Digital Readiness Assessment of Countries in Africa: A Case Study Research

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ABSTRACT
There is an increasing uptake of digital technologies across African countries. Public, private, and government services have adopted and utilized digital technologies to improve work processes, productivity, create jobs, and better service delivery. This short paper seeks to answer these questions: What is the current state of digital readiness in African countries? Do existing digital readiness assessment tools, indicators, or metrics, help to assess the digital readiness of countries in Africa? Analysis of publicly available data from Cisco index of readiness score and Broadband speed ranking by cable.co.uk, reveal that: 1) African countries' digital readiness score is below the global average of 11.96, on a scale of 0 to 25 (except Tunisia with readiness average score of 12.05); and 2) African countries' broadband speed is below the global mean speed of 25Mbps (mean speed of 4.51 and 3.80 Mbps for sub-Saharan Africa and North Africa, respectively). Second, analysis of various assessment tools show that the existing metrics can't be used as is to diagnose and evaluate Africa's digital readiness. Instead factors such as availability of adequate infrastructure; last-mile connectivity to homes, schools, businesses, and government agencies; and skill gaps should be considered. The implications of this study are to show the need for an appropriate assessment tools so countries in Africa prioritize efforts to embrace digital readiness.

KEYWORDS
Digital readiness; digital maturity; digital readiness assessment; digital transformation; Africa.

INTRODUCTION
In organizational theory of change literature, readiness is broadly defined as the state of being fully ready to engage in a specific activity and it highlights the importance of timing, state, and the specificity of the activity that is getting ready for (Lokuge et al., 2019). This definition presupposes that the state of readiness (whether that be psychological, behavioral, and structural) is achieved prior to the commencement of the activity. Likewise, digital readiness, the preparedness of organizations and countries to adopt and use digital technology, can be seen from different determining factors such as structural, cultural, or capability. Assessing the level of preparedness before fully rolling out or deploying digital technologies is important to avoid failure down the road. It is often reported that while accessibility, adoption, and use of digital technologies are strongly associated with innovation and better performance, lack of readiness is equally attributable to innovation failures (Nylén & Holmström, 2015).

In this case study, a distinction is being made between digital technologies, digitization, digitalization, and digital transformation. Digital technologies are constrained as an all-encompassing term to describe products or services that are either embodied in information and communication technologies or enabled by them (Lyytinen et al., 2016), digitization is construed as the conversion of analog materials to digital (Kane et al., 2017), and digitalization is the use of digital technologies and digitized data to impact how work gets done, how customers and firms engage and interact, and how revenue streams are created (Lyytinen, et al., 2016). A comprehensive definition of digital transformation is given by i-SCOOP.eu (2016) as "the profound transformation of business and organizational activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic and prioritized way, with present and future shifts in mind."

Beyond digital technologies, beyond digitization and digitalization, digital transformation implies radical change, and it looks at the whole organization holistically vis-a-vis culture, skilled workforce, processes, policies, innovation culture, leadership, and relationships to the larger stakeholders. The path to digital transformation is not uniform across organizations and across countries in the world as many countries are at different stages of development. While advanced economies (broadly) are in the leading edge of adopting digital technologies and benefiting from it, least-developed economies are trailing behind and are often playing catch-up. Digital transformation impacts global inequity as the gap between the rich and the poor continues to widen. There are promising developments in Africa. In early 2020, the launch of the first phase of the ITU Digital Transformation Centers initiative, with four initial centers in Africa and their national networks (Ghana, Côte d'Ivoire, Zambia and Rwanda) marked an important milestone in establishing and enhancing regional institutional capacity that is inclusive (ITU, 2021).

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Current State of Digital Readiness in Africa

Africa is home to over one billion people. Almost 500 million or 50% subscribe to mobile services (ITU, 2021). Despite an increasing uptake in technology adoption and utilization, Africa still lags the rest of the world in digital technologies accessibility, use, infrastructure, and skills. For example, Internet penetration in Africa is estimated at 36% (United Nations, 2020). Infrastructure and human capital development are reported to be the most persistent challenges that prevented many African countries from enjoying the potential benefits of digital technologies. Two datasets were analyzed to showcase the current state of digital readiness in Africa—1) Cisco index that calculates 118 countries' (33 in Africa) readiness score on a scale of 0 to 25; 2) Worldwide broadband speed ranking of 221 countries and territories (54 in Africa) by cable.co.uk. The data for sub-Saharan Africa countries were extracted, prepared, and analyzed using R statistical package—the results are presented in Figures 1 and 2.

The global digital readiness score (for 118 countries) ranges from 5.9 to 20.1 with global average of 11.96 (the red horizontal line on Figure 1) based on a scale of 0 to 25. Only Tunisia with readiness score of 12.05 has above the average global score 11.96. The composite score is calculated out of 7 dimensions and 25 items/indicators, i.e.—1) technology adoption (3 items), 2) start-up environment (3 items), 3) human capital (4 items), 4) technology infrastructure (4 items), 5) business & government investment (3 items), 6) ease of doing business (4 items), and 7) basic needs (4 items). These countries are also grouped by the stage of their digital readiness from the lowest stage (Activate), middle stage (Accelerate), and highest stage (Amplify).

The 33 African countries analyzed separately for this study are all in the Activate (lowest) stage except Tunisia (12.05 score), Morocco & South Africa (both 11.5 score), Rwanda (10.96 score), and Egypt (10.83 score) that are in the accelerate stage. The average score for the 33 African countries is 8.31. The score in Africa ranges from the lowest 5.89 for Central African Republic to the highest 12.05 for Tunisia. Further grouping is shown in Figure 1 to account for minor differentiation between countries in the activate stage—thus activate5 is for countries with readiness score between 5.0 and 5.99, activate6 is for countries between 6.0 and 6.99, etc.

The data analyzed from cable.co.uk for global broadband speed (Figure 2) equally shows that all 54 African countries (48 Sub-Saharan and 6 North Africa) have below the global average broadband speed of ~25Mbps (shown by the red horizontal line in Figure 2). The average broadband speed for sub-Saharan Africa (SSA) is 4.51 Mbps, 3.80 for North Africa and with this speed it will take countries in SSA 4 hours and 12 minutes to download 5GB movie. While countries with the highest speed in Western Europe have 105 – 120 Mbps range (except the outliers that are in the 200 Mbps range), it will take them 5 to 6 minutes to download 5GB movie.

Existing Digital Readiness Assessment Tools

Digital readiness can be assessed at individual, workgroup, organization, industry, or country level. For example, digital readiness across different sectors, i.e., manufacturing (Pirola et al., 2019), healthcare (Mather & Cummings, 2019), agriculture (Basso & Antle, 2020), banking and financial sector (Balakrishnan & Shuib, 2021), higher education (Zalite & Zvirbule, 2020), or public service delivery (e-government) (Mergel et al., 2019), or by specific technologies, for example AI readiness (Holmstrom, 2021), IoT readiness (Atayero et al., 2016), or any combination of these technologies by country or industry, for example Cyber Security readiness of South Korea (Yang et al., 2017).

Regardless of the level of assessment, different methods, models, frameworks, tools, indexes are developed to gauge digital readiness. These assessment tools and indexes are used as a diagnostic tool to evaluate existing capability and gaps to identify areas of strength and weakness, as well as assist in setting goals, and in developing and evaluating targeted digital-improvement initiatives (Zhang et al., 2019). Since the introduction of the technology readiness level (TRL) methodology by NASA in 1970's, large numbers of assessment tools are developed. A comprehensive and appropriate assessment tools were reviewed, and the result is presented in Table 1.

While the descriptions of each of the dimensions and their items/indicators were not provided in the table above for space reasons, across the different assessment tools it is evident to note that organizational culture and digital skills are as equally important as technology adoption and use.

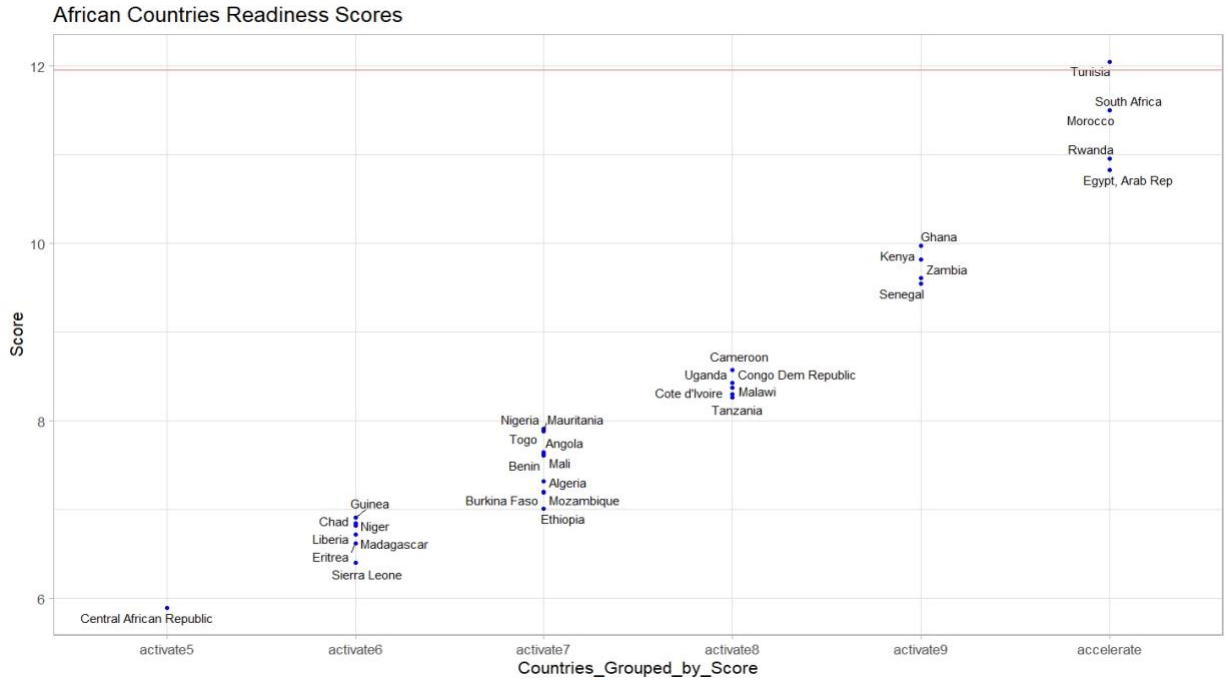

Figure 1. Africa's Readiness Score

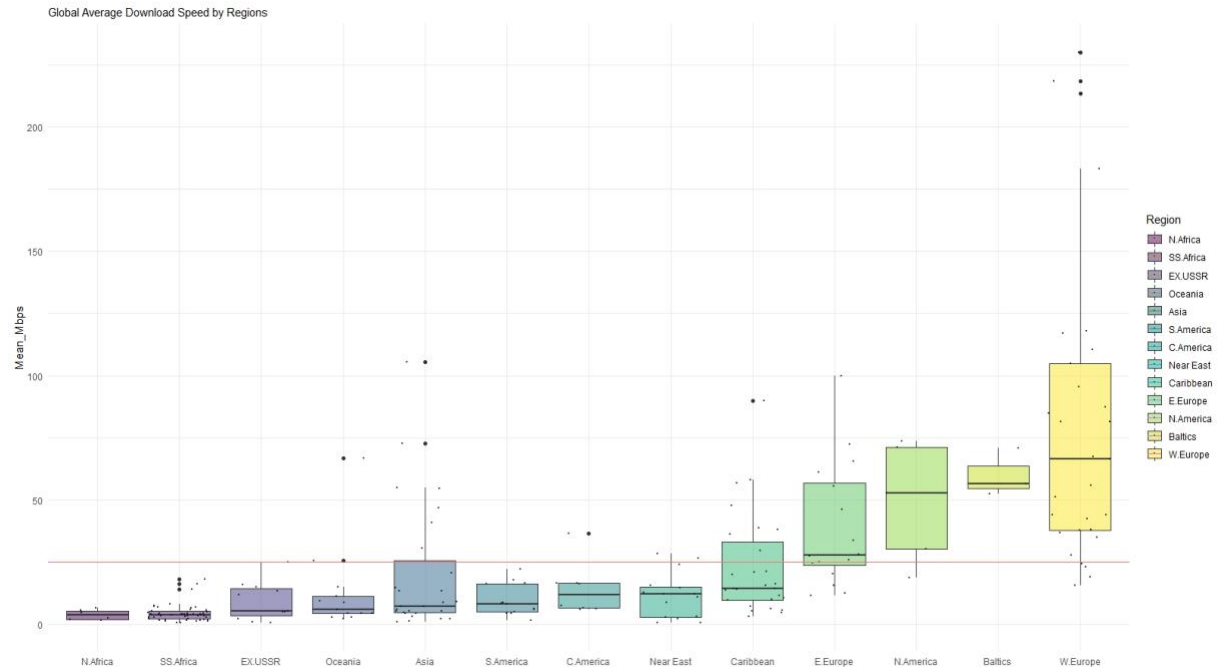

Figure 2. Global Broadband Speed in Mbps

Table 1 presents the result of a comprehensive review of the literature and only select relevant tools and indexes are presented here.

Name	Dimensions	Stages of Maturity
Network Readiness Index (NRI 2020. PORTULANS Institute)	Technology; people, Governance, Impact	N/A
Digital Maturity Assessment Tool (Government of South Australia, KPMG Australia, version 4.2)	Governance & leadership; People & culture; Capacity & capability; Innovation; Technology	Minimal; Informal & reactive; Transitional; Customer-driven; Transformed
Country Digital Readiness (CISCO, 2019)	Technology adoption; Start-up environment; Human Capital; Technology infrastructure; Business & government investment; Ease of doing business; Basic Needs	Activate; Accelerate; Amplify
E-government Development Index (UN, 2020)	Normalized composite index of 3 indices—Online Services Index (OSI); Telecommunications Infrastructure Index (TII); Human Capacity Index (HCI)	Low Middle High Very High
Digital Adoption Index (World Bank, 2016)	People; Government; Business	0 – 1 scale
DIGITAL Maturity Model 5.0 (Forrester, 2018)	Culture; Technology; Organization; Insights	Skeptics; Adopters; Collaborators; Differentiators

Table 1. Select List of Digital Readiness Assessment Tools

Key Indicators for Africa

One of the questions for this paper is to investigate how much existing tools and indicators can help gauge readiness in the context of Africa. When most of Africa, especially in sub-Saharan Africa, don't have adequate infrastructure such as electricity, prohibitive cost of devices and limited Internet service—last-mile connectivity issues to homes, schools, and businesses, government agencies, and skill gaps are the most important indicators that should be prioritized to assess Africa's readiness. Existing digital readiness assessment tools don't fully account for the situation on the ground in Africa. Even with the declining cost of technologies, still most of these devices are out of reach for tens of millions of citizens in Africa (ITU, 2021). Not all countries start from the same place when it comes to the history of digital technologies adoption and using existing models as is will not help much to determine the gaps and diagnose the real issues. Instead African countries need to take stock of its challenges and potentials, both short-term and long-term, to focus on its competitive advantage such as its 70% youth population for context-driven digital transformation to take root.

CONCLUSION

The use of digital technologies brought significant impact in work and day-to-day lives. When technologies are increasingly integrated into the workflow routines across organizations and businesses, and when that is coupled with relevant policies, culture, strategy, leadership, commitment, and technology-savvy populace, it can be safely argued that digital transformation will be achieved. As noted above, Africa still trails all regions of the world in accessing and using digital technologies. Even with increasing uptake in adoption of digital technologies in recent years, the best strategy to assess Africa's digital readiness is: 1) through in-country infrastructure such as electricity and connectivity to and between schools, hospitals, businesses, government agencies, industries, etc; 2) increased digitization effort to enhance machine readable, accessible, and integrated work flows (e.g., medical records, government IDs, driver's license, forms, business applications, tax documents, fintech transactions, etc.); and 3) increased digital skill of the workforce and citizens at large. We make the case that these upfront and critical steps are necessary for digital transformation to take root in Africa. In view of that, instead of adopting the existing readiness indicators, metrics, and/or maturity models as is, it is important to develop Africa's Readiness Metrics based on the above three big areas. Without digitization the accessibility of digital technologies (hence digitalization) alone will not bring digital transformation.

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