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Summary of the CSTP assessment of Costa Rica's policies and practices relative to the implementation of OECD legal instruments in the area of science and technology

This document presents a summary of the CSTP's assessment of Costa Rica's policies and practices relative to the implementation of OECD legal instruments in the area of science and technology, including biotechnology. This report has been declassified by the Secretary-General. The Council authorises the Secretary-General to declassify the documents related to the accession of the candidate country as appropriate. The CSTP is herewith invited to take note.

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FOREWORD

The OECD Council decided to open accession discussions with Costa Rica on 9 April 2015. On 8 July 2015, the Council adopted a Roadmap for the Accession of Costa Rica to the OECD Convention [C(2015)93/FINAL] (referred from here onwards as the Roadmap) setting out the terms, conditions and process for accession. The Roadmap provided that in order to allow the Council to take an informed decision on the accession of Costa Rica, Costa Rica would undergo in-depth reviews by 22 OECD technical committees, including the Committee for Scientific and Technological Policy (CSTP). Following the conclusions of the technical reviews, on 15 May 2020 the OECD invited Costa Rica to become the 38th Member country of the Organization. On 25 May 2021 Costa Rica, having completed its domestic procedures for ratification of the OECD Convention, deposited its instrument of accession thus becoming a full Member of the Organisation.

This Summary report has been produced at the request of Costa Rica and is based on the Secretariat's evaluation report that was part of Costa Rica's accession review in the field of scientific and technological policy dating from 2018[1]. References to more recent developments available through Costa Rica's response to the OECD-EU STI policy survey in the STIP Compass Database through December 2020 have also been incorporated into this Summary.

Over the course of the accession review process and subsequently, Costa Rica has taken significant measures to align its national innovation system's framework and practices with OECD standards.

This summary of the CSTP assessment also includes a number of recommendations for continued improvement highlighted in the original accession assessment, with a view to ensuring that Costa Rica's policies, regulations and practices in the area of science and technology support the societal, economic and sustainability objectives of the country In the future, as an OECD Member, Costa Rica will have the opportunity to further benefit from the reform experiences and expertise of its peers as it pursues its reforms in the area of science and technology.

The principal authors of this summary are Alan Paic and Mario Cervantes, with input from Fernando Galindo Rueda on the statistical assessment, under the oversight of Alessandra Colecchia, Science and Technology Policy Division of the OECD Directorate for Science, Technology and Innovation.

[1] Successive versions of the review informed accession discussions on Costa Rica held by CSTP and its Working party on Bio, Nano and Converging Technologies [BNCT] in April 2016 and October 2018, and its conclusions and recommendations reflect both bodies' assessments.

Summary of the CSTP assessment of Costa Rica's policies and practices relative to the implementation of OECD legal instruments in science and technology, including biotechnology.

1. Introduction

1. The present document summarises the CSTP's assessment of Costa Rica's willingness and ability to implement the substantive OECD legal instruments within the competence of the CSTP as well as of its policies and practices as compared to OECD policies and practices. The document draws on the CSTP formal opinion, which itself was based on the CSTP preliminary examination report, the technical opinion of the CSTP Working Party on Bio, Nano and Converging Technologies (BNCT) and the information collected during the fact-finding mission to Costa Rica in 2017.

2. Costa Rica is committed to developing and implementing science and technology policies that are in line with best practices in most OECD countries. Throughout the accession process, discussions with government stakeholders highlighted the initiatives that Costa Rica has taken to support its transition towards a knowledge-based economy. Among these were the "XXI Century Strategy: Knowledge and Innovation in 2050 in Costa Rica", and the Costa Rican National Plan for STI (NPSTI) which introduced a number of policy initiatives for increasing investment in human capital and research infrastructure until 2020.

3. The XXI Century Strategy of the Ministry of Science, Technology and Telecommunications (MICITT) strives to strengthen science-industry linkages, establish evidence-based policy making, and optimise the generation, diffusion and utilisation of knowledge in the business sector. The Strategy highlights the need for Costa Rica to become a digital society, based on an inclusive approach to access, use and appropriation of digital technologies. Costa Rica has also taken steps to develop mechanisms for citizen participation in STI policy making.

4. However, a number of challenges remain for Costa Rica, as identified in the OECD Reviews of Innovation Policy: Costa Rica 2017 (OECD, 2017a), including the fragmentation of governance of research and innovation, low business R&D investment, and weak science-industry linkages. R&D spending in the business sector is particularly low, which is a significant obstacle for Costa Rica to reach its ambitious R&D spending objectives, as laid out in the National Plan for STI. Technology transfer and co-operation between Multinational Enterprises (MNEs) and domestic firms as well as between universities and firms remain underdeveloped. Strengthening industry-science linkages, including the development of applied research institutions and technology extension services, and better aligning skills provision with industry demand, will be imperative to reach the goals outlined in Costa Rica's XXI Century Strategy as well as in its National Plan for STI.

5. At the beginning of October 2019 the country engaged in a legislative process to reform its National Council for Scientific and Technological Research (CONICIT) into a Research and Innovation Agency. If the bill is approved, the new Agency will be responsible for the implementation of different national instruments and programs that aim to boost research, innovation, human capital and start-ups[2]. In 2020-21, the Ministry of Science, Technology and Telecommunications developed a series of workshops regarding the necessary amendments required to align the Costa Rican legal framework with the

[2] By the time this document was approved in 2021 this bill was under discussion in Parliament.

OECD policies in the field of science and Technology in particular as regards the Recommendation on the Governance of Clinical Trials; the Recommendation of the Council on Quality Assurance in Molecular Genetic Testing and the Recommendation on Human Biobanks and Genetic Research Databases.

6. 2. Assessment by the CSTP +of Costa Rica's position with respect to general OECD legal instruments in the area of science and technology To assist the CSTP in its evaluation of the country's willingness and ability to implement the substantive OECD legal instruments under the Committee's responsibility, as well as Costa Rica's policies and practices compared to OECD best policies and practices in this area, Costa Rica was requested to respond to two accession questionnaires in order to provide information on its scientific, technological and innovation policies. The questionnaires covered:

- The position with respect to, and policy consistency with, OECD legal instruments in the area of scientific and technological policy under the direct responsibility of the CSTP.
- The position with respect to, and policy consistency with OECD legal instruments in the area of biotechnology under the direct responsibility of the CSTP's working party, BNCT.
- General information on Costa Rica's national innovation system; scientific and technological policies and governance.
- The availability of statistical information and indicators on science, technology and innovation consistent with OECD methodologies and standards.

7. On the basis of a preliminary examination report and Costa Rica's response to the CSTP and BNCT accession questionnaires, the CSTP held its initial accession examination of Costa Rica at its 109th Session on 26 October 2016. During the examination discussion the Committee concluded that the initial accession examination of Costa Rica was satisfactory.

8. The Secretariat then conducted a fact-finding mission to Costa Rica on 6-8 February 2017. During discussions with policy makers, businesses, academics and other stakeholders, the Secretariat was able to confirm existing information and gain further insights on Costa Rica's willingness and ability to implement the OECD legal instruments in science and technology including biotechnology.

9. As part of its final assessment, known as the formal opinion, the CSTP concluded that Costa Rica was willing and able to implement the OECD legal instruments and highlighted the country's willingness to implement its action plan and new timelines to accelerate the process of implementation of the OECD legal instruments in the area of science and technology, including biotechnology. The following sections are extracted from the formal opinion and describe the state of Costa Rica's position vis-à-vis the OECD instruments at the time of the assessment by the CSTP.

2.1 Recommendation of the Council concerning a General Framework of Principles for International Co-operation in Science and Technology [OECD/LEGAL/0237]

10. As a small economy, Costa Rica faces strong incentives to collaborate internationally in science and technology (S&T). A number of specific policies address international co-operation in S&T. Costa Rica has a policy for international cooperation in S&T for the period 2015-21 that aims to promote graduate training, public-private partnerships, research and development (R&D) and investment in research infrastructure. MICITT is responsible for scientific scholarships supporting stays abroad of lecturers and

researchers. A loan contract between the government and the Inter-American Development Bank (IADB) supports research stays abroad of Costa Rican researchers.

11. At the institutional level, publicly funded doctoral programmes (e.g. at the Costa Rica Institute of Technology) require students to participate in international exchanges. In common with many OECD Members, Costa Rica has entered into a number of bilateral science and technology agreements. These include co-operation agreements between Costa Rica and India, the People's Republic of China, and Uruguay, among others.

12. Several institutions provide support for the development and maintenance of research infrastructure and equipment, e.g. the Incentive Fund for Science and Technology of the MICITT whose funds are allocated by the National Council for S&T (CONICIT). Against a backdrop of obsolete research infrastructure and lack of research equipment, in 2013, the government of Costa Rica, in co-operation with the biggest public universities, established a project that aims to increase public investment in research infrastructure. Financed by a loan from the World Bank, the project supports networks of excellence between researchers from Costa Rica and institutes around the world. However, there is a lack of government policy that encourages international co-operation in research infrastructure, and the maintenance of the research infrastructure depends on higher education institutions (HEIs) themselves[3]. In terms of access to Costa Rican research infrastructure, foreign researchers can access national research funding from the state budget if they are employed by Costa Rican research institutions.

13. When allocating funds to research projects, universities normally take into consideration publication in international scientific journals of researchers. Furthermore, international collaboration and international research funds are on the rise and competitive funding systems at public universities reward research proposals that include publications in international scientific literature.

2.2 Recommendation of the Council concerning Principles for Facilitating International Technology Co-operation Involving Enterprises [OECD/LEGAL/0282]

14. Costa Rica has attracted many multinational enterprises (MNEs) in advanced manufacturing industries (e.g. Information and communication technologies – ICT – and medical devices). However, the participation of Costa Rican firms in international technological co-operation remains a policy challenge due to a low level of domestic business R&D and a lack of technology transfer from MNEs to Costa Rican firms. A loan programme (funded by an IADB loan) supports in-house R&D activities in small and medium-sized enterprises (SMEs) if they engage in technology development or technology transfer with public research institutes (PRIs)[4]. However, there are presently no specific cluster policies or policies that facilitate the participation of SMEs in co-operative R&D projects involving public research.

15. Costa Rica recognises the importance of international technology co-operation among enterprises as well as between enterprises and public research. Bearing in mind the OECD Recommendation, the government is committed to carrying out reforms of the relevant legal framework in order to facilitate co-operation among enterprises, and between enterprises and public research institutions, as well as to create incentives for researchers

[3] MICITT has worked on multilateral mechanisms to improve this point, including the participation of Costa Rica in the "ResInfra" project in partnership with CELAC nations and the European Union.

[4] A feature of PRIs in Costa Rica is that most of them are technical institutes providing services for companies, e.g. biological analysis on seeds.

to engage in co-operation with industry. It further commits to promoting the formation of innovation clusters aimed at new high-tech sectors in order to support technological transfer between high-tech SMEs, MNEs, HEIs, and PRIs.

2.3 Recommendation of the Council concerning Access to Research Data from Public Funding [OECD/LEGAL0347].

16. Costa Rica recognises the importance of open access to publicly funded research results, although presently it does not have any specific legal framework or policies promoting open access to publicly funded research. The existing legal framework requires that publicly funded technology platforms should be open to the public, but this does not specifically relate to science and research data (see Decree 38276 RE of the Ministry of National Planning and Economy - MIDEPLAN – as well as MICITT).

17. However, in 2017 the country implemented a National Research Policy towards Excellent Science that contains initiatives on open data and open access reflecting the principles of the OECD Recommendation.

18. The extended timeframe for implementation until the end of 2021 was requested because the implementation of a national repository requires regulatory and administrative changes, such as explicit institutional agreements on the terms of access and use of research results and data as well as the protection of intellectual property to be implemented at the academic institutions and public research institutions. Costa Rica subsequently established a detailed roadmap for the implementation of its National Research Policy and was able to shorten the requested timeframe for implementation – initially set until the end of 2022 - by one year. It now commits to fully implementing the Recommendation by 2021.

19. Discussions with various stakeholders from the MICITT and leading universities informed the country's state of implementation with regard to access to research data. The national repository (KIMUK) became operational in 2016, and is presently mostly used for publications. It was to be expanded by 2018 to include the institutional repositories of publications and data of all four leading public universities. There will be an incentive for researchers to intend to include their production in KIMUK, since they will be evaluated on the basis of publications in the national repository. The idea was that by 2020, the national repository, KIMUK, would be integrated into a national STI information service which was being developed by MICITT in co-operation with the Korean Institute of Science and Technology Information (KISTI). In order to make the institutional reforms sustainable, a national open data access policy was to be drafted by 2018, and a Bill of Law to be introduced by 2022.

2.4 Recommendation of the Council on the Governance of Clinical Trials [OECD/LEGAL/0397]

20. The timeframe to implement by 2020 was requested in order to adopt and implement new regulations on risk assessment principles and procedures as well as risk categories, taking into account the different needs of the relevant stakeholders.

21. The Costa Rican Law on Biomedical Research regulates the conduct of clinical trials of medical products. The existing legislation covers issues such as ethical reviews, permits for clinical trials, informed consent, and safety reporting. The National Council for Health Research (CONIS), supported by the Ministry of Health, is responsible for the oversight and management of clinical trials, including risk assessment, trial registries, and approvals. It does so in close consultation with the Ministry of Science, Technology and Telecommunications. Clinical trials must receive approval from the National Council for Health Research, and must meet the requirements of good clinical practice.

22. The Costa Rican Scientific Ethics Committee (CEC) is responsible for ensuring that biomedical research respects the basic principles of life, health, human dignity as well as good clinical practice. It can suspend or cancel a biomedical research project at any time.

23. The Law on Biomedical Research has been in place since 2014, and this regulation has introduced significant flexibility compared with the previous legislation which was very restrictive. Clinical practice follows the international standards of the Good Clinical Practice (GCP) Conference. GCP includes standards set by the Council for International Organizations of Medical Sciences (CIOMS) and good clinical practices established by the International Conference on the Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH).

24. The current legal framework does not include risk categories for clinical trials, nor does it establish risk assessment principles and procedures. However, the Government of Costa Rica is in the process of defining a legal framework that includes risk categories and risk assessment principles for clinical trials based on international standards.

25. Concretely, Costa Rican authorities stated that they intended to strengthen the supervisory capabilities of the independent National Council for Health Research (CONIS) by the end of 2017, and of the Scientific-Ethics Committee (CEC) by 2019. The Clinical Trial Regulation was to be introduced in 2017, the National Clinical Trial Regulation in 2018, and a Reform of the Law of Biomedical Research by 2020. A detailed roadmap for this process was presented to the CSTP.

26. In 2021, Costa Rica intends to strengthen its framework to align with the Recommendation of the Council on the Governance of Clinical Trials [OECD/LEGAL/0397] in the context of efforts to support regulatory reform on biomedical research to facilitate and accelerate the approval of Covid-19 and other clinical trials in line with international standards. Specifically, Costa Rica is making an amendment to the Regulation to the Biomedical Research Regulatory Law No. 39061-S, in order to specify that the Scientific Ethics Committees (CECs), during the process of analysis and approval of the investigations, must evaluate and categorize the risk each investigation involves. For this purpose, the Committees may use the parameters defined in the Risk Analysis Guide that will be issued by CONIS. This analysis and risk assessment must have the proper scientific justification.

2.5 Daejeon Declaration on Science, Technology and Innovation Policies for the Global and Digital Age [OECD/LEGAL/O416]

27. Costa Rica adopted the Declaration at the OECD Meeting at Ministerial level on Creating our Common Future through Science, Technology and Innovation held on 20-21 October 2015 in Daejeon, Korea.

28. Through the Daejeon Declaration Adherents affirm a shared vision of the importance of science and technology to economic development and for addressing global challenges. Adherents also recognise the importance of open science and international co-operation and recognise that changes brought about by globalisation and digitalisation require changes in national polices and instruments with examples. In this context, Costa Rica's National Plan for STI 2015-2021 aims to implement an open access policy towards publicly funded research that is in line with the Daejeon Declaration. The National Plan for STI 2015-2021 also aims to implement a National Information System for Science and Technology (SINCYT). SINCYT will collect information on R&D projects, research infrastructure, as well as patents and publications from publicly funded research. The information will help improve the monitoring of R&D activities by the government.

29. Like many OECD Members, Costa Rica has entered into a number of international co-operation agreements on STI. These include bilateral co-operation agreements signed with the Ministry of Foreign Affairs and International Development of France, with the Federal Ministry of Education and Research of Germany, and with the Ministry of Science and Technology of the People's Republic of China.

30. As regards policies for the next production revolution and digitalisation, MICITT launched in October 2018 the Digital Transformation Strategy: The Bicentennial of Costa Rica 4.0. This strategy contains the country's vision and proposes the lines of actions needed to drive Costa Rican society towards the new digital economy and to address country challenges, by making a better use of digital technologies in the government, the private sector and society as a whole. Costa Rica 4.0 requires new approaches in practically all STI policies. It highlights the need to promote data science for decision-making and risk management, together with interoperability and data exploitation solutions through technologies such as artificial intelligence and big data.

31. Costa Rica is working on the development of the National Center of Artificial Intelligence (NCAI) that best fits the country's context. The aim is to establish a physical space, infrastructure and a suitable IT architecture and equipment to host computer systems and programs. The center will promote culture and regulation adapted to international standards on the use, exchange and protection of personal data. Moreover, it seeks to strengthen the technical skills and knowledge of professionals in public institutions, both within and beyond NCAI. In 2019, Costa Rica signed a Letter of Intent with the Artificial Intelligence section at the Prime Minister's office of the United Arab Emirates for NCAI staff to exchange experiences and scientific-technological information and training, in the areas of data mining and big data. This agreement will facilitate the participation in seminars and conferences, allowing researchers to monitor the state-of-the-art in this field at the national and international level.

32. Concerning scientific advice, the National Academy of Sciences advises the Costa Rican Parliament and the Costa Rican Government on issues relating to research and innovation. It is also responsible for conducting research evaluations. Beyond its main function as a public funding agency, the National Council for S&T Research (CONICIT) provides policy advice to the government with regard to STI. Finally, as part of Costa Rica's response to COVID19, the country has developed national guidelines for the surveillance of COVID-19. The guidelines include general characteristics, operative definitions, epidemiological surveillance procedures, and social risk communication and were elaborated by a working team made up of researchers and professionals of different institutions (Ministry of Health, Costa Rican Social Security Department, Institute for Research and Teaching in Nutrition and Health (INCIENSA), Costa Rica University with the advice of the Pan-American Health Organization).

3. Assessment by the CSTP of Costa Rica's position with respect to OECD legal instruments in the field of biotechnology[5]

3.1 Recommendation of the Council on the Licensing of Genetic Inventions [OECD/LEGAL/0342]

33. Regarding concrete action to accelerate policy implementation, an inter-ministerial committee was to be established in 2017 to introduce institutional reforms in support of the licensing of inventions at public research institutes, technology transfer offices, regulatory

[5] The assessment set out in Section 3 is based on the technical opinion of the BNCT.

authorities and supervision entities. The purpose was to provide guidelines and best practices with regard to clear ownership of genetic inventions and clear obligations to commercialise. Following the stock-taking of current regulations, analysis and prioritisation of the reform in 2017, the actual regulatory reform was to begin, in co-ordination with other Ministries, in 2018. However, in order to make the reform sustainable, a Bill of Law was to be introduced by 2022.

34. On the basis of the information provided, Costa Rica is at the early stages of policy implementation and operation.

3.2 Recommendation of the Council on Quality Assurance in Molecular Genetic Testing [OECD/LEGAL/0350]

35. The extended timeframe to the end of 2021 is required to reform the accreditation and certification body. In terms of concrete implementation, Costa Rica plans to strengthen the accreditation and certification body (Ente Costarricense de Acreditacion, ECA) to implement the Recommendation in the accreditation process. An ad hoc commission was to be created in 2017. Training and support for careers in genetics at universities was to be provided by 2019, and approved by 2021. In parallel, a reform of the Decree of Professional Bodies and new regulation for ECA is to be implemented by 2022.

3.3 Recommendation of the Council on Human Biobanks and Genetic Research Databases (HBGRD)[OECD/LEGAL/0375]

36. Costa Rica noted that a timeframe by the end of 2020 was required to introduce regulatory changes to the Law of Biomedical Research. On the organisational aspect, a pilot study was to be carried out at the San Juan de Dios Hospital in 2017, in order to generate a model, and later replicate it in other institutions. A public network of biological resource centres and biobanks was to be established by 2020. Costa Rica also reported on international co-operation with other biobanks and provided specific examples were cited such as a Spanish model of collective biobanks at hospital clinics, notably at Hospital Santa Fe in Valencia, Spain. This example demonstrated the intention to conform with international best practices on access to biological material and information. On the legal front, Costa Rica was to establish an inter-institutional process to elaborate new regulations in 2017. Those institutional regulations were expected to be approved by 2019, while national regulations were to be approved by 2021.

3.4 Recommendation of the Council on Assessing the Sustainability of Bio-based Products [OECD/LEGAL/0395]

37. The extended timeframe to end 2021 is needed to expand the mandate of the National Technical Commission for Biosafety to include an assessment of the sustainability of bio-based products. An Inter-ministerial Committee for Bioeconomy was scheduled to be established in 2017. It would involve participation from industry in 2018-19 to discuss changes to the composition of the National Technical Commission for Biosafety (CONAGEBIO), including consumer representatives. Following stock-taking of current regulations, analysis and prioritisation of reform, which took place during 2017, the external regulations about bio-products was to be reformed in co-ordination with Ministries of Environment, Agriculture and Economy by 2019. However, in order to make the reform sustainable, a Bill of Law for Bioeconomy in Costa Rica is scheduled to be introduced by 2021.

38. On the basis of the information provided, Costa Rica was considered at an early stage of policy implementation and operation.

3.5 Recommendation of the Council concerning Safety Considerations for Applications of Recombinant DNA Organisms in Industry, Agriculture and the Environment [OECD/LEGAL/0457]

39. In 2020, the responsibility for the OECD Recommendation on Recombinant DNA was transferred from the CSTP to the Joint Meeting of the Chemicals Committee and the WP on Chemicals, Pesticides and Biotechnology which has been replaced by the Chemicals and Biotechnology Committee as of 1 January 2021. The following section summarises CSTP's assessment on Costa Rica's implementation of that instrument prior to the transfer for responsibility.

40. Costa Rica has demonstrated evidence it complies with international instruments or guidelines concerning the safe use of recombinant DNA organism relevant to the OECD Recommendation, notably: 1) the International Plant Protection Convention (IPPC); and 2) the Convention on Biological Diversity, including the Cartagena Protocol on Biotechnology Safety of the Convention of Biological Diversity, ratified through the national law No. 85373.

41. Costa Rica has specific policies on risk assessment and risk management for the safe use of recombinant DNA organisms such as the National Codex Committee which recognises the Codex guidelines on the development of food safety assessment process. Industrial applications. Examples of appropriate containment measures and Good Industrial Large-Scale Practice (GILSP) were not found in Costa Rica. Costa Rica does have experience with containment measures in clinical laboratories. However, there is a need to elaborate a system for managing industrial applications. In 2016, the Executive Decree No. 393414 established the Regulation for the application of administrative sanctions in matters of unauthorised access to genetic elements and biochemistry established in the Biodiversity Law No. 7788.

42. As regards agricultural and environmental applications, Costa Rica has the following mechanisms to evaluate the potential risks of recombinant DNA organisms for agricultural and environmental applications.

43. In 2006, the National Animal Health Service (SENASA) was established under Law No. 8495, as a regulatory and supervisory body for the use of genetic material of animal origins. Costa Rica noted that it did not, at the time of the CSTP assessment, have a system in place to assess and authorise the use of GM animals.

44. On the basis of the information provided, Costa Rica appeared willing and able to implement this Recommendation. Costa Rica is in an advanced stage of policy implementation and operation.

3.6 Recommendation of the Council on Responsible Research and Innovation in Neurotechnology [OECD/LEGAL/0457]

45. The Recommendation on Responsible Innovation in Neurotechnology, the first international standard in this domain, aims to help governments and innovators anticipate and address the various ethical, legal and social challenges raised by new neurotechnologies, while still promoting innovation in the field. As noted in its position, Costa Rica embraces the nine principles outlined in this Recommendation through Law No. 9234 of 2014 (Biomedical Research Regulatory Law), setting the legal framework of clinical trials in Costa Rica. This Law, inter alia, integrates ethical considerations in clinical trials for neurotechnology; enables capacities of oversight and advisory bodies to enforce and to establish accountability mechanisms; and protects the use of personal brain data in Costa Rica by establishing that the use of information and data related to people's health is

prohibited, for purposes not contemplated or permitted in the informed consent or in the law.

46. Societies are confronted with health and economic challenges of an ageing population and the increasing prevalence of mental and neurological disorders. In Costa Rica the number of older people (65 years or above) doubled in the past 20 years (221 000 in 2000 to 449 000 in 2019). Costa Rica has been among the first low or middle-income countries that developed an Alzheimer's action plan in 2014. The Costa Rica Mental Health Policy 2012-2021 (Política Nacional de Salud Mental 2012-2021, San José, Costa Rica: El Ministerio, 2012) has been an important instrument for addressing pressing mental health issues in the country. In the last decade the life sciences and technology sector has been a major driver of international collaboration and innovation in Costa Rica. The Brain Awareness Week (2018), organised by the Neuroscience Research Center at the University of Costa Rica, the use of electronic health records in clinics, and the strong representation of companies in area of digital technology are indicators for a strengthening of technology innovation in Costa Rica.

47. As acknowledged in Costa Rica's position, there is a need to increase the number of research facilities for neurotechnology and the Government will thus need to conduct intensive training programs to create capacities to implement and to adapt general regulations and controls to this frontier area of knowledge. There is also further room for improvement in Costa Rica's innovation input and outcome measures, as well as further development of independent, transparent and rigorous processes to assess the cost-effectiveness of health care activities through Health Technology Assessment (HTA).

4. Assessment of Costa Rica's position vis-à-vis internationally comparative statistical information on science, technology and innovation (STI)

4.1 Institutional and legal framework

48. The National Institute of Statistics and Censuses (INEC) is by law the governing body of the National Statistical System and responsible for planning the national statistical activity, while the Unit of Institutional Planning at MICITT is directly responsible for STI statistics.

49. Costa Rica's system of STI statistics and indicators was developed by MICIT relatively late, in 2006, with significant progress made in a short space of time and despite limited resources. Its integration into the overall national statistical system does not appear to be complete, and there is scope for establishing agreements for the exchange of information and collaboration across relevant institutions via data collection and reporting.

50. Compared to OECD Member countries and also other Latin American non-member economies, Costa Rica's statistical infrastructure for STI policies is relatively under-developed, which may hinder the accountability and evaluation of policy impact - and therefore policy learning and adjustment. Costa Rica has in, co-ordination with the Secretariat, adopted an action plan to address these issues, as outlined in Section 4.3.

4.2 Availability and methods used for different types of statistics

Data collection and dissemination

51. MICITT oversees the collection of R&D and innovation data for the business sector in partnership with INEC and CINPE, an academic research centre. Data on human resources in science and technology are collected under the supervision of MICITT and the National Council of Rectors. Indicators are made available in a dedicated statistical report

(MICITT Indicators Report), and in a dedicated and easily accessible website comprising a series of dashboards on activities in the areas of science & technology, R&D, innovation and human resources (MICITT, 2017b). However, the information available through this platform contains virtually no metadata or explanatory notes, which is a major shortcoming and represents a departure from best practice. There are also no links to dedicated websites with the underlying source data. STI indicators are also available through INEC's Statistical Yearbook although the information is not linked to the MICITT website.

Alignment with OECD STI measurement standards

52. The survey questionnaires used by Costa Rica reflect an attempt to comply with OECD guidance as contained in the Frascati Manual and Oslo Manual for R&D and innovation in firms, respectively. The two main survey instruments used for the "institutional" and business sectors are described in (MICITT, 2017a) and refer to OECD and UNESCO standards, as well as regional implementation guidelines developed for the LAC region. The combination of questions on innovation, R&D, and ICT within the same survey aimed at business may not only lead to non-response but also hamper full compliance with the key indicators prioritized by the OECD and the CSTP. In particular, information on R&D in business is significantly compromised as information on sources of funding is only requested for the entire business innovation expenditures, which are notoriously more difficult to measure. This results in a significant coherence challenge between what R&D public administrations report to be funding compared to what firms themselves report receiving from administrations.

53. Survey and data collection implementation also appear to depart from OECD measurement standards in a number of instances. Despite significant progress in recent years, insufficient efforts are currently made to capture the resources dedicated to R&D across the entire economy, especially in the service sector. In addition, sampling methods require clarification to ensure they account for best practice in capturing "rare" phenomena like R&D performance. No evidence has been found of suitably updated registers of likely R&D performers. The use of random sampling without adjustments (no stratification by likely R&D performance, sector or size) appears to lead to significant volatility in the data, thus impinging on validity and accuracy. The experience of some OECD countries in combining R&D and innovation surveys into a single instrument demonstrates this is possible in principle but requires careful design and implementation. The approach towards sampling may also explain the apparently high rates of business innovation and reduce the usefulness of the data to policy makers.

54. For the institutional sector(s), greater and more effective use of administrative data and more thematically targeted survey instruments could provide more robust and reliable data. Project level and budgetary information could be better exploited, leading to better integration of administrative data in the overall STI statistical framework. This would require considerable co-operation with major funding agencies and other ministries. The volatility of non-R&D Science and Technology Activity Data casts considerable doubts on its validity and relevance for policy makers.

55. Costa Rica's collection and reporting of human resources for STI is focused on indicators of R&D personnel on the one hand and new graduates on the other, and uses institutional databases of public and private universities under the supervision of the National Council of Rectors. However, some inconsistencies have been identified across databases, possibly owing to the use of different definitions across institutions. In addition, current reporting does not make any systematic effort to collect information on the entire population of highly qualified individuals (by qualification or occupation, as recommended by the OECD).

56. Currently, Costa Rica does not produce technology statistics on firms engaged in biotechnology or nanotechnology, or statistics on attitudes, perceptions, and engagement regarding science and technology. Data on scientific publications and patents are available from commercial (large indices) and administrative sources, but there appears to be no real integrated dissemination vehicle with wide-ranging indicators from multiple sources on the general state of STI in Costa Rica. On the basis of the information provided and identified online, Costa Rica's adoption of OECD recommended practices on the statistical collection and dissemination of data on science, technology, and innovation data is significant but still partial, leaving considerable room for improvement and international alignment.

International engagement

57. Costa Rica does not yet submit statistics for publication by the OECD and this is being addressed by Costa Rica's roadmap on STI statistics. In 2020, COVID has delayed progress on the roadmap. Data for Costa Rica are published by the Iberoamerican Network for Indicators on S&T (RICYT) and by the UNESCO Institute for Statistics (UIS). Some apparent differences have been found across national and international sources by the OECD team working on the OECD Reviews of Innovation Policy: Costa Rica. Boosting the internal and external coherence of Costa Rica's STI data should be a major priority, and differences should be carefully accounted for and explained in accessible methodological notes.

58. Costa Rica participated for the first time in the meeting of the Working Party of National Experts on Science and Technology Indicators (NESTI) in March 2016, linkages having been established in 2011 as part of joint IADB-RICYT-UIS-OECD efforts to promote the adoption of best practices in innovation surveys in the LAC region.

4.3 Costa Rica's roadmap on STI statistics

59. In order to better align its policies with OECD best practices, a roadmap was agreed with the Costa Rican statistical authorities to comply with the taxonomies within the Oslo Manual and Frascati Manual which qualify different types of business support for innovation. Concrete action points through 2019-20 were identified in discussion with MICITT and other actors within the STI statistics and analysis area. These include the following:

60. Raising awareness of OECD resources such as internal workshops (roadshow seminars) in which OECD standards can be presented and discussed for the benefit of data providers and administrators; OECD will share relevant resources and documents with Costa Rica, e.g. explaining the links between the Frascati Manual and the System of National Accounts.

61. Changes to data collection practices whereby the Central Bank of Costa Rica, MICITT and CINPE should work together to co-ordinate their respective R&D data sources, as well as possible updates to the current innovation survey approach to obtain a detailed picture of R&D performance within Costa Rica's firms.

62. Changes to data analysis and dissemination practices would include the submission of R&D data on an experimental basis to OECD from 2018, while detailed business R&D data was supposed to be available from 2019 but the COVID19 crisis has delayed progress. Costa Rica should make effective use of evaluation requirements embedded in existing Inter-American Development Bank (IADB) loans and benefit from the opportunities of OECD analytical projects to build analytical capabilities as well as a microdata infrastructure suitable for policy analysis. Online platforms and publications showcasing the statistics of Costa Rica's STI system should receive continued support, and fully use

available statistical resources. Mapping of financial flows supporting science, R&D and innovation across the STI system should be particularly encouraged in order to assist prioritisation of monitoring and evaluation work.

63. Costa Rica's commitment to implementing this roadmap shows that the country is on track towards providing statistical data as required from an OECD Members.

64. The findings concerning statistics and the implementation of the concrete action points were fed on a timely basis into the Committee on Statistics and Statistical Policy accession process.

5. Recommendations

65. In light of the above, the CSTP Committee recommended that Costa Rica ensures the implementation of its roadmaps for: i) the Recommendation of the Council concerning Access to Research Data from Public Funding as outlined in Section 2.3; ii) the Recommendation of the Council on the Governance of Clinical Trials as outlined in section 2.4; iii) the Recommendation of the Council on the Licensing of Genetic Inventions as outlined in section 3.1; iv) the Recommendation of the Council on Quality Assurance in Molecular Genetic Testing as outlined in Section 3.2; v) the Recommendation of the Council on Human Biobanks and Genetic Research Databases as outlined in Section 3.3; and vi) the Recommendation of the Council on Assessing the Sustainability of Bio-based Products as outlined in Section 3.4; as well as the measures in order to ensure quality for STI statistics discussed in section 4.3 above.

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