

ITUCBS SANTO DOMINGO**2018**

Global ICT Capacity Building Symposium
18 to 20 June 2018
Santo Domingo, Dominican Republic

FINAL REPORT



INTRODUCTION

1. The 2018 Global ICT Capacity Building Symposium (CBS 2018) took place in Santo Domingo, Dominican Republic, from 18 to 20 June 2018. It was organized by the International Telecommunication Union and hosted by Indotel.
2. The theme of the Symposium was “Developing Skills for the Digital Economy and Society”.
3. The Symposium attracted around 331 participants from 36 countries, public and private organizations, universities and research institutions, and other regional and international organizations.
4. The work of CBS 2018 was conducted under the chairmanship of Mr Fabricio Gómez Mazara, Member of the Board of Directors, INDOTEL. The outcomes of the Symposium are expected to provide strategic guidance to the national and international community, including ITU, on capacity building in the field of ICT, and on strengthening collaboration among the global ICT capacity building community.
5. Further information, including the agenda, the presentation slides, media information, the list of participants, and photos are available at <https://www.itu.int/en/ITU-D/Capacity-Building/Pages/events/CBS/2018/default.aspx>.

MONDAY, 20 JUNE 2018

Opening ceremony

6. The Global ICT Capacity Building Symposium (CBS 2018) was officially opened by H.E. Dr Margarita Cedeño de Fernandez, Vice-President of the Dominican Republic. Also participating in the opening ceremony were H.E. Mr Miguel Vargas Maldonado, Minister of Foreign Affairs of the Dominican Republic, H.E. Dr Alejandrina Germán, Minister of Higher Education, Science and Technology of the Dominican Republic, H.E. Ms Robianny Balcacer, Minister of Youth of the Dominican Republic, Mr Luis Henry Molina, President of INDOTEL, and Mr Brahim Sanou, Director of the ITU Telecommunication Development Bureau (BDT).
7. The Guest of Honour, H.E. Dr Margarita Cedeño de Fernandez cautioned that digital technology could widen the digital divide to include the social divide if we do not guard against social inequality. She emphasized the need to develop digital entrepreneurship as a focus of attention. She thanked ITU for creating a public forum for discussing such critical issues as capacity building in the digital era.
8. The President of INDOTEL, Mr Molina urged developing countries to move away from being passive receivers and consumers of digital products and services to active creators of content so as to fully participate in the information and knowledge society. He spoke of the efforts being undertaken in the Dominican Republic under the Digital Republic initiative, towards creating a digital economy and society.
9. The BDT Director, Mr Brahim Sanou emphasized the importance of developing digital skills in order to enable people to leverage the new digital tools. He noted that ICTs were a powerful tool to achieve the 2030 Agenda for Sustainable Development.

Skills requirements for the digital transformation

10. In setting the scene for the Symposium, the drivers of the digital transformation were highlighted, namely Internet of things (IoT), big data and artificial intelligence. These digital technologies will be characterized by the disruption they will cause to many sectors of the economy, such as manufacturing and services sectors. Furthermore, the nature of jobs will change as automation, robots, and artificial intelligence will take over certain tasks. Man and machines will complement each other.
11. These drivers will need different types of 21st-century skills, capabilities and attributes, characterized by hard-to-teach intangibles such as emotional intelligence, curiosity, creativity, adaptability, resilience and critical thinking. Organizations will demand specialized knowledge and expertise from its workforce. Capacity building will need to take into account the skills requirements of these drivers of the digital economy.
12. Some research findings were presented, which showed some of the changes in jobs and skills sets in the digital era, including the following:
 - 58% of organizations need employees with specialized knowledge and experience.
 - Both hard and soft skills will be essential for future careers.
 - In the United States, social skills will be required in 83% of the jobs, analytical skills will be required in 77% of the jobs, while physical skills will be required in only 18% of the jobs.
 - Employment growth will be higher in jobs with social and analytical skills.

- STEM occupations are expected to have the highest growth rates, with computer occupations having by far the highest jobs growth.
- People express more worry than optimism about future automation.
- Knowledge of computers, social dexterity, communications skills and access to training are perceived as key to success.

These findings call for a reorientation in the thinking about the jobs of the future and the skills sets they will require.

13. The disruption that takes place in the economic sectors and the demand for new and different sets of skills will also spill over into the higher education system. Some are predicting the end of the University monopoly in terms of the credentials and value of the degree as we know it today. Lifelong learning will become crucial and different skills and competencies will be required at different stations in life.
14. Panelists raised key questions regarding ethics and values regarding AI. It is not enough to address what artificial intelligence and machines *can* do, but there is need to also address what AI *should* do. Not everything that is utility-maximizing is necessarily better. This discussion on values needs to take place starting at the design stage because values affect design and values guide the future. This means that engineers need the knowledge and tools to include ethical and societal values - such as sustainability, safety, privacy and fairness - into the design of new products and technologies. It is not enough just to possess technical skills for AI developers, but also business and ethical skills. Ethics in design should be guided by three criteria, namely Accountability, Responsibility, and Transparency (ART). Harnessing the positive potential outcomes of AI in the digital economy and society is what has driven the current discussion and debates on “AI for Good “.
15. The session also discussed the future world of work, highlighting the fact that while the digital world of work created opportunities in terms of the new jobs and professions, it also creates risks of creating greater inequalities and exploitation. For example, on one hand, research has established that as many as 20% of jobs are predicted to disappear completely, while at least one third of the tasks in 60% of the occupations will be automated. On the other hand, the digital world of work will create many Non-Standard Employment (NSE). The types of work for NSEs are temporary, part time or on call work, disguised employment and multi-party employment relationships. These are jobs with low income, no security and no on-the-job training and basically no rights or bargaining power. These challenges call for greater policy frameworks that embrace the technological gains of the digital economy and balance them with the imperatives for workforce protection. There is also need to redefine the labour market systems to incorporate lifelong learning and personal development. Education and training systems also need to be redesigned to develop people with the competencies needed for the jobs of the future.
16. In the ensuing discussions, delegates noted the need to reflect on whether the discussions on emerging technologies carry the same relevance to all countries, developing and developed. It was highlighted that some technological developments may be here and now in some countries, while in other countries those developments may still be in the future.
17. Delegates further urged Governments to ensure that the necessary infrastructure for ICTs is available to enable high-quality, affordable access and effective use of ICTs.

Policy implications for achieving the SDGs in a digital world

18. The policy session noted that ICTs are an integral part of the digital economy and they cut across all the 17 Sustainable Development Goals (SDGs). It was therefore critical to integrate ICTs in the development of sectoral policies to ensure the success of the 2030 Agenda for Sustainable Development. Development work undertaken by agencies such as UNDP was guided by the SDG goals. Countries were therefore urged to develop national digital policies and to align them to the achievement of the SDGs.
19. The digital economy and society requires digital citizens, where everyone has the necessary skills to participate in the economy and access digital tools and services. In order to achieve this, the Session emphasized the need to integrate ICTs into the education policies so that students who graduate from the education system have acquired the necessary skills to use digital tools.
20. During the session, delegates were informed of the work that UNESCO is doing to influence national Governments to incorporate ICTs into their Education policies in order to produce graduates from the education system that are ready for the digital economy. UNESCO being the main UN agency for education, is supporting their member states to develop ICT in education policies and master plans, and ensuring that these are aligned with national priorities. They have also developed the UNESCO ICT in Education Toolkit, which is used by education policy makers, planners and practitioners to formulate, plan and evaluate education. Capacity building is undertaken through a global ICT in Education Policy Platform where national and regional workshops are conducted.
21. One panelist spoke of efforts undertaken within the Caribbean community countries (CARICOM) towards the formulation of a Single ICT Space Policy. This contribution highlighted the critical role of capacity building in the implementation of the Single ICT Space Policy.
22. The delegates were informed of how in Argentina the Government through the Ministry of Education has embarked on an initiative to promote the participation of Universities in ICT activities as a way of fast tracking development of knowledge and skills towards a digital economy and society. The initiative brings universities, Government and the private sector together to encourage networking and innovation for the benefit of developing the country as a whole. Through this initiative, the Government of Argentina pursued the following objectives:
 - Promotion of STEM careers within the country.
 - Teaching about International Organizations related to ICTs in Universities.
 - Articulating the participation of Universities in ITU.
23. A project funded by the Argentine Government was signed with ITU wherein 23 universities were sponsored to participate in the work of ITU. As a result more than 15 Argentinian Universities are Academia Associates, two are part of the ITU Centres of Excellence network, and Argentinian Universities have participated in the activities of the three ITU sectors such as ITU Study Groups, Academia events, and the World Summit on the Information Society (WSIS) Forum.
24. Delegates noted that the big challenge to integrating ICTs in schools is the availability of ICT infrastructure in schools. Delegates further noted that ICT is a world of shared responsibilities, and solutions should come from different parties and players making their contributions. It was proposed that community networks can be a good solution for the provision of connectivity in a sustainable way, as was the case in some communities in the Americas region. Another example is the concept of Youth Ambassadors and Youth networks that was promoted within the Caribbean Community (CARICOM).

25. Delegates noted the following as key takeaway points: the need to adopt a multi sectoral and multi-disciplinary approach to incorporate ICTs into policy formulation to achieve SDGs; and the need to build human and institutional capacity to avoid creating a digital and data divide.

Innovative approaches to teaching and learning: the role of academic institutions in building a workforce fit for purpose

26. The session noted that the digital economy is changing the skills requirements of the workforce, and because of that, there was a need to adapt the learning environment and learning curriculum to respond to these new skills requirements. It was acknowledged that in addition to job-related technical skills, there is also a need for business and entrepreneurial skills such as, creative thinking, problem-solving and team working skills. This will become increasingly more important as robots get smarter and take over some of the technical work that humans are currently doing. In a digital economy characterized by big data, skills in how to use this data (data coding) and how to verify it, become critical.
27. The panelists noted that the traditional college or University system concentrates too much on preparing for jobs and not enough on also mentoring own-account business leaders. Further University recruitment and selection processes and the streamlining of students into some faculties narrowed their career options. Institutions need to adopt greater multi-disciplinary approaches, cross-faculty teaching, research-based assignments and combined delivery programmes in order to meet the requirements of work life in the era of the 4th Industrial Revolution.
28. The session acknowledged that in order for universities to produce graduates that fit the digital economy, they need to adapt their teaching and learning style and curriculum design to suit the needs of the digital environment. Universities need to transition from Education 1.0 (which is the traditional learning), to Education 4.0 (which is focused on innovation). Delegates were taken through a case study of Chulalongkorn University, Thailand, where the Education 4.0 model is already in practice.
29. A different model of learning was presented, which aims to produce graduates for the digital economy faster and cheaper than the traditional model of Professor-centred University learning. Based on a case study of the Africa Leadership University, the model is designed to address the looming workforce demands of the African continent in the next 15 years or so. The learning experience is focused on deep engagement, experiential learning, and peer-to-peer-learning and student ownership. Lectures are essentially banned. This type of learning is centred on problem solving innovations, and is anchored on the students fully owning their learning, growth and personal development. The clear message was that learning should not be based on a one- size- fits-all model, which is what the traditional lecture-based learning suggests.
30. Panelists noted that learning needs to be more focused on the needs of the workplace and designed to co-create solutions that address the real challenges being faced. An example given was the MIT World Education Lab that was launched to transform education in a sustainable way. This learning provides research-driven insights and tools that help individuals and organizations to develop the skills they need to thrive in the modern economy. It focuses on ongoing and new research linked to the community of global leading global companies and MIT educational products and service.
31. Panelists expressed the view that change in academic mindset was needed to think outside the box in dealing with the emerging challenges of skills development for the digital economy. This mindset change would include embracing new models and methods of learning, and the need to adapt school and University curriculum to accommodate these new teaching and learning methodologies.

32. A presentation was shared on how a university in the Dominican Republic, INTEC, is adapting its learning environment to build competencies needed for the new digital economic order. The University identifies the major challenges facing the Dominican Republic, and then tailoring the University system to respond to these unique challenges. The University focuses on developing an innovation capacity and designing an innovation curriculum that responds to these national challenges. Using this approach, the University has been able to design some ground breaking ICT innovations. The University also has a very high employment index for its graduates.
33. Universities were urged to undertake strategic planning and informed forecasting within their administrations in order to be relevant for the 4th Industrial Revolution. Based on research over the past 20 years, panelists were taken through the critical areas of change required to meet the needs of students, communities and the wider society globally. This reform was based on the recognition that the landscape is constantly changing and that many new jobs of the future are as yet unknown.
34. There is need to establish a continuing curriculum reform based on skills that incorporate humanistic fundamentals, as well as applying more flexibility in readapting curricula. Further, there is need to stimulate research and innovation capacities. Universities must realize that they are an essential actor in the national innovation system and as such, should act as incubators of new discoveries. They therefore need to transform their curricula to deliver training in new areas such as entrepreneurship and innovation, business and science ethics. Finally, education needs to be more personalized instead of one system for all.
35. The delegates urged Governments to act as catalysts for change and reform in universities as most of these institutions are funded by Governments.

TUESDAY, 19 JUNE 2018

Leveraging partnerships in capacity building for the digital era

36. The delegates took note of the fact that developing digital skills at the scale of an entire economy and society is a task that requires the involvement and participation of different stakeholders. Key among these stakeholders were Governments at the national, regional or international levels, private sector, academia, development agencies, non-governmental organizations and community organizations. At an individual level, people can participate in skills development by sharing their knowledge and skills in particular areas.
37. ITU took the opportunity of this session to launch the second edition of the ITU publication “Capacity Building in a Changing ICT Environment”. This publication is an example of partnerships in capacity building because it is made up of contributions by academic scholars and other experts interested in sharing their knowledge in the various areas of their expertise. The second edition of the publication focuses on digital skills for the digital era, and features six authored articles. ITU invited experts to express their interest in contributing to future editions of the publication. During the launch, some of the contributors presented their articles and highlighted key learning and capacity building issues highlighted in their articles. The articles for which presentations were made were:
 - “Emerging trends and technologies in ICT and capacity building challenges”.
 - “Teaching in the digital era: perspectives from personal experience”.
 - “Emerging practices in smart learning across diverse cultural communities: a global analysis”.
 - The full publication is available at https://academy.itu.int/index.php?option=com_content&view=article&layout=edit&id=236&lang=en.

38. Following the launch of the publication, a number of other ITU capacity building partners discussed their experiences in working with ITU to implement some capacity building programmes.
39. The representative of CISCO spoke on the partnership between ITU and CISCO, which has been running since 2003. A key element of that partnership is the Internet Training Centre initiative (ITCI), through which thousands of people have been trained and acquired skills that they have used to find employment or entered the IT sector. CISCO highlighted the need to transform capacity building to go beyond the traditional and historical target groups of policymakers and regulators, and reach out to communities at large who do not need to know or understand the technologies but are keen to use the technology to better their lives. Basic skills training in ICTs have to be targeted at wider communities who need to be encouraged to use these ICTs. Training-of-trainers' programmes can assist to reach larger populations in shorter periods.
40. The representative of INATEL, Brazil, spoke on the contributions of ITU Centres of Excellence to capacity building
41. The representative of the International Telecommunication Satellite Organization (ITSO) spoke on the capacity building cooperation between ITSO and ITU. Satellite communication is an access tool, and with up to 4 billion people in the world without access, satellite is the only solution for those living in areas difficult to access. The ITU-ITSO training course has been running for the past 8 years, and to date more than 1500 people have been trained. The training targets mostly policymakers and regulators.
42. Delegates noted that one of the biggest challenges in capacity building was to measure the impact of training. Measuring impact of training would motivate industry and governments to invest in training.
43. ITU highlighted that the current partnerships were being reviewed to deepen and broaden their scope and to ensure they are relevant to the current challenges. The broad areas covered by the capacity building partnerships were in the development of training materials, the delivery of training programmes, co-organizing knowledge sharing forums and events, as well as the provision of financial, material and expert resources for the implementation of capacity building programmes. Partnerships can be built around any and all of these areas, based on shared interests.
44. It was highlighted during discussions that by its very nature, capacity development within the digital ecosystem inherently suits a partnership approach. Different parties bring to the table different resources, based on their different interest and capacities.
45. Delegates were informed that the challenge to build capacity for the digital economy and society is huge, and ITU is open to new partnerships according to the needs and interests of the prospective partners.
46. Delegates noted that ITU plays an important role in facilitating and coordinating partnerships for capacity development in the ICT sector to enhance digital skills, drawing from the rich resources and expertise of its membership. ITU was urged to continue playing this role and bring together key stakeholders and establish synergies in capacity development initiatives in order to achieve the greatest impact.
47. ITU was further urged to continue to facilitate knowledge creation and exchange for skill development in the digital economy. Working with academic institutions is critical in this respect. Publications such as "Capacity building in a changing ICT environment" are valuable inputs to enhance knowledge and an excellent example of collaboration with academia.
48. Delegates noted with appreciation the capacity development work being undertaken by ITU under the umbrella of ITU Academy, and urged ITU to continue supporting countries in training, especially the least developed countries.

Challenges and opportunities faced by LDCs, SIDS and LLDCs and implications for capacity development

49. Delegates acknowledged that small island developing states (SIDS), landlocked developing countries (LLDCs) and the least developed countries (LDCs) have unique challenges when it comes to digital development, and these challenges pose a real danger in that these countries and their people may be excluded from participating in and benefiting from the global digital economy and society.
50. The session opened with the findings of the thematic report on “ICTs, LDCs and the SDGs: Achieving universal and affordable Internet in the LDCs” which was produced by ITU and the Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), and launched in January 2018. This report analyzes ICT developments in the LDCs and tracks progress towards achievement of the SDGs, using a three-dimensional framework which looks at access, affordability and skills.
51. One of the key findings of this report is that digital skills are closely linked to educational attainment, which highlights the importance of school enrolment and investing in national education. Therefore, investing in education and skills increases Internet uptake. Delegates noted that these findings reinforced the link between education and digital inclusion which was noted in the discussion on integrating ICTs in the education curricula.
52. The session was followed by presentations on the challenges to digital inclusion of SIDS and LDCs in the Caribbean and the Asia-Pacific regions. First is the lack of connectivity. Due to geographical dispersion, connectivity is mainly through satellite and without link to the global backbone. For example, only 5 countries (out of 22) in the Pacific have so far established submarine fiber cable access to the global backbone. The other challenge is the small size of the island markets, making it unattractive for the private sector to invest in ICT infrastructure. In addition to the infrastructural challenges, levels of ICT skills are low. In the Caribbean region, limitations to the creation of a digital economy were similar, covering lack of submarine cable access, low levels of technical literacy, geographic dispersion, and lack of enabling policy and regulatory frameworks. In addition to these challenges, there was a lack of investment opportunities in the digital infrastructure in the region. There is also absence of policy support and brain drain from the region.
53. Capacity building is critical to support these countries in establishing regulatory regimes to address digital challenges such as e-waste, and preparation of national roadmaps through broad consultation.
54. Delegates were informed of some of the training and capacity building initiatives undertaken in some countries as they try to address their digital skills gaps. In Haiti, a project is being implemented showcasing how digital skills can be developed in a resource-constrained environment. The objective of the project is to create enabling conditions for young Haitians, especially women, to find employment in the digital economy. The project entailed providing the digital infrastructure to promote Internet development in Haiti, providing the digital skills through training, and then involving partners for scale and sustainability. The training is provided through an online and blended model and mobile-based methods. Although this project is still in its infancy, there are observations indicating an uptake of digital knowledge and skills among the participants.
55. Panelists recommended a multi-stakeholder approach as the best solution to digital skills development in these regions. Different stakeholders need to work together to provide the necessary infrastructure to support a digital economy and integrate these regions to the global digital grid. A regional harmonized approach should be applied in defining policies and strategies in order to overcome these challenges. Public and private partnerships are essential for social and economic development and the promotion of the digital economy in these regions.

56. To encourage capacity building and skills development in these countries, solid solutions and investments in e-learning need to be encouraged. New learning solutions are required to support these countries but such solutions need to take into account constraints in terms of bandwidth. These solutions should also accommodate appropriate learning methodologies such as blended learning.
57. It was highlighted that to encourage regional collaboration in the Caribbean region, countries could participate more actively in regional bodies such as CITEC for the Americas where similar problems are discussed and common regional visions are adopted. This is in line with the harmonized regional approach that was already recommended.
58. The symposium delegates called on the international community and development agencies to support SIDS, LLDCs and LDCs to develop their digital infrastructures and digital skills in order to ensure they participate fully in the digital economy.

Identifying core skills required for the digital economy

59. The session looked at a number of core technology areas associated with the future digital economy and around which skills will need to be developed. It brought together representatives from industry and academia to discuss these core areas and the skills required for them, and explore what is being done to address these skills needs. The new technologies driving the digital technologies include AI, IoT, and cybersecurity and data science. As a result skills are required such as IoT developers, data analysts, distributed and networked systems analysts and cybersecurity experts. In addition, the topic of Internet governance and related skills requirements was considered.
60. IoT as a discipline is now being taught in a number of universities. Although there is learning in the scientific/technology topics covering this discipline, there are four other core skills that are needed in the IoT field. These are: deep systems understanding; ability to grasp new systems and programming languages quickly; awareness for security, privacy and human-computer interaction; and “learning how to learn”. Learning must therefore be flexible, hands-on, and continuous.
61. Another important core area in the digital economy is data science. The teaching of data science is systematic, covering understanding of the different types of data, identifying the appropriate problems to which the data can be applied and the ethical issues of data. This discipline requires its own set of skills, among them being: research skills, machine learning, hacking, as well as math and science. The danger, however, is that these skills can be used both for good and for bad purposes. Other skills sets necessary in learning data science are collaboration, team work, and hands-on practicals to learn by doing.
62. In a digitally connected world, digital security is an indispensable skill that needs to be developed because of the security threats that are posed by sharing the Internet. Digital security is the cornerstone of the digital economy. Predictions are that cybercrime will cost businesses 6 trillion US dollars annually by 2021, and that there will be 556 million victims per year, or 1.5 million victims per day. Therefore, companies that are able to attract and retain digital security talent will be much more successful in profiting from the digital opportunity and managing the digital security risk.
63. The digital security workforce gap is very wide, and is estimated to reach 1.8 million by 2022. Universities are challenged to respond and bridge this gap through delivering training that responds to the needs of the digital economy. A number of Universities are actively involved in delivering capacity building in this area.
64. There are various ways by which universities could be involved in dealing with the capacity building challenge for digital security. They could provide career guidance that direct prospective students into this growing area; adapt university programmes and curricula to the cyber-security job market; frequently update the content of the course materials to keep pace with this fast evolving demand;

define very clear digital security pathways that exist with this domain; and encourage women to take up courses and jobs in cybersecurity.

65. Panelists noted that increasingly new technologies such as AI and robotics are raising ethical questions, and thus the incorporation of ethics and values into the study and design of the new technologies and new products becomes necessary. Digital technologies should not be allowed to ignore or invade the space for human values that need to be protected. Academic institutions who carry out research and teach in these digital technologies were challenged to be on the frontline in the development of “responsible AI” to avoid a conflict between digital technologies and humanity.
66. Panelists from academic institutions shared their experiences in the implementation of training programmes and activities in these and other related areas such as cybersecurity and Internet governance. The Symposium noted that areas of training such as Internet governance, by nature require a multistakeholder approach due to the number of players involved and their diverse interests.
67. Panelists noted that learning new digital skills should now become a basic requirement for every student due to their critical nature in a digital economy. For example, data is the basis of the 4th industrial revolution, and as such data science has developed as a discipline. Accordingly, data dexterity should be a basic requirement for every student. This refers to the ability to identify different types of data; identify appropriate problems to which data can be applied; discuss issues around that data (including ethical issues), and then communicating the issues with respect to that data. Data science is therefore becoming a skills set. It was emphasized that data is now a resource, just like oil, but data knowledge is where the power lies.
68. It was noted that one of the challenges facing academia is that the digital technologies are changing rapidly, and the curriculum cannot keep pace with this change. New inventions and upgrades in technologies, such as sensors (the main drivers of IoT technologies), are so frequent that only a few months can be too long. This means that learning has to be continuous, and lifelong learning is becoming the norm in the digital environment.
69. The symposium noted that there is a strong need for academia and industry to work together to ensure that the development and delivery of skills in the new technologies keeps pace with the change in those technologies.

Developing skills for an inclusive digital society

70. The session recognized that the lack of digital skills is one of the key reasons why people are not using the Internet. Unless programmes are put in place to ensure that people have the skills to use digital tools, these people will not be able access services such as education, health or government services, among others, which will be provided increasingly via the Internet as a society becomes digital.
71. Available statistics indicate that 75% of global Internet users access the Internet through a mobile network only. However, despite the availability and increasing affordability of mobile Internet, many people in developing countries do not know how to use the Internet on their mobile phones. For this reason, some mobile operators had put in place some digital skills training programmes for their mobile phone users.
72. Digital skills can be broken down into three levels of classification: basic functional digital skills; generic digital skills; and the high-level digital skills. Different key stakeholders, such as mobile operators and Governments, can play a key role in building the skills for people falling into any of these groups.
73. Panelists highlighted the importance of putting in place digital inclusion programmes whose main focus is the development of digital skills among those who are not accessing digital services due to

lack of skills. Further, programmes should also be put in place to develop digital skills among marginalized groups in society such as the illiterate, the elderly, people with specific needs, rural communities and other less privileged communities.

74. One of the presentations discussed the emerging skills required to enable digital inclusion for persons with disabilities. Organizations need to have measurable ICT accessibility and show the importance of maintaining an inclusive workplace for both employees and customers with disabilities. There are training programmes to assist organizations design such workplace ICT accessibility solutions. Participants wishing to take these training programmes can participate online through self-paced training or MOOCs. There are also a number of publications and guidelines that can be used to build capacity on how to provide for disability accessibility. ITU has been involved in the development of some of the guidelines and policy frameworks for accessibility.
75. A number of digital inclusion projects and training programmes were presented during the session. One case study focused on an ICT training project for local indigenous people in Mexico. The identification of the training areas, project design and implementation, including the methodology of training, had the involvement of the communities themselves. This was a key component for the success of the project. At the end of the training, the community had a network of community technicians who were able to develop their own projects and solve local problems in areas such as Internet connectivity and community radios, among others.
76. Another project shared in the session was the training in digital skills of less privileged children from underserved communities in Nigeria to prepare them to participate in the digital economy. Children were trained in the development of skills such as coding, robotics digital fabrication, artificial intelligence and mobile app building. The children were taught how to develop mobile apps that are designed to solve local problems. So far, the project has reached 6000 children, of whom about 4000 are girls.
77. The Symposium noted that digital literacy and other digital skills development programmes are key elements of digital inclusion. Digital skills programmes at the community level stand a better chance of being successful if the communities themselves are involved in the design and implementation of those programmes, based on their unique needs and priorities.

WEDNESDAY, 20 JUNE 2018

Fostering entrepreneurship and innovation in the digital era

78. The session highlighted the importance of innovation as the main driver of the digital technological developments that are revolutionizing the state of industry as we know it today, including artificial intelligence, online streaming platforms, and mobile apps. For example, streaming has revolutionized the way people are accessing music, news and movies, and mobile apps are now our interface to the world. Commonalities in these innovations are that they are disruptive; they support businesses; their output is digital; and they have a global reach.
79. Innovation and Intellectual Property Rights (IPRs) go hand in hand. These rights protect an innovation from being used by other people for commercial purposes without the prior consent of the IP right holder. The existence of IP protection laws can therefore be seen as an incentive to encourage innovation.
80. The panelists stated that digital products and services created a huge market, which is also an opportunity for entrepreneurs to leverage on digital technologies to deliver those services.
81. The session provided an opportunity for young innovators to present their innovations and explain from a personal experience perspective the motivations behind being an entrepreneur and the skills

and competencies required to succeed as an entrepreneur. Given the high usage of ICTs among the younger generation, they have a greater appreciation of the role and contribution of ICT technologies and services to the digital economy.

82. One of the innovations was by an NGO, CodePhil, from the Philippines. CodePhil was established by undergraduate students at Columbia University and MIT. Their mission is to empower youth in rural Philippines through digital literacy skills and promote decent jobs for youth. This is because digital literacy skills coupled with complementary soft skills are considered essential to leaving no one behind in the digital future.
83. One of the skills they considered essential for the future are typing skills. To achieve this, they developed TypePhil, a free application, available both online and offline, which teaches students how to properly type on a keyboard using ten fingers. By the end of 2018, they hope to have 10,000+ unique, registered users on TypePhil, and are targeting to distribute their application at 1,000+ Tech4Ed centers and schools.
84. Another innovation that was showcased was by We Robotics. They create robots and drones based on a concept they call Flying Labs. They use robots to solve specific local needs for which robots may be a solution. For example, transportation of blood banks to rural clinics has been done using drones where the distance to a clinic was far and the terrain difficult. They then provide the hardware and software and training to the locals on how to use the robots.
85. The third innovation showcased is a start-up named MaeFloresta, which is co-founded by a young computer scientist (Universidad del Valle) in Colombia. Their start-up focused on software development and training in digital animation for children and teenagers. The platform that supports the training of their products is called TupiTube. The entrepreneurs behind this innovation want to grow the animation industry in developing countries, starting with Latin America. The biggest challenge, however, is breaking the cultural barrier in a society where animation and storytelling is not known as a learning tool. To change cultural perceptions, they have embarked on giving talks in schools about animation history and industry and bringing the topic to the classroom. They also hold animation contests and public performances and try to identify future talent.
86. The last innovation, called UjuziKilimo, is an agricultural innovation developed in Kenya that uses IoT, AI and data analytics to collect and analyze millions of data sets from satellites and field sensors on best ways to utilize resources like water and fertilizer. These data are then analyzed and the results supplied to farmers to give them actionable insights while enabling the agricultural industry deliver data driven services to them. This has resulted in Kenyan farmers using this innovation increasing their productivity and efficiency.
87. Some of the skills that were mentioned as key for entrepreneurs to become successful are technical skills, coupled with such soft skills as problem solving, decision making, collaboration, communication and leadership.
88. Delegates noted the importance of innovation and entrepreneurship as key drivers of growth and productivity in the digital economy. As digital technologies keep evolving, new challenges and opportunities emerge, and these generate a market for entrepreneurship to thrive, especially among the techno-savvy youth population.
89. It was noted that innovation is driven by people and therefore efforts should be concentrated on the development of human talent.
90. Delegates highlighted that key components for the development of digital skills for youth are equal access to digital literacy, resilient infrastructure, youth engagement in the policy design process, multistakeholder partnerships and the promotion of digital skills at both formal and informal levels.

91. Delegates urged Governments to create enabling environments for youth to develop their innovation and entrepreneurial skills, through establishing innovation hubs and start-up incubators to enable them to reach their full creative potential.

Presentation of awards

92. In this session, awards were given to the four innovators who presented their innovations during the Symposium, to recognize their efforts and contribution towards strengthening ICT skills. An award was also given to the event host, INDOTEL, for hosting the event.

Chair's summary conclusions

93. The Chairman of the Symposium, Mr Fabricio Gómez Mazara, Member of the Board of Directors, INDOTEL, presented his summary report of the Symposium. This report contained the Chairman's conclusions and recommendations. The summary report is available at <https://www.itu.int/en/ITU-D/Capacity-Building/Pages/events/CBS/2018/default.aspx>.

Closing ceremony

94. The Symposium closed with a video of the event highlights, as well as closing remarks by ITU and the host.