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Globalization and interdependence

Development cooperation with middle-income countries

Report of the Secretary-General

Summary

Middle-income countries, which are diverse in terms of size, population, geography and endowment of natural resources, represent, as a group, about one third of global gross domestic product and are major engines of global growth; they also face a number of development challenges and risks that are not merely financial or about transitioning to the high-income country group, but primarily about institutional, social and technological capabilities. Creating and ensuring enabling conditions for the production, adoption and adaptation of new technologies, including renewable energy technologies, biotechnology and digital technologies, remains a key development strategy for middle-income countries.

The United Nations development system is actively engaged in cooperation with middle-income countries on a range of issues, thereby ensuring sound progress in the implementation of the 2030 Agenda for Sustainable Development, strengthening and promoting multidimensional measures of poverty and fostering technological innovations and technology transfer. To that end, the Organization provides institutional, technical, statistical and capacity-building support at the national, regional and global levels.

* [A/74/150](#).



I. Introduction

1. In its resolution [72/230](#), the General Assembly requested the Secretary-General to submit a report on development cooperation with middle-income countries at its seventy-fourth session. The present report, prepared in response to that request, is based on information presented at the high-level meeting of the General Assembly on the challenges of middle-income countries held in New York in December 2018.

2. The report is organized as follows: an assessment of development cooperation needs in middle-income countries is presented in section II; recent economic trends and an analysis of one of the key development needs – technology transfer – of middle-income countries are discussed in section III; a summary of the activities carried out by the United Nations development system to facilitate technology transfers and the measurement of multidimensional poverty, based on input from United Nations agencies, funds and programmes, as coordinated by the Development Coordination Office, and input from the World Bank and the International Monetary Fund (IMF) appears in section IV; and conclusions and recommendations are presented in section V.

II. Development cooperation and development challenges in middle-income countries

3. Development cooperation with middle-income countries¹ plays a crucial role in the implementation of the 2030 Agenda for Sustainable Development. The pledge made in the Agenda, “that no one will be left behind” requires strengthening development cooperation to address the needs of the poor and the most vulnerable, the overwhelming majority of whom now live in middle-income countries. A tailored approach is therefore required that tackles the bottlenecks that this highly heterogeneous group of countries² face at different stages of development, while considering their common challenges.

4. Common challenges that many middle-income countries face include natural resources management, reliance on primary commodity exports, the pervasive effect of disaster risks and climate change, high levels of external debt and the

¹ Throughout the present report, the term “middle-income countries” refers to the combined lower- and upper-middle-income categories adopted by the World Bank, which currently includes 107 countries for the 2020 fiscal year (as at 1 July 2019). Low-income economies are defined as those with a gross national income (GNI) per capita, calculated using the World Bank Atlas method, of \$1,025 or less in 2018; lower-middle-income economies are those with a GNI per capita between \$1,026 and \$3,995; upper-middle-income economies are those with a GNI per capita between \$3,996 and \$12,375; high-income economies are those with a GNI per capita of \$12,376 or more. This analytical classification is primarily used by the World Bank as an operational guideline for determining lending eligibility in categories such as financing from the International Development Association or the International Bank for Reconstruction and Development (IBRD) and blended finance. The United Nations development system, while acknowledging the category of middle-income countries and occasionally referring to it in its analytical work, does not use the classification for guiding cooperation activities. Instead, the United Nations follows the classification of developed countries, developing countries, least developed countries and a few other country groups, including landlocked developing countries and small island developing States.

² Among many possible distinctions, the category includes some small island developing States, landlocked developing countries, countries in conflict and in post-conflict situations, as well as countries at different levels of demographic transition, from the most populous to the least densely populated.

volatility of exchange rates and capital flows.³ Identifying, measuring and alleviating multidimensional poverty, enhancing access to, and the quality of, social services, strengthening social protection systems and improving environmental sustainability, including by switching to a low-carbon economy, remain critical challenges for many middle-income countries.

5. Disaster risk is increasing in many middle-income countries, exacerbated by stagnant poverty and rising inequality, economic shocks and slowdown, rapid urbanization, unplanned land use and land degradation, pollution and climate change. Disaster risk is concentrated in low- and middle-income countries, with lower-middle-income countries standing to lose almost 7 per cent of their gross domestic product (GDP).⁴ Financing disaster risk reduction efforts and building resilience to economic and environmental shocks remain a challenge in many middle-income countries.

6. Over the past 15 years, 35 low-income countries have transitioned to middle-income country status.⁵ Such progress reflects a sustained economic growth achieved in most parts of the developing world. While income per capita only partly reflects the overall economic and social development of a country, the move to middle-income status can significantly affect the availability of official financial resources and often triggers donor discussion on whether to reduce or even phase out official development assistance (ODA). As per capita income increases above low-income thresholds, access to external (concessional and non-concessional) public finance often decreases faster than can be offset by commensurate increases in tax revenues in per capita terms. This pattern is referred to as the “missing-middle” challenge, as described by the Inter-Agency Task Force on Financing for Development in its report entitled *Financing for Development: Progress and Prospects 2018*.

7. Countries vulnerable to external shocks and disasters often exceed per capita income thresholds but have limited capacity to mobilize public resources owing to their small size, remoteness and vulnerability.⁶ The missing-middle challenge underlines the importance of a smooth transition and international support for middle-income countries as they confront the myriad development challenges to becoming high-income countries. In the process of graduating from the low-income country group, many middle-income countries often lose access to finance with concessional terms from multilateral development banks and face harder terms, even though the maturities and interest rates offered through such financing are still more favourable than those under market terms.⁷

8. Significant policy reforms have been undertaken by the World Bank to improve engagement with all clients across the income spectrum while prioritizing additional financing for countries below the graduation discussion income, that is, the level of gross national income per capita above which graduation from the International Bank for Reconstruction and Development starts to be discussed. In 2018, the loan pricing and single borrower limit of the World Bank became differentiated on the basis of

³ Informal summary of the President of the General Assembly at its seventy-third session, high-level meeting of the General Assembly on the challenges of middle-income countries, held at Headquarters on 4 December 2018.

⁴ United Nations Office for Disaster Risk Reduction, *Global Assessment Report on Disaster Risk Reduction: Atlas – Unveiling Global Disaster Risk* (2017).

⁵ Lars Engen and Annalisa Prizzon, *Exit from Aid: An Analysis of Country Experiences* (Overseas Development Institute, April 2019).

⁶ United Nations, Inter-Agency Task Force on Financing for Development, *Financing for Development: Progress and Prospects 2018*, p. 97.

⁷ The shift in financing sources tends to have an impact on the sectoral allocation of international public finance, with less focus on social sectors such as health, which are often financed through grants.

borrower income. For clients in the upper range of the income spectrum (those above the graduation discussion income), a new approach to the country partnership frameworks programme has been implemented. Reimbursable advisory services have been created to enhance the scale and impact of the programme. The International Finance Corporation of the World Bank has implemented a revised framework on the application of the additionality principle, enhancing its ability to pursue impactful engagement with upper-middle-income countries.⁸

9. In the case of financing from the International Development Association arm of the World Bank, exceptions exist for small States even if they exceed income thresholds. Funds from the concessional financing facility have been made available to middle-income countries that host large numbers of refugees. In its *Financing for Development: Progress and Prospects 2018* report, the Inter-Agency Task Force on Financing for Development encourages a wider use of exceptions to eligibility, such as the use of additional flexibilities to access appropriate sources of financing, alternative measures such as the least developed countries category used by the United Nations, the structural gap approach used by the Economic Commission for Latin America and the Caribbean or the criteria used specifically for small island developing States by the United Nations Development Programme (UNDP), to facilitate access to international public finance for certain categories of middle-income countries.

10. The Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD) has developed a work stream on transition finance to explore the evolution and interaction of public sources of finance, such as ODA and other official flows, and private sources of finance, such as foreign direct investment and foreign remittances, across the development continuum, namely, in low-income countries, middle-income countries, fragile contexts and different regions of the world.⁹

11. For many middle-income countries, the development challenge is not merely financial or about transitioning to the high-income country group. It is about strengthening institutional, financial, social and technological capabilities to sustain growth and avoid the so-called “middle-income trap” (see [A/68/265](#)). The determinants of growth at low- and high-income levels are usually different, posing challenges to middle-income countries as they identify, try and test new growth strategies that are more effective ways to avoid the trap.

12. Many middle-income countries can no longer compete with low-income countries in the exporting of labour-intensive goods because their wages are relatively high. They are also often unable to compete in skill-intensive and higher value-added exports because of low labour productivity and other institutional and capacity constraints. Middle-income countries often end up with slow growth, stagnant or falling wages and a growing informal economy. Their challenge is to how to redesign development strategies with a focus on innovative, sustainable and inclusive growth, gradually shifting to higher value-added sectors. To achieve that goal, middle-income countries need access to better technologies, research and innovation and better management practices, which can foster skills development and boost productivity. Access to new and relevant technologies that match the needs of the middle-income

⁸ The financial products of IBRD are also evolving to increasingly support middle-income countries in areas such as financial risk, exposure to natural disasters and asset management, as well as at the subnational level. The World Bank is developing new instruments, such as the programme-for-results financing instrument, and is revising its guarantees policy to encourage additional private sector investment in middle-income countries.

⁹ Cécilia Piemonte and others, *Transition Finance: Introducing a New Concept* (OECD, March 2019).

countries remain a critical necessary condition for boosting productivity and achieving sustainable economic growth.

III. Trends and development strategies in middle-income countries

A. Economic trends and challenges in middle-income countries: 2017–2019

Economic growth

13. Middle-income countries, home to approximately 70 per cent of the world's population, account for more than one third of global GDP. There has been significant convergence – that is to say, catching up – with high-income countries for a few upper-middle-income countries including China, although the pace of convergence has slowed down in recent years. In lower-middle-income countries, however, despite decades of fast economic growth, per capita incomes remain low.

14. Middle-income countries are still benefiting from the rise in productive capital stock, and many need to further boost their investment rates in order to sustain or to accelerate their: growth momentum; absorption of new technologies; penetration of new export markets; establishment of new industries; and improvements in human capital. However, as mentioned above, several upper-middle-income countries may be caught in a middle-income trap, facing a protracted period of subdued growth rates. Since 2010, a few upper-middle-income countries, namely, Argentina, the Russian Federation and Venezuela (Bolivarian Republic of), attained high-income economy status but subsequently fell back into the middle-income category, as their GDP growth faltered owing to a deterioration in domestic and external economic environments, demonstrating the vulnerability of the middle-income countries to domestic and external economic shocks and their likelihood of encountering significant growth setbacks.

15. Middle-income countries in all regions recovered from the broad slowdown observed in 2015 and 2016. Middle-income countries in East and South Asia remained the fastest growing group despite a deceleration of their aggregate growth due to the economic slowdown in China in 2018, which affected the region through global production chains, in particular in the electronics industry. The decrease in the demand from China for many commodities is putting downward pressure on the exports of many middle-income countries in Africa and Latin America, slowing down their economic growth over the near term.

16. As in the past, the contribution of productive investment to growth in middle-income countries in 2017 and 2018 remained relatively modest compared with contributions from private consumption. At the same time, household indebtedness continued to increase, posing medium-term financial sustainability risks if the economies of middle-income countries are to face a further slowdown in growth.¹⁰

International trade

17. The volume of international trade carried out by middle-income countries tapered off throughout 2018, primarily because of weaker growth in the demand for merchandise imports in most developed economies. The slowdown masks regional heterogeneity, as middle-income countries in East Asia initially remained resilient, thanks to the demand for electronics and integration into the global production chains, which bolstered intraregional trade. Other middle-income countries benefited from

¹⁰ The *World Economic Situation and Prospects: 2019* and the *World Economic Situation and Prospects as of mid-2019* reports present more detailed analyses of the economic prospects, risks and policy challenges for regions and countries.

the fast expansion of global trade in services. Tourism is the third largest export sector in the world and, in many middle-income countries, it is the top export earner; the sector accounts for 1 in 10 jobs worldwide, including direct, indirect and induced jobs, and remains crucial for employment outcomes in a number of middle-income countries.

18. Since the global financial crisis in 2008, the world has experienced a rise in trade protectionism. As many as 800 new trade protection measures have been introduced globally per year,¹¹ in particular in steel, metal products, cars and other vehicles and appliances.¹² The escalation in trade tensions since 2018 and a sequence of rising tariffs among the largest economies, most prominently between China and the United States of America,¹³ as well as the renegotiation of some regional trade agreements, pose significant risks to a large number of middle-income countries, although some of them may benefit from trade diversion and the relocation of production.

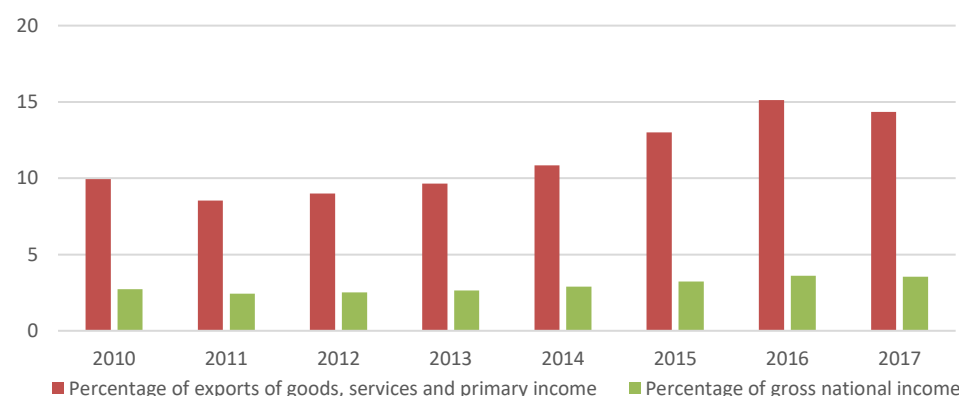
19. Technological advances leading to automation, in particular of manufacturing jobs, can further threaten the export-led manufacturing growth model of development pursued of many middle-income countries. A number of commodity-exporting middle-income countries have been accruing debt as a result of the rapid growth in public expenditures during the period called the commodity super cycle, when commodity prices soared amid strong demand from China but did not adjust downward as revenues fell alongside declining commodity prices. Protracted low commodity prices will remain a drag on growth for many middle-income countries, in particular those in Latin America and Africa.

Trends in public and private debt

20. Public debt levels in middle-income countries continued to increase in the period 2017–2019, with debt-to-GDP ratios in some countries reaching levels comparable to those experienced during the debt distress of the 1980s, approaching or even exceeding 100 per cent of the countries' GDP. The debt service of middle-income countries has increased since 2011, reaching more than 14 per cent of total exports and primary income (see figure I).

Figure I

Trends in the debt service of middle-income countries: 2010–2017



Source: Department of Economic and Social Affairs, based on data from the World Development Indicators database of the World Bank.

¹¹ Zornitsa Kutlina-Dimitrova and Csilla Lakatos, "The global costs of protectionism", Policy Research Working Paper, No. 8277 (World Bank, December 2017).

¹² Global Trade Alert website, available at www.globaltradealert.org/ (accessed on 20 June 2019).

¹³ Bilateral trade in merchandise between China and the United States fell by more than 15 per cent from September 2018 to mid-2019.

21. Public debt has been rising owing to increased development spending needs; shrinking government revenues due to lower growth; tax avoidance; and the increasing share of external financing in loans rather than grants. In parallel, debt composition has also been changing, with a larger share of external debt carrying variable interest rates and larger reliance being placed on commercial creditors. In certain cases, middle-income countries built up debt to finance public investment; in other cases, elevated debt levels resulted from borrowing to finance current fiscal expenditure in an environment of declining commodity revenues. A large share of the public and publicly guaranteed debt of middle-income countries is denominated in foreign currencies; in 2017, dollar-denominated debt accounted for 75 per cent of their outstanding external debt.

22. The rise in public debt in middle-income countries has been accompanied by increasing corporate debt, as many large companies benefited from ultra-low interest rates in the advanced economies. However, the increase in non-financial corporate debt has not always translated into productive investment, as frequently funds raised through bond issuance in international markets have been reinvested into more profitable domestic markets, often into speculative activities. The observed increase in leveraged loans is of particular concern. The recent shifts in monetary policy¹⁴ may induce further borrowing, both public and private, exacerbating the risks of debt distress in cases of increases in global interest rates, currency pressures and capital outflows.

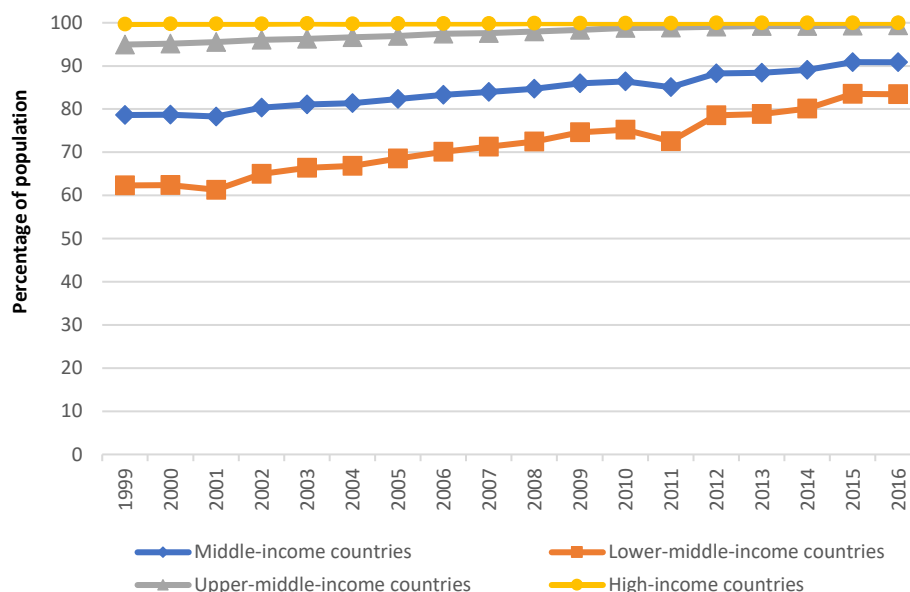
B. Enabling technology transfers for middle-income countries

23. Escaping the above-mentioned middle-income trap depends on structural transformation and policies to facilitate such a transformation. Frontier technologies, including renewable energy technologies, biotechnology and digital technologies, such as artificial intelligence and crowd-based technologies, can present new growth opportunities and accelerate progress towards the achievement of the Sustainable Development Goals. As many middle-income countries strive to achieve faster growth, an innovation-focused development strategy can make the difference between stagnation and a structural transformation of their economies.

24. The technological gap between high-income and middle-income countries, and among middle-income countries, is persistent. The gap in access to electricity has declined (see figure II), with more than 80 per cent of the population in lower-middle-income countries having access to electricity in 2016, compared with 60 per cent in 2000. The technological divide is, however, stark in terms of access to broadband Internet, which is crucial for participating in the digital economy and using and innovating frontier technologies (see figure III). In lower-middle-income countries, less than 5 per cent of the population have a fixed broadband subscription, while the rate in upper-middle-income and high-income countries is about 20 and 30 per cent, respectively.

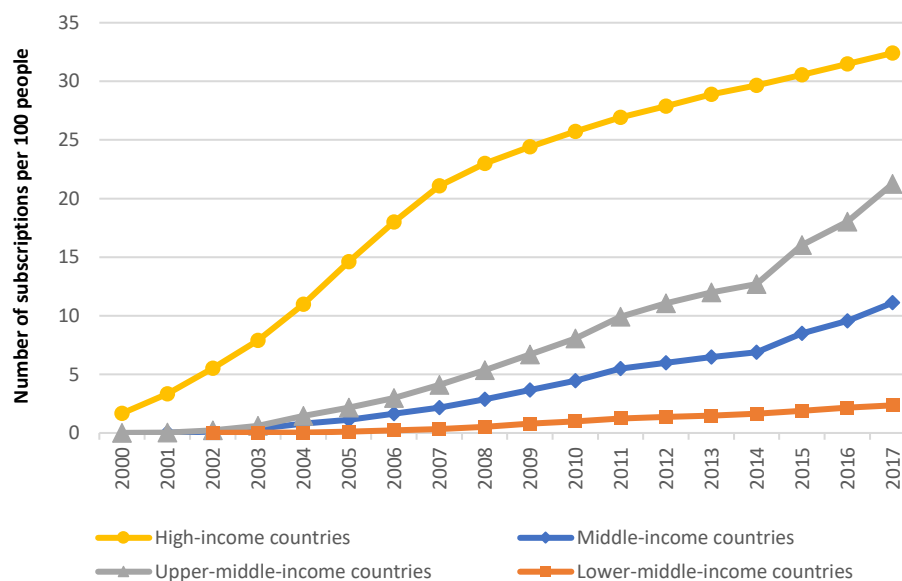
¹⁴ *World Economic Situation and Prospects as of Mid-2019* (update to the *World Economic Situation and Prospects: 2019*, United Nations publication, Sales No. E.19.II.C.1), p. 7.

Figure II
Access to electricity in high- and middle-income countries: 1999–2016



Source: Department of Economic and Social Affairs, based on data from the World Development Indicators database.

Figure III
Fixed broadband subscriptions in high- and middle-income countries: 2000–2017



Source: Department of Economic and Social Affairs, based on data from the World Telecommunications/Information and Communications Technology (ICT) Indicators database of the International Telecommunication Union (ITU).

25. History has shown that leapfrogging is possible. In the late twentieth century, China, the Republic of Korea and Singapore successfully developed their productive capacities by following a different pattern of industrialization than that of the first and second industrial revolutions. Following this model, middle-income countries can

skip the earlier stages of the development path followed by early industrializers and make use of many new technologies, adapting them to meet their development needs.

26. Relatively large middle-income countries have been able to take advantage of lower wages to enter the labour-intensive production stages offshored by developed countries. However, bridging the technology divide between middle-income and high-income countries, and also among the middle-income countries, requires the innovation and diffusion of technologies across more countries and different sectors within countries. Depending on their position relative to the technological frontiers, middle-income countries can follow two strategies: they can innovate or they can use imported technologies.

National innovation systems

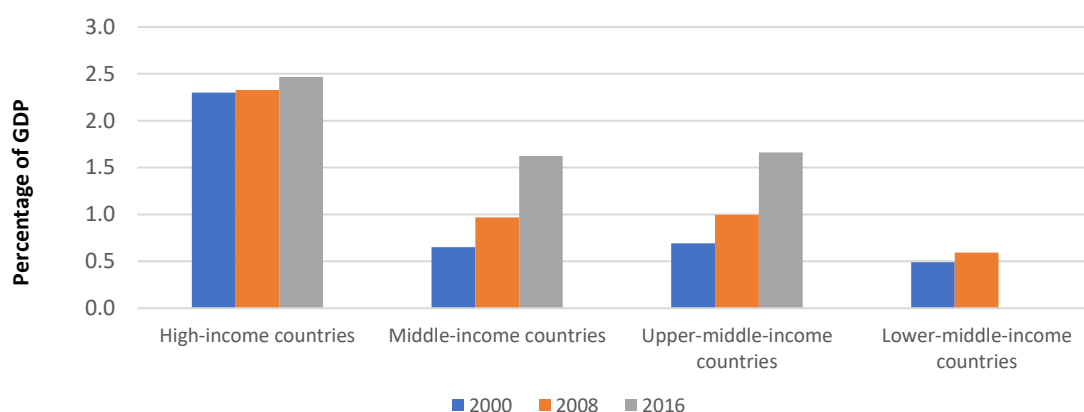
27. As highlighted in the *World Economic and Social Survey 2018: Frontier Technologies for Sustainable Development*, national innovation systems are essential for the production, improvisation and diffusion of new technologies and for the successful adaptation of technologies to local contexts. A national innovation system is defined as “a system of interconnected institutions to create, store and transfer knowledge, skills and artefacts which define new technologies”. While national innovation systems in technologically advanced countries are generally focused on innovation, such systems in middle-income countries prioritize the diffusion, adoption and adaptation of existing technologies to domestic needs. Notwithstanding the complexity and diversity of national innovation systems, there is broad agreement among scholars and practitioners that the adoption and development of new technologies are primarily nation-specific and industry-specific phenomena. There are significant variations among middle-income countries, requiring them to take country-specific contexts and priorities into account in the development of their national innovation systems.

28. Since the start of the digital revolution, a few large private firms have dominated innovation in the digital sphere. Governments, especially in middle-income countries, will need to play a catalytic role in order to ensure fair competition and an even playing field among innovators so as to facilitate not only the innovation but also the diffusion and adaptation of new technologies.

29. There is a clear need for the development of an enabling regulatory framework to ensure a fair return on investment in innovations. Antitrust laws and intellectual property rights are crucial to the promotion of a level playing field for technology developers, to ensuring that market participants benefit from network effects and in facilitating the market entry of new innovators and entrepreneurs. Governments will need to increase public spending on research and development and to complement the efforts of private sector actors that lack the resources to undertake in-house research and development.

30. The share of GDP spent on research and development, known as research and development intensity, has more than doubled in middle-income countries over the past decades, from 0.65 in 2000 to 1.62 in 2016, with wide variations across countries and sectors (see figure IV). However, much more investment in this area will be required, especially in lower-middle-income countries, if they are to effectively break away from the middle-income trap.

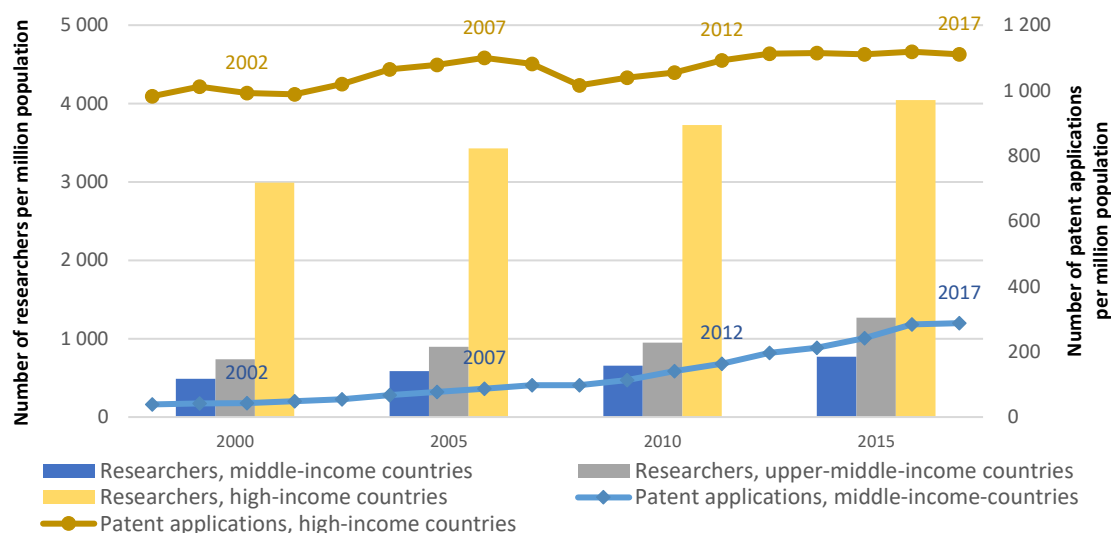
Figure IV
Expenditures in research and development in high- and middle-income countries: 2000, 2008 and 2016



Source: Department of Economic and Social Affairs, based on data from the World Development Indicators database.

31. Middle-income countries are increasingly becoming innovators of new technologies. In recent decades, an increase in the number of researchers and patent applications has been noted in upper-middle-income countries in particular (see figure V). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), the number of researchers in middle-income countries increased by 50 per cent during the period from 2000 to 2015. Total patent applications, both from residents and non-residents, increased by almost 10 times in upper-middle-income countries during the period from 2000 to 2017, while the increase was limited to less than 20 per cent in high-income countries. China alone accounted for most of the increase in the number of patent applications in upper-middle-income countries, with the total number rising from 41.1 to 996.5 per million over the years between 2000 and 2017.

Figure V
Number of researchers and patent applications in high- and middle-income countries: 2000–2017

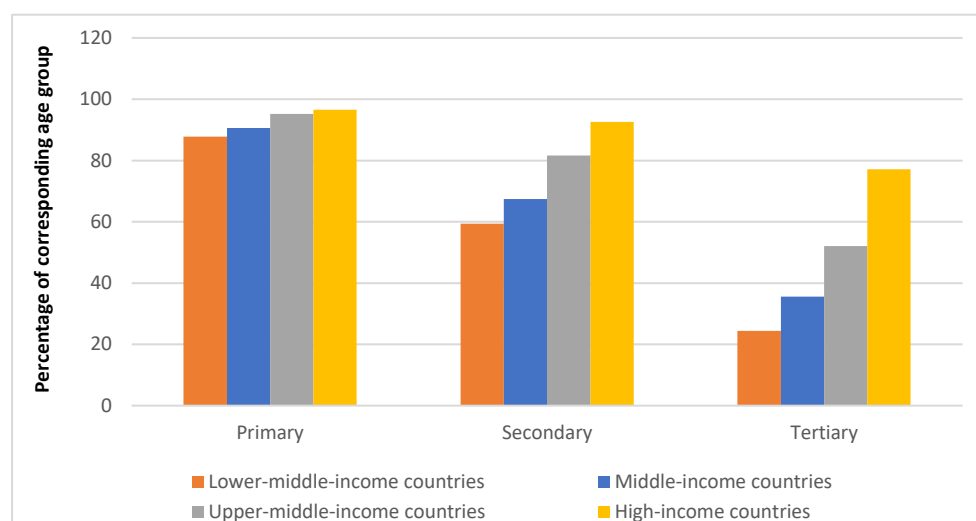


Source: Department of Economic and Social Affairs, based on data from the World Development Indicators database.

32. Middle-income countries still face critical challenges, however, in modernizing their educational and health systems. Quality education and health, which are essential to build the human capital required for the adoption and use of advanced and frontier technologies, are still not available to everyone in those countries. While many middle-income countries have caught up in terms of the number of years of schooling (see figure VI), the quality of education and low levels of enrolment in higher education are significant constraints to the development of national innovation systems.

Figure VI

School enrolment in high- and middle-income countries, by level of education: 2017



Source: Department of Economic and Social Affairs, based on data from the World Development Indicators database.

33. Weak institutional structures are another factor limiting the capacity of middle-income countries to adopt and develop new technologies: a large proportion lack effective institutional structures to support innovation, and their innovation systems are highly fragmented. Such systems are predominantly composed of small enterprises, with an often-overcrowded public sector support system that fails to provide sufficient technological support services and infrastructure, and a limited research community that is not well connected to productive and development realities.

Technology transfer

34. While middle-income countries are developing the conditions necessary for innovation, many will still need to rely on imported technologies, and, therefore, on international technology transfer. Technology transfer is defined as the “transfer of systematic knowledge for the manufacture of a product, for the application of a process or for the rendering of a service and does not extend to the transactions involving the mere sale or mere lease of goods”.¹⁵

35. The most common pathways for international technology transfer include government assistance programmes, direct purchases, licensing, foreign direct investment, joint ventures, cooperative research arrangements, co-production

¹⁵ Definition taken from the draft international code of conduct on the transfer of technology issued in 1985 at the sixth session of the United Nations Conference on an International Code of Conduct on the Transfer of Technology.

agreements, education and training.¹⁶ However, many middle-income countries face considerable challenges in gaining access to and accelerating international technology transfers owing to political, economic and institutional barriers, such as insufficient human capabilities, high transaction costs, insufficient legal protection and inadequate environmental standards. The classification of the middle-income countries, which is based solely on the GDP per capita criterion and does not take into account other measures of development, including multidimensional measures of poverty, can also impede their ability to access and import new technologies under flexible and favourable terms, which is critical for boosting productivity growth and avoiding the middle-income trap.

36. Creating enabling conditions for international technology transfers remains a key development strategy for many middle-income countries. Such conditions can be organized into three pillars: building the necessary human, organizational and information assessment and monitoring capacity, which is required at all stages of the process of technology transfer; developing economic, regulatory and legal frameworks that provide positive incentives to innovate; and creating new and innovative mechanisms for technology transfer, including national innovation systems.¹⁷

37. A number of middle-income countries have taken steps to create enabling national environments for international technology transfers. The Government of India, for example, has established an investor-friendly policy that is more transparent, predictable and comprehensible, including a series of reforms to improve the business environment, thus significantly reducing the time and the number of procedures required to register a business, enforce contracts or file and pay taxes through the use of online systems. Other Governments of middle-income countries have taken initiatives to expand access to finance for small-and medium-sized enterprises that need access to new technologies to expand their business operations. Other efforts include developing competitive capital markets and facilitating international capital flows that support foreign direct investment and technology transfers.

38. Governments may also want to consider facilitating an assessment of local technology needs and the social impact of technologies so that the transfer of technology and foreign investments meet local demands. For example, Viet Nam has adopted a strategy to promote next-generation foreign direct investment, focusing on attracting investment from abroad in high-tech, environment-friendly and less-energy-consuming sectors, developing foreign direct investment in a sustainable manner by emphasizing quality and socioeconomic impact and strengthening linkages with domestic enterprises.

Intellectual property rights

39. Intellectual property institutions can ensure that innovators are sufficiently compensated for their investments in research and development without imposing excessive costs in terms of inefficient knowledge use, encumbered follow-up innovations and stifled competition. Market-based intellectual property institutions are the dominant means by which innovation is incentivized. However, empirical evidence has shown the relative ineffectiveness of such institutions in a number of industries in many different countries over the past decades, including the constraints they may impose on national- or industry-level diffusion and competition, stemming, in part, from the lack of clear boundaries of intellectual property rights and the absence of efficient and liquid intellectual property markets, and exacerbated by the increasing complexity of technology. In this regard, policy efforts, both in middle-

¹⁶ Bert Metz and others, eds., *Methodological and Technological Issues in Technology Transfer* (Cambridge, Cambridge University Press, 2000).

¹⁷ Metz and others, *Methodological and Technological Issues*.

income countries and, more importantly, in developed countries, should be directed at significantly improving the market-based intellectual property institutions and exploring alternative approaches, when appropriate.

40. There are many ways of allowing flexibilities in the formulation and enforcement of intellectual property policies, including tailoring intellectual property protection on the basis of technology and industry characteristics, exempting countries with special needs from certain intellectual property requirements, allowing patentability to be determined on the basis of national development contexts, or experimenting with different intellectual property approaches that might offer less of a trade-off between compensating for investments in research and development and enabling knowledge diffusion in practice.

41. The call for flexibilities echoes one of the most important lessons learned in the area of global development over the past seven decades, as noted in the *World Economic and Social Survey 2017: Reflecting on Seventy Years of Development Policy Analysis*: there are no “one-size-fits-all” blueprints for bridging the technology divide and boosting productivity growth. As the world navigates the uncharted waters of rapid technological change, countries and communities are likely to benefit from a more flexible approach to intellectual property policies that accounts for the specific contexts in which the countries and communities operate.

42. Engaging with multinational enterprises through global value chains provides opportunities for knowledge spillovers through the pooling of knowledge and by encouraging new practices, specialization and the use of new varieties of foreign inputs and intangible inputs. However, such engagement is likely to be footloose, and multinationals tend to hold control over the intellectual property rights from innovations along the global value chains at their headquarters.

43. Sustainable development will require that middle-income countries are able to access both existing and emerging technologies without facing significant constraints. An intellectual property rights regime that supports the key Sustainable Development Goals of securing food, health and better environmental outcomes will remain critical for reducing the technological divide and improving access. International consensus on treating certain technologies as global public goods, on the basis of the principles of shared and differentiated responsibilities among all countries, will ensure sustainable development for all.

IV. Cooperation of the United Nations system with middle-income countries

44. Recognizing the diversity of middle-income countries is a critical aspect of providing effective support, tailored to both the continuing and the emerging challenges of those countries. The group contains more than two thirds of all programme countries and accounted for 57 per cent of all United Nations country-level expenditures in 2017 (see table below). Nearly half of core resources expenditures were spent on assistance to lower-middle-income countries, a group that includes 17 of the least-developed countries.

45. The ambition of the 2030 Agenda needs to be met with bold changes in the way in which the United Nations development system operates. In the case of providing support to middle-income countries, such changes imply a gradual shift from a traditional model of direct support and service provision towards a greater emphasis on integrated high-quality policy advice, capacity development and support for the leveraging of partnerships and financing.

United Nations expenditure by country group: 2017

(Millions of United States dollars)

<i>Group</i>	<i>Number of countries</i>	<i>Share of country-level expenditure (percentage)</i>	<i>Average expenditure per country</i>	<i>Expenditure per capita</i>
Least developed countries	47	47.7	256.0	12.0
Small island developing States	58	2.6	13.0	9.4
Middle-income countries	110	56.8	130.1	2.6
Landlocked developing countries	32	27.2	214.0	13.6
African countries	57	44.9	198.0	9.0

Source: Office of Intergovernmental Support and Coordination for Sustainable Development, Department of Economic and Social Affairs.

Note: The country groups are not mutually exclusive.

A. Technology transfers facilitated by the United Nations system

46. The United Nations system has been active in supporting technology transfers in middle-income countries. The following examples illustrate the range of activities conducted.

47. The United Nations Industrial Development Organization (UNIDO)¹⁸ is implementing a pilot project in Kenya on the use of micro hydropower technology developed in Japan. Capacity-building for the maintenance and manufacturing of the technology was carried out in collaboration with representatives of the academic community. It is also implementing a waste-to-energy initiative, through which a biogas centre has been established at the Kenya Industrial Research and Development Institute using technology developed in France. The biogas centre, which serves countries in East and Central Africa, analyses waste for energy production. Prior to the establishment of the lab, waste had to be sent to Europe for analysis. Biogas technology from Germany, India and the United States has also been installed at private sector companies involved in the project. In addition, UNIDO is collaborating with the Moroccan Agency for Sustainable Energy in a project to demonstrate vanadium flow battery technology as an innovative battery energy storage system for renewables ready to connect to the grid and to mini-grid solutions in Morocco and other African countries. Public-private partnership workshops are being used to disseminate the technology beyond Morocco.

48. In Turkey, the Global Environment Facility-UNIDO Cleantech Innovation Programme is collaborating with the Scientific and Technical Research Council of Turkey, to promote clean energy technologies in small- and medium-sized enterprises. The collaborative project promotes innovation for ecosystems by connecting promising start-ups and small- and medium-sized enterprises with global networks to provide mentoring and establish partnerships. A total of 25 clean technology start-ups have been enhanced through a national accelerator programme and the 10 most promising companies have been paired to work with international mentors.

49. In seven regions of northern Namibia, the United Nations has supported smallholder farmers by strengthening their adaptive capacity to adopt climate-

¹⁸ In December 2017, following a request by middle-income countries, UNIDO developed a strategic framework aimed at advancing the industrial cooperation activities of UNIDO with middle-income countries and promoting inclusive and sustainable industrial development within the group. The framework prioritizes the implementation of technical activities in the fields of technology transfer, green industries and circular practices, and skills development.

resilient agricultural production practices through the setting up of more than 200 micro-drip irrigation gardens at community, school and individual homestead gardens. In addition, during the course of 2019, the Organization has provided support for the launch of national high-resolution satellite imagery for the entire country to be used during census-mapping exercises.

50. Kazakhstan, with the support of UNESCO, has been working on the joint management of transboundary areas and resources, including transboundary surface groundwater resources and transboundary biosphere reserves, as a means for sharing scientific knowledge and best practices, building peace and promoting dialogue among countries in the region.

51. The United Nations Children's Fund (UNICEF) has provided support for the implementation of global technical solutions for management information systems in several sectors in Nigeria. By providing information at the community level with national coverage, such systems provide critical data on progress towards the goal of the 2030 Agenda of leaving no one behind.

52. In Jordan, the national Ministry of Social Development and the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women) are partnering to address challenges in access for women to sustainable and decent employment. A key element involves training in digital literacy and the use of blockchain technology for cash disbursements for work. The training sessions serve as a first step towards equipping vulnerable women and girls with the technological skills required to participate in the economies of the twenty-first century.

53. In 2017, the Government of Honduras, the United Nations country team in Honduras and the United Nations Office for South-South Cooperation signed a first-of-its-kind memorandum of understanding, which brings together all three parties to promote and strengthen South-South and triangular cooperation. The memorandum defines the commitments of each party on the basis of their comparative advantages. Under the memorandum, the Government of Honduras will be both a recipient and a provider of South-South and triangular cooperation. The Government of Panama subsequently entered into a similar agreement. Such institutionalized and system-wide support by United Nations country teams for South-South cooperation can serve as a model for other countries ([A/73/63-E/2018/8](#), para. 186).

54. The Economic Commission for Africa works to address the shortage of skills needed to install, maintain, design and upgrade medical devices. The Innovators' Summer Schools, a biomedical engineering curriculum developed to build capacity in emerging technologies, such as coding mobile devices to serve medical devices and three-dimensional (3D) printing, and entrepreneurial competencies, were organized annually. To encourage further growth, the participating institutions have formed the African Biomedical Engineering Consortium.

55. The Economic and Social Commission for Asia and the Pacific facilitates information-sharing on technologies such as big data, the Internet of things, artificial intelligence and 3D printing. An Asia-Pacific regional knowledge network is being developed to facilitate South-South cooperation in the transfer of technologies. Capacity-building in the design of policies for technology transfers have benefited several countries, including India, Indonesia, Kazakhstan, Malaysia, the Philippines, Sri Lanka and Thailand. The Economic Commission for Europe carries out innovation for sustainable development reviews for middle-income countries with economies in transition. The reviews provide a comprehensive assessment of national innovation systems and offer policy recommendations to Governments to foster innovation.

56. The Economic Commission for Latin America and the Caribbean provided support to the sixth Ministerial Conference on the Information Society in Latin

America and the Caribbean. The Conference agreed to set 30 goals to promote the use of digital technologies in order to foster a knowledge-based economy, innovation and sustainable development. Nine working groups on digital technologies were established. The groups encourage the formation of networks to foster cooperation with other organizations. The Economic and Social Commission for Western Asia has been supporting the streamlining of technology ecosystems in Arab countries by establishing national technology transfer offices in several countries. It helps in the mapping of the national landscape of technology transfer; identifying gaps in the legal framework; advocating policy changes; building capacity; and linking national technology transfer offices to academia. Its technology centre serves as a platform for the exchange of ideas, policy options and experiences on technology and innovation, engaging young people and entrepreneurs.

57. ITU provides support to middle-income countries through projects and direct assistance aimed at fostering the development and use of telecommunications and information and communications technologies (ICTs) for sustainable development. Such efforts include building capacity in the development of strategies, policies and practices for digital inclusion, the empowerment of women and girls and persons with specific needs, as well as activities in the areas of climate change adaptation and mitigation and the use of green energy technologies. The approach adopted by ITU is grounded in innovation to accelerate digital transformation and ensure the sustainable growth of the digital economies of middle-income countries. Support has also been provided to ensure the availability of modern and secure telecommunication and ICT infrastructure and services. In addition, ITU provides assistance in establishing enabling policy and regulatory environments.

58. The Department of Economic and Social Affairs coordinates the efforts of the entities of the United Nations system to support the Technology Facilitation Mechanism and serves as the secretariat for the collaborative, annual multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals. Membership of the United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals has increased to 42 United Nations entities. The Technology Facilitation Mechanism provides a strategic platform for collaboration among United Nations entities, allowing participants to study the impacts of new and emerging technologies, especially in the fields of robotics, artificial intelligence, biotechnology and nanotechnology, on the efforts to achieve the Goals. The Department has also participated in subgroup meetings of the High-level Panel on Digital Cooperation. In 2018, the Department, together with the World Bank, the United Nations Conference on Trade and Development (UNCTAD), UNESCO, UNIDO, the European Commission and national partners, contributed to four expert group meetings on digital cooperation. Moreover, the Department, together with the United Nations University-Maastricht Economic and Social Research Institute on Innovation and Technology and UNIDO, the inter-agency sub-working group on capacity-building in science, technology and innovation of the United Nations inter-agency task team, worked on pooling training materials on science, technology and innovation and explored inter-agency training activities. The sub-working group organized a training session entitled “United Nations-wide capacity-building workshop on technology for development: innovation policies for the Sustainable Development Goals in the Arab region”, hosted by the Economic and Social Commission for Western Asia.

59. The science, technology and innovation policy review programme is at the core of the technical cooperation efforts of UNCTAD in the field of science, technology and innovation. UNCTAD has completed 14 reviews, including in the Dominican Republic, Iran (Islamic Republic of), Oman, Peru and Thailand, and has initiated a review in Panama. The reviews help governments to integrate policies for science,

technology and innovation into their national development strategies. In 2017, the United Nations inter-agency task team on science, technology and innovation designed a training programme on innovation policies for the Sustainable Development Goals, in which technology transfer is a critical aspect. Pilot courses have been organized in Jordan, in partnership with the Economic and Social Commission for Western Asia and the Higher Council for Science and Technology, and in Panama, for policymakers in the Central American region, in collaboration with the National Secretariat of Science, Technology and Innovation.

60. The World Bank has been increasingly partnering with middle-income countries to broker South-South knowledge exchanges, including through the South-South Experience Exchange Facility of the World Bank Institute, global programmes and partnerships, lending operations and other mechanisms. From assistance in the fields of energy efficiency in Belarus and telecommunications regulation in Pakistan, to the provision of training and textbooks in indigenous languages in Guatemala and the strengthening of the anti-corruption commission in Indonesia, the World Bank is working with middle-income countries to help them to achieve their development goals.

61. In 2018, emerging market economies and middle-income countries received just over half of the policy-oriented training provided by IMF. Recent examples include training sessions in Colombia, Peru, Tunisia and Ukraine on the further development of property price measures; workshops in Mauritius and Thailand on financial access data, with a focus on financial technology (fintech), mobile money and data disaggregated by sex; a workshop in Kyrgyzstan on public sector debt statistics; a training course in Georgia on balance of payments and international investment position statistics; and a technical assistance project to implement the Enhanced General Data Dissemination System in Albania, Bosnia and Herzegovina and Montenegro, as well as Kosovo.¹⁹ Capacity development on gender equality has expanded to include training for government officials, peer-learning workshops and technical assistance missions in gender-responsive budgeting. IMF also works with countries on environmental tax reform and efficient energy pricing and helps to create public financial management plans to prepare countries for natural disasters and climate-related shocks.

B. Measuring multidimensional poverty

62. Improving access to technology and facilitating technology transfers are means – among many others – for achieving sustainable development. A cardinal sustainable development objective is to alleviate poverty in all its forms and manifestations. The 2030 Agenda crystallized the global consensus for a multidimensional view of poverty. The United Nations assists countries at the national, regional and global levels in building capacities to measure poverty in all its forms and dimensions in order to support national and global development objectives.

63. UNDP, in partnership with the Oxford Poverty and Human Development Initiative of Oxford University, publishes the Global Multidimensional Poverty Index, which combines 10 indicators grouped into three dimensions: education, health and standard of living. In 2018, 1.3 billion people were in multidimensional poverty, representing 23.3 per cent of the population of the 105 countries included in the calculation. In comparison, 10.7 per cent of the world population is estimated to be below the monetary poverty line of \$1.9 per person per day reported by the World Bank. UNDP is developing guidelines for mainstreaming gender and the environment

¹⁹ References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

into poverty measures including through the use of indicators on structural gender inequalities, on policies to reduce gaps, on pregnancy control and on unemployment.

64. Panama recently developed the first multidimensional poverty index focused on children and adolescents, in collaboration with UNDP, UNICEF and the Oxford Poverty and Human Development Initiative. The index is an important development, given that half of the people in multidimensional poverty are underage, according to the most recent Global Multidimensional Poverty Index. The Dominican Republic, Ecuador and El Salvador are also developing multidimensional poverty indices, with support from UNDP. The multidimensional poverty index of Costa Rica measures five dimensions of household needs: housing and Internet use, health, education, labour, and social protection. In 2016, the country also launched the first multidimensional poverty index for businesses, giving businesses a detailed view of the conditions in which workers and their families live and enabling businesses to plan initiatives to help them.

65. In the Philippines, the multidimensional poverty index is helping to shape the Government's poverty reduction efforts and improve the design of development programmes. Uzbekistan is also focusing on reducing multidimensional poverty and is working with UNDP, UNICEF and the World Bank to measure and analyse multidimensional poverty. In China, the United Nations country team has defined, as a priority, the need to recognize the extent of multidimensional poverty still present in the country. The UNICEF Multidimensional Overlapping Deprivation Analysis of child poverty in Angola informs national policy. Supported by the United Nations, the National Institute of Statistics of Angola is drafting the first national baseline indicators report of the Sustainable Development Goals that contains key data for the measurement of poverty.

66. The five United Nations regional commissions are joining forces in several activities in the context of the United Nations Development Account programme on statistics and data. A joint document was published in 2018 that included recommendations for improving the availability and comparability of non-monetary poverty indicators.

67. Since the first proposal for a regionally comparable multidimensional poverty index in 2015, the Economic Commission for Latin America and the Caribbean has focused on improving the availability and comparability of information for the measurement of poverty. The Commission also provides support to the working group on poverty statistics of the Statistical Conference of the Americas, at which the measurement of new dimensions of poverty is discussed. Through its task force on poverty measurement, the Economic Commission for Europe works to exchange knowledge on and best practices in poverty measurement, developing guidelines and recommendations for improving the international comparability and availability of statistics on poverty and the related metadata. It has elaborated a guide on poverty measurement, which, *inter alia*, covers non-monetary deprivations.

68. The Economic and Social Commission for Asia and the Pacific has developed a dissimilarity index, which measures how different population groups in middle-income countries in Asia and the Pacific fare in terms of access to services and opportunities. The index measures: educational attainment; the prevalence of stunting, wasting and overweight; access for women to modern contraception and professional help during childbirth; access to full-time employment; access to safe drinking water, sanitation, electricity and clean fuels; and ownership of a bank account. The Arab multidimensional poverty indices developed by the Economic and Social Commission for Western Asia capture less severe forms of poverty that characterize many countries such as Egypt, Jordan or Morocco. The Commission has

also promoted the idea that some of the current social and economic destabilizing forces should be addressed in a multidimensional fashion.

69. In 2019, ITU and the World Bank agreed to cooperate on the development of new measures that use detailed maps of poverty based on big data collected using computational tools that use mobile phone records, satellite data and geographical information systems. This approach would reduce data collection time and would be cost-efficient. The Food and Agriculture Organization of the United Nations (FAO) provides measures of rural poverty and has developed the Rural Livelihoods Information System, a joint initiative of FAO, the World Bank and the International Fund for Agricultural Development that disseminates comparable data and indicators on income livelihoods and rural development at the subnational level. FAO and the Oxford Poverty and Human Development Initiative are also working to improve the conceptualization of rural poverty.

V. Conclusions and recommendations

70. The implementation of the 2030 Agenda for Sustainable Development will remain out of reach if the middle-income countries are unable to achieve the full spectrum of the Sustainable Development Goals. The current international economic environment presents numerous risks to middle-income countries: less favourable terms of market access due to more protectionist policies in a few major export markets; serious risks of a partial dismantling of the global value chains; risks of capital outflows and debt distress; increasing restrictions on migration flows that have helped to alleviate domestic labour market pressures; and, in general, weakening international commitments to multilateralism, including in providing development assistance and combating climate change.

71. At the national level, many middle-income countries have adopted various strategies to address those and other challenges as part of their overall efforts to implement the 2030 Agenda. It is imperative to complement those efforts with improved and more focused cooperation with the United Nations development system, international financial institutions, regional organizations and other development partners. Among multiple dimensions of development, access to modern technologies is crucial for boosting productivity, diversifying their production and export base, achieving faster economic growth and reducing poverty and strengthening their resilience to external shocks. As described above, the United Nations system, as part of development cooperation with middle-income countries, actively facilitates technology transfer through its technical assistance, policy research and analytical and normative work. Boosting those efforts in the future is crucial for accomplishing a steady progress towards the achievement of the Sustainable Development Goals.

72. The United Nations development system, along with international financial institutions, regional organizations and other stakeholders, such as regional development banks, should ensure that the diverse and specific development challenges of middle-income countries are addressed in a tailored fashion, using a coherent and comprehensive approach to individual countries, considering, as a model, the institutionalized and system-wide support by United Nations country teams for South-South cooperation.

73. For many middle-income countries, even in the upper-middle-income category, ODA, including financing on concessional terms from different multilateral financial institutions, remains important. The countries in the lower-middle-income range are often even more dependent on development finance to achieve the Sustainable Development Goals. In certain situations, for example in the case of countries afflicted by armed conflict, special development cooperation strategies may be needed.

74. As reiterated in previous reports on middle-income countries, it is imperative to ensure that enhancing development cooperation with them does not undermine or crowd out development assistance to low-income countries, especially the least developed countries, either by limiting the available financial resources or by diverting activities and the provision of advice. Moreover, development cooperation with middle-income countries should create positive synergies for other developing countries, for example through trade and investment channels and through the sharing of good practices, in particular within the context of South-South and trilateral cooperation.

75. The single indicator of per capita income clearly does not effectively reflect the complex nature of the development challenges faced by middle-income countries. It should be complemented with other indicators for determining practical and comprehensive strategies to address their development needs, including multidimensional poverty indices, human development indices and indices for economic and environmental vulnerability. Special attention should be given to the environmental situation, as it directly affects living conditions and, in numerous cases, future economic growth prospects.

76. Member States may wish to consider integrating multidimensional measures of poverty and other country-specific contexts in order to more effectively assess and demonstrate the specific development needs and challenges faced by middle-income countries, including challenges in developing, gaining access to and adopting new technologies. A more nuanced classification of these development challenges, looking beyond the criterion of GDP per capita, will remain critical for guiding and strengthening development cooperation with, and support for, the middle-income countries, including support for flexible international technology transfer mechanisms, in order to boost investment, productivity and GDP growth and to avoid the middle-income trap.

77. Member States may wish to consider strengthening the scope of development cooperation with middle-income countries and creating enabling environments in those countries to attract domestic and foreign investments and boost productive capacities. Such an environment is critical for bridging the technology divide that hinders the growth prospects of many middle-income countries. There is a clear need for the sharing of knowledge and information on good practices, both among the middle-income countries and between those countries and other country groupings, to enable countries to develop the human capital necessary for attracting investments and stimulating innovation. Member States may also wish to explicitly consider their needs in terms of modern educational systems, forward-looking curricula and adaptive training systems, including provisions for lifelong learning, which are essential for building the human capital required for the adoption and use of advanced and frontier technologies.

78. Strengthening development cooperation with middle-income countries, including the necessary reforms in the ways in which the United Nations development system engages with middle-income countries, also requires that middle-income countries forge a consensus among themselves on a comprehensive long-term sustainable development strategy. The establishment of the Like-minded Group of Supporters of Middle-Income Countries in 2016 has created an additional opportunity and a platform for that purpose. Closer consultation of the United Nations development system with the Group is encouraged.

79. In 2018, the first high-level meeting on middle-income countries was held within the framework of the General Assembly to discuss the gaps and challenges those countries face in the implementation of the 2030 Agenda. The holding of regular high-level meetings on this subject would facilitate assessment of progress in development cooperation of the United Nations system with middle-income countries and the generation of recommendations supporting improvements in that regard.