

Digitalisation and the future of African manufacturing

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Key messages

- Digitalisation will have a significant impact on manufacturing globally. African countries both face a digital divide and reap fewer benefits from digital technologies once installed.
- The costs of **operating robots and 3D printers will soon become cheaper than the costs of labour** performing certain tasks. But as inflection points (in furniture manufacturing, for example) will occur later in African countries such as Kenya (2034) than in developed countries such as the US (2023), **African countries have longer to prepare**, and can therefore still pursue manufacturing-led development strategies.
- African countries should **build up industrial capabilities in less-automated sectors** (such as food and beverages, garments, metals, and paper) that can help them to move into higher-value-added activities. They should also urgently **prepare for a more digital future** by stimulating access to broadband and developing technical skills and technology hubs.

What is digitalisation?

Digitalisation refers to digital transformation of the economy, achieved through an interaction of digital technologies such as cloud computing, artificial intelligence, Internet of Things (IoT) etc. with physical Information and communication technology (ICT) infrastructure. This can lead to the development of smart machines, smart platforms and digital products. The digital economy is supported by an enabling environment of 'digital skills', 'national innovation systems', 'policies and regulations' and other digital accelerators.

Africa's level of digitalisation is low

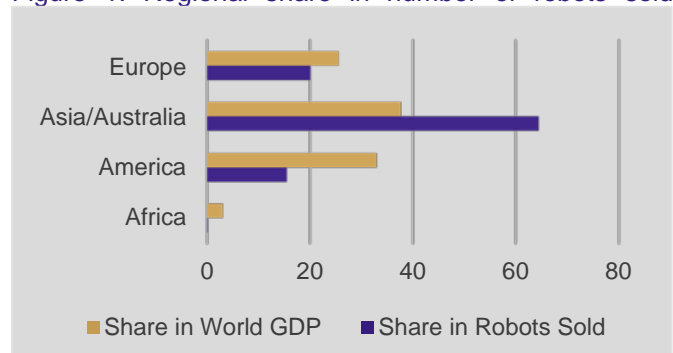
There is a persistent global digital divide. Sub-Saharan Africa (SSA) is significantly lagging in access to the internet – the average internet penetration rate (% of population with access to the internet) in SSA was 10 percentage points lower than that in South Asia in the year 2016 – and in use of the internet. Figure 1 shows that Africa's share in robots sold in 2015 (around 0.2% of world sales) is 15 times lower than its share in world GDP (around 3%). Reasons for the digital divide include higher cost of capital and financing in developing countries, and poorer infrastructure, skills and logistics.

The impact of digitalisation is lower

If African countries address the constraints to digitalisation, this may open several important opportunities in terms of improvements in productivity; increase in demand of new and existing products;

reduction in costs of production, allowing entry of small and medium-sized enterprises into the export market; and reduction in costs of trading, enabling higher global value chain (GVC) participation. These effects are also likely to generate employment opportunities.

Figure 1: Regional share in number of robots sold



Source: International Federation of Robotics, World Economic Outlook (2017). Notes: Data is for the year 2015. Share in World GDP is calculated using Nominal GDP data (Billions of U.S. Dollars). The horizontal axis represents percentages. America refers to North, South and Central America.

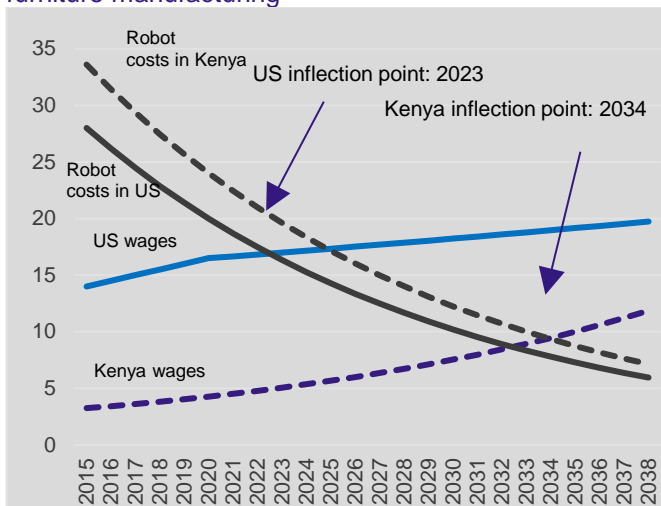
New empirical analysis for low- and middle-income countries over the past 30 years confirms that an increase in digitalisation (proxied by internet penetration) boosts manufacturing labour productivity. However, while a doubling of internet penetration (e.g. from 5% to 10% in Kenya from 2007 to 2012) in middle-income countries increases labour productivity by 11.3%, it increases labour productivity in low-income countries by

only 3.3%. Using a panel of 155 countries, we find evidence of a slowdown in convergence of SSA countries' manufacturing labour productivity in recent years. To improve the impact of digitalisation, skill development is crucial. A skilled workforce can increase the impact of internet penetration on manufacturing labour productivity by roughly nine.

A window of opportunity?

Digitalisation is still low in Africa, compared to other regions, indicating that African countries may not yet experience the full impact of the global technological surge. The rate of digitalisation also varies significantly within the manufacturing sector, with electronics, computer and transport industries being automated at a much faster rate than food, beverage, tobacco, wood and paper industries. These less-automated sectors can therefore act as a window of opportunity for African countries to undertake local production and regional trade. The length of the window of opportunity depends on the rate of automation and relative costs in an industry.

Figure 2: Window of opportunity – the case of Kenyan furniture manufacturing



See full report for sources and notes.

Firms will increase investment in automation only when the cost of employing labour is, by some margin, higher than the cost of automation, i.e. operating robots. Our analysis finds that in the case of the furniture industry, while robots in the US will become cheaper than US labour in the year 2023, robots in Kenya will become cheaper than Kenyan labour only a decade later, in 2034. This suggests that African countries have a window of roughly a decade to develop less-automated sectors.

However, if the digital divide persists in the context of a growing global digital economy, developed economies will re-shore production, which could adversely affect employment in developing countries. Some 250,000 jobs have already been re-shored to the US since 2010. Figure 2 shows that US robots in the furniture industry will become cheaper than Kenyan labour in 2033 – there

is an increased threat of re-shoring in the future.

Preparing for a digital future

While developing countries have a longer period to adapt to the digital future than developed countries, they too need to prepare for it. Low-income African countries face a two-pronged problem: (i) low levels of digitalisation; and (ii) low impact of increasing digitalisation.

To digitalise manufacturing, African countries need to increase access to internet and other ICT technologies, through altering country-specific conditions and contributing towards improving the investment climate, firm capabilities, national innovation systems and ICT infrastructure, direct financing opportunities and participation in GVCs.

Policies targeting public-access solutions are required to make the internet more affordable (see e.g. Botswana). This includes free or subsidised access to open areas such as educational institutions, local and community centres, public Wi-Fi etc. Kenya has emerged as a leader of digitalisation in SSA, accomplished through strategic steps by both the public and the private sector. Financial support from the government needs to be extended – not only to manufacturing and services start-ups but also to ecosystem enablers such as technological and innovation hubs (e.g. the Kumasi Hive hub in Ghana or the iHub in Kenya). Taxes and incentives can serve as important drivers for bridging the rural–urban digital divide, while policies targeting public-access solutions can increase access to digital technologies.

For manufacturing to benefit more from digitalisation, it is crucial for African countries to develop complementary skills. Becoming future-ready involves revising and reorienting the curriculum in African educational institutions around STEM subjects, and providing better technical and vocational education and training through public–private sector collaboration.

References

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