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**Dialogue on the special theme for the first session of the
United Nations Habitat Assembly**

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Report of the Executive Director

Summary

The theme of the first session of the United Nations Habitat Assembly is “Innovation for better quality of life in cities and communities”. The theme has the sub-theme “Accelerated implementation of the New Urban Agenda towards achievement of the Sustainable Development Goals”.

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Contents

I. Introduction.....	3
A. Innovation as an accelerator of the quality of life in cities and communities	3
B. Facts and figures relating to innovation	3
C. Key commitments related to the New Urban Agenda and other global agreements	4
D. Secretary-General’s strategy on new technologies	4
II. Innovation for sustainable cities and communities: promising practices	4
A. Overview of innovation-related best practices at UN-Habitat	4
B. Innovation for reduced spatial inequality and poverty in communities across the urban-rural continuum.....	5
C. Innovation for enhanced shared prosperity of cities and regions	6
D. Innovation for strengthened climate action and an improved urban environment	7
E. Innovation for effective urban crisis prevention and response.....	8
III. Innovation as an institutional enabler	9
A. Approaches: innovation labs, incubators and accelerators	9
B. Monitoring and knowledge: innovative data systems	10
C. Advocacy, communication and partnerships	10
D. Innovation and capacity-building	11
E. Systems and processes	11
IV. Opportunities for expanding innovation in the work of UN-Habitat.....	12
A. Innovation through frontier technology	12
B. Social, economic and cultural innovations.....	12
C. Challenge-driven innovation.....	13
D. Vision of UN-Habitat as a centre of excellence and innovation for sustainable urban development	14
E. Key issues for discussion	14

I. Introduction

A. Innovation as an accelerator of the quality of life in cities and communities

1. Societies have regularly experienced intense periods of creation, imagining innovative ways to make life easier and using new approaches in order to progress. From the Stone Age to the Industrial Revolution to today's high-paced, constantly changing environment, values, beliefs, attitudes, actions and behaviours have been challenged and altered to enable innovation and change to take place and endure in cities and communities.

2. Innovation, in the context of sustainable urban development, may be defined as the activities and processes of creating and implementing new knowledge and solutions to improve living conditions for all.

3. Cities are the physical manifestation of history and culture and incubators of innovation, industry, technology, entrepreneurship and creativity. They drive national economies by creating prosperity, enhancing social development and providing employment, but they can also be breeding grounds for poverty, exclusion and environmental degradation.¹

4. Consequently, if the premise that the battle for achieving the Sustainable Development Goals will be won or lost in cities is to hold true, cities will have to continue to drive innovation in groundbreaking ways to achieve a lasting impact in communities and to ensure that no one is left behind, as envisaged in the 2030 Agenda for Sustainable Development.

5. The present report explores the theme of the first session of the UN-Habitat Assembly, "Innovation for better quality of life in cities and communities", with the sub-theme "Accelerated implementation of the New Urban Agenda towards achievement of the Sustainable Development Goals". It presents basic facts and figures on innovative approaches to sustainable urban development and also looks at promising practices with regard to innovation for sustainable cities and communities, innovation as an institutional enabler, and opportunities for expanding innovation in the work of UN-Habitat. Finally, it proposes key issues for discussion.

B. Facts and figures relating to innovation

6. The world is rapidly urbanizing. The year 2008 saw it reach the important milestone of more than half of its population living in urban areas, a figure that is expected to rise to 70 per cent by 2050. At the same time, the world is rapidly becoming more digital. In 2018, another important milestone was reached: more than 50 per cent of the world's population is now connected to the Internet. By the end of 2019, the number of mobile phone users is expected to reach 5 billion. The world we live in is both urban and digital, presenting opportunities for inclusion, efficiency and innovation. We should remember, however, that half the world's population remains unconnected and thus unable to participate in the digital economy in a meaningful way. Not surprisingly, most of the benefits of the digital revolution have been reaped by the educated and well connected, which has somewhat limited its impact.

7. The new digital economy, dubbed the "fourth industrial revolution" (World Economic Forum), built on data, reduced transaction costs and sharing platforms, is already having a profound effect in many parts of the world. According to the consulting firm McKinsey, an overwhelming majority of American businesses are already experiencing the impact of digitalization, and the gap between the most digitized and the remainder is growing, which in turn is having an impact on cities. According to some estimates, the smart cities' market could be worth as much as \$2.57 trillion by 2025.

8. In the Global Innovation Index, which assesses countries' institutions, research, infrastructure, markets, businesses, knowledge outputs and creative outputs, there is a strong correlation between innovation and income. The top 30 countries are all high-income, with the exception of China, which is in seventeenth place. The global innovation divide remains wide. However, the Index also identifies 20 countries, of which six are in sub-Saharan Africa, that, in terms of innovation, are overperforming relative to their level of development. Innovation clusters, often in cities, are essential for national innovation performance. However, official data on the existence and performance of clusters of innovation at the international level are often not available, while only a few Index indicators are readily available at the regional or city level for a large group of countries.

¹ UN-Habitat (2008), *State of the World's Cities 2010/11: Bridging the Urban Divide*, p. 11. Available at <file:///C:/Users/laevt/Downloads/State%20of%20the%20World%20Cities%2020102011%20-%20Cities%20for%20All%20Bridging%20the%20Urban%20Divide.pdf>.

C. Key commitments related to the New Urban Agenda and other global agreements

9. In the light of current trends and the realization that science, technology and innovation are crucial to fulfilling the promises of the 2030 Agenda, a number of global development frameworks, including the Sustainable Development Goals, the New Urban Agenda and the Paris Agreement under the United Nations Framework Convention on Climate Change, all include commitments with regard to science, technology and innovation.

10. For example, Sustainable Development Goal 17 calls for improved North-South, South-South and triangular regional and international cooperation in the areas of, and access to, science, technology and innovation and enhanced knowledge-sharing. It also calls for the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries. Innovation is also specifically mentioned in relation to other Sustainable Development Goals.

11. In the New Urban Agenda, innovation is mentioned as a particularly important factor in achieving sustainable and inclusive urban prosperity and in planning and managing urban spatial development. Implementation of the New Urban Agenda requires an enabling environment, including access to science, technology and innovation and the use by businesses of creativity and innovation to solve development challenges. Technological innovation is also important, including the production of national information and communications technology strategies and citizen-centric digital governance tools.

12. It is stated in article 10, paragraph 5 of the Paris Agreement that innovation is critical for an effective global response to climate change. According to United Nations Framework Convention on Climate Change Technology Executive Committee Brief 10, there is a pressing need to accelerate and strengthen innovation to deliver environmentally and socially sound technologies in order to achieve the goals of the Agreement. Harnessing technological innovation is crucial for countries to achieve the smooth implementation of their intended nationally determined contributions and national adaptation plans. A review of 190 intended contributions revealed that almost 140 countries highlighted the importance of climate technologies for meeting their targets.

D. United Nations Secretary-General's strategy on new technologies

13. Technological innovation is included in the reform of the United Nations System launched by the Secretary-General. In fact, a Strategy on New Technologies is at the centre of the reform with the objective "to define how the United Nations system will support the use of new technologies such as artificial intelligence, biotechnology, blockchain and robotics to accelerate the achievement of the 2030 Sustainable Development Agenda and to facilitate their alignment with the values enshrined in the UN Charter, the Universal Declaration of Human Rights, and the norms and standards of international law".

14. For UN-Habitat, this generates a renewed interest in the use of technological innovation in truly transforming cities as centres of growth of shared prosperity. What role will urban intelligence (use of artificial intelligence in cities to help make informed decisions) play in helping cities' leaders make more informed decisions and in creating feedback loops between communities and the urban environment?

15. How will technological innovations support the rise of smart cities or liveable cities that combine sustainable urban development with urban intelligence? How can cities become living laboratories for smart urban technologies that can handle all the major systems a city requires — water, transport, security, solid waste, green buildings and clean energy to improve quality of life for all? The answers to these questions drive UN-Habitat positioning in and contribution to the implementation of the United Nations system strategy on technological innovation. They are encapsulated in the UN-Habitat draft strategic plan for 2020–2025.

II. Innovation for sustainable cities and communities: promising practices

A. Overview of innovation-related best practices at UN-Habitat

16. A question central to the discussion on innovation is how best practices with regard to innovative approaches are influencing the development of sustainable cities and communities. At UN-

Habitat, best practices have been a long-standing modality of knowledge generation and sharing, which the work on innovation draws and builds upon.²

17. Award schemes have proved an effective way of raising awareness and harvesting well-documented best practices and innovations. The Dubai International Award, attributed by the municipality in partnership with UN-Habitat, has since its inception collected over 5,500 best practices from 150 countries. UN-Habitat works closely with other partners, including with Shanghai municipality through the annual *Shanghai Manual*,³ to identify and compile good practices that will identify new ways to accelerate results with regard to sustainable urbanization.

18. UN-Habitat is a global leader in the management of urban best practices by acquiring, creating, refining, documenting, transferring, sharing and catalysing the use of knowledge generated by these practices. The launch of the New Urban Agenda online platform during 2019 as a global platform for reporting progress on the implementation of the New Urban Agenda and the urban-related Sustainable Development Goals will advance the systematic access, sharing and uptake of best practices and policies by member States and partners.

B. Innovation for reduced spatial inequality and poverty in communities across the urban-rural continuum

19. As is noted in the draft strategic plan for 2020–2025, poverty and marginalization are often concentrated in specific locations and reflected in the lack of adequate housing, clean drinking water, sanitation, domestic energy, transport, health, education and public space. Inequality also persists within communities as women, youth and persons with disabilities often suffer intersectional discrimination and further marginalization. The work of UN-Habitat under this theme translates into three key outcome areas: (i) increased and equal access to basic services, sustainable mobility and public space; (ii) increased and secure access to land and adequate and affordable housing; and, (iii) effective settlements growth and regeneration.

20. Across these outcome areas, innovation to reduce spatial inequality and poverty can be categorized in three broad forms, illustrated in the following examples:

(a) ***Innovation in processes of engagement*** and ensuring that the voices of marginalized groups are heard in policy formulation, policy implementation and monitoring at global, regional, national and local levels. A good example of this at the local level is the agency's work on urban planning and design which has demonstrated in several locations how participatory approaches can be effectively used in urban extensions and regeneration to reduce spatial exclusion and inequality. The Colonia Doctores project in Mexico City, for instance, focuses on recreating an attractive, equal and sustainable neighbourhood through reinvigorating investment in housing and infrastructure, using urban guidelines, spatial quality parameters, public space plans, a strong vision for mobility and the coupling of public and private investments, underpinned by robust stakeholder engagement processes. The Future Cities Programme funded by the United Kingdom has also introduced innovative participatory processes in 19 cities across ten countries, to develop city profiles and identify priority infrastructure investments which would benefit the widest cross-section of the community and inform development choices in such a way that they work for all.

(b) ***Innovation in the use of data and evidence for decision-making***, including the creative combination of quantitative and qualitative data and metrics and the use of geospatial data, big data, etc. In the sphere of housing, UN-Habitat has designed a decision support tool to promote the use of sustainable building materials and construction technologies for public and private social housing providers collectively trying to solve the problem of urban housing shortages in countries such as India. Similarly, an assessment tool has been developed to plan for urban regeneration and slum upgrading based on a standard of affordability, which involves the incremental transformation of neighbourhoods and cities in line with the needs and domestic resources of the poorest and their capacity to contribute. This approach maintains the principles of social mix, mixed use, cultural diversity, heritage, sustainable densities with adequate public spaces, access to sustainable mobility and climate adaptation, with a people-centred focus, at the forefront of the urban transformation process.

² Governing Council resolution HSP/GC/26/CPR.10, para. 7, highlights this mandate and encourages member States, at the twenty-seventh session of the Governing Council, to share best practices regarding the early implementation of the New Urban Agenda.

³ See, for example, *Shanghai Manual 2017: A Guide for Sustainable Urban Development in the Twenty-First Century*, available at <http://www.urbanoctober.org/2017/downloads/ShanghaiManual2017AnnualReport.pdf>.

(c) ***Innovation in the deployment of frontier technologies for participation, planning, data analytics and modelling, scenario-building, etc.*** Mapping and analysing urban space through remote sensing, crowdsourcing and Big Data, as well as games, virtual reality and other visualization techniques, hold great promise for community participation in urban planning and design. The UN-Habitat Global Public Space Programme uses technologies such as Kobo Toolbox for mapping spaces and the Minecraft video game as a participatory tool for upgrading public spaces. The innovative use of Minecraft — a computer game with over 154 million copies sold — has been particularly lauded as an enjoyable and transformative way of using a video game to encourage dialogue between different groups and give vulnerable groups a voice, making it easier to communicate their interests and ideas to improve their own lives. To date, it has been used in nearly 100 projects in 30 countries and territories, including Nigeria, Kenya, South Africa, Ethiopia, Peru, Mexico, Haiti, Nepal, Bangladesh, India, China and Kosovo. The SHERPA app is an easy-to-use self-evaluation app for project managers, communities and other stakeholders involved in the planning, design, construction and assessment of housing projects. The tool, developed by UN-Habitat, is available in English, French and Spanish. UN-Habitat also collaborated with the start-up Multimer to conduct studies to collect, visualize and analyse geolocated biosensor data in Nairobi and Kuala Lumpur. Local cyclists were equipped with heart-rate wristband monitors and brainwave headbands. The data and resulting maps illustrate the stress and relaxation levels of cyclists on different roads and can provide transport planners and decision makers with information to provide enhanced street designs based on human signals.

C. Innovation for enhanced shared prosperity of cities and regions

21. The city and the overall concept of the “urban” have evolved over time, changing in terms of size, form, attributes and functionalities. This evolution has been shaped by a new economic geography, distance, regional interdependencies, connectivity, human, financial and merchandise flows, innovation and the use of technology that have created much larger and interconnected geographic entities. In these transformations, cities have reached a crossroads in which diversification, creativity, idea-based solutions, placemaking, arts and culture, talented human capital and frontier technologies are playing an increasingly important role.⁴ Indeed, as illustrated in the UN-Habitat draft strategic plan for 2020–2025, the following three outcome areas are fundamental to securing a brighter “cities and regions” future: (i) improved spatial connectivity and productivity; (ii) enhanced locally generated revenues that are more equitably distributed; and (iii) expanded deployment and extended use of frontier technologies.

22. In terms of innovating for spatial connectivity and productivity, the UN-Habitat analysis of the causes and effects of city growth and prosperity through the City Prosperity Index shows that connectivity is a cornerstone of regional growth and development. It maximizes local comparative advantages, unlocks the potential of production networks and value chains and shapes different forms of regional integration.

23. Connectivity concerns not only transport infrastructure, but also the development of corridors involving business, transport, information and communication technology, energy, people and knowledge networks. It should not be limited to specific sectors and demarcated areas, but instead form an integrated whole that encompasses rural and urban areas, thereby reinforcing functional and interconnected territories.⁵ Connected cities and regions act as nodes where global and regional flows of people, capital, goods and information combine and commingle, resulting in faster economic growth. Connectivity plays an increased role in the creation and distribution of prosperity far beyond their specific areas, frequently contributing to the reduction of rural poverty.⁶ Innovation for spatial connectivity requires the support of legal, institutional and regulatory frameworks and new forms of governance.

24. With respect to innovations to enhance locally generated revenue that is more equitably distributed, connected cities and regions present a number of well-identified specific risks: poor urban/regional planning, territorial disparities, lack of coordination and deficient coping strategies in the face of social and fiscal disparities. Although these affect the entire population, the bulk of the

⁴ Florida International University Miami Creative City Initiative (2016), *Miami’s Great Inflection: Towards Shared Prosperity as a Creative and Inclusive Global City*. Available at https://www.creativeclass.com/_wp/wp-content/uploads/2016/06/FIU_Miamis_Great_Inflection_Web1.pdf.

⁵ Economic and Social Commission for Asia and the Pacific (2014), *Regional Connectivity for Shared Prosperity*. Available at <https://www.unescap.org/resources/regional-connectivity-shared-prosperity>.

⁶ UN-Habitat (2014), *State of the World’s Cities 2012/2013: Prosperity of Cities*. Available at <https://sustainabledevelopment.un.org/content/documents/745habitat.pdf>.

risks fall disproportionately on the poor. Many cities, however, face serious financial constraints on making an adequate response to these challenges and are unable to deliver their development agenda and enhance the quality of life for all.

25. Innovative financing mechanisms and novel approaches to raising and spending funds are needed, including blended finance, impact investment, public-private partnerships, borrowing and bond issuances. New schemes such as the C40 Cities Finance Facility and Climate Adaptation Finance offer novel opportunities for funding. Country/city ownership, multi-stakeholder partnership and higher accountability and transparency are critical in the use of these funds.⁷

26. In terms of the deployment and extended use of frontier technologies, innovations and technological developments have primarily occurred in cities and contributed to societal development and prosperity. Increased interest has surged in the potential of novel frontier technologies that can expand digital connectivity, diversify and expand the range of online availability, reduce costs and increase accessibility and the delivery of goods and services. Frontier technologies can also bring new opportunities for the use of energy and natural resources, enable more efficient transportation at a lower cost and more effectively connect producers and consumers through digital platforms, thereby enabling frontier technologies to reshape the economy and expand the opportunities for shared prosperity.

27. Whether frontier technologies are globally new or simply replicated and applied to local contexts, they require skills and capacities to manage high levels of risk and uncertainty and make sustainable development a reality by improving people's lives, promoting prosperity and protecting the planet.⁸

D. Innovation for strengthened climate action and an improved urban environment

28. Innovation is emerging as an important area of focus in the UN-Habitat draft strategic plan for 2020–2025, notably in three outcome areas: (i) reduced greenhouse gas emissions and improved air quality; (ii) improved resource efficiency and protection of ecological assets; and (iii) effective adaptation of communities and infrastructure to climate change.

29. As is illustrated below, innovation to strengthen climate action and improve urban environment can take multiple forms across these outcome areas.

30. With the almost universal adoption of the Paris Agreement in 2015, countries have set ambitious goals for climate change mitigation and adaptation. The Paris Agreement highlights the central importance of innovation with respect to meeting the many challenges posed by climate change. The need for collaborative approaches to spur “innovation to solving sustainable development challenges” is also highlighted in the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the New Urban Agenda.

31. Several technical solutions for tackling the challenges posed by climate variation already exist. Nevertheless, better instruments are needed for upscaling, replicating and working together for implementation. Challenges associated with innovation include lack of funding, inability to scale innovations to a wider market, lack of adequate skill sets and inability of businesses and institutions to take risks.

32. UN-Habitat has been increasingly requested by member States and development partners to help spur urban innovation. UN-Habitat has been implementing several initiatives on innovative climate action, including the encouragement and deployment of new innovative technologies as part of the work on climate-smart cities, low carbon transport and air quality, rolling out and testing innovative approaches to monitoring emissions, urban planning or scaling up viable innovations in the climate-compatible slum upgrading.

33. In Kenya, UN-Habitat, in collaboration with UN Environment, Ericsson and the national Government, piloted innovative low-cost technologies to monitor air quality and measure the impact of a three-day street closure of inner-city streets in Kiambu and Nairobi County. The results of the analysis illustrated that average pollution levels were nearly halved. The availability of such data provides an understanding of air quality levels and their health impact, but also guides future policy and planning efforts towards more sustainable transport systems. UN-Habitat and the University of Nairobi set up a Start-up Innovation Hub with funding from the German Government. The Hub supports mobility start-ups from Africa in accelerating their early growth by providing coaching and

⁷ UN-Habitat draft strategic plan for the period 2020–2025 (HSP/HA/1/7).

⁸ Ibid.

mentoring. Six start-ups have been accepted into the Hub and are developing ways to make public transport more convenient and reduce pollution and emissions through the uptake of electric mobility.

34. In New York City, UN-Habitat exhibited the Ecological Living Module (ELM), a self-sufficient “tiny house”, to pioneer new smart building technologies and demonstrate strategies for residential construction that provide high-quality, efficient and flexible housing while enhancing sustainable development. Solar energy meets the power needs of the four occupants, potable water is harvested from humid air, a purification system provides good indoor air quality and increases the microbiome diversity, and a micro-farming wall grows fruit and vegetables. The overall performance of the Module is monitored via a sensor network and data display.

35. UN-Habitat updated the Master Plan in Belmopan, the capital of Belize, for it to grow and develop into a resilient and sustainable city. As part of this planning process UN-Habitat and the city council organized a public design studio where citizens were invited to design the central square with the help of virtual reality software; the contest attracted over 100 young citizens designing a new green, lively centre for the city.

36. In Honiara, Solomon Islands, UN-Habitat deployed drones and mobile applications for household surveying for improved capture of climate change risks and vulnerabilities in remote and informal settlements, helping the Government of this Small Island State to better protect its citizens from climate change.

37. Yakutsk, Russia, is one of a number of cities where UN-Habitat is leading innovative efforts for urban resilience profiling. Some of the indicators are gathered through satellite data, not only analysing the last 40 years, but also identifying trends for a further 90 years.

38. In the Philippines, UN-Habitat supports five cities in the development of neighbourhood-level innovative climate-resilient design solutions. Outcomes from this initiative will inform the national land use planning framework and capacity development of planners.

39. In Ouagadougou, Burkina Faso, UN-Habitat pioneered the transfer of low-carbon technology to an informal settlement context, now providing cost-saving services and green job opportunities to slum residents in a drive to spur economic development and technology. At the same time, UN-Habitat is delivering pro-poor livelihood improvements, building adaptive capacities and constructing concrete adaptation infrastructure in informal settlements in conjunction with the Adaptation Fund, pioneering innovative ways to mobilize international climate finance for pro-poor climate resilience building.

E. Innovation for effective urban crisis prevention and response

40. The New Urban Agenda recognizes the full potential of well managed urbanization to prevent, prepare for and respond better to urban crises and to result in more inclusive, sustainable and resilient cities. There is a particular opportunity in crisis moments to restore cities and countries to a more sustainable urbanization and a consequent development trajectory, with a view to achieving the Sustainable Development Goals. As new urban approaches are being developed to prevent, prepare for and respond better to urban crises, innovation plays a key role. Areas of innovation along three outcome areas include (i) enhanced social integration and inclusive communities; (ii) improved living standards and inclusion of migrants, displaced populations and returnees through effective crisis response and recovery; and (iii) enhanced resilience of the built environment and infrastructure.

41. In relation to enhanced social integration and inclusive communities, social and spatial inequality and insecurity can trigger unrest in cities and lead to conflict. The UN-Habitat *City Profile of Mosul, Iraq: A City under Siege* (2016), maps the correlation of spatial inequality and violent extremism. Innovative use of technology plays an increasing role in providing granular urban spatial analysis for policymaking, facilitating direct support to vulnerable people and strengthening community engagement in efforts to foster social cohesion, as illustrated in the examples below.

42. Local knowledge can be crowdsourced using mobile apps that link key word descriptions from users, georeferencing and official data to enable local authorities and other actors to more effectively formulate targeted interventions to reduce spatial inequalities and safety concerns. Data-sharing mechanisms linking emergency rooms, local authorities and police have also helped target and reduce violent crime. Mobile-phone-based cash transfers have improved the implementation and reach of social safety nets and, coupled with biometric data on vulnerable persons, improved aid effectiveness in crisis contexts. Gaming technology, such as Minecraft, has also been used to enhance social cohesion and this approach is increasingly applied in refugee/host community settings to foster such cohesion.

43. With respect to improved living standards and inclusion of migrants, refugees, internally displaced persons (IDPs) and returnees through effective crisis response and recovery, it is a fact that more than a billion people globally are migrants and almost 258 million⁹ live outside their own countries. Sixty per cent of the 14.4 million refugees worldwide and 80 per cent of the 38 million IDPs reside in urban areas.¹⁰ However, as cities often fail to cope with rapid population surges, innovative approaches that link systemic urban development challenges with durable solutions provide an increasingly important entry point in urban displacement crises.

44. The UN-Habitat city profiles, through spatial analysis of the impact of crisis on urban infrastructure, public services, local economy and housing, identify priority locations and sectors for action and systemic issues that need to be addressed. For example, in Iraq, the *Initial Planning Framework for the Reconstruction of Mosul* provided a comprehensive framework to outline priority recovery projects and programmes and offered a range of legal, urban planning and coordination tools. The initiative builds on a growing recognition that humanitarian, development and peacebuilding efforts are complementary and need to reinforce each other within a nexus to respond to volatile situations and repeated crises such as those suffered by Iraqis. In Lebanon, injecting highly skilled local capacity into unions of municipalities by establishing regional technical offices enabled mayors to respond better to the needs of refugee and host communities. In Ethiopia, options being explored to deal with barriers to the formal economy by using existing industrial parks legislation to create business development zones in peri-urban areas will increase job opportunities for IDPs, urban migrants and the urban poor. In Somalia, fast-tracking city and regional planning, land registration and municipal finance will contribute to durable solutions for IDP populations and start providing economic and social development dividends associated with better planned urbanization.

45. Enhanced resilience of the built environment and infrastructure means that the ability of cities to maintain continuity through all shocks and stresses while positively adapting and transforming towards sustainability depends on planning and acting to prepare for and respond to all hazards, whether sudden or slow-onset, expected or unexpected. Large-scale programmes such as the 100 Resilient Cities programme (pioneered by the Rockefeller Foundation) and the Making Cities Resilient campaign (United Nations Office for Disaster Risk Reduction) are providing important platforms for the transfer of knowledge, tools and experience. Innovative approaches to mainstreaming urban resilience into national and city development plans are made possible by urban analytical tools such as the UN-Habitat City Resilience Profiling Programme, which measures and identifies actions to reduce multi-hazard impacts, including those associated with climate change. Technology, ranging from early warning systems to devices used during construction to monitor quality, to the use of drones to periodically inspect buildings, is playing an ever-increasing role in the implementation of urban resilience actions.

III. Innovation as an institutional enabler

A. Approaches: innovation labs, incubators and accelerators

46. Over the years, UN-Habitat has introduced several innovative approaches and practices to enable institutions to improve collaboration, incubate and test new ideas and establish new ways of working.

47. The Urban Planning and Design Lab brings together different stakeholders as well as UN-Habitat in-house expertise, setting up multidisciplinary teams to develop and implement transformational projects in cities. Design thinking is applied as an iterative approach in which projects are defined and refined together with relevant stakeholders. Bringing together experts in the realms of urban planning, governance, resilience, transport, urban data and finance generates new tools and normative outputs that can be replicated and scaled. Technology and data approaches are tested to visualize and assess new interdependencies in cities for better plans and decision-making. Urban Labs are incubators that facilitate the creation of similar setups embedded in local authorities to guide urban development and support better integrated urban management.

48. Similarly, UN-Habitat Housing Studios are platforms for the co-creation and acceleration of affordable housing which is tailored to local contexts and budgets, finance institutions and construction techniques. They have been implemented using a South-South cooperation approach and

⁹ <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml>.

¹⁰ UN-Habitat (2017), *Habitat III Issue Papers*, Issue Paper II: Migrants and refugees in urban areas. Available at <http://habitat3.org/wp-content/uploads/Habitat-III-Issue-Papers-report.pdf>.

paying special attention to social issues, while making the best out of state-of-the-art innovations in technology, architecture and engineering.

49. UN-Habitat has also supported the establishment of the Transformative Urban Mobility Accelerator, an innovation and incubation hub for mobility start-ups, at the University of Nairobi and funded by the Transformative Urban Mobility Initiative. The Accelerator supports start-ups from Africa in accelerating early stage growth by providing coaching, mentoring and know-how. The first cohort of six start-ups was admitted into the Accelerator in December 2018 and solutions to make access to public transport more safe and convenient are being developed.

50. Finally, the Global Land Tool Network supports capacity development in cities through practical, interactive learning exchanges and practical training for key stakeholders and implementers, focusing on fit-for-purpose land administration through innovative land tools and approaches, with development of action plans and (where feasible) provision of follow-up implementation support. During 2018, 36 learning events were held, training 1,178 participants from more than 40 countries.

B. Monitoring and knowledge: innovative data systems

51. The data revolution is transforming society. Innovative data systems, digital sharing platforms, cloud visualization and real-time data mechanisms provide unprecedented power to understand, analyse and ultimately change the world we live in. It is estimated that 90 per cent of the data in the world have been created in the last five years. Digital technologies make it possible to leverage new sources of data and information and to develop new approaches for data collection, management, processing and dissemination.

52. Many cities lack adequate basic data or are formulating policies without clear information. It is estimated that only 1 per cent of “big data” is analysed at the city level. Moreover, the use of abundant and complex sets of information is becoming a negative externality in decision-making for a number of local and national governments and stakeholders, particularly when these data are poorly connected to city diagnosis, the preparation of action plans, the use of best practices, and the monitoring of results and impacts of these policies.

53. Innovative data mechanisms need to be linked to training to promote access, interpretation and use. They require standards, clear formats, validation mechanisms and adequate platforms to achieve better communication and use of information.

54. The UN-Habitat practice of innovation and technology for urban monitoring is bound to advance several potential applications and adoption of new technologies, processes and partnerships. This includes slum mapping and identification as part of the monitoring of urban Sustainable Development Goals, the development of an online platform and digital application for capturing and reporting urban data for the global development agendas, the use of a mobile-based reporting tool to improve data capture and quality from frontline providers and the use of innovative geospatial technologies for monitoring urban trends and disaggregating information to ensure that no place and no one is left behind. Innovative data digital systems herald prosperity and development, but bridging the digital divide is crucial if we want to achieve prosperity for all.

C. Advocacy, communication and partnerships

55. Urbanization can be a transformative force for enhanced economic growth, productivity and sustainable development. This requires huge financial investment, unleashing of untapped resources, more focused cooperation and collaboration within the United Nations System and among multiple stakeholders in the public and private domains. The 2030 Agenda for Sustainable Development, the New Urban Agenda and the Addis Ababa Action Agenda on Financing for Development identify a key role for the private sector in realizing Sustainable Development Goals and urban development. Emphasis is placed on innovative investment opportunities as well as on public, personal and private-sector partnerships.

56. Some estimates suggest a housing affordability gap of \$650 billion per year, or 1 per cent of global GDP. It is projected that to replace today’s substandard housing and build the additional units needed by 2025 would require an investment of \$9 trillion for construction alone. An even larger investment is needed to address sustainable development efforts in urban areas, with infrastructure demands alone requiring up to \$5.4 trillion in annual investment over the lifespan of the Sustainable Development Goals. Despite a growing awareness of this need, the level of investments targeting sustainable growth across the world’s cities is alarmingly low.

57. UN-Habitat is determined to scale up the engagement of the private sector, drawing support to accelerate the implementation of the Sustainable Development Goals.

58. Social media are changing quickly, and not only the usual media. Facebook and Twitter live are particularly useful for interactions as they can include live question sessions and demonstrations. Ted Talks are also an effective way to reach local communities, stimulate discussion and share innovative ideas.

59. The rapidly developing digital communications climate provides ample opportunity for increased message effectiveness and efficiency including applications that analyse social media or websites. Other tools allow several platforms to be managed in one place by using calendar and planning tools and analytical functions for reporting and strategic direction.

60. Targeted advertising, with the two dominant players being Google and Facebook, is one of the most disruptive recent developments in communication, enabling the delivery of tailored messages to more and more specific target audiences while steadily decreasing the attractiveness of non-targeted advertising.

61. One of the most accessible tools is the smartphone, generally equipped with a video camera and immediate video editing and publishing capabilities via third-party applications.

D. Innovation and capacity-building

62. Whether innovation is supporting work on (i) spatial inequality and poverty reduction, (ii) shared prosperity of cities and regions, (iii) climate action and urban environment, or (iv) urban crisis prevention and response, it must be underpinned by capacity-building. Indeed, the capacity of individuals and institutions to understand and use innovative technologies and methods in the design, planning and implementation of projects and overall operations is a key aspect of harnessing the full potential of digitalization.

63. UN-Habitat uses innovative capacity-building approaches and tools to enhance the knowledge and skills of its staff and the wider public. This includes the adoption of online interactive learning tools and various learning platforms, such as Lynda and the Global Urban Lectures Series. The latter is a readily available online knowledge and skills development product, now in its fifth season. Used by more than 160,000 users in more than 65 countries, the series has been named the second-best Massive Open Online Course focusing on cities.

64. Capacity-building initiatives around the world are increasingly introducing computer-based tools and advanced methods which draw on information technology and advanced technology in analysing and learning from best practice as well as case study-based education in order to promote systemic innovations that are impacting the way cities are governed and managed. Cities such as Singapore, Seoul, Jakarta, Hamburg and Auckland have adopted approaches that draw on capacity-building and connect innovations, digital technology and citizen participation in order to build inclusive and sustainable cities.

65. An example of capacity-building supporting innovative solutions is demonstrated by the development of a mobile phone application by UN-Habitat, in collaboration with Brazilian start-up Colab, in a project being implemented in cooperation with the United Nations Economic Commission for Latin America and the Caribbean, local governments and non-governmental organizations in cities in Brazil, Bolivia and Peru. It is an innovative participatory channel and an accountability tool for monitoring and reporting on the New Urban Agenda and Sustainability Development Goal 11 which facilitates engagement between citizens and local municipalities in Brazil. Nearly 10,000 citizens in 804 cities in Brazil have adopted the innovative tool for city-wide public consultations. The results from the data collected during the period between October 2018 and February 2019 unequivocally reveal the shortcomings in urban policies.

E. Systems and processes

66. The introduction of innovation into an organization's systems and processes can improve productivity, reduce cost, increase delivery efficiency and introduce new partnerships and relationships.

67. Digital transformation plays a fundamental role in bringing innovative solutions to the delivery of an organization's mandate and work plans through supporting knowledge management systems, facilitating collaboration and communication, supporting advocacy events and activities, streamlining workflows and business processes and supporting management in informed decision-making.

68. For example, the integration of new blockchain frontier technology within an organization's process is reducing transactional costs, removing middleman level approvals and delays, making the transaction more transparent between participants and allowing the penetration of new communities which previously did not have access because of these barriers.

69. In common with other organizations, UN-Habitat is involved in programme management and implementation, urban policies development, research and capacity-building and dissemination of knowledge which has been accumulated through over 30 years of experience on urban issues. Artificial intelligence and other digital tools can transform how knowledge is captured, developed and disseminated. It makes capturing and sharing vast amounts of results and knowledge across the organization and with its external partners more efficient and effective.

70. Moreover, using the concept of digital diffusion, it is important that innovation and digital transformations are adopted by all partners and communities involved with sustainable cities and communities, not just a select few, in order to boost efficiency and productivity. Action will be needed by all actors and partners in the urban development domain to overcome innovation adoption barriers.

IV. Opportunities for expanding innovation in the work of UN-Habitat

A. Innovation through frontier technology

71. Without appropriate policies, frontier technologies can also produce greater inequality, increase social dislocations and endanger human rights. For frontier technologies to make an effective contribution to urban sustainability, they need to be applied in an appropriate manner to ensure that the opportunities for prosperity they bring are shared among citizens, cities and regions.

72. Some of this work has already begun. UN-Habitat is a member of the Cities for Digital Rights Coalition which calls for human rights principles such as privacy, freedom of expression and democracy to be considered by cities implementing digital platforms. In 2017, UN-Habitat produced the Rwanda Smart City Master Plan. In 2016, plans for a new public transport system in Nairobi were prepared using data collected by smartphones. Since 2012, UN-Habitat has been using digital technologies to give citizens in more than 30 countries a strong voice in public space design projects.

73. UN-Habitat has also established some partnerships in this field, including with the International Telecommunication Union (ITU), United Cities and Local Governments, the Smart Africa Alliance and the Smart LATAM Alliance. UN-Habitat is also working directly with the Governments of Egypt, the United Arab Emirates, Saudi Arabia and the Republic of Korea on future cities and smart cities strategies. UN-Habitat has partnered with private sector companies such as Microsoft, Huawei and Ericsson and is a member of ITU and the United for Smart Sustainable Cities' initiative led by the United Nations Economic Commission for Europe; it is co-chair of the ITU Internet of Things and Smart Cities standardization group. Plans are under way to establish a Chinese private sector council to advise on best practices for urban technology deployments.

74. UN-Habitat is also establishing partnerships with countries such as Mauritius which are using Public-Private Partnerships in innovative ways to respond to challenges and issues pertaining to sustainability, social inclusion and economic resilience through intelligent public transport, smart cities and special urban economic zones.

75. However, UN-Habitat could play a much stronger role as an objective voice in this field, which is still very much private sector-led, for example by creating multi-stakeholder smart cities platforms that develop norms and standards that link smart city technologies to urban fundamentals; strategic advisory services to national and local governments undergoing digital transformation as well as to private sector technology companies to develop technology that is more responsive to the needs of small and medium-sized cities as well as underserved neighbourhoods and the urban poor. UN-Habitat can also continue working on effective implementation, by producing smart city strategies and masterplans and implementing projects that integrate technologies for example.

B. Social, economic and cultural innovations

76. In the search for better quality of life and prosperity, community-led innovations have a clear role to play in improving conditions for local populations in the ways in which they live, work, move, relax and more generally make the most of the urban advantage.¹¹

¹¹ UN-Habitat (2014), *State of the World's Cities 2012/2013: Prosperity of Cities*.

77. The work of UN-Habitat work is inspired by a number of transformational innovative community-led approaches documented globally, including:

- (a) In Papua New Guinea, community groups utilized participatory visual media to bridge communication gaps between themselves and government agencies to drive social change and address gender-based violence, an extreme form of gender inequality.¹²
- (b) In Nigeria, the Urban Community-Led Total Sanitation movement is implementing a local government area-wide approach to accelerate access to improve sanitation, hygiene and water. This is an innovative solution that has freed more than 1,654 communities from open defecation and benefited over 1.15 million people with improved sanitary latrines.¹³
- (c) In Victoria, British Columbia, Canada, local communities are developing innovative approaches to improve access to local transport and in North London in the United Kingdom, the Barnet Community Transport is providing safe, accessible and reliable community transport to local residents in the surrounding area, managing their own fleet of vehicles.¹⁴
- (d) Community-driven innovative entrepreneurial ideas in Chile are connecting rural and urban areas and in so doing are diversifying the economy and decreasing spatial disparities.

78. Almost by definition, community-driven innovations seem to result from cooperation and dialogue. In many cases, they are incremental solutions when they leverage local knowledge practices and resources and more radical innovations when they leverage non-local knowledge sources. In most circumstances, innovation is both a process and a result, which requires development models that are adaptable and flexible with respect to the community's needs and result from a local creative capital in view of improving quality of life in cities and communities by accelerating the implementation of the New Urban Agenda and the achievement of the Sustainable Development Goals.

C. Challenge-driven innovation

79. Challenge-driven innovation is a method for testing, identifying and implementing innovative solutions by using prizes or rewards to induce innovators to solve problems. Through the process it is possible to attract the interest of innovators with the right knowledge and expertise.

80. In recent years, national and local governments, development agencies and multilateral institutions, including UN-Habitat, have started using challenge-driven innovation processes to solve pressing problems. The United States National Aeronautics and Space Administration regularly crowdsources innovative solutions from students, citizen inventors and entrepreneurial firms for technologies such as lunar landers, space elevators, fuel-efficient aircraft and astronaut gloves. The India Smart City Challenge takes a challenge-driven approach to select cities for funding for urban regeneration and retrofitting. Nesta's Flying High Challenge works with local governments in the United Kingdom to explore the future of urban drones and drone systems. The UN-Habitat Innovate Kenya Counties Challenge used challenge prizes to connect Kenyan counties with youth innovators.

81. Through the strategic use of challenge-driven innovation processes, UN-Habitat and partners can work with national and local governments to identify innovative solutions to urban challenges related to spatial inequality, urban prosperity, climate change and urban crises. The methodology can bring together and create multi-stakeholder partnerships and steer the innovation capacity of the private sector, including start-ups, towards working with problems that come directly from cities. UN-Habitat is developing three new challenges: the Affordable Distributed Energy Challenge, the Africa Smart Cities Challenge and the Smart and Safe Cities Challenge.

¹² Thomas V., Kauli J., Borrey A. (2018), Harnessing community-led innovations: the role of participatory media in addressing gender-based violence. Available at <https://www.tandfonline.com/doi/abs/10.1080/09614524.2018.1430748>.

¹³ UNICEF (2010), *Community-Led Total Sanitation in Nigeria: Case Studies*. Available at <http://gahp.net/wp-content/uploads/2017/10/Institute-for-Development-Studies-Community-Led-Total-Sanitation-in-Nigeria-Case-studies-.pdf>.

¹⁴ Kotecha M., Davies M., Miscampbell G. and others (2017), *What Works: Successful Community Transport*, Research Institute Report No. 7. Available at <http://www.powertochange.org.uk/wp-content/uploads/2017/06/Research-Report-7-Transport-DIGITAL.pdf>.

D. Vision of UN-Habitat as a centre of excellence and innovation for sustainable urban development

82. UN-Habitat is repositioning itself as a major global entity, a centre of excellence and innovation. It is refocusing on its niche as the thought leader and go-to agency that sets the global discourse and agenda on sustainable urban development, drives political discussions, generates specialized and cutting-edge knowledge, shapes technical norms, principles and standards and acts as a multiplier in the exchange of knowledge, experience and best practices in getting cities and human settlements right.

83. Prosperity and the sustainable transformation of cities and regions are driven by the ability of decision makers to understand and use data to guide policies and strategies. In this regard, to play an increasingly important role as a centre of excellence, UN-Habitat is using spatial, economic, social and environmental data to generate knowledge that will influence sustainable urban development policies and strategies at the national and local levels. At the core of the work of UN-Habitat is an increasingly important use and management of digital data flows and knowledge (information capturing, transfer via systems, synthesis and analysis, information to action).

84. The investment of UN-Habitat in knowledge generation and management is grounded in the understanding that lasting impact in the lives of people around the world can be achieved through the uptake by countries and cities of state-of-the-art norms, standards, guidelines in the areas of sustainable urban development, in response to the 2030 Agenda promise of leaving no one and no place behind. Innovation and contextual approaches that take into account local circumstances are fundamental to the interventions of UN-Habitat.

85. UN-Habitat will leverage its focal point role in the United Nations system and the convening power of urban stakeholders, including local authority organizations and academia, to catalyse North-South, South-South, triangular and regional collaboration on innovative approaches to improve quality of life in cities and communities. UN-Habitat will enhance its role as the agent of innovation and change at the national, subregional and regional levels, within a reformed and strengthened United Nations development system, to accelerate the adoption of innovation and assess its impact.

E. Key issues for discussion

86. The prosperity of cities and regions is not an accident. It comes from a clear vision and planning, leadership, effective institutional coordination, adequate implementation and the measurement of results, as well as sustainable use of innovative and smart solutions. To effectively use innovation to improve quality of life in cities and communities and accelerate implementation of the New Urban Agenda and the Sustainable Development Goals, a number of issues need to be considered at the global, national and local levels, including:

- (a) How can cities become living laboratories for smart urban technologies that can handle all the major systems a city requires — water, transport, security, solid waste, green buildings and clean energy — to improve quality of life for all?
- (b) What are the national requirements for countries to create an environment that encourages innovative solutions to issues of spatial inequality and poverty, prosperity of cities and regions, climate action and crisis in urban settings?
- (c) How should national institutions be reinforced so that they are better able to integrate new knowledge and solutions into established systems in the communities they serve?
- (d) What could be the role of UN-Habitat in engaging with actors in the smart cities field to ensure that the smart city vision becomes more inclusive and moves beyond the unsustainable new town approach that has emerged, towards a city vision that is compact, connected and sustainable?
- (e) What role could UN-Habitat play in assessing and advising on the innovation capacity of cities around the world?