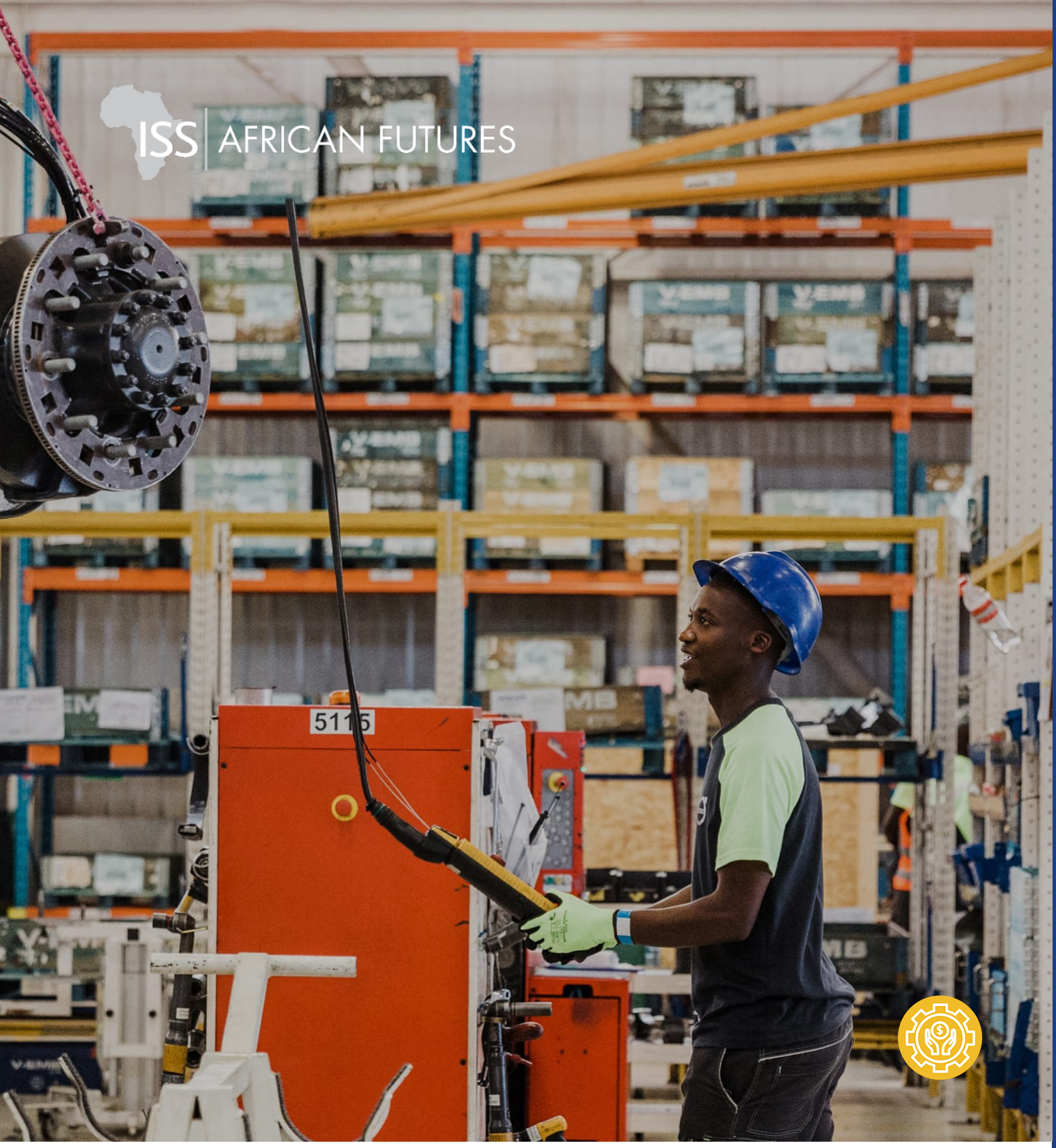

Manufacturing

The future and the impact of the diffusion of knowledge

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The future and the impact of the diffusion of knowledge

ICT-led globalisation and associated knowledge flows are undermining the previous competitive advantage of industrialised countries and are changing the outlook for global value chains. The result is that an increased number of jobs in the developed world are now in direct competition with jobs in emerging economies. The cross-border flow of data and knowledge has broken the monopoly that workers in wealthy nations had on using advanced manufacturing-specific intellectual property, giving rise to the notion of 'new globalisation'.[1] In theory, individuals can directly participate in globalisation by using digital platforms to study, find jobs, showcase their talent and build networks. In practice, this opportunity is limited to those who have electricity, are connected to the Internet and have the inclination, knowledge and interest to pursue it.

Although globalisation has had a disruptive impact in much of North America and Europe, fuelling populist politics, the phenomenon has had a cohesive impact on emerging Asia, where the middle class has flourished and millions of people have been lifted out of poverty.

In an interconnected and globalised world, knowledge flows inevitably undermine the concept of country comparative advantage—even in countries that are part of integrated trade blocs[2] where regional value chains are well established.[3] Financial flows are already generally deregulated and now knowledge is also flowing more freely across boundaries; it is only labour mobility that remains restricted.

In response to the impact of this 'new globalisation', industrialised countries have embraced policies to protect their knowledge, for example, through excessive use of patent protection and instituting requirements for minimum labour standards and the amount of carbon generated in production. Conversely, emerging factory economies have embraced policies that foster knowledge sharing and creation. It is for this reason that China champions globalisation (despite having significant domestic barriers to foreign companies), whereas the US seeks to protect its domestic manufacturing sector from foreign competition by withdrawing or renegotiating trade agreements to now include much higher domestic and labour content requirements.

The problem for the US and other high-income economies is that the ICT revolution has broken industrialised nations' monopoly on knowledge. As a result, barriers faced by manufacturers and specific industries and services in emerging countries, including in Africa, are constantly being lowered, often quite dramatically.

Trends in robotics, automation, computerised manufacturing and artificial intelligence (AI) all appear to reduce the advantage of locations with low labour costs. But this is not necessarily to the detriment of Africa. Originally, companies sought to locate manufacturers in countries with the cheapest labour and rapid growth in multinationals and consumers occurring in emerging rather than developed economies today. According to one estimate, almost half of the world's largest companies will have headquarters in emerging markets and closer to consumer growth by 2025.[4] These trends will first benefit economies of Asia but are beginning to be seen in Africa too.

A variety of digital technologies (particularly in the media), new materials (such as bio- or nano-based materials) and new processes (such as 3D printing, AI and robotics) threaten to disrupt existing manufacturing patterns. The future will likely see the development of a more distributed global economy, where manufacturing and services are closely linked and value chains are shorter and closer to markets. All offer opportunities for Africa. Generally, new technology decreases the required input costs of manufacturing, particularly for smaller production runs. Technologies such as 3D printing may eventually end the smokestack factory model of production and perhaps the world could even see the evolution of something akin to a cottage-industry model.[5]

Lower barriers to entry allow companies to venture into areas outside their traditional specialisation. Start-ups can quickly go up the productivity curve to threaten established businesses. It is even evident in something as established as car

manufacturing, with a company such as BYD in China threatening to outflank traditional manufacturers in Germany, the US, Japan and South Korea by investing heavily in electric vehicle technologies.

Instead of an ownership economy, digital platforms also allow and facilitate the development of a sharing economy (where individuals rent or borrow goods and services for a specific time or task rather than buy and own them). Production is therefore experiencing a shift towards customisation consisting of smaller production runs closer to the end markets and greater flexibility.[6] The local manufacturer of, say, a spare part for a car or a replacement gear in a machine will be able to purchase the plan from the cloud and print locally. That means there is no more need for international shipping, tracking or customs.

Ghanaian entrepreneur Bright Simons refers to this as the rise of 'Alibaba industrialisation'.[7] He refers to an 'unsung industrial revolution' in several African countries powered by 'a worldwide revolution in modular design, multi-purpose machinery, efficient small-batch production, global SME–SME [small and medium enterprise] engagement, new forex transfer practices, and the growing strategic transformation of China's late-phase industrial players.' This is a world where small and medium-sized Chinese suppliers provide large chunks of the industrial jigsaw and 'African hustlers and unconventional industrialists act as shuttle-brokers of the various factors of production between China and Africa.' According to him, the Fourth Industrial Revolution (digitisation) makes it easier for African states to become part of value chains from which they were previously excluded.

Endnotes

1. See, for example: R Baldwin, *The great convergence: Information technology and the new globalization*, Cambridge: Harvard University Press, 2016.
2. Examples are the United States–Mexico–Canada Agreement (USMCA), the European Union, and East and Southeast Asia.
3. Ethiopia, Kenya, Morocco, Seychelles, South Africa and Tanzania have managed to make strides into global value chains. Manufacturing leads the integration into GVCs, ahead of agriculture and business services. See: JE Stiglitz, Introductory remarks: Promoting sustainable industrial policies, in Industrialize Africa: Strategies, policies, institutions, and financing, Abidjan: African Development Bank Group, 2017.
4. JE Stiglitz, Introductory remarks: Promoting sustainable industrial policies, in Industrialize Africa: Strategies, policies, institutions, and financing, Abidjan: African Development Bank Group, 2017, 16, 20.
5. African Center for Economic Transformation, The future of work in Africa: The impact of the Fourth Industrial Revolution on job creation and skill development in Africa, Accra: ACET, 2018.
6. K de Backer and D Flaig, The future of global value chains: Business as usual or 'a new normal'?, Paris: Organisation for Economic Co-operation and Development, 2017, 21.
7. B Simons, Africa's unsung 'industrial revolution', 21 March 2019.

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