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The Pitfalls of the Education System in Sudan:

The Challenges of Transition, Transformation, Inclusivity, and Future of Work

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Summary

Inspired by the popular protests that swept the kleptocratic regime of Omar al-Bashir from power and reflecting on the revolution's "freedom, justice, and peace" slogans, the people of Sudan aspired to create an education system that meets Sudan's education development agenda. This transition has offered a rare window of opportunity for wider policy reforms.

In this context, this report analyzes major themes such as the nexus between education equity and catch-up; technology as an enabler for inclusivity; the future of work and the current education system in Sudan; and the practice of freedom, inclusivity, and transformation of society. We do so by examining the current challenges to building a sound education system that responds to current and future economic needs – namely, the future of work. The analysis advocates for the use of technology in education as an enabler and transformer for catching up.

Three perspectives are brought to light in this report. The first highlights the importance of building an inclusive society through an advanced education system to overcome the current obstacles and spur inclusive knowledge-based growth. The second addresses the role of education amidst the dangers of widening inequality, disparities in the country, and instability. The third deals with debating the biggest challenges facing the higher education model and how to address them to meet the needs of the future of work and societal and global transformation at the edge of technology and automation.

This report aims to present ideas and conversations in education on the top policy agenda to the transitional government of Sudan with respect to the challenges facing Sudan's education system. Current challenges, including COVID-19, offer great opportunities to do things differently in guiding the transformation of the education sector in light of this transformational process. Reframing the policy debates in Sudan with respect to education as transformation for employment, employability, and economic growth requires deep thinking and leadership with a vision to take the education sector to a new level. The mismatch between education and future work is likely to create an inverse relationship between years of schooling and the possibility of finding a job.

Among the key policy recommendations, education models in Sudan need to reflect the demand for lifelong learning to cope and catch up with the technological and social changes brought about by the Fourth Industrial Revolution. The education system in Sudan falls short and reflects policymakers' aspirations and the leadership's consistent failure to develop an education system that meets the aspirations of the young generation and acts as a precondition to transforming the Sudanese economy to another level. The German vocational skills model offers great opportunity, particularly for lost talents in conflict zones and beyond. The negative perception and stigma with respect to vocational education in Sudan as "education for dropouts" must change. Other policy recommendations and lessons from the reviewed literature suggest that Sudan still has an opportunity to take development steps in the age of technology and automation.

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1. Introduction

Achieving universal primary education in Sudan – much less catching up with the standards of higher education in line with the requirements of the labor market of the Fourth Industrial Revolution – is a profoundly challenging task. Universal basic education remains an elusive goal under the prevailing conditions of a large number of internally displaced people (IDPs) associated with conflicts and political instability. Moreover, chronically low enrollment persists even under normal conditions when schools are available (supply side) in other parts of the country, particularly in Eastern Sudan (namely Kassala and the Red Sea states). This suggests that there are much deeper forces undermining the demand for education in Sudan, including governance issues that extend beyond the boundaries of policies, institutions, and processes.

As inspired by the iconic slogan of the December 2018 Revolution (freedom, justice, and peace), closing the education disparities and underdevelopment status of many communities in Sudan while building an inspirational education system that meets the development agenda and the future of work should be an overarching goal for the post-revolutionary democratic Sudan.

Unfortunately, at the time of writing this report, Sudan has already become once again under military rule, following a coup on 25 October 2021 led by none other than the President of the Sovereignty Council. The fallout from this coup has been devastating for the political stability of the country and its economic recovery, driven by a new development vision guided by the transitional government. In light of the very complex economic and political situation, high levels of poverty, and low levels of educational attainment, this study aims to explore two important dimensions of the development record in Sudan by studying the relationship between different factors, including technology, that can facilitate educational outcomes. These include the necessary conditions that are likely to make the education sector more positive and biased toward the future in light of limited resources and multiple priorities.

On another level of the discussion, there has been increasing concern about the present and prospective inadequacy of employment opportunities and matching with educational outcomes in Sudan. It emanates partly from a retrospective view of the course of events in the years of low economic growth that Sudan continues to experience and the lack of a sound educational system that links education with the present and future of work. A sound educational system also helps break the conflict cycles caused by underdevelopment and marginalization and improves agriculture productivity in large agrarian communities by enabling educated rural communities to utilize technology.

Following the global debate and the ongoing transitions in ideas and technology, transforming the education system in Sudan requires a new generation of ideas and thought-provoking debates enlightening the way forward on this arduous road. Reframing the policy debates on the appropriate education and learning system in Sudan – including curriculums and as transformation for employment, employability, and economic growth – will not be an easy task, as it draws practical implications and stimulates a discussion on the desirability of much-needed change. By informing some important policy debates, it will, hopefully, point the way toward more inclusive and sustainable development.

As the structures of economies are changing globally, education in Sudan must respond to this global change. In 1971, Simon Kuznets, a Russian émigré who had built his career in the United States, was awarded the Nobel Prize in Economics "for his empirically founded interpretation of economic growth, which has led to new and deepened insight into the economic and social structure and process of development." In his prize lecture titled *Modern Economic Growth: Findings and Reflections*,[1] Kuznets (1971) summarized the structural changes that accompany economic growth, emphasizing "the shift away from agriculture to nonagricultural pursuits and, recently, away from industry to services." These are the sectoral changes in production needed for nations to prosper. Nations do not develop by merely doing more of the same thing. They must do different things and do them better. Likewise, to take developmental steps toward transformation, education must do differently through quality, innovative approaches, and digitalization.

Sudan's education system is facing significant challenges beyond the central decades-long argument over advocating for increasing public investment in the sector as commonly viewed in many analyses (pro-poor and incidence analyses). It is about re-envisioning the entire sector, addressing disparity, and catching

[1] Kuznets, S. (1971). *Modern Economic Growth: Findings and Reflections*, Nobel Prize Lecture. https://www.nobelprize.org/prizes/economic-sciences/1971/kuznets/lecture/

up in a new fashion by utilizing technology, quality guided by global trends and economic need, and the philosophy of providing education itself as a viable model for transformation in the 21st century (namely the Fourth Industrial Revolution) to keep up with the pace of advancement in technology necessary for leading the knowledge economy and creating jobs.

According to Jahanian (2020),[2] automation and the gig economy are radically changing how we work. Following the global debate and the ongoing transitions in ideas and technology in education requires a new generation of thought-provoking debate. The process of reframing the policy debates on education as transformation for employment, employability, and economic growth puts forth an important discussion on the desirability of transforming the education system in Sudan by informing some important policy debates. Policy failure, combined with a lack of appropriate theoretical underpinning, leads to more institutional failure to perform and catch up, negatively impacting present and future generations. The spillover effect is likely to go beyond education to the whole society. The Annex outlines such linkages, particularly investing in human capital and changing the nature of work.

As aforementioned, policy failure and the lack of appropriate theoretical underpinning guiding the transformation of the current crisis in the education system in Sudan will eventually lead to further institutional failures, thereby blunting the legitimate aspirations of the generations of Sudanese youth expected to guide the country's renaissance. Such failure to catch up with the pace of technology will result in serious implications for the future of work and employability in a country characterized by an unexploited population dividend where youth constitute the majority. Moreover, the structure of Sudan's economy has not shown any change since its independence with respect to the composition of sectors' contributions. Leading education is responsible for such a structure as growth very much depends on the increased sophistication of education. Also, the COVID-19 pandemic and future shocks of its kind should provide an impetus for drastically rethinking curricula and empowering teachers to make the best use of their professional skills. Moreover, COVID-19 offers a rare opportunity to build and operate digital platforms for an inclusive education learning environment using recent technology.

Against this background, this report presents ideas and asks some key questions in order to build an educational agenda to empower the envisaged transitional and future elected governments of Sudan to meet the challenges of the Fourth Industrial Revolution and exploit the opportunities provided by the digitech economic order. In this context, the report considers and focuses on the following three central themes:

Firstly, the danger of the failure to ensure equitable access to education in widening inequality, disparities, and instability in the country.

Secondly, the critical importance of building a robust educational system for overcoming the current obstacles and spurring inclusive knowledge-based growth and building an inclusive society.

Thirdly, the key elements of an emerging agenda for a high education model and the way forward toward fulfilling this agenda.

The nature and complexity of the range of topics related to the education system in Sudan presented in the report are complex and hardly solved by one methodological model or approach. As such, the report adopted desk reviews, utilizing primary data through interviews, as well as brainstorming methods to address these three themes and utilize a "systematic combining approach" to put all those ideas together. According to Gadde (2001), the systematic combining approach is a process where theoretical framework, empirical fieldwork, and case analyses evolve simultaneously, and it is particularly useful for the development of new theories and approaches. We discuss systematic combining in terms of two processes: the first is matching theory and ideas with reality, while the second deals with direction and redirection. The processes are affected by four factors: (1) what is going on in reality, (2) available theories, (3) the case that gradually evolves, and (4) the analytical framework. These are the aspects that guided my thinking throughout this report. According to this approach, the report utilizes both secondary and primary data (interviews) to sort out the ideas in a constructive manner.

The report contributes to these debates by suggesting a new approach that aims to create a digital society that maximizes societal well-being and the transformation to the Fourth Industrial Revolution. Employability is likely to turn into a burden on the economy and society due to a mismatch between the education and labor market. In some cases, the aspiration and absence of opportunities are likely to turn into negative coping mechanisms.

[2] Jahanian, F. (2020). *How higher education can adapt to the future of work*. https://www.weforum.org/agenda/2020/01/how-can-higher-education-adapt-to-a-constantly-evolving-future-of-work/

For the remainder of this report, section II provides a review of the nexus between education, technology, transformation, and inclusivity; namely, the future of work and education to meet the future aspirations of youth, inclusivity, and development. Section III analyzes the available secondary data to identify the key characteristics of the educational system, highlighting key challenges and constraints. Section IV discusses results and findings and highlights the current important challenges facing the transformation of the sector. Section V presents concluding remarks and key policy recommendations of the proposed interventions that consider the aspirations for education to produce better graduates for the labor market while addressing horizontal disparities.

2. The Nexus between Education, Technology, Transformation, and Inclusivity: A Review of Global Trends

As globalization and rapid advancements in technology continue to transform the civic space and the world of work, education systems have grown increasingly disconnected from the realities and needs of global economies and societies. Education models must adapt to equip children with the skills to create a more inclusive, cohesive, and productive world. S*chools of the Future: Defining New Models of Education for the Fourth Industrial Revolution* outlines a new framework for defining quality education in the new economic and social context and shares the key features of 16 schools, systems, and programs pioneering the future of education. These examples may serve as inspiration for driving holistic and transformative action on this important agenda. This report is the result of a widely consultative process with education experts, policy and business leaders, education technology developers, and experts curated by the Platform for Shaping the Future of the New Economy and Society.[3]

The World Bank's Africa's Pulse (October 2020),[4] extensively discusses how digital technologies percolated through the three interrelated transformations associated with the economic transformation for jobs framework (technological, sectoral, and spatial) and supported its foundations (investments in skills, infrastructure, and institutions supporting inclusive productivity growth). A recent report titled *The Fourth Industrial Revolution and Digitization* will transform Africa into a global powerhouse (2020) emphasizes that technology offers new ways to fight poverty, inequality, and inclusivity. For instance, mobile money, Artificial Intelligence (AI), the Internet of Things (IoT), and blockchain can enhance opportunities for data gathering and analysis for more targeted and effective poverty reduction strategies. We have already witnessed the transformational power of formal financial services through mobile phones, such as Kenya mobile money (known as M-Pesa) reaching the underserved, including women, who are important drivers for sustainable poverty eradication. These financial services allow households to save in secure instruments to enlarge their asset base and escape the cycles of poverty (Ndung'u, N. and Signé, L., 2020).[5]

Economic historian Joel Mokyr has called the 19th and 20th centuries "the most transformative centuries in all of human history." The graph starts in 1000 BC and goes to the present day. It is flat for most of human history. The Industrial Revolution is generally agreed to have begun in the late 1700s or the first half of the 1800s, and that's also when most of the markers of human well-being started to change (Piper, 2018).[6]

The six metrics he charted were (1) life expectancy; (2) GDP per capita; (3) the percentage of the population living in extreme poverty; (4) "war-making capacity," which is a measure of technological advancement for which we have the most historical data; (5) "energy capture," which reflects access to food, livestock, firewood, and, in the modern day, electricity; and (6) the percentage of people living in a democracy. The resulting graph is startling, and from the below chart in Figure 1, it's easy to see why. Over almost all of human history, each of these metrics of well-being was completely flat. The same share of people lived in a democratic society, i.e. approximately none.

Frontier technologies can bring enormous benefits to the lives of poor people in Sudan. Prospects are immense in agriculture, health, education, energy, and other areas

[3] See Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution | World Economic Forum (weforum.org).

[4] Zeufack, Albert G.; Calderon, Cesar, Kambou, Gerard; Kubota, Megumi; Cantu Canales, Catalina; Korman, Vijdan (2020). "Africa's Pulse, No. 22" (October), World Bank, Washington, DC. Doi: 10.1596/978-1-4648-1568-3

[5] Ndung'u, N. and Signé, L. (2020). *The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse*; in Capturing *The Fourth Industrial Revolution: A regional and national agenda* https://www.brookings.edu/wp-content/uploads/2020/01/ForesightAfrica2020_Chapter5_20200110.pdf

[6] Piper, K (2018). *Human History, in one chart, Vox*, https://www.vox.com/future-perfect/2018/11/8/18052076/human-history-in-one-chart-industrial-revolution

Box 1: The future of work and the role of education: An evolution perspective

First: Main messages from recent World Bank reports:
The World Development Report (WDR) 2019: *The Changing Nature of Work*

Technology is changing how people work and the terms on which they work. Even in advanced economies, short-term work, often found through online platforms, is posing similar challenges to those faced by the world's informal workers. Fears that robots will take away people's jobs have dominated the discussion over the future of work, but the 2019 World Development Report finds that, on balance, this appears to be unfounded. Instead, technology is bringing opportunity and paving the way to create new jobs, increase productivity, and improve public service delivery. The traditional production patterns (machine learning production function) are changing. The rise of the digital platform firm means that technological effects reach more people faster than ever before.

- Technology is changing the skills that employers seek. Workers need to be good at complex problem-solving, teamwork, and adaptability.
- What can governments do?
- Invest in human capital, especially in disadvantaged groups and early childhood education to develop new skills that are increasingly in demand in the labor market, such as high-order cognitive and socio-behavioral skills.
- Enhance social protection to ensure universal coverage and protection that does not fully depend on formal wage employment.
- Increase revenue mobilization by upgrading taxation systems, where needed, to provide fiscal space to finance human capital development and social protection.

Second: Main messages from the IMF (2018)
The Future of Work in Sub-Saharan Africa

- There is a fundamental uncertainty about the impact of the Fourth Industrial Revolution on jobs and labor markets. Will technology take away jobs from people or will it lead to the creation of many new products, services, and jobs that we cannot even dream of yet?
- If technology helps people do their jobs better, Sub-Saharan Africa's convergence with the rest of the world could experience a boost. However, if technology takes jobs away from people, Sub-Saharan Africa could diverge from the rest of the world.
- The "classical" manufacturing, export-led development model will need to be adapted to the constraints and opportunities brought about by the Fourth Industrial Revolution.
- The region should understand the potential for job creation in the next two decades.

Sub-Saharan Africa created sufficient jobs to keep up with population growth over the past two decades. However, quality did not accompany quantity, as most of the new jobs created were in agriculture or services with low value-added, and most of the new jobs created were in self-employment.

IMF (2018). *The Future of Work in Sub-Saharan Africa*.

of development. There are numerous examples of successfully mobilizing frontier technologies. However, with the exception of a few countries in Africa like Kenya and South Africa, many of these technology deployments remain at the pilot level (UNCTAD, 2021).[7]

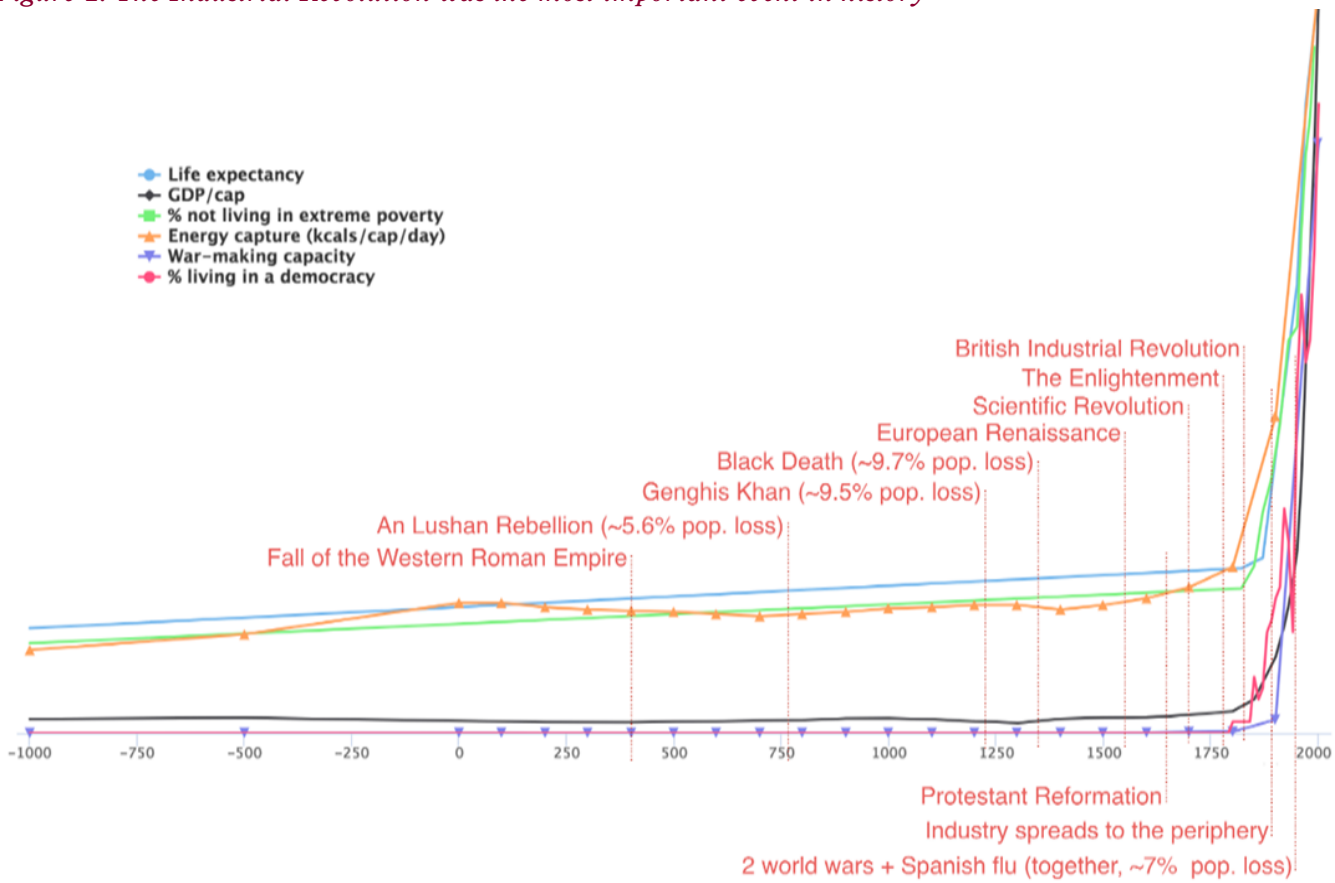
According to a recent report by the World Economic Forum (2020),[8] education systems play a key role in defining the values and norms that enable positive human interaction. In addition to 'hard' skills, such as technology design and data analysis, it is crucial that schools also foster human-centric skills (such as cooperation, empathy, social awareness, and global citizenship) that enable children to shape future societies that are inclusive and equitable. In this context, education, business, and public sector leaders must think beyond 'business-as-usual.' Transitioning all education systems to ones designed for the Fourth Industrial Revolution (Education 4.0) has tremendous potential to better prepare children for the future of work, revive pathways to social mobility, improve productivity, and enhance social cohesion.

The returns to early investments are the highest of those made over the life span, and the advantages conferred by these investments grow over time. Early investments

[7] UNCTAD (2021). Technology and Innovation Report. https://unctad.org/system/files/official-document/tir2020_en.pdf

[8] World Economic Forum (2020). *Schools of the Future Defining New Models of Education for the Fourth Industrial Revolution*. WEF_Schools_of_the_Future_Report_2019.pdf

Figure 1. The Industrial Revolution was the most important event in history



in such services would alleviate this constraint (World Bank, 2019).[9] In a country with a young population like Sudan, the contention here is that there is a strong link between education attainment, civil war, and economic transformation.

The legacy and spillover effect of the backwardness education system is irreversible and will further be a factor of development failure. This argument is in the line with that of a World Bank policy research paper titled Breaking the conflict trap (2003), which stated: "Where development succeeds, countries become progressively safer from violent conflict, making subsequent development easier. Where development fails, countries are at high risk of becoming caught in a conflict trap in which war wrecks the economy and increases the risk of further war."[10]

a. Toward a "skills over degrees" model: A changing perspective of providing education and labor market trends and their implications for aspirations

While the education degree still rules, by and large, we are slowly moving toward a reality with more focus on acquiring skills rather than degrees, namely the German vocational skills model. Conventional thinking tells us that the surest route to success in professional life lies at the end of a higher education degree and, not surprisingly, that holding a degree correlates with improved chances of employment as well as higher income. However, the value of degrees is being questioned more than ever before; not just in places where students face high tuition fees and life-long debt, but also in education systems where university is "free" (the opportunity cost of spending several years on study are worth the next 60 years in a career that will likely constantly change over time). Whether traditional higher education is still the best way to provide people with the skills needed to compete in unpredictable job markets is debatable (OECD, 2019).[11]

[9] World Bank, 2019. World Development Report 2019: The Changing Nature of Work. Washington, DC: World Bank. doi:10.1596/978-1-4648-1328-3. License: Creative Commons Attribution CC BY 3.0 IGO

[10] Collier, Paul; Elliott, V. L.; Hegre, Håvard; Hoeffler, Anke; Reynal-Querol, Marta; Sambanis, Nicholas. (2003). Breaking the Conflict Trap: Civil War and Development Policy. A World Bank policy research report; Washington, DC: World Bank and Oxford University Press. © World Bank. https://open-knowledge.worldbank.org/handle/10986/13938 License: CC BY 3.0 IGO."

[11] OECD Library (2019). *Education at a Glance*. https://www.oecd-ilibrary.org/education/education-at-a-glance-2019_f8d7880d-en

Box 2: How the 'gig economy' is changing the world of work

- Automation and the gig economy are radically changing how we work.
- How we learn must keep up with the pace of these new technologies.
- Learning needs to be cross-disciplinary, personalized, and focused on human skills.
- Together, the government and the private sector can future-fit education.

What is platform work?

Platform work is an employment model where individuals provide specific services organized through a digital platform that connects them with clients.

This can be a location-based app allocating jobs such as food delivery, taxi, or plumbing services, or a web-based platform outsourcing work like translation or graphic design.

Platform work has increased fivefold in the last decade.

What is the gig economy?

Platform work is also known as 'the gig economy,' as workers are paid by the 'gig' or task rather than by the hour.

Adopted from How the 'gig economy' is changing the world of work: https://www.euronews.com/next/2021/04/07/the-gig-economy-a-crash-course

The answer is that, if it is possible to influence beliefs and aspirations[12] in a way that leads to higher levels of labor market attainment, then appropriate policies can be developed (Gardiner, D., Goedhuys, M. 2020).[13]

b. Toward an education that meets Sudan's development agenda: Perception versus reality

Closing the education disparities in Sudan while building an inspirational education system that meets the development agenda and the future of work poses a serious development challenge in the country. In the context of the global knowledge-based economy, there is an undeniable need to train the next generation in emerging digital competencies to become fluent in designing, developing, or employing technology responsibly.

The World Youth Report (2018) titled *Youth and the 2030 Agenda for Sustainable Development* emphasizes that the goals, targets, and instruments incorporated in the 2030 Agenda for Sustainable Development offer increased opportunities to advance youth development objectives in the context of social, economic, and environmentally sustainable development efforts.

The challenges of securing and retaining decent work in Sudan in the near future are even more serious and complex for vulnerable and marginalized youth. While entrepreneurship offers opportunities for some youth, a diverse and robust employment strategy must include options and opportunities for all youth.

c. The skills mismatch problem

In Sudan, a significant number of individuals are out of school, particularly in conflict-affected areas. The current transitional government scheme is only based on its approach to the out-of-school group and ex-combatant to accommodate them through military recruitment, which falls short of ideal thinking. It is important to prepare them to transition to better jobs. For example, a recent

[12] Acknowledging the relevance of aspirations to development efforts, Lybbert and Wydick (2018) investigate how aspirations can be realized and become positive outcomes. They turn to Snyder's (2002) theory of hope to explain how to arrive at successful aspirations. First, individuals need to set a goal for the future (an aspired position). Second, they need to have the necessary agency to carry out the steps required to attain that goal. Third, they need to visualize pathways to achieving that goal, such as access to the cognitive or material tools necessary for their journey. When a person's aspirations for the future are aligned with what they believe can be achieved, given their circumstances and through their own effort (Dalton, Ghosal and Mani, 2016; Bandura, 1993), then aspirations become analogous to expectations and successful outcomes become more likely. Therefore, whereas aspirations afford a dimension for preferences, expectations are the product of experiential perceptions, such that they become more context-specific. Through this framework, the inverse U-shaped relationship between aspirations and action propounded by Ray can be better understood as the proposition that if aspirations that are either too low or too high discourage motivation, then there is a peak to be found where aspirations meet expectations toward the top of the inverse U curve. By designing policies and programs that help recipients visualize the potential pathways to achieving their goals, development efforts can productively mobilize the motivating power of aspirations.

[13] Gardiner, D. and Goedhuys, M. (2020). *Youth Aspirations and the Future of Work: A Review of the Literature and Evidence*, ILO Working Paper 8 (Geneva, ILO).

World Bank initiative in Brasilia (2021)[14] titled *The Future Starts in School: Preparing Brazilian Youth for Their Transition into Better Jobs* finds that a significant share of young people in Latin America are not in school or working. They've been nicknamed "NEETs" (not in education, employment, or training) or "*nem-nems*" (meaning 'neither/nor' in Portuguese).

A recent ERF/ILO regional report on Jobs and Growth in North Africa (2021)[15] examines the link between economic growth and labor market performance in Sudan during the period 2000-18. The report shows that there is no association between educational attainment and productivity, suggesting that the expansion in education over the last two decades has had no significant impact on enhancing labor productivity in Sudan.

3. Sudan's social, political, and economic outlook

Decades of war contributed to the creation of a military culture and political polarization in various parts of the country. Military activities, tribal fighting, the availability of small arms, and insecurity represent the greatest threat to the enforcement of the rule of law and voluntary returns of IDPs to their original areas.

After the September Revolution, Sudan stands at the crossroads of major change. Peace seems to finally be at hand with the signing of the Juba Peace Agreement with some armed groups. The peace agreement provides an important opportunity for laying the foundation for durable solutions for displacements. Though the non-signatory parties to the peace agreement pose significant challenges to the transitional government, the government is trying hard through different ways to bring them to the negotiating table. Major economic reforms adopted by the transitional government are ongoing and have not yet resulted in improved economic performance or in setting the stage for more inclusive, equitable, and sustained economic growth. Though these developments are welcome, their interaction poses new challenges to the country; namely, how to meet the immediate demands of peace and maintain a favorable macroeconomic environment for enhanced growth and development.

The key challenges facing the transitional government are the urgent need to reverse the steady deterioration of public services; stabilize the economy which is characterized by low morale, poor productivity, inefficiency, and a weak service delivery capability; and maintain its international commitment to dealing with refugee pact. Although some of the problems have technical solutions, the real challenge is to change the political and institutional environment in which the public service functions. This will involve the identification and implementation of a feasible strategy focused on key priorities. In order for it to succeed, the approach would need to be firmly grounded in the political realities and consistent with the political appetite for change, and an assessment of the capacity for change within the public service itself is needed.

a. Disparities in development between leading and lacking regions in Sudan

Sudan has had a long history of macroeconomic economic imbalances and structural problems that are hard to rectify with quick dividends in the short term. The current debate over phasing out fuel subsidies in Sudan is intense, emotional, and provocative. Energy consumption and food subsidies are among the most controversial and socially sensitive fiscal policy tools in Sudan aiming to smooth consumption.

Sudan's economic growth pattern has been volatile over the past four decades. In the post-independence period, Sudan had prudent and market-friendly economic policies in a stable international environment. The result was low inflation and a favorable investment environment. The economic and development policy was also outward-oriented, particularly in support of the expansion of cotton production. A few laws that encourage private sector investment in the rain-fed agriculture and manufacturing sectors were enacted. However, the threat of political instability was looming with conflicting ideologies of its multiple coalition partners in government.

[14] A World Bank study carried out in Pernambuco State in 2018 identified a number of factors contributing to the fact that 11 million young people (two-thirds of them women and girls) are neither working nor in school in Brazil. The study connected the high rates of youth out of school, out of work, and not in any job or training with barriers those youth face. The first is related to students' impressions that continuing an education and finding a job is not perceived as important, valuable, or feasible for them (young women in particular shared this perspective), and the second relates to students' lack of knowledge or preparedness to take steps toward achieving their aspirations. How could students be motivated and supported to complete school, transition into work, and achieve? https://www.worldbank.org/en/news/feature/2021/01/28/the-future-starts-in-school-preparing-brazilian-youth-for-their-transition-into-better-jobs?cid=ECR_TT_worldbank_EN_EXT_ChangingLives

[15] ERF/ILO (2021). Regional report on Jobs and Growth in North Africa, *Economic growth and labor market outcomes in an agrarian economy* https://erf.org.eg/events/jobs-and-growth-in-north-africa-webinar-series-organized-by-erf-and-ilo/

Box 3. Transitional government priorities

The general framework for the transitional government program, adopted in December 2019, sets out 10 government priorities. The first and top priority is achieving and sustaining peace as a prerequisite for durable solutions, set as the following steps:

1. Putting an end to war and building fair, comprehensive, and sustainable peace.
2. Addressing the economic crises and establishing the bases of sustainable development.
3. Combatting corruption and committing to transparency and accountability.
4. Promoting public and private freedoms and safeguarding human rights.
5. Ensuring the promotion of the rights of women in all areas and their equitable representation in the structures of governance.
6. Restructuring and reforming the organs of the State.
7. Establishing a balanced foreign policy that ensures the interests of Sudan.
8. Supporting social welfare and development and preserving the environment.
9. Enhancing the role of youth of both sexes and expanding their opportunities in all areas.
10. Organizing the process of constitution making and the preparation for free and fair elections.

The 2014 Household Survey reveals a high level of inequality both across and within regions. The data show that Khartoum was the region with the lowest poverty incidence followed by the Northern Region. The Eastern and Central Regions are among the third lowest, while Kordofan and Darfur are the poorest in Northern Sudan, with the highest rate in Northern Darfur (see Figure 4 on spatial distribution of poverty in the north).

From the maps in Figures 2 and 3, it is important to point out that most drivers of violence – and the resulting cycles of displacement and protracted situations – are structural, developmental, economic, and political. The significant development disparities between urban and rural areas and between regions contributed to growing inequalities and an increasing urban informal sector accounting for more than 60 percent of GDP. This situation has aggravated the migration from rural to urban centers, which is believed to have weakened agricultural productivity and deepened poverty in both urban and rural areas.

b. Challenges and opportunities for the transitional government

The key challenges facing the transitional government are the urgent need to reverse the steady deterioration of public services; stabilize the economy which is characterized by low morale, poor productivity, inefficiency, and a weak service delivery capability; and maintain its international commitment to dealing with the refugee pact.

Although some of the problems have technical solutions, the real challenge is to change the political and institutional environment in which the public service functions. This will involve the identification and implementation of a feasible strategy focused on key priorities. This strategy's approach would need to be firmly grounded in the political realities and consistent with the political appetite for change. It would also require an assessment of the capacity for change within the public service itself. According to the IMF (2019),[16] regime change in Sudan has created a window of opportunity for fundamental reforms to address major macro imbalances and lay the groundwork for inclusive growth. However, the challenges facing the new government are daunting.

The significant development disparities between urban and rural areas and between regions in Sudan have contributed significantly to the growing inequalities, political tension, and a growing informal urban sector. In contrast, the chronic humanitarian situation caused by civil war in some parts of the country is dire, with large numbers of IDPs and refugees. The two below maps demonstrate that most drivers of violence – and the resulting cycles of displacement and protracted situations – are structural, developmental, economic, and political factors.

4. Results and findings

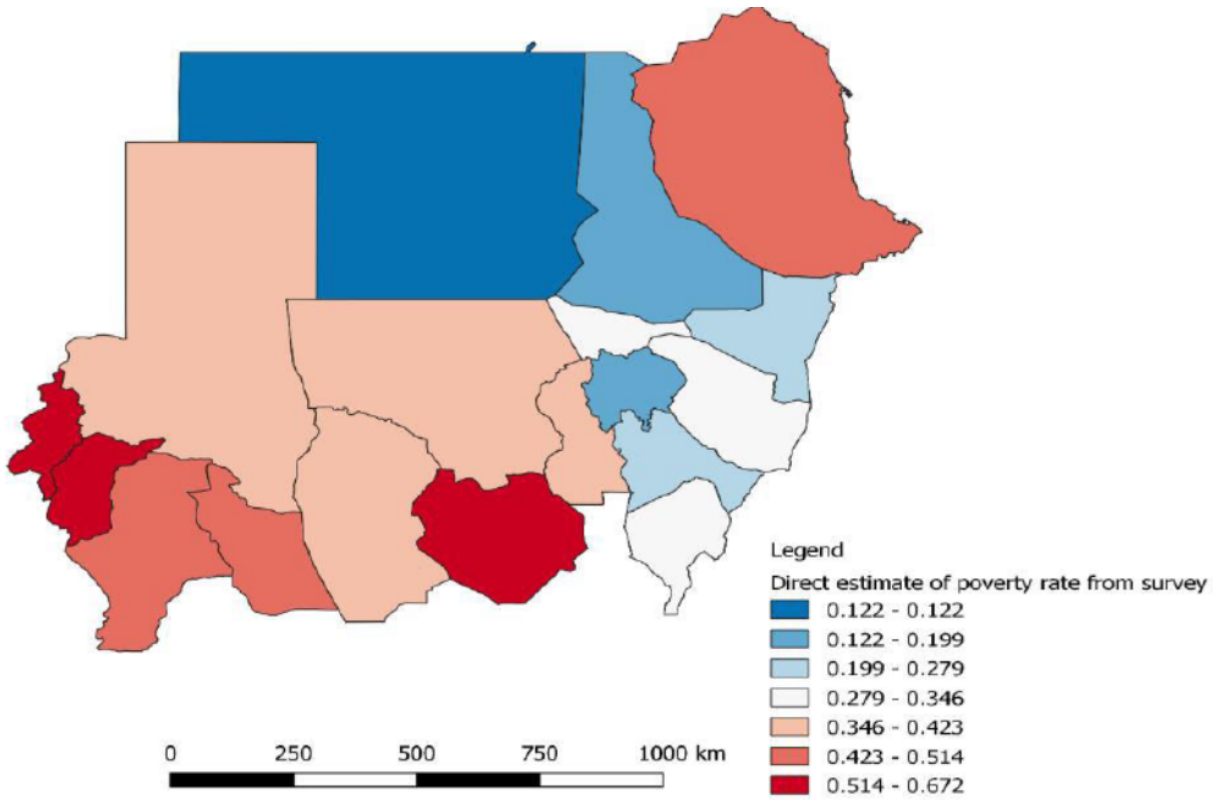
a. Background

Sudan has one of the largest numbers of out-of-school children in the Middle East and North Africa (MENA) region. It is estimated that more than three million children in the country between the ages of five and 13 are not in the classroom. Seventy-six percent of primary school-age children attend school, and that figure dips to 28 percent for secondary school-age children. At 43 percent, Blue Nile is the worst performing state for children who are out of primary school (UNICEF, 2021).

Conflict, a lack of awareness about the importance of education, and chronic under-development all contribute to the poor schooling of boys and girls in Sudan. The inability to pay fees (even though school is free as per government policy) prevents many poor families from sending children

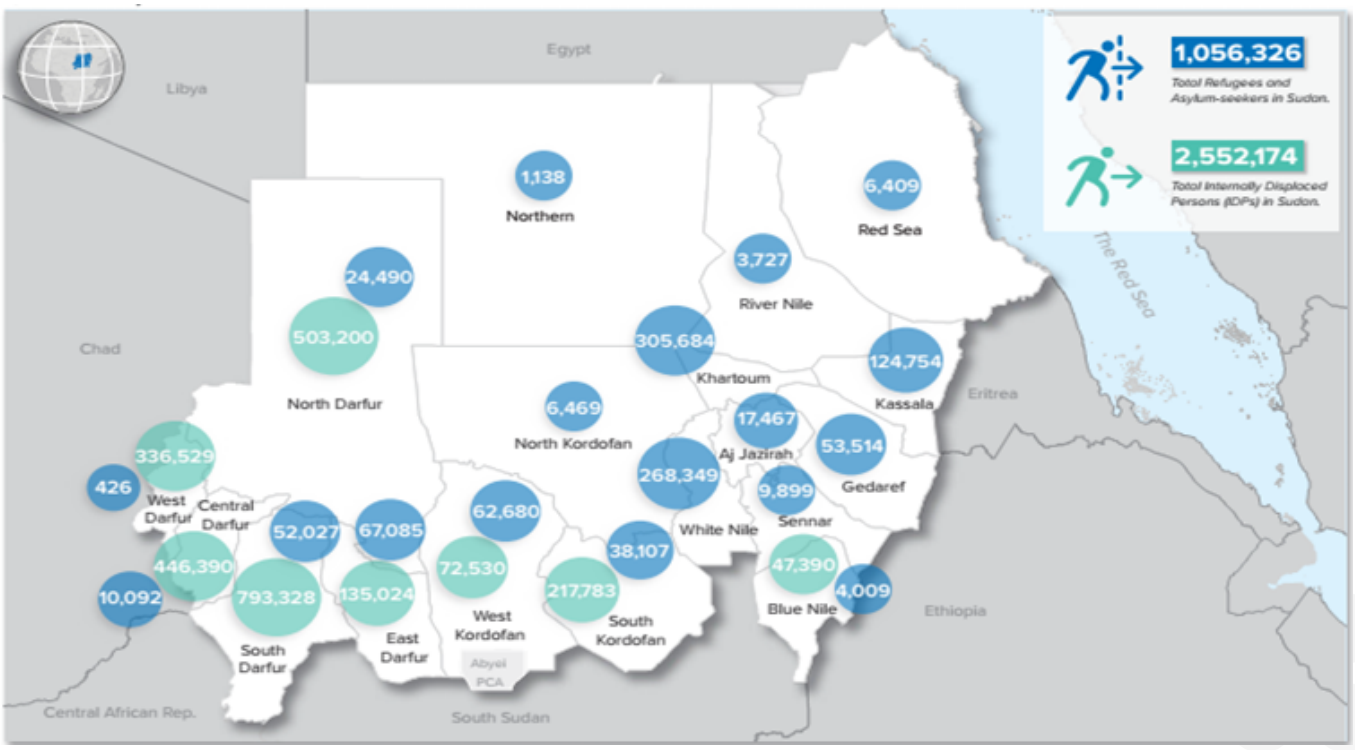
[16] IMF (2019), Article IV Consultation, https://www.imf.org/en/Publications/CR/Issues/2020/03/10/Sudan-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-Executive-49254

Figure 2. Significant disparities and widespread of IDPs



Source: World Bank 2019, Mapping Poverty in Sudan.

Figure 3



Source: UNHCR, CBS, and World Bank

to school. Finally, cultural pressures and the traditional views of the role of women mean fewer girls attend and remain in school. Even if all the barriers to education are somehow hurdled, once in the classroom, the quality of learning is below the required standards. The Ministry of Education identified 3,692 unqualified teachers in South and East Darfur out of a total of 7,315 employed teachers. Many teachers in Sudan were found to be untrained, under-supervised, and unequally distributed between rural and urban areas. In these schools, instruction consisted of rote learning, the school environments themselves were often unfriendly, with inadequate separate sanitation facilities for girls, and teaching materials tended to be inappropriate, outdated, or non-existent.

Although Sudan has recorded steady progress in education on some measures, from an increase in primary school attendance to gender parity in primary classrooms, much work remains to be done. Many educational institutions are indeed being innovative in an effort to transition into what is needed of them today, but how does it happen at scale? This is the central question regarding the impact of education on transformation.

b. First: Status of education in Sudan

We first look to the Education Sector Strategic Plan (2019),[17] which has been developed on the background of the national strategy and other international commitments. It aims to provide a strategic direction that the country has to follow to keep up with the objectives set out in the policy and legal contexts as well as international commitments and conventions. The plan has provided policy and programmatic responses to the issues and constraints identified in the sector analysis, and these will form the focus of education development for the next five years.

The plan covers interventions centered around increasing access to preschool; enhancing the quality of delivery of preschool programs; enhancing retention in basic education; improving the quality of basic education; increasing access to and equity in formal basic education; increasing opportunities for basic literacy programs; increasing access to and equity in secondary education; improving learning and skill development in secondary education; and strengthening the system for better delivery of preschool, basic, and secondary education programs.
Although there is late entry to basic education in the country, there has been considerable improvement between 2009 and 2014. In 2009, 40 percent of children aged six years old reported to have attended school, compared to seven in 10 children in 2014, recording an improvement of 30 percentage points in only five years. Notwithstanding the improvement, 2.86 million children eligible for basic and secondary education were out of school, a majority of whom were in the basic education reference age range.

Data from the survey conducted in six states with a high concentration of refugees indicate that majority of the children enrolled in the surrounding schools are natives. In basic education, the number of refugees enrolled in these schools account for up to five percent of the total enrollment, signaling the need to focus additional efforts on the foreign nationals who are granted refugee and asylum status in the country.

Total education expenditure increased by 154 percent from SDG 2.7 trillion in 2009 to SDG 6.9 trillion in 2017. The recurrent spending in education at current prices more than doubled in the same period, increasing from SDG 2.4 trillion in 2009 to SDG 5.4 trillion in 2017. However, it is observed that in constant 2016 prices, education recurrent expenditure dropped by half in the same period, with the country spending an equivalent of SDG 10.5 trillion in 2009 compared to SDG 5.4 trillion in 2017. Three-quarters and two-thirds of basic schools in rural and urban areas, respectively, have a preschool attached to them. Overall, around 72 percent of basic schools have a preschool attached to them.

Basic education is the single biggest spender in the recurrent budget (46 percent). Higher and secondary education are second and third, with total spending amounting to SDG 1,159 million and SDG 963 million, respectively. The former translates to 20 percent of the total public recurrent expenditure to education while the latter translates to 17 percent. Altogether, spending in general education (preschool, basic, and secondary) constitute 67 percent of the public recurrent spending on education.

On average, the recurrent spending in general education mostly covers teacher salaries, with 90 percent of the recurrent spending in basic education spent on salaries. Meanwhile, the same item constitutes 88 percent of the secondary recurrent unit cost. On top of the resources received from the federal, state, and locality levels, households contribute to education development in a big way. In basic education, for instance, on top of the SDG 2.6 trillion covered by public finances, parents contributed a total of SDG 496 million in the 2016/17 fiscal year, translating to around 16 percent of the reported spending.

There are 217,000 teachers in basic education schools,

[17] Source: Republic of Sudan, Ministry of General Education. General Education Sector Strategic Plan 2018/19 – 2022/23 January, 2019

175,000 of whom are in government schools and 42,300 of whom are in non-government schools. Around 24,000 teachers in basic education government schools are volunteers, translating to 13 percent of the total number of teachers in government schools. In secondary schools, close to 8,000 teachers out of a total of 78,549 teachers are volunteers, representing 11 percent. The pupil-to-teacher ratio in basic education is 1:36 with considerable disparities between states, ranging from a high of 1:63 in West Darfur to a low of 1:17 in the Northern State.

c. Gross enrollment rate

Notwithstanding the increase in the number of schools, the existing capacity in basic and secondary schools is far from adequate to accommodate the population eligible for school. Basic education gross enrollment rate (GER) remained stable at 72 percent between 2009 and 2016 before increasing by a single point to 73 percent in 2017. In secondary, the GER increased by five percentage points from 34 percent in 2009 to 39 percent in 2016 before dropping a point in 2017 to settle at 38 percent.

In addition to the stagnation in the coverage of basic and secondary education, the results show considerable differences between boys and girls and significant disparities across states, with refugee host states recording relatively higher GER. Overall, there are more boys accessing basic schools compared to girls, the former recording a GER of 75 percent while the latter posted 71 percent. In the majority of the states, the gap between boys and girls is considerably small, but in some cases, the gap is overwhelming. In West Darfur, there is a 22-percentage point gap between the GER for boys and girls (86 percent and 64 percent). In West Kordofan, the gap is 20 percentage points.

d. Public expenditure on education

Public expenditure on higher education in Sudan increased substantially in 2012-16, going from SDG 438 million to SDG 1.159 billion. However, in relative terms, the level of higher education spending remains unchanged at 0.2 percent of GDP. Average public expenditure per student was equal to SDG 2,310 (approximately USD 500) in 2013-14 and varied from 410 in Open University in Khartoum to SDG 8,090 in Khartoum University (MoHESR). Universities enrolling larger numbers of students receive less public financing per student, meaning that they remain underfinanced.

Total education expenditure increased by an almost similar margin (154 percent) from SDG 2.7 trillion in 2009 to SDG 6.9 trillion in 2017. The recurrent spending in education in current prices more than doubled in the same period, increasing from SDG 2.4 trillion in 2009 to SDG 5.4 trillion in 2017.

Even though spending on education shows a tremendous increase between 2009 and 2017 in current prices, deeper analysis indicates that, in constant 2016 prices, the spending on education dropped, with recurrent spending dropping by half between the same periods. Table 1 presents the summary of the economic outlook and overall government expenditure as well as specific expenditure on education between 2009 and 2017. We note that the overall government expenditure increased by 168 percent from SDG 23 trillion in 2009 to SDG 62 trillion in 2017.

However, it is observed that, in constant 2016 prices, recurrent education expenditure dropped by half in the same period, with the country having spent an equivalent of SDG 10.5 trillion in 2009 compared to SDG 5.4 trillion in

Table 1. Public expenditure in education, 2009 and 2017

Labour market status in February 2020	**2008/09**	**2016/17 I-PRSP**
Total government expenditure	23,037.60	61,854.20
Total government recurrent expenditure	16,173.20	57,654.20
Education recurrent expenditure in constant 2016 prices (million SDG)	10,456.00	5,436.20
Education recurrent expenditure in current prices (million SDG)	2,468.62	5,436.20
Education capital expenditure in current prices (million SDG)	254.92	1,490.31
Total education (Million SDG)	2,723.53	6,926.51
Total education expenditure relative to total government	**11.82%**	**11.20%**
Education recurrent expenditure relative to total government recurrent spending	15.30%	9.40%
Share of education recurrent spending as % of GDP	2.20%	1.20%
Share of total as % of GDP	2.40%	1.20%

Source: World Bank, IMF, and Sudan Bureau of Statistics.

Figure 4. Gross enrollment rates in general education

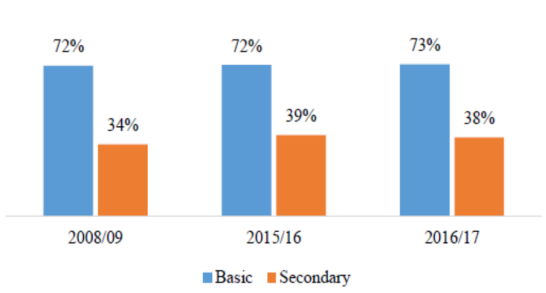


Figure 5. Gross enrollment rates in basic education by state

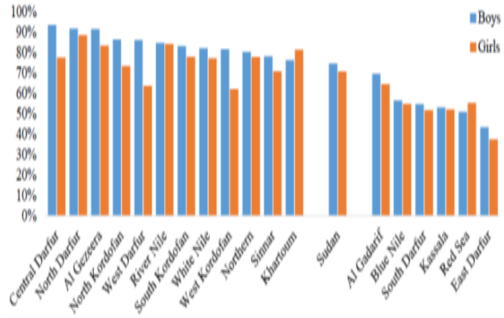
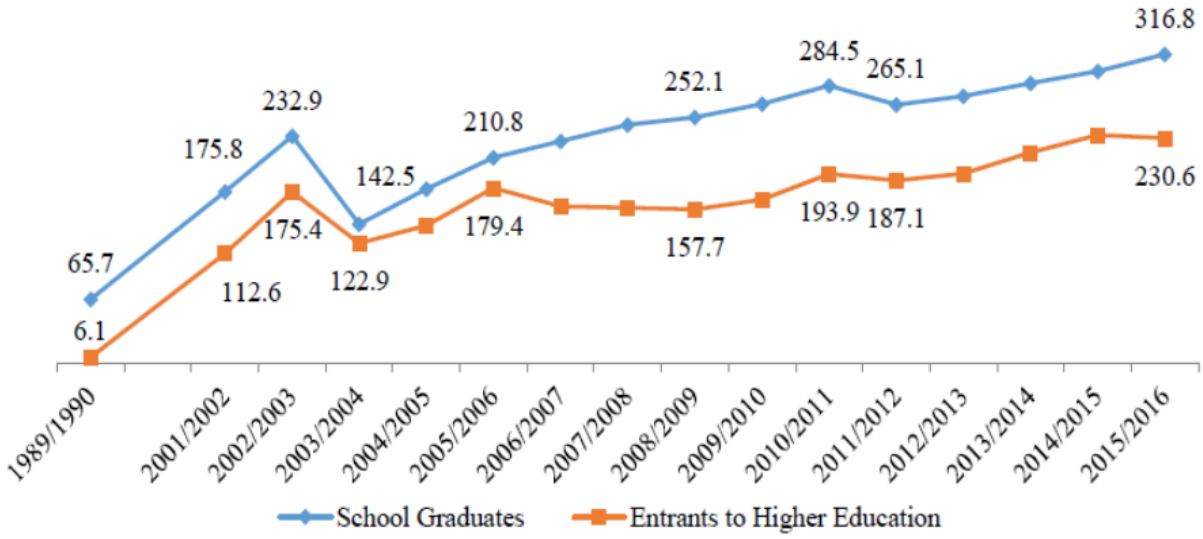


Figure 6. Secondary graduates and admission to universities and colleges in Sudan ('000)



Source: General Directorate of Admission, MoHESR

2017. Relative to government overall spending, the share of education expenditure remained unchanged between the two reference years, recording 11.82 percent in 2009 and 11.2 percent in 2017. However, recurrent education expenditure relative to total recurrent government expenditure dropped by six percentage points from 15.3 percent in 2009 to 9.4 percent in 2017 and, relative to the GDP, spending on education dropped by half from 2.4 percent in 2009 to 1.2 percent in 2017.

e. Schools' connectivity to electricity

According to the United Nations Department of Economic and Social Affairs (UNDESA), lighting in schools increases the likelihood of teaching early in the morning and late in the evening when there is no natural light. In cases where schools are required to provide remedial classes or recover lost time due to unprecedented circumstances occurring in schools, early morning and late evening classes have been found to work well for schools. Lighting in schools also presents the opportunity to employ the use of modern media tools such as beamers, in which case limited resources (teachers with specialized talent) can be shared across schools. This section provides information on the proportion of schools that are connected to electricity to discuss children and youth who are excluded from the benefits of electricity and what that means for their educational opportunities.

f. Electricity connectivity in basic education shows clear disparities among Sudan states

Less than half of the schools in Sudan are connected to a power source, and for those that are connected, the majority have access to stable power. Only 46 percent of basic education schools are connected to electricity, with more than 10,000 schools not able to carry out any school activity before daybreak or late in the evening. Of

the connected schools, 92 percent are connected to the main power network, which guarantees them stability in the supply of electricity.

Almost half of the learners enrolled in basic education are in schools without connectivity to any source of electricity. As presented in Table 19, around three million learners are enrolled in schools without any source of electricity, representing 48.8 percent of the total enrollment in basic education (52.5 percent in government schools and 15.5 percent in non-government schools). Further details show that more than one million of these learners are enrolled in government basic education schools.

g. Higher education revolution philosophy and objectives[18]

Education is instrumental in developing fully functional individuals in society. The process to produce knowledgeable people in society starts at the lower education level and continues to the higher education level.

In modern society, the higher education sector has been regarded as an important contributor to a country's ad-

[18] *Pesa International Journal of Social Studies*, July.2020, Vol: 6, Issue:2

Figure 7. Electricity connectivity in basic schools by state, 2017

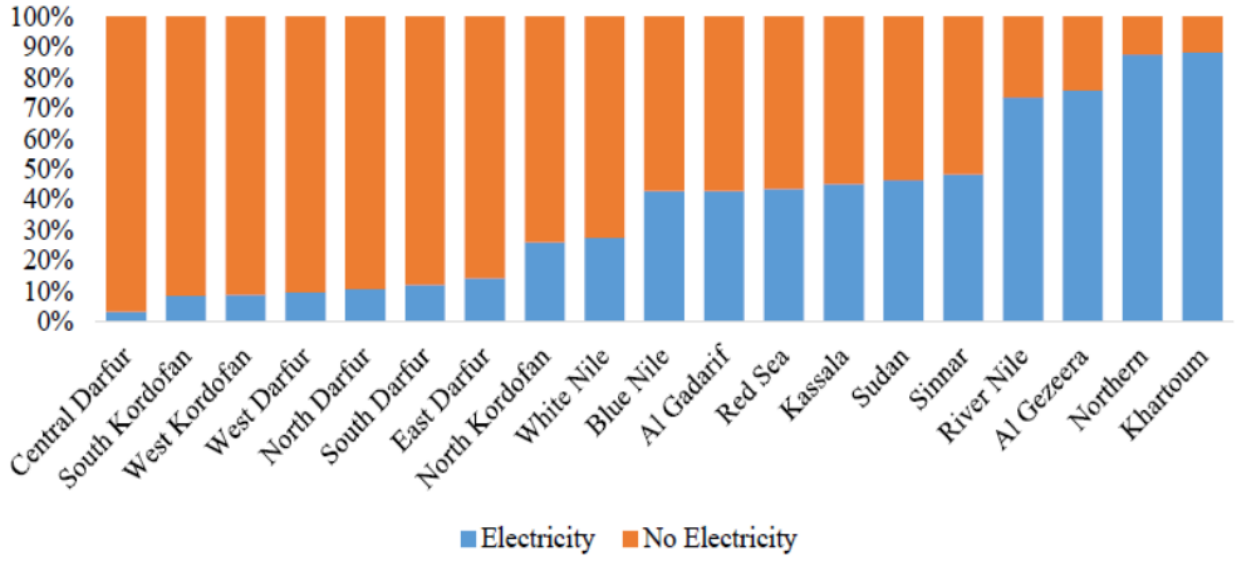


Figure 8. Connectivity to electricity in basic schools, 2017

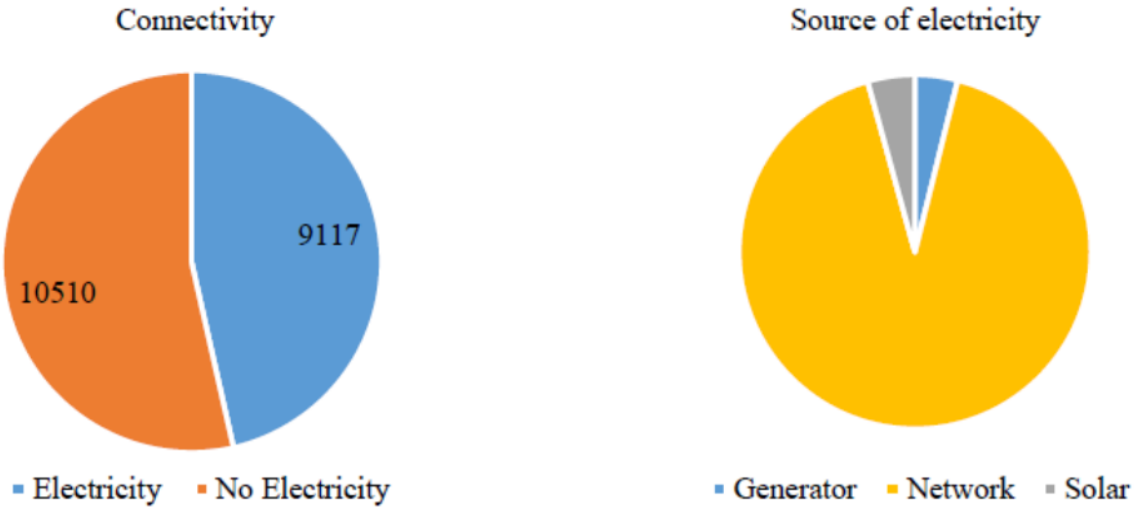


Figure 9. Connectivity to electricity in secondary schools, 2017

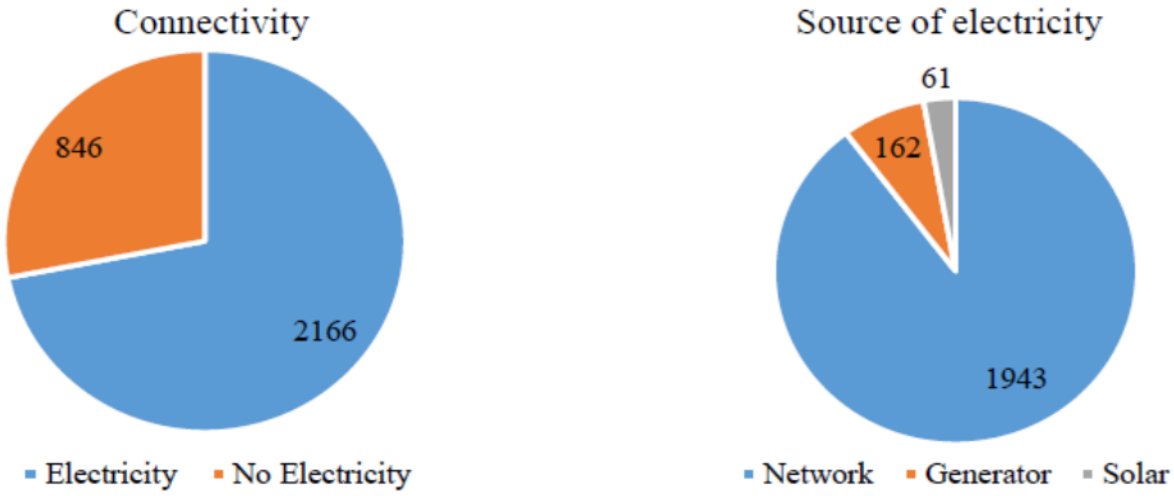
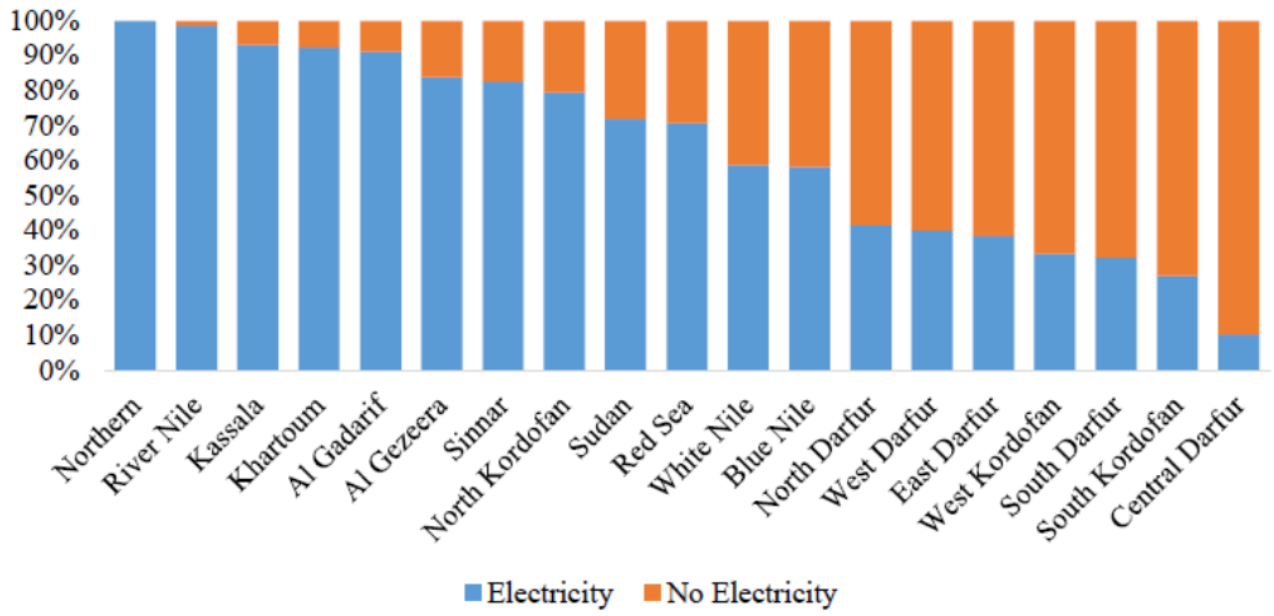


Figure 10. Electricity connectivity in secondary schools by state, 2017



vancement. It is expected to train the workforce, generate knowledge, or nurture innovation, all of which are the core functions of a higher learning institution (HLI). It is considered the center of human resource development that leads to the development and change of a society toward achieving effective economic and social progress. Besides this main function, higher education represents a major pillar of a nation's growth. HLIs in a country are supposed to undertake innovative and applied research and improve the quality of life that the community in the country is entitled to. In short, the higher education sector contributes to the provision of important services to society in all its forms, through its involvement in research, applied research, education, training, or consulting (Magboul and Ibrahim, 2015).[19]

The year 1990 is considered a turning point for the higher education landscape in Sudan, characterized by the birth of the higher "education revolution." This has been championed by the National Salvation "revolution" that came to power in June 1989. This regime declared that the situation of higher education in Sudan had severely deteriorated in

[19] Magboul, Osman Al Amin, Ibrahim Al Taaib Mohammad Abd Al Mlik (2015). University Professors Statues, *Deliberation of The Third Higher Education and Scientific Research Conference*,2015, p. 111,120

all aspects and there was an urgent need for revolution or reform (Elhadary, 2010).[20]

The philosophy of higher education in Sudan spells out the essentiality to advance society, fulfill their needs, and take care of comprehensive societal development through the rehabilitation of individuals capable of creativity and innovation. Higher education in Sudan also values close interaction between higher learning institutions and the community and upholding the society's spiritual and human values to foster the progress and development of the nation (MHESR, 2017).[21]

The higher education revolution of 1990 had several major objectives (Elhadary, 2010), including (a) increasing student intake at all institutions and reforming admission policy, that is, to enhance access among all members the society instead of confining it to elite people; (b) building universities in different states of Sudan, including rural areas, to avoid concentration of higher learning institutions in the capital; (c) creating chances for private higher education institutions and relate educational programs with the local environment and the needs of the society; (d) abolishing student boarding and subsistence schemes; (e) encouraging all students studying abroad to continue their studies at Sudanese institutions; and (f) using the Arabic language as the language of instruction and research.

The introduction of higher education objectives in the 1990 higher education revolution has caused both public and private higher learning institutions in Sudan to undergo rapid expansion. The number of public higher learning institutions increased from five universities and one polytechnic in 1989 to 35 universities and 21 colleges and institutions (Gasim, 2010).[22] Regarding private higher learning institutions, the number increased from two in 1989 to 16 in 1996 and 26 in 2003 (El Tom, 2003).[23] The number of private higher learning institutions has approached 48 universities and 85 colleges and institutions (see Table 1). The expansion of higher learning institutions happened at a rate so high that its quality has not been accordingly regulated. The major role of universities in basic and applied research was neglected, and academic activities did not consider the country's needs. This led to academics' claims that the higher education revolution in Sudan has a stronger political influence rather than substantiating academic achievement (Elhadary, 2010).

The quality of higher education deteriorated markedly under the salvation government for several reasons. The Education Planning and Organization Act stipulates that the main objectives of general education should be to "consolidate the religious beliefs and morals of young students" and "educate them about religious teachings and traditions and have a generation of free and responsible believers while concentrating on social values driven by good deeds and piety." It is apparent that interest in achieving such ideological objectives has come at the expense of the educational process and significantly contributed to students' low academic levels in Arabic and English as well as in natural and social sciences due to the rising number of Islamic subjects (Fanak, 2020).[24]

The higher education revolution during the Bashir regime strived to expand higher education in Sudan to meet the needs of the country's economic development and keep up with a growing population. On the negative side, critics of the higher education revolution argue that the horizontal expansion occurred at the expense of elementary and secondary education (El-Hassan, 1992).[25] Moreover, the unplanned expansion led to a degraded quality of higher education institutions in terms of production of poor graduates and research output.

Decreased public spending is another major problem. Total spending allocated to education in 2017 amounted to SDG 829 million (approximately USD 41.4 million), or less than one percent of the total public spending of SDG 96.2 billion. This contrasts with the SDG 29,122 billion (or 42 percent of public spending) allocated to security and defense.

At the university level, many agree that the decision to 'revolutionize' higher education led to an increase in the number of students enrolled in universities. However,

[20] Elhadary, Y. A. E. (2010) The Higher Education "Revolution" in Sudan and its Impact on Research in Higher Education Institutions, *Bulletin of Higher Education Research*,9, 9-11

[21] Ministry of Higher Education and Scientific Research (MHESR) (2017). Mission and Vision, Retrieved from http://www.mohe.gov.sd/

[22] Gasim, G. (2010). Reflecting on Sudan's higher education revolution under Al-Bashir's regime. Comparative and International Higher Education, 2(2), 50-53.

[23] El Tom, M. E. A. (2003). 'Sudan' in Teferra, D. and Altbach, P.G. (Eds.), *African Higher Education: An International Reference Handbook*. Bloomington: Indiana University Press

[24] Education in Sudan: A Long History but Deeply Troubled Reality - Fanack.com; https://fanack.com/education-in-the-middle-east-and-north-africa/education-in-sudan/

[25] El-Hassan, Zaki (1992). Instability of Higher Education in Sudan: The Effect of Al-Bashir's Higher Education Policies. Reports: Education in Sudan. Available online at: http://www.sudanupdate.org.

Box 4. Research in higher education institutions in Sudan

Despite the increase in the number of universities in Sudan and the increasing number of faculty members and research centers in universities, the technological progress of scientific research is lagging. There has been a decline in the quantity and quality of research in recent years due to weak research capacity, lack of training for human resource development, and limited financial resources. Expenditure on higher education and scientific research includes government support, which is currently limited to paying wages and salaries, and a small amount of expenditure on facilitation, rarely covering research funds in universities (Abu Al Gookh, 2015). There are several combined factors that directly affect the level of the outputs of scientific research in Sudanese universities, including (Abu Al Gookh, 2015):

1. Lack of detailed plans for scientific research at the Ministry of Higher Education and Scientific Research.
2. Absence of research plans in most higher learning institutions.
3. Weak funding, as the global rate is two to 3.5 percent of national income, while in Sudan it is only 0.2 percent.
4. Difficulty in publishing locally because of financial difficulties, and globally due to the inability to keep up with the requirements of publication in international journals.
5. Weak use of the results of scientific research due to the absence of coordination between universities and the beneficiaries of research, as well as the absence of the appropriate mechanism to benefit from the outputs of scientific research.
6. The migration of many academics abroad to improve their living conditions.

Source: Hibatallah, S. and Abdul Rahman, S. (2020). Change and Development of Higher Education in Sudan, Pesa International Journal of Social Studies, July.2020, Vol: 6, Issue: 2 https://doi.org/10.25272/j.2149-8385.2020.6.2.02

the quality of education has declined because the greater number of students was not accompanied by a proportionate increase in the necessary funding and capabilities. Some critics say the decision did not take into consideration labor market needs, and many graduates have struggled to find work. Further, the private higher education sector has expanded without adequate governmental supervision and control. There are more than 80 private universities and higher education institutions in Sudan compared to 36 public ones. However, the five oldest public universities, established long before the present salvation government, are the best and still attract the brightest students.

At a different level of the discussion, most conversations about the "future of work" focus on how new technologies and ways of working (such as AI and the gig economy) will dramatically reshape modern industries. Over the past three years, our ongoing work on behalf of the U.S. Department of Education has included hands-on approaches to developing critical thinking, attaining next-generation skills, exploring career pathways, and upskilling American adults – all of which suggest that the future of education is really about the future of work.[26]

According to an article by Wladawsky-Berger (2020)[27] experts differ widely in their predictions about how technological innovation will change the labor market, but they all see a need for changes in education," write British professor Phillip Brown in a recently published article, *Rethinking the Race between Education and Technology*. While experts don't generally agree on much, they're pretty much of one mind when it comes to the growing importance of skills and education in our 21st century digital economy. Moreover, although the technical and knowledge requirements of what people do for a living may change, the social context in which people interact, network, and produce will remain, and social skills are more difficult for smart machines to develop." Finally, "all three theories – namely *Labor scarcity, Job Scarcity and The End of Work* see a need for educational reform and a greater focus on lifelong learning."

h. Higher education, automation, and the future of work in Sudan

The rapid pace of today's advances in technology and AI requires a more comprehensive workforce and education strategy across a spectrum of measures, including policy, access, programs, and outreach. Higher education is unique in its power to catalyze social mobility, serving to bridge social, economic, racial, and geographic divides like no other force. As job markets constantly evolve, the future demands a system of higher education that is as dynamic and adaptable as the technologies around which our society now revolves.

Educational degrees still largely rule, but we are slowly moving toward a reality characterized by more focus on acquiring skills rather than degrees, namely the German vocational skills model. According to conventional thinking, the surest route to success in one's professional life lies at the end of a higher education degree and holding a

[26] If you share our curiosity, these resources will help you understand the complexity of the problem at hand: https://www.luminary-labs.com/insight/automation-education-future-work-reading-list/

[27] https://blog.irvingwb.com

degree correlates with improved chances of employment as well as higher income (OECD, 2019).[28]

The quality of higher education in Sudan has deteriorated markedly under the previous regime. Higher education in Sudan needs a serious review to meet current global trends in both technology and the labor market and national development agenda.

Adopting the German vocational skills model and drawing practical lessons and domesticating them in the sector will stimulate a much-needed discussion on the desirability of combining both traditional academic approaches with an equally important vocational model to absorb the significant out-of-school numbers instead of just simply recruiting them in the military. Such thinking will point the way toward more inclusive and sustainable development. The German vocational skills model offers a great opportunity to change the course of higher education training t0 match the skills required in the labor market. It also offers an opportunity for lost talents in conflict zones and beyond. The negative perception and stigma with respect to vocational education in Sudan as "education for dropouts" must change.

i. What is new in the 2020 budget goals within the education sector?

Upgrading and reforming the educational and health environment is necessary to achieve a productive social and economic life. The budget has laid out the cornerstone of transforming the social sector, namely education and health.

The 2020 budget in the social sector was guided by the United Nations' recommendations that low-income countries spend 53 percent of their GDP on education, health, and other sectors in order to achieve the Sustainable Development Goals. To follow this recommendation, the Minister recommended that Sudan increase spending on these sectors by more than USD 39 billion annually on top of current spending to achieve the above 53 percent commitment. It is worth noting that Sudan currently spends the equivalent of only 5.5 percent of its GDP on some of these important sectors. Hence, a gradual approach to reach better proportions was suggested. Accordingly, the actual spending on the education and health sectors will be doubled.

The 2020 budget has made an unprecedented move by increasing salaries and wages in the budget by almost 100 percent. It was well received by the teachers. In a similar vein, the budget has clearly indicated the commitment to free basic education and prohibits the imposition of any fees from any party in public schools. In addition, the budget also provided free school meals in all government schools in the country (by allocating two percent of current transfers to states instead of one percent). With respect to higher education, the budget increased the umbrella of the direct cash guarantee program to support university students by adding 50,000 students, bringing the total number to 300,000 students.

Against this background, a small perception was designed to capture different perspectives with respect to the significance of such a move as well as the overall improving conditions in the education sector.

Based on different interviews, the rapid expansion of wages initiated by the former first revolutionary and Transitional Government Minister of Finance Dr. Ibrahim Elbadawi to the education sector was highly welcomed as a necessary step to transform the sector. More policy measures within the sector were taken to set up a clear vision to guide the transformation of the sector.

It's also important to note that different respondents agree that technology can significantly help create conditions for transforming and facilitating learning and education outcomes, including a wider reform program for transformation and inclusivity. Other findings are as follows:

1. The construction of additional schools has given the country a big push toward universal access, with more children likely to go to school today than they did five years ago. However, the achievement of universal basic education remains a major challenge for Sudan, with basic and secondary education exhibiting one of the lowest retention profiles in the region. From the supply side, 13 percent of basic education schools (14 percent government and eight percent non-government) do not offer Grade 5 to Grade 8 schooling (meaning, they do not offer continuity to education). This phenomenon is magnified by the fact that 35 percent of basic education schools have at least one missing class, including one percent of schools that do not have lower grades. This situation could be a very big risk for children not coming to school while those who are in school may easily find the motivation to not look for alternatives and instead choose to drop out.
2. Although access to Gross Intake Rate to Basic Education is not too far from the universal mark (100 percent), only 51 percent and 13 percent of learners are likely to access end of basic education and end of

[28] OECD Library (2019). Education at Glance. https://www.oecd-ilibrary.org/education/education-at-a-glance-2019_f8d7880d-en

secondary education, respectively, with significant disparities exhibited between boys and girls, rural and urban locations, and across wealth statuses. The diagnosis has shown that girls have a lower chance of accessing school compared to boys. They are also less likely to remain in school. Children from rural locations have lower chances of accessing school compared to their peers from urban locations. The diagnosis has shown that boys from urban households are five times more likely to complete secondary education compared to boys in rural locations. Girls from urban households are also five times more likely to complete secondary compared to their rural peers. These findings provide an opportunity to look at rural education policy more strategically if education is to remain the greatest equalizer of all men and women.

3. The results of the National Learning Assessment (NLA) have shown persistent challenges in the acquisition of desired knowledge in literacy and numeracy at the foundational stages. Despite being in Grade 3, four in 10 children show no awareness of any relationship between letters and sounds, the rest reading at various levels. Even more striking is that less than half of those who can read can comprehend what they read, which is a very big signal for intervening for the children while they are still young. In numeracy, even though the children posted better performance compared to literacy, there is still a lot to be done, as less than half (46 percent) of the children can correctly solve level 1 addition and four in 10 children can solve level 1 subtraction.
4. The strategic education plan has given sufficient situational analysis but lacks innovative approaches to fill the gap and enhance digital learning. Policies that foster investments in innovation and digital technologies can help reset economic structures and facilitate catching up with the rest of the world through clear development outcomes within the education sector. Digital technologies present an opportunity to accelerate the transformation and inclusivity of the education sector in Sudan. Digital technologies are critical for addressing major development challenges facing the sector.
5. Different development situations will require different kinds of spending (different weights placed on the functions of public finance, in fact) to secure the SDGs.
6. Lessons from reviewed literature suggest that Sudan still has an opportunity to leap development steps in the age of technology and automation. This is possible only if there is leadership with a clear vision and determination to make a difference and take the sector to a new level.
7. It is important to introduce technology rather than depend heavily on the current supply side approach for increasing enrollment through the construction of more schools, as it has not helped increase the enrollment ratio. Technology can help both by creating more fiscal space through effectiveness and creating efficiency in reorienting resources toward other development spending related to the sector.

First: Key findings from the review and secondary data

This part of the report presents the results and findings in three major sections. The first tackles the current status of the education sector, and the second provides an overview of education transformation within the first ambitious September revolution budget 2020 and sketches the key findings of Sudan's Education Sector and Policy Perspective from the survey. Finally, the third section offers some ideas with respect to automation, education, and the future of work in Sudan along with a reading list and final thoughts as well as a conclusion and key policy recommendations.

There is a consensus among all the respondents of the short interviews perception survey that envisioning the sector to catch up with the Fourth Industrial Revolution is a prerequisite for economic growth, job creation, and filling the gap between the labor market and the current skills mismatch. The adopted policy by the first revolutionary budget 2020 was regarded as a milestone by focusing on the social sector, and for the first time, teachers received a jump in their salaries by almost 100 percent. Other findings are drawn from both desk reviews and the perception survey with respect to two key issues: the future of education and what needs to be done for the sector. The main findings are:

- The supply side has not changed the enrollment ratio. The traditional analysis dominated the education sector for a long time and emphasized either public spending or curriculum, ignoring the facilitation of other infrastructure like communications facilitating virtual education.
- Education system innovation goes beyond just a misleading notion or looking to it from increasing government expenditure; pro-poor spending will translate into better educational outcomes. Increasing the supply of schools in Sudan during the 1990s was the dominant policy practice as a policy instrument to promote schooling. Re-envisioning the entire sector is the only possible way out for transformation.
- Increasing the social spending budget through targeted public spending or development partners'

assistance to the sector is not always necessarily associated with better outcomes in social indicators. Evidence from Kassala state in Eastern Sudan (namely El Gash Delta) suggests that there is little evidence that increasing school availability is associated with large changes in enrollment.

- The significant development disparities between urban and rural areas and between regions in Sudan have contributed significantly to the growing inequalities, political tension, and an increasing inequality through education opportunities. Unfortunately, a supply-side approach falls short and has not worked in increasing the enrollment ratio in some states. The transformational agenda needs to think beyond the classical notion centered on pro-poor public expenditure; it must be a multidimensional approach where infrastructure development, including communication, plays a significant role in this endeavor. The increase in the supply side of building schools has not increased the enrollment ratio in Sudan.
- It is important to align research with the demand-driven private sector and public strategic interest and change the tradition of public research funding toward significant private sector engagement in leading private sector interest in all aspects. The current public funding cannot achieve anything.
- Policy failure, ad-hoc emergency approaches to development, and a lack of appropriate theoretical underpinning guiding the transformation of the current crisis in the education system in Sudan will eventually lead to more institutional and aspiration failure for generations of young Sudanese individuals who are supposed to guide the renaissance of the country. Failure to catch up with the pace of technology will result in serious implications for the future of work and employability in a country characterized by a population dividend where youth constitute the majority.
- Moreover, the structure of Sudan's economy has not shown any change since its independence with respect to the composition of sectors' contributions. Leading education is responsible for such a structure as growth very much depends on the increased sophistication of education.

Second:
Key findings from the perception survey of Sudan's education sector, and policy perspective and feedback on the first September revolution budget 2020

The 2020 budget was guided by the most prominent slogan of the December revolution (freedom, peace, and justice; and the revolution is the people's choice), as fulfilling the economic entitlements of this slogan requires the icon to build economic legitimacy as the focus of the social contract for both the ruling elite and the opposition in post-revolution Sudan.

Third:
Automation, education, the catch-up game, and the future of work in Sudan: A reading list and final thoughts

Over the past several years, we have heard more and more about how the rapid changes because of technological advancements in automation, deep learning, and AI will lead to unforeseen consequences in our life and work. Many agree that these changes are going to disrupt routine work for white-collar and blue-collar workers, with experts predicting that around 40-60 percent of all existing jobs will become automated. In a social structure based upon a wage labor system, this has understandably created a growing sense of anxiety around what people will do for work and to survive. This is intensified and exacerbated by an increasingly polarized media environment (Sataar, 2019).[29]

The rapid pace of today's technological advances requires a more comprehensive workforce and education strategy across a spectrum of measures, including policy, access, programs, and outreach. The private sector, the government, educators, and policymakers must all work together to deliver multiple pathways of opportunity for young people looking for their first foothold in the job market, as well as to reskill and upskill workers striving to maintain their place in the workforce. For example, the private sector could rethink human capital development as a long-term investment and focus on leadership development and vocational program design. Other options to increase access to education and training could include tax and fiscal policies to incentivize workforce development, greater collaboration between research universities and community colleges, and income share agreements, where students commit to paying a percentage of their future income in exchange for financial aid. Public-private partnerships focused on higher educational attainment and workforce development are a long-term investment in a vibrant economic future.[30]

[29] Sataar. A (2019). The Future of Education for The Future of Work, https://hundred.org/en/articles/the-future-of-education-for-the-future-of-work#c955a9d8

[30] https://www.weforum.org/agenda/2020/01/how-can-higher-education-adapt-to-a-constantly-evolving-future-of-work/

Higher education is unique in its power to catalyze social mobility, serving to bridge social, economic, racial, and geographic divides like no other force. As job markets constantly evolve, the future demands a system of higher education that is as dynamic and adaptable as the technologies around which our society now revolves.

In places in Sudan where war and other social and cultural factors make it hardest to catch up in education due to the lack of infrastructure provision, conflicts, or lack of infrastructure, the policy response should be commensurately comprehensive through the bundling of service delivery and technological advancement interventions that can bring about change and inclusivity. It is important to note that the great advantage of technology is the affordability and possibility to bring inclusivity once the model of traditional thinking changed. The analysis in this report is underpinned by the four following stylized facts:

- Policy failure, ad-hoc emergency approaches to development, and a lack of appropriate theoretical underpinning guiding the transformation of the current crisis in the education system in Sudan will eventually lead to more institutional and aspiration failure for generations of young Sudanese individuals expected to guide the renaissance of the country.
- Failure to catch up with the pace of technology will result in serious implications for the future of work and employability in a country characterized by a population dividend where youth constitute the majority.
- Moreover, the structure of Sudan's economy has not shown any change since independence with respect to the composition of sectors' contributions. Leading education is responsible for such a structure as growth very much depends on more education sophistication.
- The belief that increasing the social spending budget through targeted public spending or development partners' assistance to the sector is not always necessarily associated with better outcomes in social indicators. The practices of budget decentralization have shown different findings in Sudan.

Fourth: Decentralization and education policies in Sudan: A general perception versus the reality of the education sector

Success on the basis of decentralization is both great and small. If the decentralization is understood as political power and preferment, then the success will be small. For this reason, decentralization should be understood as a political commitment to delivering public services and political backing at the state level for the achievement of goals, and performance improvement toward satisfying both national and international objectives. Whether decentralization helps or hinders the education policies in Sudan largely depends on whether people have been oriented on "why" they have to decentralize before they know "how" they are going to decentralize and benefit from the decentralization as a means of devolution of power and policies.

To date, research indicates that decentralization in reform has largely fallen short in creating these conditions. Given the current nature of decentralization, there is no magic formula available for the Ministry of Education in Sudan from a macro or micro perspective at the state level. While some states like Eastern Sudan suffer from the demand side for education, other states in Greater Darfur lack enough supply side. It is evident that decentralization has not helped bring different policy perspectives in dealing with both the supply and demand of specific local contexts. The genuine efforts of governance to make a difference with the existing pattern of local leadership are illusionary and still trickle down the national policies without enough consideration to their own local dynamic. Even in the case of appropriate policies, committed governance is more important than result-oriented policies.

Automation, education, and the future of work in Sudan: A reading list and final thoughts on the "skills over degrees" model

The rapid pace of today's advances in technology and AI requires a more comprehensive workforce and education strategy across a spectrum of measures, including policy, access, programs, and outreach. Higher education is unique in its power to catalyze social mobility, thereby serving to significantly bridge social, economic, racial, and geographic divides. With the constant evolution of job markets, the future demands a system of higher education as dynamic and adaptable as the technologies around which our society now revolves.

Although education degrees still largely rule, the world is slowly moving toward the German vocational model, which entails a reality that focuses more on acquiring skills rather than degrees. However, conventional wisdom states that the surest route to professional success lies at the end of a higher education degree and that having a degree correlates with improved chances of employment as well as higher income (OECD, 2019).[31]

[31] OECD Library (2019). Education at a Glance https://www.oecd-ilibrary.org/education/education-at-a-glance-2019_f8d7880d-en

The COVID-19 pandemic has given the entire world a crash course in virtual education and digital education platforms. With the pandemic creating a surge in demand for virtual education, decision-makers face an urgent need to get digital platforms and programs up and running in schools. Digital infrastructure, including electricity and communications, is a major challenge in the country to foster a digital platform in remote areas to achieve the objective of inclusivity.

5. Conclusions and policy recommendations

The report initially was written as part of Hirak ERF project series in dealing with the Sudan transition and bringing a new perspective to the education sector. For a host of reasons, there was limited time and data difficulties common to the analysis with respect to the nature of the issues and linkages that have been addressed by the report, namely education policies, technology (AI), and the future of work. As such, the report is purely based on utilizing secondary data together with utilizing the outcomes of the literature in related fields with some perception surveys without traditional empirical analyses of either cross-section or time series data. The report was able to draw some policy conclusions and the way forward for further research in this area that help to shape the debate for further analysis. The major limitation is that no empirical investigations were tested.

Despite the methodological and data difficulties, to explore the relationship between different educational outcomes, technology, future of work, and inclusivity in Sudan, there are many pieces of evidence at the descriptive level (at least) indicating that the current approach to education needs to be revisited in different aspects to transform the sector with the vision highlighted in this report.

Before and during the oil boom, an increase in education supply has not translated into similar growth in enrollment ratio. The traditional analysis dominated the education sector for a long time from the public spending point of view, emphasizing either public spending or curriculum and ignoring the facilitation of other infrastructure like communications facilitating virtual education. Increasing the supply of schools in Sudan during the 1990s was the dominant policy practice as a policy instrument to promote schooling, but how much should one expect school enrollment to increase as a result of such an approach with an emphasis on expanding education opportunities? Evidence from Kassala state in Eastern Sudan (namely El Gash Delta) suggests little evidence that increasing school availability is associated with large changes in enrollment (Abd El Rhman, 2003).

Dissatisfaction with the past performance of the education sector and disquiet about the future of education in Sudan are serious enough to raise doubts regarding the current orientation of the education policy. There is also increasing emphasis on employment and creating jobs as an objective of economic policy in Sudan, and it appears that emphasis on employment issues will continue in the future. However, the fact of the matter is that there is a manifestation between the outcome of education, economic policy, and job creation. The report argues that all are mutually exclusive. For this reason, a comprehensive education policy framework is needed. Adopting digital platforms and learning programs can transform the current conventional education system in Sudan.

Given the current underdeveloped nature of the country's infrastructure, particularly in remote areas as enablers (electricity and communications), it may be too early in Sudan to determine whether AI and digital platform learning will be successful in enabling new forms of learning and improving outcomes, but they are still promising as viable options in the near future. However, to win the race between education and technology, the skills that matter should be a subject of considerable debate that guide the future of education in Sudan that meets the need of both current and future generations.

The current learning environment must be contextualized with technological innovation and revolution. COVID-19 is a serious economic challenge but offers a rare opportunity to do things differently by initiating structural reforms to catalyze digital technology adoption, particularly in the education sector, through the domestication of virtual education.
Drawing practical lessons and domesticating them in the sector from different models (e.g., Germany) will stimulate a much-needed discussion on the desirability of combining both traditional academic approaches with an equally important vocational model to absorb the significant out-of-school numbers instead of simply recruiting them in the military. The negative perception with respect to vocational education in Sudan as "education for dropouts" must change. The German vocational model offers a great opportunity, particularly for lost talents in conflict zones and beyond.

Other policy recommendations

Among the key policy recommendations, education models in Sudan need to reflect the demand for lifelong learn-

ing to cope and catch up with the technological and social changes brought about by the Fourth Industrial Revolution.

The education system in Sudan falls short and reflects policymakers' aspirations and the leadership's consistent failure to develop an education system that meets the aspirations of the young generation and acts as a precondition to transforming the Sudanese economy to another level. Private sector demand for specific research to domesticate technology will play a significant role in this matter.

Leveraging technology in the education sector is an important development for the transformation of the education sector to ensure that current and future generations are not left out through a sound education system with innovation capacities. Current challenges hold great opportunities for this transformational process. Lower technological and innovation capabilities mean putting the dream of economic diversification and knowledge-based growth on hold.

Limitations and ideas for further research

Given the complexity of the study and the absence of recent surveys in Sudan, the study takes and utilizes secondary data to sort out the idea and the linkages between education, technology, and the future of work in Sudan. For a host of reasons, including data difficulties and time limitations, the conceptual framework into which such information is presented is ill-suited for a clear understanding of the link between education, economics, and the future of work.

Further research studying the potential impact of automation, education, and the future of work in Sudan will bring some fascinating new insights. Additional research, which is recommended by the results of this scoping study and by the many others completed in recent years, should tackle the need to understand paths from current jobs to future highly automatable jobs and those which are much less likely to be automated, as well as the response of higher education to the transformation. Such research must be conducted to assist with the transitioning economies of Sudan to enlighten the future with confidence.

Annex

Investing in human capital

As economies move toward innovation and knowledge on the global scale, including the transition to green energy solutions, investing in the future requires us to do things differently. Innovation is based on quality education, which is crucial as we seek to move toward a fairer economy that can transform the wellbeing of Sudanese individuals. The scoping analysis in this report is an attempt to provoke new thoughts on the current education pitfalls in Sudan. In realistic terms and given the competing priorities, Sudan may not be able to provide enough resources following the traditional approach to education through what is called pro-poor spending. However, technology and digitalization offer both a fiscal and transformation space that supports quality, inclusivity, and education that meets the need of present and future generations.

Research by the McKinsey Global Institute has looked at the kind of jobs that will be lost, as well as those that will be created, as automation, AI, and robotics take hold. It has inferred the type of high-level skills that will become increasingly important as a result (Jacques Bughin, Eric Hazan, Susan Lund, Peter Dahlström, Anna Wiesinger, and Amresh Subramaniam, 2018).[32] The need for manual and physical skills as well as basic cognitive ones will decline, but demand for technological, social, and emotional, and higher cognitive skills will grow. Governments are keen to help their citizens develop in these areas, but it is hard to devise curricula and the best learning strategies without being more precise about the skills needed. It is difficult to teach what is not well defined (Marco Dondi, Julia Klier, Frédéric Panier, and Jörg Schubert, 2021).[33]

The risk of automation to jobs in developing countries is estimated to range from 55-85 percent, according to a 2016 study by Oxford University's Martin School and Citi. Major emerging economies will be at high risk, including China (77 percent) and India (69 percent), higher than the OECD developed countries' average risk of 57 percent (Martin Khor, 2017).[34]

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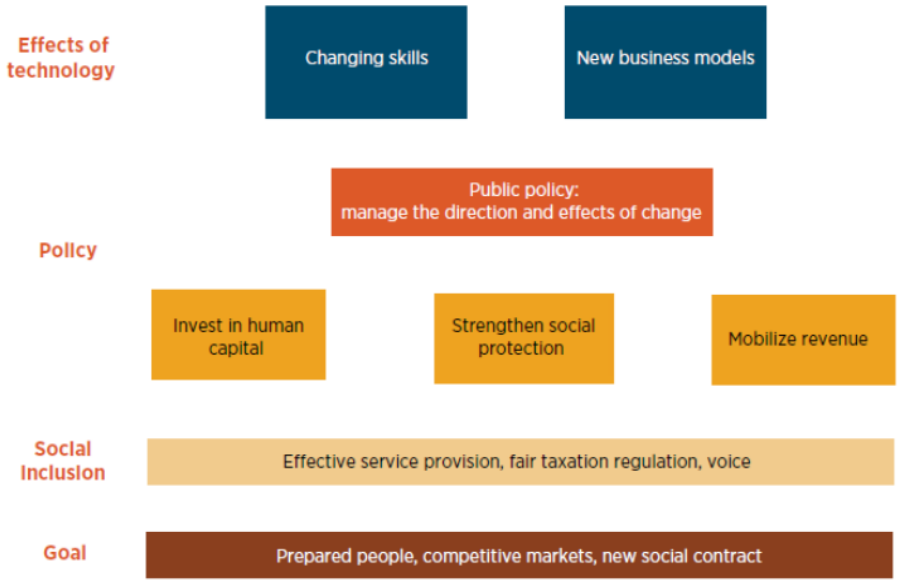
[32] Jacques Bughin, Eric Hazan, Susan Lund, Peter Dahlström, Anna Wiesinger, and Amresh Subramaniam (2018). *Demand for technological, social and emotional, and higher cognitive skills will rise by 2030. How will workers and organizations adapt?* Automation and the workforce of the future | McKinsey

[33] Marco Dondi, Julia Klier, Frédéric Panier, and Jörg Schubert (2021). Defining the skills citizens will need in the future world of work; Future-citizen skills | McKinsey

[34] Martin Khor (2017). *Automation, Robots, and the Threat of Economic Disruption in Developing Countries*; Third World Resurgence No. 319/320, Mar/Apr 2017, pp 12-13 https://www.twn.my/title2/resurgence/2017/319-320/cover01.htm

Figure 11. Responding to the changing nature of work



Source: WDR 2019 team.

In a similar vein, Østergaard and Nordlund (2019), [35]*pointed out that in a future of unprecedented societal shifts, education is crucial to managing the challenges ahead.* With more automated, digitized, and fluid job markets, today's higher education systems are quickly becoming incompatible with the future. While most debates around the future of education focus on the skills needed for the future and the imperative of reskilling, it is equally important to discuss the inevitable structural transformation of higher education:

- Education models need to reflect the demand for lifelong learning to cope with the technological and social changes brought about by the Fourth Industrial Revolution.
- Skills rather than degrees may be the reality of the future.
- Start-ups and new business models are disrupting traditional educational institutions and operating models.

According to the 2019 World Development Report, [36]*investing in human capital is the priority to make the most of this evolving economic opportunity.* Three types of skills are increasingly important in labor markets: advanced cognitive skills, such as complex problem-solving; socio-behavioral skills, such as teamwork; and skill combinations that are predictive of adaptability, such as reasoning and self-efficacy. Building these skills requires strong human capital foundations and lifelong learning.

Differences in human capital have large implications for the productivity of the next generation of workers. In a country at around the 25th percentile of the distribution of each of the components, a child born in 2018 will only be 43 percent as productive as that child would be under the benchmark of complete education and full health. The index, because of its units, can be connected in a straightforward fashion to scenarios for future per capita income and growth. Imagine a status quo scenario in which the expected years of quality-adjusted school and level of health, as measured in the index for a given year, persist into the future. Over time, new entrants to the workforce with status quo education and health replace current members of the workforce, until the entire workforce of the future has the expected years of quality-adjusted school and level of health captured in the current human capital index. It is possible to

[35] Simon Fuglsang Østergaard and Adam Graafland Nordlund (2019). The 4 biggest challenges to our higher education model – and what to do about them: The World Economic Forum, Futurist and Consultant, Copenhagen Institute for Future Studies Adam Graafland Nordlund Junior Futurist, Copenhagen Institute for Futures Studies. The 4 biggest challenges to our higher education model – and what to do about them | World Economic Forum (weforum.org)

[36] World Development Report (2019), The Changing Nature of Work, World Bank, Washington DC. https://documents1.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf

then compare this scenario with one in which the entire future workforce benefits from complete education and enjoys full health (WDR, 2019).

References

Bandura, A. (1977) Social learning theory (Englewood Cliffs, NJ, Prentice-Hall). https://journals.sagepub.com/doi/10.1177/105960117700200317

Collier, Paul; Elliott, V. L.; Hegre, Håvard; Hoeffler, Anke; Reynal-Querol, Marta; Sambanis, Nicholas. (2003). Breaking the Conflict Trap: Civil War and Development Policy. A World Bank policy research report; Washington, DC: World Bank and Oxford University Press. © World Bank. https://openknowledge.worldbank.org/handle/10986/13938 License: CC BY 3.0 IGO."

Dalton, P.; Ghosal, S.; Mani, A. (2016) Poverty and aspirations failure, in The Economic Journal, Vol. 126, No. 590, pp. 165–188.

Elhadary, Y. A. E.(2010) The Higher Education "Revolution" in Sudan and its Impact on Research in Higher Education Institutions, Bulletin of Higher Education Research,9, 9-11

El-Hassan, Zaki. (1992) Instability of Higher Education in the Sudan: The Effect of Al-Bashir's Higher Education Policies. Reports: Education in Sudan. Available online at: http://www.sudanupdate.org.

El Tom, M.E.A. (2003). 'Sudan', in Teferra, D. and Altbach, P.G. (Eds.), African Higher Education: An International Reference Handbook. Bloomington: Indiana University Press

ERF/ ILO (2021), Regional report on Jobs and Growth in North Africa, Economic growth and labor market outcomes in an agrarian economy https://erf.org.eg/events/jobs-and-growth-in-north-africa-webinar-series-organized-by-erf-and-ilo

Favara, M. (2017), Do dreams come true? Aspirations and educational attainments of Ethiopian boys and girls, in Journal of African Economies, Vol. 26, No. 5, pp. 561–583.

Gardiner, D., Goedhuys, M. 2020. Youth Aspirations and the Future of Work: A Review of the Literature and Evidence, ILO Working Paper 8 (Geneva, ILO).

Gasim, G. (2010). Reflecting On Sudan's Higher Education Revolution Under Al-Bashir's Regime. Comparative & International Higher Education, 2(2), 50-53.

Hibatallah. S and Abdul Rahman. S (2020) Change and Development of Higher Education in Sudan, Pesa International Journal of Social Studies, July.2020, Vol: 6, Issue:2 https://dergipark.org.tr/tr/download/article-file/1209860

IMF (2018) The Future of Work in Sub-Sahran Africa, https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2018/12/14/The-Future-of-Work-in-Sub-Saharan-Africa-46333

IMF (2019), Sudan Article IV Consultation, https://www.imf.org/en/Publications/CR/Issues/2020/03/10/Sudan-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-Executive-49254

Jahanian, F (2020), How higher education can adapt to the future of work https://www.weforum.org/agenda/2020/01/how-can-higher-education-adapt-to-a-constantly-evolving-future-of-work/

Kuznets. S (1971), Modern Economic Growth: Findings and Reflections, Nobel Prize Lecture, https://www.nobelprize.org/prizes/economic-sciences/1971/kuznets/lecture/

Lybbert, T.J.; Wydick, B. (2018) Poverty, aspirations, and the economics of hope, in Economic Development and Cultural Change, Vol. 66, No. 4, pp. 709–753.

Magboul, Osman Al Amin, Ibrahim, Al Taaib Mohammad Abd Al Mlik (2015). University Professors Statues, Deliberation of The Third Higher Education and Scientific Research Conference,2015 , p. 111,120

Ministry of Higher Education & Scientific Research (MHESR) (2017). Mission and Vision, Retrieved from http://www.mohe.gov.sd/

Holoubek. S (2022), Automation, Education, And The Future Of Work: A Reading List; Luminary Lab
https://www.luminary-labs.com/insight/automation-education-future-work-reading-list/

Ndung'u. N and Signé. L (2020) The Fourth Industrial Revolution and digitization will transform Africa into a global powerhouse; in Capturing The Fourth Industrial Revolution: A regional and national agenda https://www.brookings.edu/wp-content/uploads/2020/01/ForesightAfrica2020_Chapter5_20200110.pdf

OECD Library (2019), Education at Glance OECD iLibrary | Education at a Glance 2019: OECD Indicators (oecd-ilibrary.org)

Piper. K (2018), Human History, in one chart, Vox, https://www.vox.com/future-perfect/2018/11/8/18052076/human-history-in-one-chart-industrial-revolution

Republic of Sudan, Ministry of General Education. General Education Sector Strategic Plan 2018/19 – 2022/23, January, 2019

Ross, P. (2016), The Aspirations Gap And Human Capital Investment: Evidence from Indian adolescents (Oxford, Centre for the Study of African Economies). Available at: https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=CSAE2017&paper_id=692) [17 June 2020].

Sataar. A (2019), The Future of Education for The Future of Work, https://hundred.org/en/articles/the-future-of-education-for-the-future-of-work#c955a9d8

UNCTAD (2021), Technology and Innovation Report; https://unctad.org/system/files/official-document/tir2020_en.pdf

Wladawsky-Berger, I (2020) The Long-Term Future of Work and Education: Three Potential Scenarios https://blog.irvingwb.com

World Bank. (2019). World Development Report 2019: The Changing Nature of Work. Washington, DC: World Bank. doi:10.1596/978-1-4648-1328-3. License: Creative Commons Attribution CC BY 3.0 IGO

World Economic Forum (2020), How Higher Education Can Adapt to the Future of Work https://www.weforum.org/agenda/2020/01/how-can-higher-education-adapt-to-a-constantly-evolving-future-of-work/

World Economic Forum, (2020), Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution

World Economic Forum (weforum.org),(2020) Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution

Zeufack, Albert G., and others (2020). "Africa's Pulse, No. 22" (October), World Bank, Washington, DC. Doi: 10.1596/978-1-4648-1568-3 https://openknowledge.worldbank.org/handle/10986/34587

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