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Globalization and interdependence: science and technology for development

Science and technology for development

Report of the Secretary-General

Summary

The present report, submitted in response to General Assembly resolution [66/211](#), provides information on the recent work of the Commission on Science and Technology for Development, the United Nations Conference on Trade and Development and other relevant United Nations organizations to assist developing countries in their efforts to increase science and technology capacity, acquire technologies, accumulate technological know-how, apply science and technology policies to address development issues and integrate such policies into their respective national development plans and strategies.

* [A/68/150](#).



I. Introduction

1. The present report responds to paragraph 11 of General Assembly resolution [66/211](#), in which the Secretary-General was requested to report to the Assembly at its sixty-eighth session on the implementation of the resolution and recommendations for future follow-up, including lessons learned in integrating science, technology and innovation policies into national development strategies.

2. In resolution [66/211](#), the General Assembly recognized the vital role that science and technology can play in development and in facilitating efforts to eradicate poverty, achieve food security, fight diseases, improve education, protect the environment and improve productivity and competitiveness. Concerned that many developing countries lack affordable access to information and communications technologies, the Assembly encouraged the international community to promote access to such technologies for developing countries.

3. To enable developing countries to promote science and technology capacity, the General Assembly reaffirmed its commitment to strengthen and enhance existing mechanisms and to support initiatives for research and development, to address the special needs of developing countries in the areas of health, agriculture, conservation, sustainable use of natural resources and environmental management, energy, forestry and the impact of climate change. It also reaffirmed its commitment to:

(a) Promote the diffusion and transfer of technologies, including environmentally sound technologies, and the corresponding know-how, to developing countries, including through the engagement of the private sector;

(b) Promote and support greater efforts to develop renewable sources of energy, including appropriate technology;

(c) Implement policies to attract public and private investment that enhances knowledge;

(d) Support the efforts of developing countries to harness new agricultural technologies.

4. The General Assembly also requested the Commission on Science and Technology for Development to continue to assist the Economic and Social Council as the focal point in the system-wide follow-up to the outcomes of the World Summit on the Information Society and to address within its mandate the special needs of developing countries in areas such as agriculture, rural development, information and communications technologies and environmental management. In addition, the Assembly encouraged the United Nations Conference on Trade and Development (UNCTAD), in collaboration with relevant partners, to continue to undertake science, technology and innovation policy reviews, with a view to assisting developing countries in identifying the measures that are needed to integrate science, technology and innovation policies into their national development strategies.

II. Contribution of the Commission on Science and Technology for Development

5. Following the adoption of General Assembly resolution [66/211](#) in December 2011, the Commission on Science and Technology for Development, as the torch-bearer of the United Nations system for science, technology and innovation issues, continued to provide a forum for the examination of science and technology questions, advancement of the understanding of science and technology policies and their implications for development, especially in developing countries, and the formulation of recommendations and guidelines in this field. The Commission also continued to serve as the focal point for the follow-up to the outcomes of the World Summit on the Information Society.

6. This section outlines the contribution of the fifteenth and sixteenth sessions of the Commission in addressing the special needs of developing countries in areas such as agriculture, rural development, information and communications technologies and environmental management, as well as the Commission's work on the follow-up to the outcomes of the World Summit on the Information Society. It also provides information on the Commission's work on promoting dialogue, consensus-building and contributions to the post-2015 development agenda.

A. Policy discussions and dialogue in the Commission on Science and Technology for Development

7. The two priority themes of the Commission on Science and Technology for Development at its fifteenth session (21 to 25 May 2012) were: "Innovation, research, technology transfer for mutual advantage, entrepreneurship and collaborative development in the information society" and "Open access, virtual science libraries, geospatial analysis and other complementary information and communications technology and science, technology, engineering and mathematics assets to address development issues, with particular attention to education". The sixteenth session of the Commission, held from 3 to 7 June 2013, was tasked with the consideration of two priority themes, namely: "Science, technology and innovation for sustainable cities and peri-urban communities" and "Internet broadband for an inclusive digital society".

Fifteenth session

8. The creation of innovation capabilities rests on the availability of collaborative learning environments that promote interaction and the sharing of knowledge and know-how in order to enhance the overall absorption capacity of the innovation system in question. Such collaborative learning processes are intricately linked to research capacity, technology transfer and entrepreneurship, all of which contribute to and are enriched by collaborative learning environments. Countries are often constrained in their efforts to promote innovation through research, technology transfer and entrepreneurship by binding factors that are both institutional and human-resource-related. Policy frameworks that foster collaboration between research institutes and universities and the private sector, through a variety of means, including mobility of ideas and human skills, are very important.

9. The Commission's policy discussions on the theme "Innovation, research, technology transfer for mutual advantage, entrepreneurship and collaborative development in the information society" highlighted the importance of information and communications technology (ICT) capacities in developing countries to promote networking and collaborative learning for catching up and leapfrogging on the road to building knowledge societies (see [E/CN.16/2012/2](#)). For example, ICT platforms involving national research institutes and universities, as well as international research networks, can foster collaborative learning.

10. One of the key findings was that understanding the specific ways in which developing countries and least developed countries adapt ICTs such as open source software and social networks for building capabilities is critical. It is particularly useful to provide insights on establishing other types of knowledge generation and knowledge exchange activities that support development. Similarly, there is a need to understand and map the factors that stimulate innovation in contexts that have many constraints. Identifying factors that stimulate innovation despite such constraints yields important lessons for the rest of the developing world.

11. The debate on the theme "Open access, virtual science libraries, geospatial analysis and other complementary information and communications technology and science, technology, engineering and mathematics assets to address development issues, with particular attention to education" addressed the key question as to how the barriers to accessing high-quality education in developing countries can be overcome and whether open access tools can help to address some of the issues. Participants noted that school enrolment rates, especially for secondary and tertiary education, remain significantly lower than global averages in the developing world and that a significant percentage of children are out of school. They stressed the need to enable widespread access to knowledge and learning, particularly in the fields of science, technology, engineering and mathematics, since education is a key element of development. ICTs play an important role in this context, especially if they are linked with education and development policies.

12. Participants focused on the potential of open access, virtual science libraries, Geographic Information Systems (GIS) and geospatial analysis applications to enhance education and promote the exchange of knowledge. Discussions on this theme established that the number of open-access articles on the Internet has been rapidly increasing and that there are different levels of open access. Some fields of science, such as biomedicine, are more widely represented in open-access journals. In 2011, the number of commercial open-access publishers had caught up with academic or professional open-access publishers and there were already more online-only articles than print journal articles with open-access content online.

13. Open access improves the speed, efficiency and efficacy of research and enables interdisciplinary research, thereby increasing the impact of research especially for researchers in developing countries. Similarly, national or international virtual science libraries can enhance knowledge exchange and open-access search capabilities for researchers in developing countries. In terms of policy implications, the debate stressed that making open access mandatory (for example, requiring scientists to use it) would be sufficient to ensure a large amount of open-access content. In addition, it is important to ensure that there is open access for all publicly funded research, which could lead to the overall development of open-access mechanisms.

14. Participants also highlighted the importance of GIS applications and geospatial technologies for many sectors of society and their potential to overcome development challenges (see [E/CN.16/2012/3](#)). They underlined that the potential uses of GIS cover the analysis of urban poverty dynamics, monitoring urban infrastructure and services, urban transport and mobility solutions, land administration and disaster risk management. Obtaining, storing and disseminating geographic data, including remote-sensing data, is critical to facilitate the widespread use of geospatial solutions that use advanced, multi-layer methods of analysis to manage complex problems.

15. The policy debates on both priority themes of the fifteenth session found that in order to effectively introduce ICTs in the learning process, it is necessary not only to deploy technologies but also to develop human capacity, educational framework conditions, infrastructure and national policies.¹ For example, open access and virtual science libraries help to increase and extend knowledge flows, but they will have limited impact without the necessary human capacity and educational framework to make use of them. This highlights the importance of promoting and developing national strategies for human resources as a primary driver of national ICT capacity-building.

16. Participants in the fifteenth session recommended that Governments leverage ICT platforms in an inclusive and collaborative manner, involving relevant national and international stakeholders, to promote collaborative learning. They stressed the need to overcome both the infrastructure and content divides that prevent countries from taking advantage of such platforms. Participants also called upon research bodies to make their work freely available online. In the context of promoting the usage of GIS, they stressed the key role of awareness-raising through education, as well as data collection. Lastly, they encouraged the establishment of the necessary institutional framework to facilitate cooperation, sharing of scarce resources and information exchange.

Sixteenth session

17. The work on the priority theme “Science, technology and innovation for sustainable cities and peri-urban communities” focused on how science, technology and innovation can provide solutions to address the challenges of rapid urbanization in developing countries (see [E/CN.16/2013/2](#)). Urbanizing at unprecedented rates, developing countries find themselves at a crossroads regarding how best to address many of the issues of economic development. While cities are engines of growth, reaping benefits resulting from both the scale and scope of economic activities, the challenge for Governments in terms of providing safe housing, physical infrastructure and public services (including health care and education) is daunting.

18. The debate highlighted that, often, the inability of cities in developing countries to cope with the pressures of urbanization not only results in large-scale public infrastructure problems, but it has serious implications for energy use and environmental management as well. Unplanned city growth can result in damage to the peripheral areas of cities, the so-called peri-urban communities, which not only provide a range of services to cities, but are also often environmentally important

¹ Taking into account the views expressed by member States in these policy debates, the secretariat of the Commission finalized the Secretary-General’s reports on the priority themes (see [E/CN.16/2012/2](#) and [E/CN.16/2012/3](#)).

for the region. The policy discussions on this priority theme therefore focused on (a) identifying the key challenges that developing countries face in designing and building sustainable cities; and (b) analysing ways in which science, technology and innovation can help to alleviate those challenges in order to not only promote sustainable development, but also help to achieve several of the Millennium Development Goals, especially those relating to poverty, education and health.

19. Participants and experts identified a series of science and technology options that can assist in addressing the challenges of urbanization, including Internet and communication technologies, technological solutions for sustainable mobility, sustainable urban resource management and, lastly, the use of technology and innovation for improved urban governance by way of, inter alia, spatial planning, disaster management and efficient building design.

20. Participants noted that the use of science, technology and innovation in the urban context includes the application of high technology as well as low technology and innovative approaches to urban planning and institutional innovation. They also noted that the challenges of cities in developing countries, in particular least developed countries, differ widely from those of developed countries and therefore call for specific policy responses aimed at bridging the urban divide. In a large number of developing countries and least developed countries, in particular, the urban divide also manifests itself through the digital divide, where a large number of the urban citizens (the so-called urban “have nots”) do not have access to ICTs, health care, education and other essential services.

21. The policy debates on the theme “Internet broadband for an inclusive digital society” focused on exploring the nature of the broadband divide and its implications for inclusive development (see [E/CN.16/2013/3](#)). Broadband technologies have become increasingly important not only for the global knowledge economy contributing to the economic and social development of countries, but also for a range of social services delivered through the Internet that have begun to rely on broadband access in the developed world. These include services relating to education, health care, social and cultural enrichment and political engagement. However, access to broadband technologies is uneven across the developing world. Several developing countries, particularly least developed countries, have an extremely low rate of broadband penetration.

22. Highlighting that, in many ways, the broadband divide represents a specific intensification of the existing digital divide, participants elaborated on issues of inclusiveness in broadband development that currently confront the international community. At the global level, the issue is one of promoting equitable broadband development in all countries. Within countries, the broadband divide manifests itself in several ways: not only is there a problem of overall access to broadband services (owing to high Internet prices, elevated infrastructure costs, the lack of an enabling environment and low digital literacy rates), but there is also a divide between the urban and rural regions, which often affects the provision of social services to the areas that need it most in the developing world.

23. Participants emphasized the need for a systematic approach to address the broadband divide that focuses on the broadband ecosystem. They also stressed the need to address regulatory and coordination aspects that broadband policy frameworks need to deal with. The discussion highlighted existing national broadband strategies and plans, citing examples from countries that have recently

embarked upon the task of creating a comprehensive framework for broadband development, in order to promote the sharing of policy practices on this issue (see [E/CN.16/2013/3](#)). The discussions in the Commission complemented the efforts of other international organizations such as the Broadband Commission for Digital Development, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Telecommunication Union (ITU), which have conducted important initiatives in order to assess the effects of Internet deployment and penetration, such as the Partnership on Measuring ICT for Development.

24. Participants in the sixteenth session recommended that Governments establish regulatory frameworks that support cooperation and knowledge exchange on urban sustainability. Public-private partnerships, higher education and vocational training, international, national and local government networks, and urban planning at the regional level were considered possible pathways to sustainable cities. The participants emphasized the importance of addressing the special needs of lower-income households in slums. They also called upon the international community to explore innovative financing models for science, technology and innovation-based solutions to address sustainable development challenges and to establish open repositories to share best science, technology and innovation-based practices for the particular needs of developing countries.

B. Follow-up to the outcomes of the World Summit on the Information Society

25. As per the mandate accorded by the Economic and Social Council and the General Assembly, the Commission on Science and Technology for Development served as the focal point in the system-wide follow-up to the outcomes of the World Summit on the Information Society.² In the current biennial period (2012-2013), the Commission's work on that follow-up covered three pillars: (a) conducting research and annual reporting on follow-up to the Summit outcomes; (b) promoting dialogue and building consensus on furthering the implementation of the Summit outcomes; and (c) preparation for the World Summit on the Information Society Review Process, which will take place in 2015.

26. In 2012 and 2013, the Secretary-General issued an annual report entitled "Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels" (see [A/67/66-E/2012/49](#) and [A/68/65-E/2013/11](#)). These reports contain information provided by entities in the United Nations system, as well as other stakeholders, on their efforts during the previous year to implement Summit outcomes, with a view to sharing effective practices and lessons learned. The entities that contributed to the 2012 report include: Africa ICT Alliance, Association for Progressive Communications, Council of Europe, Department of Economic and Social Affairs of the Secretariat, Economic Commission for Africa, Economic Commission for Europe, Economic Commission for Latin America and the Caribbean, Economic and Social Commission for Asia and the Pacific, Economic and Social Commission for Western Asia, the Food and Agriculture Organization of the United Nations (FAO), Global Alliance for ICT and Development, Internet Corporation for Assigned Names

² See Economic and Social Council resolution 2006/46, as well as subsequent Council and General Assembly resolutions, including Assembly resolution 66/211.

and Numbers, International Chamber of Commerce — Business Action to Support the Information Society, Internet Governance Forum, Internet Society, ITU, Telefónica, UNCTAD, United Nations Environment Programme (UNEP), UNESCO, United Nations Industrial Development Organization (UNIDO), Universal Postal Union (UPU), World Bank, World Health Organization (WHO), World Intellectual Property Organization (WIPO), World Meteorological Organization (WMO) and World Trade Organization (WTO).

27. In response to the concerns expressed about the digital divide in General Assembly resolution [66/211](#), the 2011 report of the Secretary-General highlighted the vital role of the exceptional growth of mobile networks and cellular subscriptions in developing countries to enable access to ICTs. It noted the relatively unexpected growth of mobile Internet, social networking and innovations such as cloud computing. It called upon Governments and development partners to focus on understanding interactions between technology and other social, economic, cultural and legal factors and to integrate ICT policy into policies in other domains. The report also mentioned the need to increase technological, legislative and human capacity to achieve progress in the Summit outcomes.

28. In the context of preparations for the World Summit on the Information Society Review Process, during the fifteenth and sixteenth sessions of the Commission, participants underlined the need to include new technological and market changes that have taken place since the Summit in indicators that measure Summit outcomes and recognized the value of the Internet Governance Forum and the World Summit on the Information Society Forum for multi-stakeholder dialogue. Lastly, in accordance with paragraph 2 of resolution [66/211](#), the report pointed to the need to link the Summit Review Process with the review of the Millennium Development Goals in 2014-2015.

29. At the fifteenth and sixteenth sessions, member States of the Commission established that some of the Summit targets had already been achieved, but significant challenges remained, particularly regarding the inclusiveness of the information society. They emphasized the importance of multi-stakeholder participation in following up on Summit outcomes and reiterated the need to incorporate ICTs into the post-2015 development agenda by feeding the outcomes of the Summit Review Process into the review of the Goals.

30. Discussions among participants and experts identified trends and developments relating to the Summit, as requested in paragraphs 4 and 10 of resolution [66/211](#). The Secretary-General's reports on the themes "Innovation, research, technology transfer for mutual advantage, entrepreneurship and collaborative development in the information society" ([E/CN.16/2012/2](#)) and "Internet broadband for an inclusive digital society" ([E/CN.16/2013/3](#)) helped to explain the impact and policy implications of ICTs to stimulate innovative capacities and to address economic development, education, health care, social and cultural enrichment and political engagement.

31. The Working Group on Improvements to the Internet Governance Forum, established by the Chair of the Commission within the framework of its mandate on promoting dialogue on furthering the implementation of the Summit outcomes, as mentioned in paragraph 4 of resolution [66/211](#), met five times between February 2011 and February 2012. The Working Group submitted its report ([A/67/65-E/2012/48](#)) at the fifteenth session of the Commission and the substantive session of

the Economic and Social Council, held from 2 to 27 July 2012 in New York. The recommendations contained in the report were subsequently followed up by the Multi-stakeholder Advisory Group of the Internet Governance Forum, which has established a dedicated working group to evaluate and implement the recommendations. The working group undertook an evaluation of the recommendations in March 2013 and has proposed a schedule for their implementation.

32. Furthermore, in response to General Assembly resolution [66/184](#) on information and communications technologies for development, the Chair of the Commission convened a one-day open, inclusive and interactive meeting on 18 May 2012 in Geneva with a view to identifying a shared understanding about enhanced cooperation on public policy issues pertaining to the Internet, in accordance with paragraphs 34 and 35 of the Tunis Agenda for the Information Society. This open consultation was attended by 60 Governments and 80 other participants. At the meeting, delegates suggested a number of topics for further consideration, including the development of overarching principles for enhanced cooperation, the definition of roles and responsibilities of different stakeholder communities, the mapping of existing Internet governance institutions, and the modalities of multilateral and multi-stakeholder approaches.

33. Subsequently, in its resolution [67/195](#) on ICTs for development, the General Assembly invited the Chair of the Commission to establish a working group on enhanced cooperation to examine the mandate of the World Summit on the Information Society regarding enhanced cooperation as contained in the Tunis Agenda. The first meeting of the Working Group on Enhanced Cooperation, composed of 22 member States and, respectively, five representatives from the private sector, civil society, technical and academic communities, and intergovernmental and international organizations, was held on 30 and 31 May 2013 in Geneva. At the meeting, the Working Group discussed a list of potential topics, based on the Commission's above-mentioned open consultation on enhanced cooperation on public policy issues relating to the Internet, and prepared a questionnaire for distribution among stakeholders. The second meeting is scheduled for 6 to 8 November 2013.

34. Going forward, the Commission will organize a substantive discussion during its seventeenth session in 2014 on the progress made in the implementation of the Summit outcomes, with inputs from all facilitators and stakeholders. The outcome of this discussion will feed into the overall review of the implementation of Summit outcomes in 2015.

C. Promoting dialogue and consensus-building

35. Participants in the Commission shared their views and formulated recommendations on the respective priority themes during the intersessional panels and annual sessions held in 2012 and 2013. The fifteenth session also provided an opportunity for organizations with expertise on the priority themes to share their work. This included the Group on Earth Observations, the École Polytechnique Fédérale de Lausanne, the Environmental Systems Research Institute, and Microsoft. Similarly, a variety of stakeholders and experts with expertise on the priority themes, including from the United Nations Human Settlements Programme

(UN-Habitat), the International Society of City and Regional Planners and IBM, shared their work at the sixteenth session.

36. The draft resolution on science and technology for development agreed upon by Commission member States at the fifteenth session and subsequently adopted by the Economic and Social Council in July 2012 (see [E/RES/2012/6](#)) echoed several findings of the Commission's debate on this topic and included recommendations to national Governments and the international community to foster a culture of innovation. In the resolution, the Council recommended the use of mechanisms such as the promotion of national policies to encourage the use of ICTs, the establishment of programmes for the improvement of human resources in this field, and the provision of an enabling environment that encourages and supports efforts aimed at learning and capacity development.

37. The Council also recommended that national Governments increase the use of ICTs for collaborative learning by using online scientific publications, opening up online content to the public, and establishing virtual science libraries and national research and education networks that enable collective buying power for online scientific research services.

38. The substantive discussion on the two priority themes during the sixteenth session of the Commission concluded with a draft resolution on science, technology and innovation for development, which the Commission recommended for adoption by the Economic and Social Council (see resolution 2013/10). Building upon that discussion, it was recommended, in the draft resolution, that Governments consider establishing mechanisms that facilitate innovative, integrated, multidisciplinary urban and peri-urban community planning; integrate ICTs into the infrastructure of cities, where appropriate, to increase the efficiency of services, food supply and mobility, provide for the safety, security and productivity of citizens, and reduce environmental impacts; and promote technologies and business models that scale affordable and resource-efficient housing for lower-income groups.

39. In both Council resolution 2012/6 and the above-mentioned draft resolution, the Commission was encouraged to continue its role as torch-bearer for innovation and to provide high-level advice to the Council and the General Assembly on relevant science, technology and engineering for innovation issues, raise awareness among policymakers about the innovation process and identify particular opportunities for developing countries to benefit from such innovation.

40. At the fifteenth session, the Commission recommended for adoption by the Economic and Social Council a draft resolution entitled "Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society". The draft resolution was subsequently adopted by the Council as resolution 2012/5. At the 16th session, a draft resolution with the same title was also recommended for adoption by the Council (see resolution 2013/9). These draft resolutions took stock of the implementation of Summit outcomes, covered areas including Internet governance, enhanced cooperation and the Internet Governance Forum, and included recommendations on the road ahead in terms of follow-up to the Summit outcomes, as requested in paragraph 11 of General Assembly resolution [66/211](#).

41. The draft resolution of the sixteenth session (see [E/2013/31](#), draft resolution I) emphasized the importance of promoting an inclusive information society, with

particular attention to bridging the digital and broadband divide, taking into account considerations of gender, culture, youth and other underrepresented groups. It also urged all stakeholders to prioritize the development of innovative approaches that would stimulate the provision of universal access to affordable broadband infrastructure for developing countries and the use of relevant broadband services in order to ensure the development of an inclusive development-oriented and people-centred information society, and to minimize the digital divide.

D. Contribution of the Commission on Science and Technology for Development on key issues to be addressed in the post-2015 development agenda

42. Following a request by the President of the Economic and Social Council, the Chair of the Commission on Science and Technology for Development invited member States of the Commission to provide written contributions on key issues that should be addressed in the post-2015 development agenda. Written contributions received from several member States show a clear consensus on the crucial role of science and technology in the attainment of the Millennium Development Goals. They recognize that the post-2015 development agenda should simultaneously address the economic, social and environmental components of sustainable development and should be multidimensional, integrative and inclusive. Participating member States raised issues in three general areas: science, technology and ICT issues; partnerships for development; and inequalities and health.

43. **Science, technology and ICT issues.** Member States noted that while science and technology may not be ends in themselves, they are a fundamental means to achieving sustainable development goals. They also noted that domestic technological and innovation capabilities should be strengthened. Connectivity and access to ICTs are important, including narrowing the digital divide in fixed and mobile telephony and Internet access. They highlighted the role of new areas in science, technology and innovation, such as nanotechnology, renewable energy and emerging ICT technologies (including embedded systems, cloud computing and mobile communication technologies), to address development issues. They also mentioned the need to use science, technology and innovation in order to address social, economic and environmental vulnerabilities in developing countries (such as ICTs for earth observation and supporting research and education with e-science libraries).

44. **Partnerships for development.** In discussing partnerships for development, member States found that in an interdependent global economy, cooperation is essential, especially in areas that involve technology transfer. The private sector has an important role. Partnerships that facilitate technology transfer and foster productive capacities should be created or strengthened. Specific proposals included the following:

(a) New multidimensional (including economic, social and environmental dimensions) and multi-stakeholder global governance mechanisms to follow up on the post-2015 agenda and the United Nations Conference on Sustainable Development;

- (b) Partnerships among Governments, civil society and the private sector for education, capacity-building and training;
- (c) Technology transfer and research funding to enable developing countries to access technology and technology-based products;
- (d) Understanding the impact of intellectual property rights on acquiring technology;
- (e) Ensuring affordable market access for developing countries to new products developed as a result of scientific research;
- (f) New global financing mechanisms for environmental sustainability.

45. **Inequalities and health.** Member States suggested that inequalities and health issues should continue to be an important part of the post-2015 development agenda. Inequalities must be addressed if sustainable development is to be achieved. Science and technology need to be geared towards addressing some of the most pressing global health challenges, such as malaria and HIV/AIDS.

III. Work of the United Nations Conference on Trade and Development in the area of science, technology and innovation

46. UNCTAD continued assisting developing countries in their efforts to integrate science, technology and innovation into national development strategies, as encouraged in General Assembly resolution 66/211. This work was carried out under four headings during the last biennial period: contributions to the post-2015 development agenda through inter-agency collaborations; in-house research and analysis; the promotion of dialogue and consensus-building; and science, technology and innovation policy reviews.

A. Post-2015 development agenda

47. Science, technology and innovation are an essential centrepiece of the post-2015 development agenda. Developing countries will find it difficult to raise living standards in a sustained manner, feed their growing populations, keep their children healthy, and protect their environment, if they cannot find ways to use existing technologies in a cost-effective manner.³ The future also holds other challenges where new technologies will be key, particularly where climate change is involved. Emphasizing that in both traditional and frontier markets, competition among innovators will be critical to ensure the development of socially useful products and processes at affordable prices, the work of both the Commission on Science and Technology for Development and UNCTAD on the post-2015 agenda has focused on how persistent obstacles to technology and innovation capacity in developing countries will need to be addressed through a global partnership for development.

³ See United Nations System Task Team on the Post-2015 United Nations Development Agenda, “Science, technology and innovation for sustainable development in the global partnership for development beyond 2015: Thematic Think Piece”, May 2012.

United Nations System Task Team on the Post-2015 United Nations Development Agenda

48. As a member of the United Nations System Task Team on the Post-2015 United Nations Development Agenda, UNCTAD served as a lead author, along with WIPO, of a thematic think piece on “Science, technology and innovation for sustainable development in the global partnership for development beyond 2015”. In this role, it also coordinated contributions from all other partner entities, including ITU, the Office of the United Nations High Commissioner for Human Rights (OHCHR), UNEP, UNESCO, the United Nations Framework Convention on Climate Change, UNIDO and WMO.

49. Highlighting the key issues of science, technology and innovation capacity that must be addressed urgently in developing countries, the think piece identified four public policy areas that are indispensable to foster science, technology and innovation in the post-2015 agenda. The first of these is financing the acquisition of technological know-how and innovation capacity. In a large number of developing countries, shallow financial markets often thwart their responses to developmental needs. It remains imperative that the challenge of mobilizing such financial resources for technological development form a significant part of the post-2015 agenda.

50. A second obstacle is incentives. In addressing some of the key development challenges, market incentives may not be sufficiently strong to drive the necessary innovation. Where markets are not strong, additional approaches are needed to bridge the gap. This may occur with any technology needed to address the needs of poor populations. In a world where the primary incentives for innovation are market-based, the inability-to-pay often translates into an inability-to-access. There is a need for a proactive policy agenda that focuses on making innovations more readily available to those who need it.

51. A third obstacle is information. Data covering the three pillars of sustainable development need to be collected, harmonized, managed and integrated in a more coherent way to support better policymaking and decision-making. Lastly, partnerships are critical to overcoming these market failures. Developing countries will need the help of each other and the international community to foster strong development partnerships in the post-2015 world.

Seminar on Technology, Innovation and the Post-2015 Agenda on Sustainable Development

52. On 10 April 2013, UNCTAD held a seminar in Geneva entitled “Technology, Innovation and the Post-2015 Agenda on Sustainable Development”, inviting a pioneering scholar on the national innovation systems concept as guest speaker. In his presentation, the speaker emphasized that in a highly unpredictable world where it is very difficult to foresee future challenges, there is a need to envisage innovation and development strategies that promote learning capabilities. Education systems and labour markets are key elements of a learning economy. The speaker also outlined key future development challenges such as catching up and innovating out of poverty, building absorptive capacity in high-tech sectors, leveraging the informal sector, upgrading low-tech and natural resource sectors, and upgrading skills by linking schooling and experience.

B. Research and analysis

Technology and innovation report

53. The third edition of UNCTAD's flagship publication *Technology and Innovation Report*⁴ focused on the important question of how South-South collaboration for technology and innovation can be fostered in order to promote the technological development of the developing world as a whole. Economic growth in an expanding number of developing countries pinpoints the important role of technological capabilities in overall development. Followed by the successes of several East Asian countries in the 1960s onwards, a newer wave of countries, such as Brazil, China and India, are now on a steady path towards industrial catch-up. The rise of an increasing number of developing countries lends hope that newer growth poles in the South could lead to new dynamics in international relations. Against this background, the *Technology and Innovation Report 2012* argues that developing countries, particularly emerging developing countries, can play an important role in reducing the technological divide that has been growing not only between developed and developing countries, but also among developing countries themselves.

54. As analysed in detail in the report, the South is an extremely important partner in all efforts to promote technology and innovation capacity in the developing world for two reasons. First, sharing experiences and strengthening collaboration in all possible ways remains very important and relevant for developing countries that are still grappling with ways to create harmonious and coherent local innovation and industrial policy environments. A second and perhaps more important advantage of the South for technological learning is that their technologies may be contextually appropriate for developing countries.

55. In order to ensure that the role of emerging developing countries as important partners in technological learning in the South is effectively harnessed, the report suggests the structuring of a guiding international framework on South-South collaboration for technology and innovation. It proposes a set of principles around which such a framework could be structured. These principles are derived from some important issues prevailing in the context of technology and innovation exchange globally and among developing countries. The five principles are:

- (a) Prioritize the technological needs of the other developing countries and least developed countries;
- (b) Aim at sharing and better integrating the lessons learned from the ongoing catch-up experiences of other developing countries in building innovation capabilities through proactive policies;
- (c) Promote important means of technological learning, particularly through alliances and technology transfer initiatives;
- (d) Make South-South foreign direct investment more technology-oriented;
- (e) Pool developing-country resources to address common technological challenges.

⁴ *Technology and Innovation Report 2012: Innovation, Technology and South-South Collaboration* (UNCTAD/TIR/2012).

Information economy report

56. UNCTAD carried out further research and insight on topical issues relating to ICTs for development through its *Information Economy Report* series. The 2012 edition of the report, entitled *The Software Industry and Developing Countries*, explores how developing countries can build domestic software capabilities, which would enhance their capacity to tailor software for specific local needs and generate employment. The report analyses country case studies and introduces a national software system framework that depicts the key factors that affect the development of a software industry, including the quality and affordability of ICT infrastructure, access to human resources and capital, an enabling legal framework and business infrastructure, as well as linkages with international software networks. The report proposes public policy options to strengthen national software industries.

Current Studies on Science, Technology and Innovation

57. The sixth publication under the UNCTAD series “Current Studies on Science, Technology and Innovation” was launched in 2012 with the title *Geospatial Science and Technology for Development: With a focus on urban development, land administration and disaster risk management* (see UNCTAD/DTL/STICT/2012/3).⁵ The study discusses how investment in the development of geospatial science and technology enhances the information capacity of countries and presents an innovative approach to assess the benefits of these technologies, particularly in the context of developing countries. The findings of the study contributed to the understanding that the production of spatial data can create benefits in areas such as sustainable urban and regional development, land administration and disaster risk management.

58. The forthcoming publication in this series will analyse how science, technology and innovation can contribute to addressing challenges of rapid urbanization, particularly in developing countries. A second forthcoming publication is expected to provide an overview of key issues relating to broadband ICTs in the context of international objectives for socioeconomic development and to propose a set of frameworks for considering and developing new public and private initiatives to promote broadband development for an inclusive digital society.

Gender and the Current Studies on Science, Technology and Innovation series

59. The fifth study in the Current Studies on Science, Technology and Innovation series, entitled *Applying a Gender Lens to Science, Technology and Innovation* was launched in the second half of 2011 (see UNCTAD/DTL/STICT/2011/5). It was elaborated in collaboration with the Gender Advisory Board of the Commission. The study examines the interaction between gender and science, technology and innovation and notes that despite strong recognition of the potential of science, technology and innovation to contribute to development goals, gender considerations are not generally included in the design and implementation of science, technology and innovation policies. The study highlights that including a gender perspective in science, technology and innovation policymaking makes it possible to consider the aims, concerns, situation and abilities of women and men,

⁵ The series was launched in 2010 and seeks to analyse relevant topics in science, technology and innovation for development.

consequently contributing to adequately addressing development challenges. The publication explores three mechanisms to incorporate gender considerations into science, technology and innovation policymaking, namely:

- (a) Development of science, technology and innovation that is oriented towards enhancing the progress of women and their livelihood;
- (b) Promotion of gender equality in the training of human resources in science, technology and engineering education, careers and leadership;
- (c) Promotion and support towards enhancing the role of women in innovation systems at all levels.

60. UNCTAD will launch a new series of publications on gender and science, technology and innovation at the end of 2013. This new series will be oriented towards collecting and sharing best practices on science, technology and innovation policies for women. The first report will cover South Asia.

C. Promoting dialogue and consensus-building

Contribution by the United Nations Conference on Trade and Development to the annual ministerial review of the Economic and Social Council

61. The 2013 annual ministerial review of the Economic and Social Council focused on science, technology and innovation, and the potential of culture, for promoting sustainable development and achieving the Millennium Development Goals. UNCTAD collaborated in the United Nations system-wide effort on this topic, contributing to elaborating on the important role of science, technology and innovation for development, including through South-South collaboration in technology and innovation. UNCTAD also participated in regional deliberations and consultations.

62. The Commission contributed to the regional preparations for the 2013 annual ministerial review by holding a session on the review at its 2012-2013 Intersessional Panel Meeting, held in Lima. The session was organized in collaboration with the Department of Economic and Social Affairs.

63. During the high-level segment of the 2013 annual ministerial review, which took place in Geneva, in July 2013, UNCTAD held a side event entitled “Policy lessons from promoting science, technology and innovation for development”. The event presented lessons and good practices on effective design and implementation of science, technology and innovation policies in developing countries. A lesson learned is that one of the key challenges for promoting such policies is ensuring that the science, technology and innovation policy review processes continue even if there are changes in the government. Also, the extreme lack of domestic financial and human resources can prevent the implementation of science, technology and innovation policies, particularly for least developed countries. In addition, failure to include the promotion of science, technology and innovation in national development plans means that countries with limited resources cannot benefit from the international support that they would require.

Multi-year expert meeting on enterprise development policies and capacity-building in science, technology and innovation

64. UNCTAD continued to facilitate intergovernmental discussions on science, technology and innovation policy, particularly in the context of the first series of multi-year expert meetings on enterprise development policies and capacity-building in science, technology and innovation, the last session of which was held in January 2012. At that session, the UNCTAD framework for the implementation of science, technology and innovation policy reviews was presented. The framework, which is also available as an UNCTAD publication (see UNCTAD/DTL/STICT/2011/7), presents a set of guidelines for the implementation of the policy reviews. The guidelines give interested developing countries more precise information about the purposes of the process and the modalities for its implementation. They have helped to improve national ownership of the national science, technology and innovation policy review and have facilitated the implementation of the recommendations arising from such reviews. The framework takes on board many views and experiences shared in earlier sessions of the multi-year expert meeting. Some of the most important ones refer to the need to promote pro-poor innovation that specifically targets the challenges faced by the poorest and most vulnerable segments of the population. Building agricultural innovation capacity and raising agricultural productivity is crucial in that regard.

65. The multi-year expert meeting raised awareness about the potential of innovation-driven development and concluded that science, technology and innovation should be a primary component of any nation's development. In that regard, an innovation systems approach can help to ensure that science, technology and innovation policy is an integral part of national development strategies and is relevant to local economic conditions. The multi-year expert meeting outcome highlighted the need for national policy to address the different aspects of innovation systems in developing countries in a coordinated manner. These would include setting up an appropriate institutional framework that enhances linkages among businesses, academia and public sector stakeholders; designing a mix of coherent policies that stimulate public and private investment in science, technology and innovation; and enhancing the methodology for the monitoring and evaluation of innovation activities in order to support evidence-based policies. The multi-year expert meeting also identified a number of fundamental elements for establishing an enabling science, technology and innovation environment, including sustained investments in human capacity development and reduced business transaction costs. Lastly, the experts encouraged UNCTAD to further its research and policy analysis on science, technology and innovation issues, including through conducting reviews of national science, technology and innovation policies.

66. The efforts of UNCTAD in promoting dialogue and consensus-building through intergovernmental work at the expert level will continue by addressing technology and innovation in the framework of a new series of multi-year expert meetings on investment, innovation and entrepreneurship for productive capacity-building and sustainable development, which will be held between 2014 and 2016.

Investment, Enterprise and Development Commission

67. The UNCTAD Investment, Enterprise and Development Commission holds an annual gathering of investment and technology stakeholders worldwide, including

member States, investment promotion and technology agencies, the business community, academia and civil society. During its fifth session, held from 29 April to 3 May 2013, a substantive discussion on technology and innovation was held. It covered the main issues relating to the financing of innovation for development, including the main instruments; the role of investment in the wider context of promoting innovation; and the challenges that policymakers in developing countries face in overcoming financing gaps and promoting greater investment in innovation. The Commission considered, in particular, the cases of Thailand and the United Republic of Tanzania, and the views expressed by an expert of the Organization for Economic Cooperation and Development. An interactive discussion among policymakers and delegates followed.

68. Several critical issues were identified and debated. First, it was established that the almost complete absence of some instruments for innovation financing in many developing countries, including business angels and venture capitalists, means that public intervention is needed to stimulate development. Second, the discussion focused on whether public spending on innovation could stimulate greater private sector investment so that, over time, public expenditures could be reduced. Third, the participants discussed how a holistic approach to promoting innovation through the inclusion of aspects other than financing, such as technology transfer, linkages among research institutions, business and government, human capital development and infrastructure, is required so that efforts to improve financing mechanisms can succeed in enhancing the innovation performance of developing countries. Fourth, the debate centred on whether there is a need for new models that work well in promoting innovation in developing countries and can be shared broadly. This implied that there cannot be a one-size-fits-all approach to promoting innovation in the developing world.

D. Science, technology and innovation policy reviews

69. In General Assembly resolution [66/211](#) and Economic and Social Council resolution 2011/17, the Assembly and the Council recognized the importance of science, technology and innovation policy reviews and encouraged the Commission to facilitate new such reviews, upon request by member countries, in collaboration with relevant international development banks and international organizations, especially UNESCO and the World Bank, and to consider new modalities to assess progress for implementation of the recommendations resulting from the reviews. In its resolution 2012/6, the Council took note with appreciation of the high quality of science, technology and innovation policy reviews and encouraged UNCTAD to develop metrics to assess progress made by countries to implement science, technology and innovation policy review recommendations and, if requested by those countries, to conduct periodic reviews to monitor such progress.

70. The main objective of the science, technology and innovation policy reviews is to contribute to the development of national capacities with a view to improving the effectiveness of national science, technology and innovation policies oriented towards fostering development and competitiveness. Since 1999, UNCTAD has completed policy reviews for 11 countries (Angola, Colombia, the Dominican Republic, El Salvador, Ethiopia, Ghana, the Islamic Republic of Iran, Jamaica, Lesotho, Mauritania and Peru). UNCTAD is currently undertaking such reviews for three additional countries: Oman, Thailand and Viet Nam.

71. UNCTAD concluded the science, technology and innovation policy review of Peru and El Salvador in 2011, in collaboration with the Economic Commission for Latin America and the Caribbean (ECLAC). The reviews in Peru and El Salvador sought to generate greater awareness among policymakers and other stakeholders of the role of science, technology and innovation policies to support growth and development, and a set of priorities for strengthening national science, technology and innovation capacities have been identified. The diagnosis and recommendations of the reviews have fed into public policy and programme design processes. In Peru, the review process contributed in particular to national discussions on the strengthening of the institutional framework for science, technology and innovation policy design and management, and national stakeholders have expressed interest in conducting a follow-up review after five years to assess the implementation of its recommendations. The diagnosis and recommendations of the science, technology and innovation policy review of El Salvador fed into the elaboration of the National Industrial Policy and the National Innovation, Science and Technology Policy.

72. UNCTAD concluded the science, technology and innovation policy review of the Dominican Republic in 2012, also in collaboration with ECLAC. One of the main lessons drawn from the review is that despite the national efforts of the Dominican Republic to create an enabling science, technology and innovation environment by establishing normative and legislative bases and devising a development strategy, its innovation system is still in a formative stage and needs to be strengthened. The recommendations from the review call for the Dominican Republic to increase national efforts to promote business innovation; expand resources oriented towards science, technology and innovation activities, particularly in key sectors such as energy, manufacturing, ICT and biotechnology; invest in the development of human capital, strengthen the capacity of national research centres and universities; and build science, technology and innovation management capacity. The review was presented to national stakeholders in July 2012. It was also presented to the international community at a dedicated session held during the sixteenth session of the Commission. The science, technology and innovation policy review process has provided useful proposals for the strategic orientation of science, technology and innovation policy in the Dominican Republic, in particular revisions to the strategic plan for science and technology.