption of smartphones among individuals with different levels of income in South Africa. We construct a unique database of adopters of smartphones with different levels of income in South Africa, which is a developing economy with large income inequality. We use our model to assess the impact of policies which aim at stimulating the adoption of smartphones by people living below the poverty line. We find that the main driver of adoption is coverage by LTE networks, while the price of smartphones has only marginal impact. We conclude that to reduce digital divide it is critical to develop LTE infrastructure in poorer areas and people will respond by adopting smartphones irrespective of their income. The static and dynamic models</p>

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	<p>yield comparable results suggesting that consumers do not take future price and quality into account when purchasing smartphones.</p> <p>Second, we analyze how the proximity of mobile networks infrastructure and banking facilities impact the decision to adopt a mobile phone and to use mobile money services. We use a rich survey data of 12,735 individuals conducted in 2017 in nine Sub-Saharan African countries: Ghana, Kenya, Mozambique, Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda. We find that network coverage has a significant impact on the decision to adopt a mobile phone. In particular, individuals who live within 2km radius from GSM, UMTS and LTE towers are more likely to adopt both a feature phone and a smartphone, where there is a greater impact on the adoption of a smartphone. In counterfactual simulations, we consider that the whole population lives within 2km radius from any of these networks. We find that in such scenario the adoption of smartphones would increase by 12-32 depending on a country. The adoption of feature phones would decline for most countries when network coverage expands. The share of population without mobile phones would decline by 8-18 depending on a country. Our results emphasize the role of investments in network coverage for reduction of digital divide and increasing the adoption of smartphones in African countries. Overall, individuals who live in areas which are less developed economically, i.e., where no nighttime light is observed, are less likely to use mobile money services. Next, we find that smartphone users who live within 10km from a bank branch are less likely to use mobile money services, but this is not the case for users of feature phones. Furthermore, users of any type of mobile phone who live within 25km from an ATM are also less likely to use mobile money services. Thus, while there is overall less mobile money usage in areas which are less developed economically, a greater distance to financial facilities increases the incentives to use mobile money. We also find that individuals who live in less developed areas are less likely to send money using mobile money services, but this is not the case with respect to receiving money. We conclude that mobile money services enable transfers from richer to poorer areas, from richer to poorer people and from younger to older, which contributes to reduction in income inequality.</p> <p>Third, we analyze the impact of mobile phone ownership on change in employment status using NIDS panel data conducted among individuals and households in South Africa. Our estimation results suggest that mobile phone ownership has positive impact on employment status. The impact is greater in the last waves of the survey. On the other hand, ownership of a computer by a household and computer literacy do not have a significant impact on the change in employment status. In the estimation, we control for a set of individual characteristics such as race, age, gender, physical health, educational attainment, place of living and others. We also find that having a mobile phone and ownership of a computer by a household reduce the likelihood of becoming unemployed. The panel data allows us to account for unobserved heterogeneity amongst individuals.</p> <p>In the absence of fixed broadband infrastructure which is accessible to broad masses of consumers, smartphones and mobile Internet are the key disruptive technologies in Africa. As demonstrated empirically in this report on the example of financial services and labor market, mobile network infrastructure and mobile phones have critical impact on reducing digital divide and enabling poor individuals to participate in the economy.</p>
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Links to the Papers

No	Authors	Link
1	Jaime de Melo and Jean-Marc Solleder	https://bit.ly/3OzTSL6

2	Izak Atiyas and Mark Dutz	https://erf.org.eg/publications/digitalization-in-mena-and-sub-saharan-africa-a-comparative-analysis-of-mobile-internet-uptake-and-use-in-sub-saharan-africa-and-mena-countries/
3	Alemayehu Geda	http://publication.aercafricalibrary.org/handle/123456789/3401
4	Eldah Onsomu, Boaz Munga, Boniface Munene, John Macharia, Violet Nyabaro	http://publication.aercafricalibrary.org/handle/123456789/3402
5	Theirno Malick Diallo, Tsambou André Dumas, Fomba kamga Benjamin	http://publication.aercafricalibrary.org/handle/123456789/3403
6	Elvis Koroku Avenyo and Jason F. Bell	http://publication.aercafricalibrary.org/handle/123456789/3404
7	Lukasz Grzybowski	http://publication.aercafricalibrary.org/handle/123456789/3405

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