INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

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Contribution by Brazil

to the CSTD 2019-2020 priority theme on "Harnessing rapid technological change for inclusive and sustainable development"

TEMA 1: "Harnessing rapid technological change for inclusive and sustainable development"

- From the perspective of your country/region, what is the role of the government in creating the ecosystem for innovation on frontier technologies for inclusive and sustainable development?

The Brazilian ecosystem for innovation considers the importance of the triple helix approach to promoting science, technology and innovation. A positive interaction of government, the academy and the private sector is the key to pushing the technological frontier further including what concerns to inclusive and sustainable development. Brazil has achieved expressive improvements on technologies that are environmentaly friendly such as the development of renewable energy sources, such as biofuels, only
because government, the academy and the private sector worked together. In general, the Government provides funding, legal security and predictability, as well as designing and implementing policies.

- What are the most effective ways to support the improvement of skill levels and better match the supply and demand of skills?

The current technological changes have a profound impact on the labor market and requires that the educational systems aim at developing the cognitive and interpersonal skills required by the growing knowledge-based digital economy. New technologies
demand new skills, so the labor force should be trained at acquiring those skills not only before entering the market but also during the development of careers. Adult learning and retraining programs can help match the labor market evolving demands and
facilitate transition across jobs.

- What is the role of the government in facilitating a fair relation between workers and employers in the digital economy?

Government facilitates a fair relation between workers and employers in the digital economy by offering a legal framework that makes it easy for employers to hire and adjust the size of the workforce and by providing policies for workers to be trained to
develop new skills as they progress on their careers. A fair relation in the digital economy differs from the standard form of employment, in which a worker expected protection over market instabilities and long-term employment used to be the rule. The capacity to provide increasing opportunities is currently gaining more importance.

- What are the current options and lessons learned from policies to protect people affected by rapid changes in labour markets (e.g. greater benefits for those whose jobs are destroyed, retraining, federal job guarantee)?

It is expected that occupations will be lost during the technological transition under way as has happened in the past, but the net effect of the creation of jobs should be positive, considering the still unkown jobs to be invented. Government policies should
address the anxiety caused by losses with channeling discontents to activities that are on high demand. During the transition, social benefits should still be considered provided that certain conditions are met by the worker, such as his/her engagement in retraining
programs.

- What is the role of redistributive policies to ensure that no one is left behind in a world of rapid technological change?

Redistributive policies might mitigate the losses suffered by those left behind in a world of rapid technological change, although it cannot ensure that workers will not lose. The distribution of entitlements is an option for the short term as well
as a favourable tax system for lower-skilled and less wealhty workers.

- Can you provide examples of STI policies/projects/initiatives intended to promote and give directionality to technological change to make it work for inclusive and sustainable development? Are there policies/projects/initiatives that mitigate the potential negative effects of rapid technological change on inequality? Are there any of these policies/projects/initiatives directed to women,
youth, people with special needs or other groups facing specific challenges? How have the policies targeted inequalities? What are the challenges confronted in implementing these policies/projects/initiatives?

The National Science Technology and Innovation Strategy understands that scientific research and technological development is a strong pillar of sustainable and inclusive development. Some projects have been developed during the last few years and have
reaped fruitful results. The eBus project is a sucessful example of directing technological change into sustainable development. The
bus started to run on the streets of Florianopolis in 2017 and has already completed more than 100,000 km totally fuel by solar energy. As for the mitigation of negative effects on inequality as well as the promotion of sustainable development, the ministry of science, technology, innovation and communication funds activities with the "Instituto Mamirauá", based in the Amazon region,
aimed at using scientific research to tackle local problems from communities far away from urban areas. The activities include digital inclusion of citizens located in conservation areas in which they are provided with better means to manage natural resources, such as fishing, conserving biodiversity and improving their living standards.
The National Institute of Technology also acts on mitigation of inequality and social inclusion. One of its projects target the visually impaired, from the application of technologies such as ultrassound and 3D printing to model unborn babies. The Digital Entrepreneurs Project, a recent project lauched in march 2019 provides women with training and capacity-building to foster entrepreneurship in the innovation sector. The project aims to increase the female representation in the technology area workforce, which is currently estimated in 20%. The main challenge to implemente and design new projects is the current budget restrictions of the Federal Government which is still recovering from a severe economic severe crises.

- Can you provide examples of innovative initiatives in partnership with (or by) the private sector in/from your country that harnesses frontier technologies for inclusive and sustainable development? What are the innovations in terms of the use of technology? What are the innovations in terms of business models?

- What are the actions that the international community, including the CSTD, can take to contribute to maximize the benefits associated to rapid technological change and mitigate the risk of these technologies widening or creating new inequalities
within and across countries? Can you give any success stories in this regard from your country or region?

The international community should help develop future and emerging technologies especially with actions directed at the first stages of research and innovation. Under the European Horizon 2020 program, for instance, two projects showcase the contribution

of the international community to address problems arising from rapid technological change. The EIC FET Open funds research and innovation iniciatives on future and emerging Technologies and Responsible Research and Innovation (RRI) Project organizes
workshops putting together policymakers, the business sector, the academy and other citizens.

- Could you suggest some contact persons of the nodal agency responsible for policies related to rapid technological change and its impact inequality as well as any experts (from academia, private sector, civil society or government) dealing with projects in this
area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

Ministry of Science, Technology, Innovation and Communication
-Secretary of Entrepreneurship and Innovation, Paulo César Rezende de Carvalho Alvim
-Secretary of Strategic Actions and Policies, Marcelo Marcos Morales
-Secretary of Applied Technologies, Mauricio Ribeiro Gonçalves
Centro de Gestão e Estudos Estratégicos. Marcio de Miranda Santos.

Ministry of Economy
-Secretary of Development and Industrial Competitiveness, Igor Calvet
-Secretary of Innovation, Rafael Moreira

- Do you have any documentation, references, or reports on the specific examples on the priority theme in your country or region?

The National Strategy of Science, Technology and Innovation sets the overall policy for STI in Brazil and states the need to have science and technology to address the challenges posed by sustainable and inclusive development.
Decree 9,319 of March 21, 2018 establishes the National System for Digital Transformation (SinDigital) and the deployment of the Brazilian Digital Transformation Strategy (E-Digital). The Strategy is an umbrella policy aiming to harmonize and coordinate different governmental initiatives on digital issues within a coherent framework. It proposes strategic actions under the perspective of Sustainable Development Goals (SDG) of the 2030 Agenda of the United Nations. One of the strategic actions in the E-Digital is "to
evaluate potential economic and social impact of disruptive digital technologies, such as artificial intelligence and big data, and to propose policies that mitigate their negative effects and maximize positive results". E-Digital also atributes priority to the allocation of resources towards R&D and innovation involving AI, as well as capacity-building in this field.
Furthermore, it is important to mention that Brazil has also been actively involved in discussions in different international organizations related to technical standardization and policy guidance in the field of AI, with a view to implementing regulatory
measures to facilitate the optimal deployment of those applications in Brazil.
Big data related technologies are also highlighted in the Brazilian Digital Transformation Strategy. E-Digital establishes priorities on research, development and innovation to stimulate and modernize the national production structure. Additionally, the National Strategy for Science, Technology and Innovation 2016-2022 (ENCTI) stresses the critical necessity of developing and modernizing existing technologies, such as sensors, networks, high performance computers, communication protocols and software. They provide the basis for new ICT applications, for instance, the Internet of Things (IoT), Big Data and Cloud Computing. Also, E-Digital indicates a number of strategic actions related to big data and data-based economy, such as: initiatives aiming to evaluate the potential economic and social impact of disruptive digital technologies; to propose policies that mitigate negative effects of

big data and AI and to maximize their positive results; to promote the approval of incentives and attraction policies for investments on
datacentres in Brazil.
Since 2014, MCTIC has been engaging in dialogue with the private sector, with academia and with public organizations in an effort to build public policy for IoT. The forum for this dialogue is the IoT Chamber, a multistakeholder body created by the Decree nº 8,234
in May 2, 2014. The final output of this dialogue is the National Internet of Things Plan, with the objective to "foster the implementation of IoT as a sustainable development instrument for the Brazilian society, capable of increasing competitiveness,
strengthen national production chains and promote higher quality of life". The National Economic and Social Development Bank (BNDES) also participated in this process, conducting a study on IoT and contributing to the planning and prospection
processes.
On the topic of advanced manufacture, the former Ministry of Development, Industry and Trade (MDIC) conducted, together with MCTIC, an initiative with several public and private institutions to collect expertise and information from hundreds of industrial
innovation specialists. This survey resulted in the publication of a report under the title "Perspectives on advanced manufacture by Brazilian experts", that collected substantive contributions that will serve as input for an advanced manufacture policy. The survey also highlighted the importance of new Open Laboratories, dedicated to develop digital industry technologies, considering that the combination of such technologies generate unprecedented opportunities for competitive manufacturing in Brazil. As for academic production, apart from the extensive university papers, the "Centro de Gestão e Estudos Estratégicos" publishes papers, studies and articles about STI in Brazil.