

Brazil-China Innovation Dialogue: Technology and Development

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1. Regardless of the area of knowledge, the industrial sector or the country, the future of science and the technologies derived from it rest on the development of the field of Artificial Intelligence (AI). Prospecting trends in science and even technologies, always considered by many to be judgmental as a result of a low “hit rate”, could give a big leap in the perspective of developments in this field. However, in the development and use of tools generated by AI, the scientific and technological knowledge component involved, although indispensable, may not be the only determining element. Equally fundamental are the political, economic and ethical variables involved. Neglecting to study these variables can mean that the indisputable benefits brought by these new fields of knowledge and practice are outweighed by potential individual and collective losses. Recent article provides an extensive and in-depth overview of the ethical challenges posed in this field¹.
2. In meetings that predominantly bring together scientists, challenges linked to discovery/invention, development and, in recent decades, scaling up and industrial production of innovative products and processes are usually discussed. On the other hand, challenges related to the appropriation of successful innovations, normally protected by patents that guarantee the intellectual property of their authors, as well as the incorporation of innovations into government policies, are usually left aside. Here, I understand there is a challenge related to increasingly flawed ‘redistributive justice’ in a world of increasingly concentrated wealth and power. This does not just concern the technologies involved in AI – it has been a habitual and widespread feature, where imbalances affect heavily the countries of the Southern Hemisphere, currently known as the ‘Global South’. Due to the impact that these new technologies will bring to the world as a whole, neglecting this redistributive dimension will further increase the gap between the few technology holders and the majority of countries in the world. From another perspective, which deals with political and economic challenges, it is worth mentioning those related to the ownership of acquisitions in the field of AI in the forums where these countries are located. Still in terms of challenges related to the ownership of knowledge, specifically in the field of AI, there is another, which concerns the global Intellectual Property rules themselves, in force since 1994. In generative AI, the development of algorithms depends entirely from learning carried out by the millions who use them. As an essential part of this development (or scaling up), don't users share in the intellectual property of the software? Something to think about.

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¹ Changwu Huang, Zeqi Zhang, Bifei Mao, and Xin Yao - An Overview of Artificial Intelligence Ethics. IEEE Transactions on Artificial Intelligence, Vol. 4, No. 4, August 2023 p. 799 – 819

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9844014>

3. My specific work interest is public health policy and I want to address a specific challenge in that field before returning to AI. Health systems have been increasingly pressured to incorporate new medicines into the list of products they must offer to the populations under their responsibility. The pressure essentially derives from the ever-increasing prices for new products protected by patents. This price escalation results from the complexity of processes resulting from the shift from a technological and production route based mainly on chemical synthesis to a biological route in which the relative lack of knowledge leads to a higher rate of failure and, consequently, a greater amount of cross-subsidies. One of the consequences of this relatively new situation is its impact on the understanding and mechanisms for evaluating technologies with a view to incorporating them into health systems. In addition to prices that are inaccessible to families and even national governments, many products, especially medicines, involve great technological/productive complexity that, in many cases, creates uncertainty about their effectiveness. Complexity and uncertainty are added when these diseases have a genetic etiology and this causes the risks in the investment to develop these medicines to increase greatly. Advanced therapies are a promising approach for treating several genetic diseases, as well as some acquired diseases, such as some types of cancer. However, important challenges remain in its development, among which the following stand out: (a) The improvement of gene editing techniques: Gene editing technologies, such as CRISPR/Cas9, have evolved rapidly in recent years, allowing changes in the genome more precisely and efficiently and this opens up new possibilities for the development of new therapies. (b) Greater availability of delivery vectors. Producing high-quality and safe vectors has been challenging, and the availability of improved vectors such as lentiviruses, adenoviruses, and adeno-associated viruses should be an important issue. (c) Increased large-scale production: Producing therapies using advanced technologies on a large scale is challenging and advances in bioprocessing technology and vector manufacturing are essential. (d) The long-term safety of therapies developed using advanced technologies is also a challenge. As a large part of the diseases faced with these new tools are pathologies of low incidence and prevalence, the analysis of the long-term effects on patients who use these therapies makes the evaluation of these effects more complex for decision-making regarding registration and incorporation in health systems.
4. I think that a broader understanding of the challenge posed by AI, associated with facing the scientific, technological, productive, political, economic and ethical challenges involved in them can greatly advance the research, development and launch of new, more accessible products, safe and effective. I also believe that cooperation between our countries can contribute to these advances.