

TECHNOLOGICAL JUSTICE

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Proposal:

Developing the concept of, and policies for, Technological Justice

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Major changes are coming and in the years ahead will continue to come from technology and science's developments. Technology – digital, mechanical and biological (and the importance of the latter is growing with gene editing)- is creating huge opportunities. The role that the new connectivity (in mobile phones) is having on Africa's development is one example. But technology can also create major disruptions. It could also lead to greater inequalities –of a new type- within and between societies, if there are gaps in an access that is essential for development, and crucial to be in the global value chains, or in the unequal effects of these technologies.

Like the two faces of Janus, there is a dialectic relationship between technology and society: technology is part of the solution for societal challenges and part of the problem, exacerbating social inequalities.

The concept of technological justice can reconcile these two faces, connecting technology, a critical factor in human development, with our aspirations of social justice and greater equality between economies.

DEFINITION

We propose to develop this concept (and related policies) of Technological Justice. Usually the concept of technological justice has been used in reference to internal inequalities and gaps within societies. We intend to apply it to the international dimension. We could define it as “a situation in which technologies don’t create new social gaps and deficits, but on the contrary lead to a smart world society, especially as far as the solution of major challenges like poverty and sustainability is concerned”.

Convergence

“The concept of technological justice requires a rethinking of how — both in the developing and the developed world-, to encourage and nurture technological innovation that has social value and is environmentally sustainable” (Trace, 2012).

During the last decade, the European Commission has introduced the concept of “Responsible Research”, an approach to develop not only science-based technology solutions to some of the major societal challenges but also to harness the power of existing knowledge to contribute to social justice. It is useful to incorporate this idea.

The idea of technological justice must go hand in hand with the idea of technological convergence among countries.

It could be part of the G20 goals.

The Hamburg G20 final Communiqué aimed to “bridge digital divides along multiple dimensions, including income, age, geography and gender”, and to “ensure that all our citizens are digitally connected by 2025”, especially with “infrastructure development in low-income countries in that regard”.

CHALLENGES

A greater impact of automation on developing economies

An UNCTAD (2016) study leads to the conclusion that automation – one of the major effects of technological progress- could destroy 2/3 of the jobs in the developing world. Automation could lead them to a low or middle income trap, and, according to economist Dani Rodrik (2015), to a “premature de-industrialization” in many of those countries, in favor of the developed world, particularly of its most technologically advanced countries.



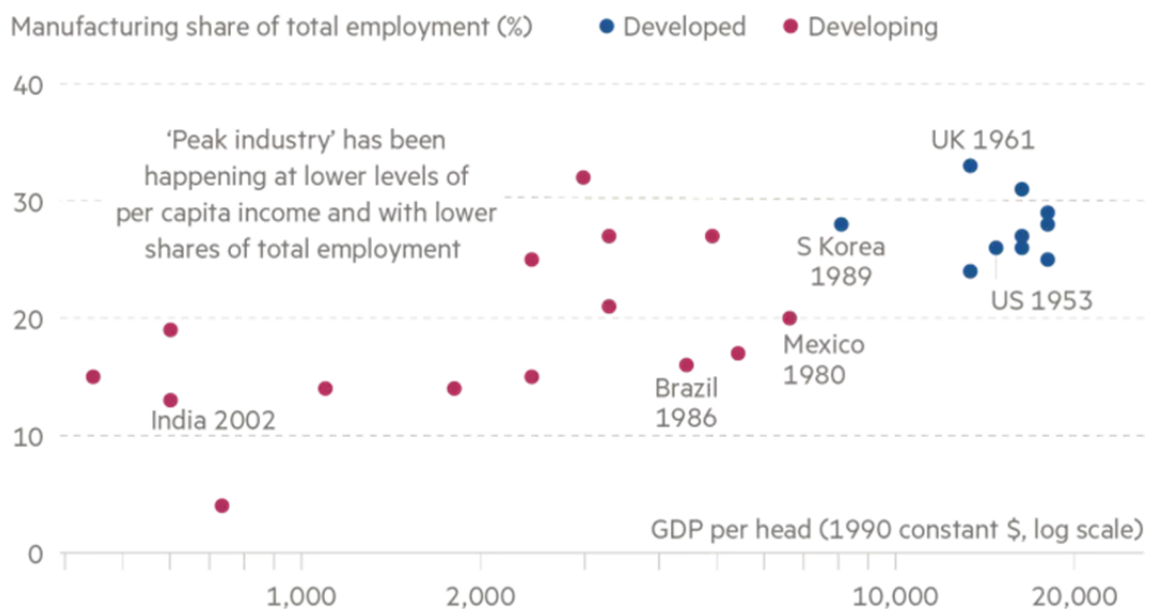
These forecasts coincide with other from Frey, Holmes and Osborne (2016), that the developing world will lose the advantage as jobs replaced by robots and 3D printing. This is still not fully the case because of the abundance of cheap labor, and because automation is still expensive in many aspects beyond the automotive and electronics sectors. But even if it arrives later, automation and 3D printing will encourage companies to bring their manufacturing back home, even more in an environment of greater trade protectionism.

Brazil and India, for instance, have seen their share of manufacturing employment peak at no more than 15% when GDP per capita was less than \$5.000 in Brazil and 1.000 in India. 69% of jobs in India and 77% in China are at “high risk” of automation, above 47% for the US and 57% across OECD.

The ILO (International Labor Organization) foresees the need to generate 40 million jobs a year just to cope with population growth,

and more than 300 million to achieve the UN Sustainable Development Goals by 2030. The goals do not seem to be possible due to the impact of digitalization and automation. According to recent studies by the OECD, Africa needs to create about 30 million jobs a year between now and 2025, to keep up with the number of youth streaming into the job market. If the internet continues to grow at the same pace as mobile telephony in Africa, 20 million to 30 million jobs could be created per year in the digital economy sector (McKinsey Global Institute 2013). But automation could act in the opposite way.

Premature deindustrialisation: countries have been switching away from industry much earlier in their development



Sources: Dani Rodrik, 'Premature Deindustrialization' (2016); Groningen Growth and Development Centre
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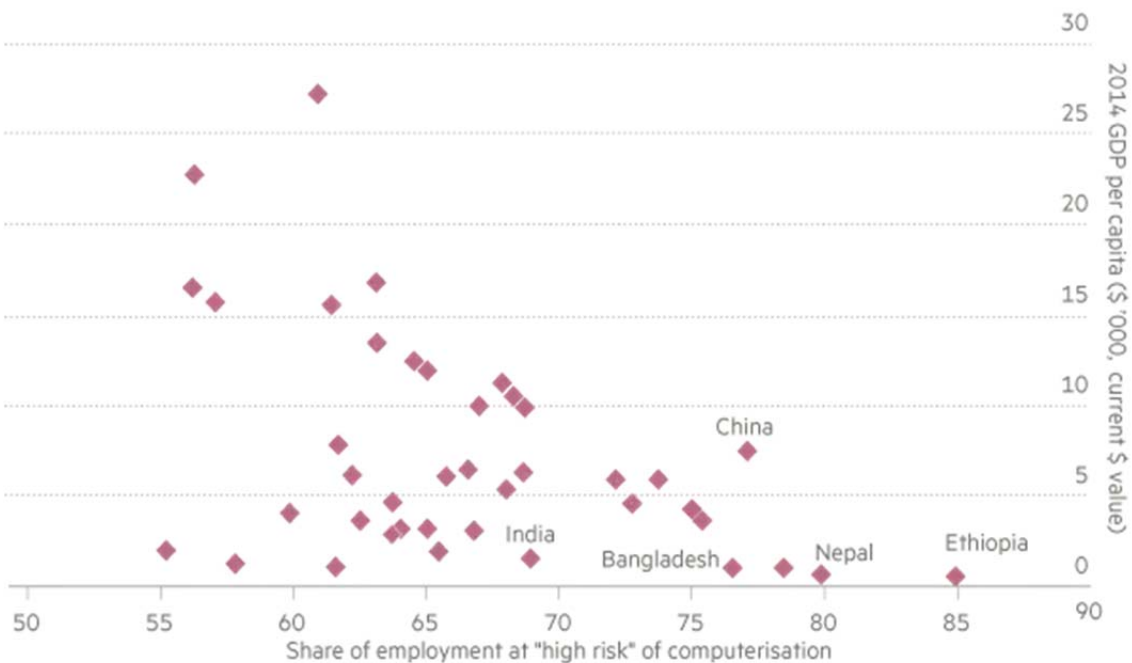
Developing economies could suffer from technological backwardness, also derived from a brain drain towards the devolved world. These two factors together could produce a gap difficult to fill. "But, in the longer run, it will bring benefits for the entire world by making smart products that help to address challenges that affect us all", according to Van Agtmael and Bakker.

Research by the UN UNIDO (2016) confirm that the share of manufacturing and manufacturing jobs in the average developing economy has fallen. But for developing economies as a whole, the

share of manufacturing and manufacturing jobs is at a record level. Nonetheless, this statistical situation is mainly caused by China. Without China, the problem stands. And China will be greatly affected by technological automation, that it is fostering through strategies like the one set up in "Made in China 2025" (State Council, 2015).

According UNIDO's study, "premature deindustrialization or non-industrialization has recently been increasingly noticeable in developing countries with a lower share of manufacturing in GDP at their peak, which they reached at a much lower level of income than the early industrializers". While the debate on whether services can become a new growth-enhancing sector continues, research indicates that premature deindustrialization is prevalent in developing countries and that "manufacturing no longer plays the role of the engine of growth in developing countries". But even UNIDO sheds some doubts about this argument, especially with China.

Countries susceptibility to automation is negatively associated with their GDP per capita



Sources: World Bank Development Report 2016; World Bank national accounts data



Other studies challenge these assumptions (like McKinsey Global Institute 2015 a). For instance, in the case of Africa it is argued that its economies are now well positioned to take advantage of the numerous opportunities that the 4th industrial revolution presents, to drive inclusive prosperity, in comparison with previous industrial revolutions (Obado, 2017): In the 1st Industrial revolution, Africa

was dealing with Slavery; the 2nd Industrial revolution coincided with Colonization, and in the 3rd Industrial revolution: Africa was focused on decolonization and nation building. The Internet could add \$ 300 billions to Africa's GDP if it continues to grow at the same pace as mobile telephony did, by 2025. according to McKinsey Global Institute Report *Lions go digital* (2015b). But to go digital does not imply the same kind of consequences as automation, 3D printing and other technologies. And there is a need to invest more in R&D: Today, Africa spends only 0,1% of its GDP on R&D, with more advanced countries in technology like Kenya spending only 1% in comparison to 3%-4% for the most developed economies.

The size of cities also matters, as far as technology is concerned (Frank et.al. 2017). Small cities in the developed world are at risk of job displacement from automation. This conclusion, based on the case of the US, could also apply to the developing world, particularly Africa, that is living through simultaneous industrial and urban revolutions. The growth of the size of the cities favors technologization.

But the important issue is to get into the global value chains of the economy. For that (Morgan, 2014) productive capacity and export capacity by improving national supply networks, human capital and available infrastructures, are essential. Current trends are shifting direct investment from multinationals to sectors with greater technological content and added value, which require greater training of the workforce. Most of these companies do not seek to minimize labor costs at any price, but rather weigh the differences between training, productivity and wages, and in general pay their employees' salaries well above those charged by other workers in the country. Industrial policy should not focus on identifying "national champions", but on coordinating a series of chained investments that allow the development of the local productive base.

According to McKinsey Global Institute analysis of the "haves and have-mores" in digital America, industries that adopt more technology quickly are more profitable. Sectors that create the most jobs — such as retail, education and government — are slower than tech and finances in terms of incorporating digital technology into their business models. If that applies to the US, even more so in the perspective of developing economies.

POLICIES

The Sustainable Development Goals Agenda mentions innovation and technology (Goal 9), but does not connect it with justice and equality (goal 10).

The Hamburg G20 summit (2017) agreed to:

- “Promote digital literacy and digital skills in all forms of education and life-long learning”.
- Push for the role of SMEs in this area.
- “Promote effective cooperation of all stakeholders and encourage the development and use of market- and industry-led international standards for digitalized production, products and services that are based on the principles of openness, transparency and consensus and standards should not act as barriers to trade, competition or innovation

Japan, its government and the Keidanren (2016) organization, are developing the concept of a Society 5.0, in which everybody would benefit of a super intelligent society. A concept of a Global Society 5.0 should be developed for a super-smart global society. Solving social issues will “create future”.

What would the consequences be in terms of public policies to advance technological justice? 1) Social policies (gain efficiencies and inclusiveness in the welfare system through technology); 2) Fiscal policies: from incentives to technologies that are not profitable for the market but that can provide redistributive benefits (education, health, work, etc.); 3) Development in aid policies that include technology; 4) R & D policies.

There is a need for a renewed focus on reform of national and international innovation systems and R&D policies, trying to create a

new consensus on how public-private partnerships can contribute to a more open and sustainable use of technology.

More open source for technologies should be sought. There are still countries in the developing world that lack proper access to fundamental innovations such as medicines, electricity, information and communication technologies (ICTs) and so on. It is essential to assure an open diffusion of knowledge, innovations and technologies in the design of development policies.

Development policies should support redistributive systems and incentives for successful application of new technologies.

Competition must be ensured to push for innovation.

Research and development should pursue to cover the basic needs of Humanity.

Pay more attention to possible major advances (like CRISPR) in biotechnology and genetic manipulation which can fight diseases and generate new inequalities.

Improve the education of the left-behind countries through global schemes (¿a global technological Erasmus?). Promote STEM studies and critical thinking in developing countries and expose their school children at an early age to digital education.

Invest in education to “upskill” the workforces to benefit from the rise of robots, rather than being a victim of this trend.

Implement the Africa 2.0 Manifesto (endorsed by 43 ministers of Education) that embraces creative and innovative approach to education.

Produce technology for local consumption, in developing countries (specially in Africa), where necessary, in collaboration with the more developed economies.

Design policies for the technological empowerment of women (a T20 Policy Brief was released on this subject).

Proposals like taxes on robots or universal basic income are not workable at a global level. Taxing rents seems more appropriate.

The aim should be “to protect people, not jobs” (Emmanuel Macron).

Promote legal frameworks to Enable innovation and use of new technologies.

Close the energy deficit through on grid, off grid and mini grid technologies.

All those policies dealt with from a holistic approach would constitute an agenda for technological justice.

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